Licensed user:
Pondera Consult B.V.
Welbergweg 49
NL-7556 PE Hengelo
0031742489940

Calculated:
16/05/2019 10:18/3.2.712

PARK - Main Result

Calculation: HKW MER 10MW incl HKN&HKZ

Wake Model N.O. Jensen (EMD) : 2005
Include mirror wakes

Calculation performed in UTM (north)-WGS84 Zone: 31
At the site centre the difference between grid north and true north is: 2.2°

Power curve correction method
New windPRO method (adjusted IEC method, improved to match turbine control) <RECOMMENDED>
Air density calculation method
Fixed standard
Air density: 1.225 kg/m³ -> 100.0 % of Std

Wake Model Parameters

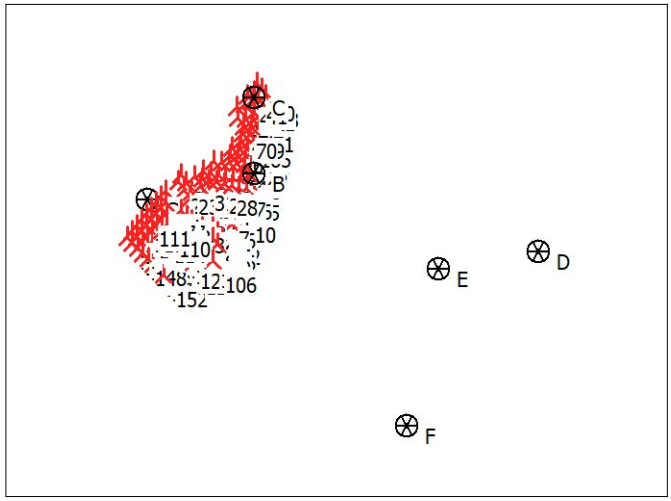
Terrain type	Wake decay constant
HH:100m Offshore	0.030

Omnidirectional displacement height from objects

Wake calculation settings

Angle [°]			Wind speed [m/s]		
start	end	step	start	end	step
0.5	360.0	1.0	0.5	30.5	1.0

WAsP version WAsP 11 Version 11.06.0028



Scale 1:1,000,000
New WTG Site Data

Key results for height 165.0 m above ground level

Terrain UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Name of wind distribution	Type	Wind energy [kWh/m²]	Mean wind speed [m/s]	Equivalent roughness
A	548,060	5,829,150	HKW-03	WAsP (WAsP 11 Version 11.06.0028)	10,182	10.5	0.0
B	558,112	5,839,246	HKW-04	WAsP (WAsP 11 Version 11.06.0028)	10,107	10.4	0.0
C	558,004	5,849,256	HKW-05	WAsP (WAsP 11 Version 11.06.0028)	10,182	10.5	0.0
D	596,112	5,829,642	OWEZ	WAsP (WAsP 11 Version 11.06.0028)	9,227	10.1	0.0
E	582,817	5,827,056	Prinses Amalia	WAsP (WAsP 11 Version 11.06.0028)	9,685	10.3	0.0
F	578,881	5,806,416	Luchterduinen	WAsP (WAsP 11 Version 11.06.0028)	9,489	10.2	0.0
G	543,967	5,835,763	HKW-02	WAsP (WAsP 11 Version 11.06.0028)	10,207	10.5	0.0

Calculated Annual Energy for Wind Farm

WTG combination	Result PARK [MWh/y]	GROSS (no loss) Free WTGs [MWh/y]	Wake loss [%]	Specific results¤) Capacity factor [%]	Mean WTG result [MWh/y]	Full load hours [Hours/year]	Mean wind speed @hub height [m/s]
Wind farm	7,825,659.2	8,545,929.8	8.4	58.7	51,484.6	5,148	9.9

¤) Based on wake reduced results, but no other losses included

Calculated Annual Energy for each of 152 new WTGs with total 1,520.0 MW rated power

Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Annual Energy Result [MWh/y]	Wake loss [%]	Free mean wind speed [m/s]
1 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,574.8	8.1	9.92
2 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	54,350.0	3.4	9.95
3 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,299.8	5.3	9.96
4 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,098.4	8.9	9.92
5 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,809.4	7.7	9.92
6 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,123.3	8.9	9.92
7 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,835.1	9.4	9.92
8 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,120.6	9.1	9.95
9 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,003.9	9.3	9.95
10 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,945.8	7.4	9.92
11 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,809.1	9.5	9.92
12 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,851.4	9.4	9.92
13 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,178.7	9.1	9.96
14 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,482.6	8.6	9.96
15 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,756.0	7.8	9.92

To be continued on next page...
*) Included in wake losses is influence from 355 WTG(s) in the neighborhood, which has status as "Reference WTGs", see separate report to identify these.

PARK - Main Result

Calculation: HKW MER 10MW incl HKN&HKZ

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Links	WTG Valid	type Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Annual Energy Result [MWh/y]	Wake loss [%]	Free mean wind speed [m/s]
16 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,023.0	9.1	9.92
17 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,101.2	8.9	9.92
18 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,417.9	8.7	9.96
19 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,957.6	7.7	9.96
20 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,513.4	10.0	9.92
21 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,512.1	10.0	9.92
22 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,138.6	9.2	9.96
23 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,018.4	7.6	9.96
24 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,995.9	5.9	9.96
25 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,879.2	7.6	9.92
26 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,023.7	9.1	9.92
27 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,763.0	9.5	9.92
28 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,396.1	10.2	9.92
29 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,278.8	10.4	9.92
30 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,446.3	10.1	9.92
31 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,942.5	9.2	9.92
32 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,088.9	7.5	9.96
33 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,574.1	8.1	9.92
34 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,838.5	9.4	9.92
35 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,687.4	9.7	9.92
36 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,579.7	9.9	9.92
37 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,698.0	9.7	9.92
38 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,953.9	9.2	9.92
39 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,912.5	7.5	9.92
40 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,177.0	5.5	9.95
41 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,890.1	6.0	9.95
42 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,544.2	4.8	9.95
43 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,233.3	5.4	9.95
44 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,473.6	6.7	9.95
45 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,595.7	6.5	9.95
46 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,968.0	5.8	9.95
47 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,886.2	4.2	9.95
48 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,632.9	8.0	9.92
49 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,984.0	9.1	9.92
50 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,940.6	9.2	9.92
51 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,183.1	8.8	9.92
52 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,680.6	7.9	9.92
53 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,453.2	6.5	9.92
54 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,386.0	8.4	9.92
55 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,591.7	9.8	9.92
56 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,762.2	9.5	9.92
57 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,468.5	8.3	9.92
58 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,409.2	8.4	9.92
59 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,750.9	9.6	9.92
60 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,145.8	8.9	9.92
61 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,114.6	7.1	9.92
62 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,449.5	8.3	9.92
63 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,846.4	9.4	9.92
64 B	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,704.6	7.9	9.92
65 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,703.8	8.1	9.95
66 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,255.8	8.9	9.95
67 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,151.8	7.3	9.95
68 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,823.5	7.9	9.95
69 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,371.0	8.7	9.95
70 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,231.5	7.2	9.95
71 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,041.4	7.5	9.95
72 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,639.8	8.2	9.95
73 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,229.7	7.2	9.95
74 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,366.4	5.1	9.95
75 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,442.1	6.8	9.95
76 C	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,195.5	7.2	9.95
77 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,900.0	6.0	9.96
78 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,181.7	9.0	9.95

To be continued on next page...

PARK - Main Result

Calculation: HKW MER 10MW incl HKN&HKZ

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Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Annual Energy Result [MWh/y]	Wake loss [%]	Free mean wind speed [m/s]
79 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,598.5	10.1	9.95
80 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,368.5	10.5	9.95
81 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,593.4	10.1	9.95
82 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,674.1	8.1	9.95
83 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,349.8	10.5	9.95
84 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,049.7	11.0	9.95
85 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,320.6	10.5	9.95
86 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,363.2	8.7	9.95
87 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,353.4	10.5	9.95
88 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,100.5	10.9	9.95
89 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,421.6	10.4	9.95
90 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,399.8	8.6	9.95
91 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,579.9	8.4	9.96
92 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,731.5	9.8	9.95
93 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,661.8	9.9	9.95
94 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,545.1	6.7	9.96
95 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,362.8	8.8	9.96
96 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,447.4	10.3	9.95
97 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,361.8	10.5	9.95
98 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,761.4	9.8	9.95
99 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,682.5	8.1	9.95
100 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,097.1	9.2	9.95
101 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,601.6	10.0	9.95
102 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,006.1	9.3	9.95
103 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,137.6	9.1	9.95
104 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,605.2	8.3	9.95
105 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,540.2	6.6	9.95
106 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,571.3	4.8	9.95
107 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,221.8	7.2	9.96
108 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,682.3	10.0	9.96
109 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,138.6	10.9	9.96
110 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,171.5	10.8	9.95
111 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,232.1	7.2	9.96
112 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,629.5	10.1	9.96
113 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,047.4	11.1	9.96
114 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	49,813.7	11.4	9.95
115 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,127.4	10.9	9.95
116 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,320.1	7.1	9.96
117 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,873.8	9.6	9.96
118 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,592.7	10.1	9.96
119 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,226.8	8.9	9.95
120 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,155.8	9.1	9.95
121 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,655.1	8.2	9.95
122 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,901.3	6.0	9.95
123 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,304.4	7.1	9.96
124 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,773.8	9.8	9.96
125 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,151.9	10.9	9.96
126 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	49,863.5	11.4	9.95
127 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	49,955.7	11.2	9.95
128 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,320.6	10.5	9.95
129 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,762.8	8.0	9.95
130 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,633.6	6.4	9.95
131 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,015.3	5.8	9.96
132 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,801.4	8.0	9.96
133 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,265.0	8.9	9.95
134 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,079.4	9.2	9.95
135 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,075.6	9.2	9.95
136 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,292.0	8.8	9.95
137 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,846.2	7.8	9.95
138 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,566.0	6.6	9.96
139 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,118.7	9.2	9.96
140 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,546.5	10.1	9.95
141 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,259.2	10.7	9.95

To be continued on next page...

PARK - Main Result

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Annual Energy Result [MWh/y]	Wake loss [%]	Free mean wind speed [m/s]
142 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,284.9	10.6	9.95
143 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	50,542.7	10.2	9.95
144 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	51,192.6	9.0	9.95
145 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	54,097.5	3.9	9.96
146 G	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,238.7	5.4	9.96
147 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,890.1	6.0	9.95
148 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,757.2	6.2	9.95
149 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	52,819.4	6.1	9.95
150 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,004.6	5.8	9.95
151 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,358.8	5.1	9.95
152 A	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	107.0	USER	V164 10 MW - HKN P-V curve	53,978.8	4.0	9.95

Annual Energy results do not include any losses apart from wake losses. For expected NET AEP (expected sold production), see report Loss & Uncertainty.

WTG siting

	UTM (north)-ETRS89 Zone: 31 Easting	Northing	Z [m]	Row data/Description
1 New	555,189	5,832,687	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7821)
2 New	558,356	5,851,237	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7824)
3 New	548,433	5,839,081	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7830)
4 New	552,768	5,836,211	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7832)
5 New	557,458	5,839,277	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7838)
6 New	555,372	5,833,658	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7825.1)
7 New	554,382	5,833,862	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7825.2)
8 New	551,413	5,834,475	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7826.1)
9 New	550,423	5,834,680	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7826.2)
10 New	556,544	5,834,424	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7828.1)
11 New	555,554	5,834,628	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7828.2)
12 New	554,565	5,834,832	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7828.3)
13 New	550,606	5,835,650	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7829.1)
14 New	549,617	5,835,855	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7829.2)
15 New	556,727	5,835,395	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7831.1)
16 New	555,737	5,835,599	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7831.2)
17 New	554,747	5,835,803	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7831.3)
18 New	549,799	5,836,825	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7833.1)
19 New	548,810	5,837,030	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7833.2)
20 New	552,951	5,837,181	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7834.1)
21 New	551,961	5,837,386	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7834.2)
22 New	550,972	5,837,591	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7834.3)
23 New	548,993	5,838,000	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7835.1)
24 New	548,003	5,838,206	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7835.2)
25 New	557,093	5,837,336	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7836.1)
26 New	556,103	5,837,539	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7836.2)
27 New	555,113	5,837,743	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7836.3)
28 New	554,123	5,837,947	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7836.4)
29 New	553,134	5,838,152	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7836.5)
30 New	552,144	5,838,356	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7836.6)
31 New	551,154	5,838,561	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7836.7)
32 New	550,165	5,838,766	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7836.8)
33 New	557,275	5,838,306	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7837.1)
34 New	556,286	5,838,510	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7837.2)
35 New	555,296	5,838,714	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7837.3)
36 New	554,306	5,838,918	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7837.4)
37 New	553,316	5,839,122	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7837.5)
38 New	552,327	5,839,326	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7837.6)
39 New	551,337	5,839,531	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7837.7)
40 New	558,898	5,850,398	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7851.1)
41 New	557,973	5,849,992	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7851.2)

To be continued on next page...

PARK - Main Result

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

UTM (north)-ETRS89 Zone: 31

		Easting	Northing	Z [m]	Row data/Description
42	New	557,047	5,849,587	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7851.3)
43	New	559,447	5,849,546	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7852.1)
44	New	558,517	5,849,149	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7852.2)
45	New	557,588	5,848,752	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7852.3)
46	New	556,659	5,848,355	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7852.4)
47	New	555,730	5,847,958	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7852.5)
48	New	557,733	5,840,520	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7921.1)
49	New	556,724	5,840,587	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7921.2)
50	New	555,716	5,840,654	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7921.3)
51	New	554,708	5,840,722	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7921.4)
52	New	553,700	5,840,790	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7921.5)
53	New	552,691	5,840,858	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7921.6)
54	New	557,915	5,841,490	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7922.1)
55	New	556,907	5,841,558	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7922.2)
56	New	555,899	5,841,625	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7922.3)
57	New	554,890	5,841,693	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7922.4)
58	New	558,098	5,842,461	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7923.1)
59	New	557,090	5,842,528	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7923.2)
60	New	556,081	5,842,595	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7923.3)
61	New	555,073	5,842,663	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7923.4)
62	New	558,280	5,843,432	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7924.1)
63	New	557,272	5,843,499	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7924.2)
64	New	556,264	5,843,566	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7924.3)
65	New	558,463	5,844,402	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7925.1)
66	New	557,455	5,844,469	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7925.2)
67	New	556,446	5,844,536	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7925.3)
68	New	558,646	5,845,373	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7926.1)
69	New	557,637	5,845,440	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7926.2)
70	New	556,629	5,845,507	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7926.3)
71	New	558,828	5,846,343	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7927.1)
72	New	557,820	5,846,410	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7927.2)
73	New	556,812	5,846,477	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7927.3)
74	New	555,803	5,846,545	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7927.4)
75	New	559,011	5,847,314	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7928.1)
76	New	558,002	5,847,381	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7928.2)
77	New	546,343	5,836,860	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7962)
78	New	548,599	5,831,417	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7969)
79	New	552,534	5,833,584	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7959.1)
80	New	553,239	5,832,897	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7959.2)
81	New	553,943	5,832,209	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7959.3)
82	New	554,647	5,831,522	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7959.4)
83	New	551,901	5,832,814	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7961.1)
84	New	552,605	5,832,127	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7961.2)
85	New	553,310	5,831,439	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7961.3)
86	New	554,014	5,830,752	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7961.4)
87	New	551,244	5,832,079	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7964.1)
88	New	551,948	5,831,391	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7964.2)
89	New	552,652	5,830,704	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7964.3)
90	New	553,357	5,830,017	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7964.4)
91	New	548,458	5,834,332	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7963.1)
92	New	549,162	5,833,645	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7963.2)
93	New	549,865	5,832,957	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7963.3)
94	New	545,710	5,836,091	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7965.1)
95	New	546,414	5,835,403	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7965.2)
96	New	550,588	5,831,309	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7967.1)
97	New	551,292	5,830,621	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7967.2)
98	New	551,996	5,829,934	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7967.3)
99	New	552,700	5,829,246	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7967.4)
100	New	548,528	5,832,875	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7966.1)
101	New	549,232	5,832,187	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7966.2)
102	New	549,931	5,830,562	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7970.1)
103	New	550,635	5,829,874	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7970.2)
104	New	551,339	5,829,187	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7970.3)
105	New	552,042	5,828,499	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7970.4)

To be continued on next page...

PARK - Main Result

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

		UTM (north)-ETRS89 Zone: 31			
		Easting	Northing	Z [m]	Row data/Description
106	New	552,747	5,827,812	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7970.5)
107	New	544,445	5,834,553	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7971.1)
108	New	545,148	5,833,864	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7971.2)
109	New	545,851	5,833,176	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7971.3)
110	New	546,554	5,832,488	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7971.4)
111	New	543,812	5,833,784	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7972.1)
112	New	544,515	5,833,095	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7972.2)
113	New	545,218	5,832,407	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7972.3)
114	New	545,921	5,831,718	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7972.4)
115	New	546,624	5,831,030	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7972.5)
116	New	545,078	5,835,322	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7968.1)
117	New	545,781	5,834,634	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7968.2)
118	New	546,484	5,833,945	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7968.3)
119	New	548,031	5,829,653	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7973.1)
120	New	548,735	5,828,966	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7973.2)
121	New	549,438	5,828,278	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7973.3)
122	New	550,142	5,827,590	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7973.4)
123	New	543,179	5,833,014	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7974.1)
124	New	543,882	5,832,326	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7974.2)
125	New	544,585	5,831,637	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7974.3)
126	New	545,288	5,830,949	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7974.4)
127	New	545,991	5,830,260	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7974.5)
128	New	546,695	5,829,572	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7974.6)
129	New	548,101	5,828,195	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7975.1)
130	New	548,805	5,827,508	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7975.2)
131	New	541,914	5,831,476	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7977.1)
132	New	542,617	5,830,787	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7977.2)
133	New	543,319	5,830,099	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7977.3)
134	New	544,022	5,829,410	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7977.4)
135	New	544,725	5,828,721	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7977.5)
136	New	545,428	5,828,033	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7977.6)
137	New	546,131	5,827,344	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7977.7)
138	New	542,547	5,832,245	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7976.1)
139	New	543,249	5,831,557	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7976.2)
140	New	543,952	5,830,868	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7976.3)
141	New	544,655	5,830,179	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7976.4)
142	New	545,358	5,829,491	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7976.5)
143	New	546,061	5,828,802	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7976.6)
144	New	546,764	5,828,114	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7976.7)
145	New	541,281	5,830,707	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7978.1)
146	New	541,984	5,830,018	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7978.2)
147	New	542,687	5,829,329	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7978.3)
148	New	543,389	5,828,641	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7978.4)
149	New	544,092	5,827,952	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7978.5)
150	New	544,795	5,827,263	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7978.6)
151	New	545,498	5,826,575	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7978.7)
152	New	546,201	5,825,886	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 107.0 m (TOT: 189.0 m) (7978.8)

PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

Wake Model N.O. Jensen (EMD) : 2005
Include mirror wakes

Calculation performed in UTM (north)-WGS84 Zone: 31
At the site centre the difference between grid north and true north is: 2.2°

Power curve correction method
New windPRO method (adjusted IEC method, improved to match turbine control) <RECOMMENDED>
Air density calculation method
Fixed standard
Air density: 1.225 kg/m³ -> 100.0 % of Std

Wake Model Parameters

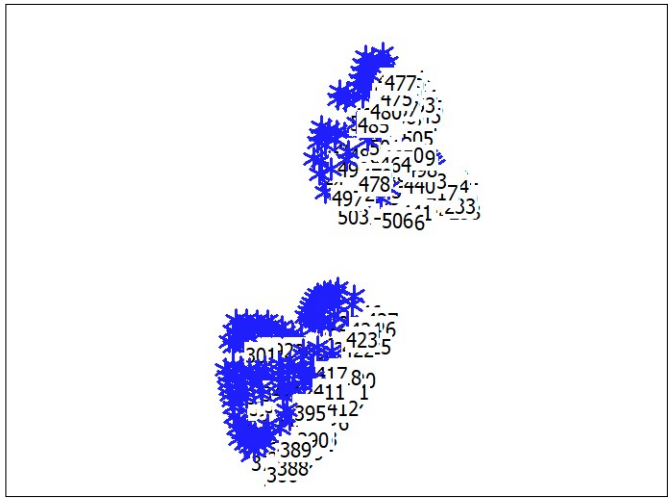
Terrain type	Wake decay constant
HH:100m Offshore	0.030

Omnidirectional displacement height from objects

Wake calculation settings

Angle [°]			Wind speed [m/s]		
start	end	step	start	end	step
0.5	360.0	1.0	0.5	30.5	1.0

WAsP version WAsP 11 Version 11.06.0028



Scale 1:1,250,000
New WTG Existing WTG

Key results for height 165.0 m above ground level

Terrain UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Name of wind distribution	Type	Wind energy [kWh/m²]	Mean wind speed [m/s]	Equivalent roughness
A	548,060	5,829,150	HKW-03	WAsP (WAsP 11 Version 11.06.0028)	10,182	10.5	0.0
B	558,112	5,839,246	HKW-04	WAsP (WAsP 11 Version 11.06.0028)	10,107	10.4	0.0
C	558,004	5,849,256	HKW-05	WAsP (WAsP 11 Version 11.06.0028)	10,182	10.5	0.0
D	596,112	5,829,642	OWEZ	WAsP (WAsP 11 Version 11.06.0028)	9,227	10.1	0.0
E	582,817	5,827,056	Prinses Amalia	WAsP (WAsP 11 Version 11.06.0028)	9,685	10.3	0.0
F	578,881	5,806,416	Luchterduinen	WAsP (WAsP 11 Version 11.06.0028)	9,489	10.2	0.0
G	543,967	5,835,763	HKW-02	WAsP (WAsP 11 Version 11.06.0028)	10,207	10.5	0.0

Calculated Annual Energy for reference WTGs

Calculated prod. without new WTGs	GROSS (no loss) Free WTGs	Wake loss	Specific results Capacity factor	Specific results Mean WTG result	Full load hours	Mean wind speed @hub height	Actual wind corrected energy	Goodness Factor
[MWh/y]	[MWh/y]	[%]	[%]	[MWh/y]	[Hours/year]	[m/s]	[MWh/y]	[%]
12,888,725.0	13,814,928.4	6.8	57.9	36,306.3	5,078	9.6	0.0	

Calculated Annual Energy for each of 355 reference WTGs with total 2,538.0 MW rated power

Links	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Power curve Creator	Name	Calculated prod. without new WTGs	Goodness Factor
				[kW]	[m]	[m]			[MWh/y]	[%]
153 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,086.1	0
154 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,035.8	0
155 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,043.3	0
156 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,174.9	0
157 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,761.3	0
158 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,928.0	0
159 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,682.7	0
160 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,056.3	0
161 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,700.7	0
162 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,820.2	0
163 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,580.7	0
164 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,522.2	0
165 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,074.2	0
166 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,626.8	0
167 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,533.3	0
168 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,784.5	0

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
169 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,648.8	0
170 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,053.7	0
171 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,757.5	0
172 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,411.2	0
173 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,457.7	0
174 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,408.1	0
175 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,498.6	0
176 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,110.4	0
177 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,476.2	0
178 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,662.2	0
179 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,581.0	0
180 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,917.9	0
181 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,336.9	0
182 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,831.2	0
183 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,371.8	0
184 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,354.6	0
185 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,463.0	0
186 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,386.9	0
187 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,624.8	0
188 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,480.7	0
189 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,658.4	0
190 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,354.1	0
191 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,346.5	0
192 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,404.1	0
193 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,380.1	0
194 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,474.9	0
195 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,000.4	0
196 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,450.6	0
197 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,758.5	0
198 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,597.0	0
199 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,440.7	0
200 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,388.9	0
201 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,817.5	0
202 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,377.4	0
203 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,527.5	0
204 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,445.9	0
205 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,654.5	0
206 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,565.0	0
207 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,819.8	0
208 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,546.3	0
209 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,473.4	0
210 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,494.3	0
211 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,671.9	0
212 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,709.2	0
213 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,478.7	0
214 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,407.7	0
215 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,371.2	0
216 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,337.6	0
217 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,309.8	0
218 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,323.7	0
219 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,342.2	0
220 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,390.1	0
221 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,410.4	0
222 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,161.8	0
223 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,443.1	0
224 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,051.6	0
225 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,045.3	0
226 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,492.1	0
227 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,056.3	0
228 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,133.4	0
229 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,575.4	0
230 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,211.4	0
231 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,204.7	0
232 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,057.1	0
233 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,245.9	0
234 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,020.2	0
235 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,043.2	0
236 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,348.5	0
237 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,166.1	0

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PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

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Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
238 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,576.2	0
239 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,217.1	0
240 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,345.3	0
241 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,203.2	0
242 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,301.2	0
243 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,166.4	0
244 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,209.8	0
245 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,314.0	0
246 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,569.3	0
247 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,146.7	0
248 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,069.4	0
249 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,168.1	0
250 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,735.4	0
251 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,291.2	0
252 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,663.2	0
253 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,757.9	0
254 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,929.8	0
255 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,565.5	0
256 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,459.9	0
257 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,108.4	0
258 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,462.0	0
259 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,612.2	0
260 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,724.5	0
261 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,419.1	0
262 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,325.2	0
263 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,069.5	0
264 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,347.7	0
265 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,580.6	0
266 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,648.5	0
267 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,398.2	0
268 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,337.6	0
269 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,079.7	0
270 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,367.6	0
271 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,617.9	0
272 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,577.1	0
273 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,459.9	0
274 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,391.1	0
275 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,458.5	0
276 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,165.6	0
277 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,759.7	0
278 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,688.1	0
279 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,642.0	0
280 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,588.4	0
281 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,637.5	0
282 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,410.9	0
283 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,086.4	0
284 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,885.7	0
285 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,038.4	0
286 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,004.5	0
287 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,062.6	0
288 F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,318.0	0
289 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,087.1	0
290 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,705.0	0
291 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,107.1	0
292 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,959.9	0
293 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,873.4	0
294 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,552.5	0
295 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,555.0	0
296 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,701.3	0
297 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,954.5	0
298 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,715.8	0
299 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,860.3	0
300 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,370.9	0
301 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,521.1	0
302 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,088.9	0
303 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,614.4	0
304 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,512.9	0
305 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,674.1	0
306 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,588.2	0

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PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

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Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
307 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,766.7	0
308 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,487.8	0
309 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,565.0	0
310 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,947.6	0
311 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,778.9	0
312 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,330.6	0
313 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,866.4	0
314 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,983.3	0
315 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,159.5	0
316 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,292.5	0
317 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,554.4	0
318 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,684.4	0
319 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,692.5	0
320 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,622.8	0
321 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,428.5	0
322 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,297.7	0
323 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,938.7	0
324 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,790.1	0
325 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,759.4	0
326 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,811.9	0
327 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,001.3	0
328 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,884.0	0
329 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,340.6	0
330 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,176.7	0
331 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,202.4	0
332 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,364.0	0
333 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,735.3	0
334 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,160.2	0
335 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,656.6	0
336 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,530.6	0
337 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,587.4	0
338 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,864.8	0
339 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,311.6	0
340 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,618.6	0
341 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,260.0	0
342 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,246.8	0
343 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,395.1	0
344 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,002.4	0
345 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,726.1	0
346 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,325.4	0
347 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,167.7	0
348 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,244.6	0
349 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,579.3	0
350 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,193.9	0
351 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,704.1	0
352 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,454.8	0
353 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,497.0	0
354 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,677.9	0
355 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,219.3	0
356 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,694.3	0
357 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,019.0	0
358 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,157.5	0
359 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,826.1	0
360 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,028.1	0
361 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,639.0	0
362 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,518.5	0
363 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,791.5	0
364 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,644.9	0
365 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,767.5	0
366 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,438.2	0
367 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,045.3	0
368 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,377.9	0
369 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,872.2	0
370 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,783.8	0
371 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,409.8	0
372 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,604.3	0
373 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,407.5	0
374 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,503.2	0
375 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,622.5	0

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PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

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Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
376 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,941.3	0
377 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,445.2	0
378 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,603.2	0
379 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,646.9	0
380 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,110.2	0
381 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,661.8	0
382 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,738.7	0
383 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,163.7	0
384 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,922.4	0
385 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,161.4	0
386 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,866.1	0
387 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,141.0	0
388 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,845.8	0
389 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,361.3	0
390 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,141.6	0
391 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,317.9	0
392 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,246.5	0
393 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,265.5	0
394 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,572.4	0
395 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,239.9	0
396 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,168.0	0
397 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,180.4	0
398 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,358.9	0
399 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,855.8	0
400 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,676.2	0
401 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,397.9	0
402 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,298.9	0
403 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,285.3	0
404 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,471.7	0
405 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,018.4	0
406 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,895.0	0
407 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,193.9	0
408 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,738.6	0
409 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,529.9	0
410 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,501.2	0
411 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,753.1	0
412 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,664.4	0
413 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,815.4	0
414 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,643.2	0
415 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,067.4	0
416 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,416.4	0
417 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,569.7	0
418 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,689.3	0
419 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,818.0	0
420 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,374.0	0
421 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,241.1	0
422 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,908.2	0
423 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,441.2	0
424 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,576.0	0
425 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,009.7	0
426 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,898.6	0
427 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,063.3	0
428 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,179.0	0
429 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,505.1	0
430 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,027.2	0
431 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,734.0	0
432 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,886.7	0
433 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,351.4	0
434 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,618.2	0
435 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,610.7	0
436 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,822.0	0
437 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,306.4	0
438 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,642.6	0
439 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,381.3	0
440 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,188.6	0
441 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,280.7	0
442 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,579.2	0
443 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,300.8	0
444 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,473.1	0

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PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

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Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
445 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,218.6	0
446 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,420.2	0
447 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,505.8	0
448 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,009.5	0
449 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,136.4	0
450 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,494.8	0
451 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,794.0	0
452 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,558.3	0
453 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,689.2	0
454 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,216.4	0
455 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,207.1	0
456 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,029.7	0
457 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,370.9	0
458 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,381.7	0
459 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,738.6	0
460 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,392.8	0
461 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,421.3	0
462 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,719.7	0
463 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,473.8	0
464 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,470.3	0
465 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,275.2	0
466 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,721.4	0
467 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,396.0	0
468 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,473.2	0
469 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,713.0	0
470 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,266.2	0
471 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,264.8	0
472 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,284.3	0
473 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,723.3	0
474 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,570.4	0
475 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,771.7	0
476 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,962.5	0
477 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,577.5	0
478 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,296.3	0
479 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,332.9	0
480 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,378.9	0
481 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,478.1	0
482 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,629.6	0
483 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,891.9	0
484 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,538.3	0
485 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,818.9	0
486 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,665.7	0
487 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,383.0	0
488 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,400.8	0
489 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,379.6	0
490 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,889.1	0
491 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,341.2	0
492 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,658.9	0
493 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,424.7	0
494 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,164.8	0
495 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,483.3	0
496 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,646.6	0
497 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,735.4	0
498 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,422.0	0
499 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,303.9	0
500 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,973.7	0
501 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,937.0	0
502 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,033.4	0
503 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,941.3	0
504 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,710.5	0
505 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,266.0	0
506 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,446.1	0
507 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,433.6	0

Licensed user:
Pondera Consult B.V.
Welbergweg 49
NL-7556 PE Hengelo
0031742489940

PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

WTG siting

UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z	Row data/Description	Production source	Statistical basis for normalized production: [Months]
			[m]			
153	582,037	5,825,515	0.0	WMPA 60		
154	581,541	5,825,752	0.0	WMPA 59		
155	581,045	5,825,990	0.0	WMPA 58		
156	580,549	5,826,228	0.0	WMPA 57		
157	582,496	5,825,818	0.0	WMPA 54		
158	582,988	5,825,571	0.0	WMPA 55		
159	582,004	5,826,064	0.0	WMPA 53		
160	583,480	5,825,325	0.0	WMPA 56		
161	581,513	5,826,310	0.0	WMPA 52		
162	581,021	5,826,556	0.0	WMPA 51		
163	582,970	5,826,130	0.0	WMPA 46		
164	582,483	5,826,385	0.0	WMPA 45		
165	580,529	5,826,802	0.0	WMPA 50		
166	583,457	5,825,875	0.0	WMPA 47		
167	581,995	5,826,640	0.0	WMPA 44		
168	583,944	5,825,620	0.0	WMPA 48		
169	581,508	5,826,895	0.0	WMPA 43		
170	584,432	5,825,365	0.0	WMPA 49		
171	581,021	5,827,150	0.0	WMPA 42		
172	582,972	5,826,707	0.0	WMPA 36		
173	583,454	5,826,443	0.0	WMPA 37		
174	582,490	5,826,971	0.0	WMPA 35		
175	583,937	5,826,179	0.0	WMPA 38		
176	580,533	5,827,405	0.0	WMPA 41		
177	582,007	5,827,235	0.0	WMPA 34		
178	584,419	5,825,915	0.0	WMPA 39		
179	581,525	5,827,499	0.0	WMPA 33		
180	584,902	5,825,651	0.0	WMPA 40		
181	583,457	5,827,020	0.0	WMPA 28		
182	581,043	5,827,763	0.0	WMPA 32		
183	583,934	5,826,747	0.0	WMPA 29		
184	582,980	5,827,293	0.0	WMPA 27		
185	584,412	5,826,473	0.0	WMPA 30		
186	582,502	5,827,566	0.0	WMPA 26		
187	584,889	5,826,200	0.0	WMPA 31		
188	582,026	5,827,839	0.0	WMPA 25		
189	581,547	5,828,111	0.0	WMPA 24		
190	583,948	5,827,323	0.0	WMPA 19		
191	583,476	5,827,606	0.0	WMPA 18		
192	584,420	5,827,041	0.0	WMPA 20		
193	583,004	5,827,888	0.0	WMPA 17		
194	584,892	5,826,759	0.0	WMPA 21		
195	581,070	5,828,385	0.0	WMPA 23		
196	582,531	5,828,170	0.0	WMPA 16		
197	585,364	5,826,477	0.0	WMPA 22		
198	582,059	5,828,452	0.0	WMPA 15		
199	584,439	5,827,608	0.0	WMPA 11		
200	583,972	5,827,900	0.0	WMPA 10		
201	581,587	5,828,734	0.0	WMPA 14		
202	583,505	5,828,191	0.0	WMPA 9		
203	584,906	5,827,318	0.0	WMPA 12		
204	583,039	5,828,481	0.0	WMPA 8		
205	585,373	5,827,027	0.0	WMPA 13		
206	582,572	5,828,772	0.0	WMPA 7		
207	582,105	5,829,063	0.0	WMPA 6		
208	584,457	5,828,159	0.0	WMPA 5		
209	583,996	5,828,458	0.0	WMPA 4		
210	583,534	5,828,757	0.0	WMPA 3		
211	583,073	5,829,056	0.0	WMPA 2		
212	584,027	5,829,008	0.0	WMPA 1		
213	592,510	5,831,701	0.0	Offshore Windpark Egmond aan Zee / 12		
214	592,935	5,831,215	0.0	Offshore Windpark Egmond aan Zee / 11		

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

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UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z [m]	Row data/Description	Production source	Statistical basis for normalized production: [Months]
215	593,367	5,830,738	0.0	Offshore Windpark Egmond aan Zee / 10		
216	593,785	5,830,248	0.0	Offshore Windpark Egmond aan Zee / 9		
217	594,210	5,829,765	0.0	Offshore Windpark Egmond aan Zee / 8		
218	594,635	5,829,282	0.0	Offshore Windpark Egmond aan Zee / 7		
219	595,066	5,828,790	0.0	Offshore Windpark Egmond aan Zee / 6		
220	595,491	5,828,306	0.0	Offshore Windpark Egmond aan Zee / 5		
221	595,915	5,827,823	0.0	Offshore Windpark Egmond aan Zee / 4		
222	594,536	5,830,909	0.0	Offshore Windpark Egmond aan Zee / 21		
223	596,341	5,827,337	0.0	Offshore Windpark Egmond aan Zee / 3		
224	594,961	5,830,426	0.0	Offshore Windpark Egmond aan Zee / 20		
225	595,386	5,829,939	0.0	Offshore Windpark Egmond aan Zee / 19		
226	596,758	5,826,863	0.0	Offshore Windpark Egmond aan Zee / 2		
227	595,811	5,829,456	0.0	Offshore Windpark Egmond aan Zee / 18		
228	596,235	5,828,973	0.0	Offshore Windpark Egmond aan Zee / 17		
229	597,270	5,826,468	0.0	Offshore Windpark Egmond aan Zee / 1		
230	596,916	5,828,199	0.0	Offshore Windpark Egmond aan Zee / 16		
231	595,287	5,831,569	0.0	Offshore Windpark Egmond aan Zee / 29		
232	595,712	5,831,083	0.0	Offshore Windpark Egmond aan Zee / 28		
233	597,340	5,827,716	0.0	Offshore Windpark Egmond aan Zee / 15		
234	596,137	5,830,600	0.0	Offshore Windpark Egmond aan Zee / 27		
235	596,562	5,830,117	0.0	Offshore Windpark Egmond aan Zee / 26		
236	597,766	5,827,233	0.0	Offshore Windpark Egmond aan Zee / 14		
237	597,040	5,829,573	0.0	Offshore Windpark Egmond aan Zee / 25		
238	598,190	5,826,750	0.0	Offshore Windpark Egmond aan Zee / 13		
239	597,696	5,828,826	0.0	Offshore Windpark Egmond aan Zee / 24		
240	596,039	5,832,227	0.0	Offshore Windpark Egmond aan Zee / 36		
241	596,464	5,831,744	0.0	Offshore Windpark Egmond aan Zee / 35		
242	598,120	5,828,337	0.0	Offshore Windpark Egmond aan Zee / 23		
243	596,888	5,831,261	0.0	Offshore Windpark Egmond aan Zee / 34		
244	597,313	5,830,778	0.0	Offshore Windpark Egmond aan Zee / 33		
245	597,798	5,830,225	0.0	Offshore Windpark Egmond aan Zee / 32		
246	581,938	5,809,670	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (94)		
247	580,605	5,809,303	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (95)		
248	579,652	5,809,041	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (96)		
249	581,625	5,808,865	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (97)		
250	580,154	5,808,809	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (98)		
251	578,496	5,808,723	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (99)		
252	580,657	5,808,508	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (100)		
253	578,974	5,808,485	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (101)		
254	581,251	5,808,288	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (102)		
255	579,448	5,808,239	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (103)		
256	579,929	5,808,008	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (104)		
257	578,087	5,808,012	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (105)		
258	580,412	5,807,760	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (106)		
259	578,577	5,807,774	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (107)		
260	580,882	5,807,505	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (108)		
261	579,071	5,807,520	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (109)		
262	579,568	5,807,277	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (110)		
263	577,660	5,807,334	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (111)		
264	580,042	5,807,014	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (112)		
265	578,169	5,807,067	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (113)		
266	580,537	5,806,707	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (114)		
267	578,674	5,806,818	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (115)		
268	579,182	5,806,551	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (116)		
269	577,306	5,806,630	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (117)		
270	579,693	5,806,276	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (118)		
271	577,809	5,806,387	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (119)		
272	580,188	5,806,021	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (120)		
273	578,316	5,806,128	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (121)		
274	578,848	5,805,870	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (122)		
275	579,380	5,805,570	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (123)		
276	576,916	5,805,900	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (124)		

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PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z [m]	Row data/Description	Production source	Statistical basis for normalized production: [Months]
277	577,439	5,805,661	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (125)		
278	579,904	5,805,320	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (126)		
279	577,963	5,805,386	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (127)		
280	578,511	5,805,087	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (128)		
281	579,035	5,804,820	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (129)		
282	576,540	5,805,102	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (130)		
283	577,094	5,804,911	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (131)		
284	579,583	5,804,546	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (132)		
285	577,634	5,804,603	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (133)		
286	578,191	5,804,321	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (134)		
287	578,715	5,804,038	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (135)		
288	579,289	5,803,644	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (136)		
289	573,220	5,802,271	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1276)		
290	574,531	5,802,197	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1277)		
291	575,939	5,801,904	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1278)		
292	564,980	5,804,195	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1279)		
293	566,755	5,804,176	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1280)		
294	568,529	5,804,158	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1281)		
295	570,304	5,804,140	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1282)		
296	565,599	5,803,336	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1283)		
297	567,374	5,803,317	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1284)		
298	569,148	5,803,299	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1285)		
299	570,923	5,803,281	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1286)		
300	572,697	5,803,264	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1287)		
301	564,445	5,802,495	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1288)		
302	566,219	5,802,476	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1289)		
303	567,994	5,802,457	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1290)		
304	569,769	5,802,439	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1291)		
305	571,543	5,802,422	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1292)		
306	565,064	5,801,635	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1293)		
307	566,838	5,801,616	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1294)		
308	568,613	5,801,598	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1295)		
309	570,388	5,801,580	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1296)		
310	572,162	5,801,563	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1297)		
311	563,910	5,800,795	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1298)		
312	565,684	5,800,776	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1299)		
313	567,459	5,800,757	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1300)		
314	569,233	5,800,739	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1301)		
315	571,008	5,800,721	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1302)		
316	564,528	5,799,935	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1303)		
317	566,303	5,799,916	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1304)		
318	563,306	5,796,102	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1305)		
319	564,547	5,796,713	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1306)		
320	565,906	5,796,392	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1307)		
321	568,451	5,796,861	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1308)		
322	564,590	5,789,985	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1309)		
323	564,392	5,790,980	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1310)		
324	564,194	5,791,975	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1311)		
325	563,996	5,792,970	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1312)		
326	563,798	5,793,965	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1313)		
327	563,600	5,794,960	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1314)		
328	565,770	5,790,735	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1315)		
329	565,571	5,791,731	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1316)		
330	565,373	5,792,726	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1317)		
331	565,175	5,793,721	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1318)		
332	564,976	5,794,716	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1319)		
333	564,778	5,795,711	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1320)		
334	566,949	5,791,486	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1321)		
335	566,751	5,792,481	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1322)		
336	566,552	5,793,476	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1323)		
337	566,353	5,794,471	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1324)		
338	566,155	5,795,466	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1325)		

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

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UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z	Row data/Description	Production source	Statistical basis for normalized production: [Months]
			[m]			
339	568,327	5,791,242	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1326)		
340	568,128	5,792,237	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1327)		
341	567,929	5,793,232	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1328)		
342	567,731	5,794,227	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1329)		
343	567,532	5,795,222	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1330)		
344	567,333	5,796,217	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1331)		
345	569,506	5,791,993	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1332)		
346	569,307	5,792,988	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1333)		
347	569,108	5,793,983	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1334)		
348	568,909	5,794,978	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1335)		
349	568,710	5,795,973	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1336)		
350	570,884	5,791,749	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1337)		
351	570,685	5,792,744	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1338)		
352	570,486	5,793,738	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1339)		
353	570,286	5,794,733	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1340)		
354	570,087	5,795,728	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1341)		
355	569,888	5,796,723	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1342)		
356	564,771	5,788,336	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1343)		
357	567,523	5,789,081	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1344)		
358	568,898	5,789,454	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1345)		
359	570,274	5,789,828	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1346)		
360	571,649	5,790,202	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1347)		
361	565,696	5,787,610	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1348)		
362	568,448	5,788,355	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1349)		
363	569,823	5,788,728	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1350)		
364	571,198	5,789,102	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1351)		
365	572,574	5,789,476	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1352)		
366	565,246	5,786,511	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1353)		
367	566,621	5,786,883	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1354)		
368	569,372	5,787,629	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1355)		
369	570,748	5,788,003	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1356)		
370	572,123	5,788,377	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1357)		
371	566,171	5,785,784	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1358)		
372	567,546	5,786,157	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1359)		
373	571,673	5,787,277	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1360)		
374	573,048	5,787,651	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1361)		
375	565,720	5,784,685	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1362)		
376	567,096	5,785,058	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1363)		
377	568,471	5,785,431	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1364)		
378	569,847	5,785,804	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1365)		
379	572,597	5,786,552	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1366)		
380	566,645	5,783,959	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1367)		
381	568,021	5,784,331	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1368)		
382	569,396	5,784,705	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1369)		
383	570,772	5,785,078	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1370)		
384	567,513	5,783,401	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1371)		
385	567,843	5,782,096	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1372)		
386	568,335	5,782,779	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1373)		
387	568,844	5,783,619	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1374)		
388	570,098	5,783,905	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1375)		
389	570,463	5,786,987	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1376)		
390	573,418	5,788,676	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1377)		
391	573,742	5,789,596	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1378)		
392	574,171	5,788,036	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1379)		
393	574,816	5,788,859	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1380)		
394	572,953	5,791,985	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1381)		
395	572,815	5,793,009	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1382)		
396	572,678	5,794,033	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1383)		
397	572,540	5,795,057	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1384)		
398	572,403	5,796,081	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1385)		
399	572,265	5,797,105	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1386)		
400	574,779	5,792,275	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1387)		

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

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UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z [m]	Row data/Description	Production source	Statistical basis for normalized production: [Months]
401	574,641	5,793,299	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1388)		
402	574,503	5,794,323	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1389)		
403	574,365	5,795,347	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1390)		
404	574,227	5,796,371	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1391)		
405	574,090	5,797,395	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1392)		
406	576,744	5,791,541	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1393)		
407	576,605	5,792,565	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1394)		
408	576,467	5,793,589	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1395)		
409	576,328	5,794,613	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1396)		
410	576,190	5,795,637	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1397)		
411	576,052	5,796,660	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1398)		
412	578,292	5,793,879	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1399)		
413	578,153	5,794,903	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1400)		
414	578,015	5,795,926	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1401)		
415	577,876	5,796,950	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1402)		
416	576,220	5,798,604	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1403)		
417	576,221	5,799,504	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1404)		
418	578,659	5,799,014	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1405)		
419	578,660	5,799,914	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1406)		
420	581,098	5,798,523	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1407)		
421	581,098	5,799,424	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1408)		
422	580,646	5,803,664	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1409)		
423	581,314	5,805,227	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1410)		
424	581,981	5,806,790	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1411)		
425	583,606	5,804,256	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1412)		
426	584,343	5,807,061	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1413)		
427	584,712	5,808,463	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1414)		
428	575,031	5,791,196	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1415)		
429	579,227	5,795,022	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1416)		
430	579,230	5,796,000	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1417)		
431	580,081	5,796,709	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1418)		
432	577,510	5,831,183	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1419)		
433	578,783	5,830,842	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1420)		
434	581,651	5,831,440	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1421)		
435	582,616	5,835,281	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1422)		
436	583,903	5,840,401	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1423)		
437	584,517	5,832,038	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1424)		
438	585,160	5,834,599	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1425)		
439	585,790	5,831,697	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1426)		
440	590,570	5,830,924	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1427)		
441	590,080	5,826,466	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1428)		
442	588,648	5,826,832	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1429)		
443	588,967	5,828,113	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1430)		
444	590,895	5,841,260	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1431)		
445	591,214	5,842,541	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1432)		
446	591,533	5,843,822	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1433)		
447	587,374	5,827,174	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1434)		
448	587,694	5,828,454	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1435)		
449	588,014	5,829,735	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1436)		
450	589,305	5,840,320	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1437)		
451	589,624	5,841,601	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1438)		
452	589,943	5,842,882	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1439)		
453	590,262	5,844,162	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1440)		
454	590,582	5,845,443	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1441)		
455	586,421	5,828,795	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1442)		
456	586,715	5,829,983	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1443)		
457	587,061	5,831,357	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1444)		
458	588,035	5,840,660	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1445)		
459	588,355	5,841,941	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1446)		
460	588,674	5,843,222	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1447)		
461	588,993	5,844,503	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1448)		
462	589,313	5,845,783	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1449)		

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

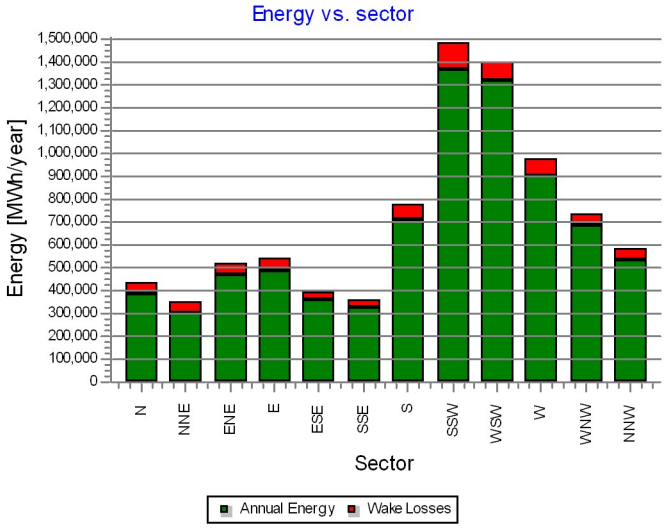
UTM (north)-ETRS89 Zone: 31

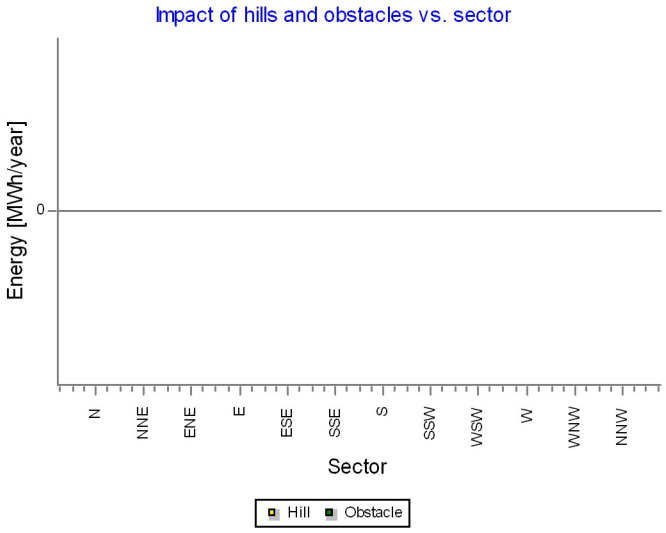
	Easting	Northing	Z [m]	Row data/Description	Production source	Statistical basis for normalized production: [Months]
463	589,632	5,847,064	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1450)		
464	586,431	5,834,258	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1451)		
465	586,753	5,835,409	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1452)		
466	587,086	5,842,281	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1453)		
467	587,406	5,843,562	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1454)		
468	587,725	5,844,842	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1455)		
469	588,045	5,846,123	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1456)		
470	588,365	5,847,404	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1457)		
471	588,684	5,848,685	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1458)		
472	585,527	5,841,374	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1459)		
473	585,815	5,842,622	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1460)		
474	586,135	5,843,902	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1461)		
475	586,455	5,845,183	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1462)		
476	586,775	5,846,463	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1463)		
477	587,095	5,847,744	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1464)		
478	582,924	5,831,099	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1465)		
479	583,244	5,832,379	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1466)		
480	584,671	5,842,992	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1467)		
481	584,867	5,844,242	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1468)		
482	585,187	5,845,523	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1469)		
483	585,508	5,846,803	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1470)		
484	585,828	5,848,084	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1471)		
485	582,633	5,840,742	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1472)		
486	582,954	5,842,022	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1473)		
487	581,022	5,834,341	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1474)		
488	581,344	5,835,622	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1475)		
489	581,704	5,842,334	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1476)		
490	579,428	5,833,402	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1477)		
491	579,750	5,834,682	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1478)		
492	580,071	5,835,962	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1479)		
493	578,156	5,833,743	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1480)		
494	578,478	5,835,023	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1481)		
495	578,800	5,836,303	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1482)		
496	588,929	5,824,713	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1483)		
497	578,530	5,828,638	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1484)		
498	590,798	5,833,624	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1485)		
499	590,523	5,835,530	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1486)		
500	588,583	5,835,947	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1487)		
501	584,699	5,837,102	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1488)		
502	580,472	5,829,404	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1489)		
503	579,572	5,825,576	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1490)		
504	586,217	5,836,824	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1491)		
505	590,047	5,838,679	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1492)		
506	586,929	5,825,009	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1493)		
507	581,362	5,841,082	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1494)		

PARK - Production Analysis

Calculation: HKW MER 10MW incl HKN&HKZWTG: All new WTGs, Air density 1.225 kg/m³
Directional Analysis

Sector		0 N	1 NNE	2 ENE	3 E	4 ESE	5 SSE	6 S	7 SSW	8 WSW	9 W	10 WNW	11 NNW	Total
Roughness based energy	[MWh]	436,108.6	347,188.8	517,557.7	539,612.3	390,204.3	361,174.2	774,518.3	1,485,182.0	1,400,113.6	978,973.8	735,180.4	580,115.6	8,545,934.0
-Decrease due to wake losses	[MWh]	55,577.7	49,839.6	52,548.9	55,014.8	32,964.3	34,917.1	66,740.3	114,392.6	83,612.7	75,889.3	49,845.5	48,927.6	720,270.8
Resulting energy	[MWh]	380,530.7	297,349.3	465,008.9	484,596.6	357,240.3	326,257.3	707,778.7	1,370,788.6	1,316,501.5	903,085.4	685,333.8	531,188.6	7,825,658.0
Specific energy	[kWh/m²]													2,437
Specific energy	[kWh/kW]													5,148
Decrease due to wake losses	[%]	12.7	14.4	10.2	10.2	8.4	9.7	8.6	7.7	6.0	7.8	6.8	8.4	8.43
Utilization	[%]	35.3	37.1	36.2	32.7	36.5	33.6	24.3	21.4	23.2	25.0	28.8	29.8	26.7
Operational	[Hours/year]	547	438	572	576	433	410	737	1,270	1,208	940	777	636	8,544
Full Load Equivalent	[Hours/year]	250	196	306	319	235	215	466	902	866	594	451	349	5,148





PARK - Power Curve Analysis

Calculation: HKW MER 10MW incl HKN&HKZWTG: 1 - PONDERA VESTAS V164-10.0MW 10000 164.0 !O!, Hub height: 107.0 m

Name: V164 10 MW - HKN P-V curve
Source: Pondera

Source/Date	Created by	Created	Edited	Stop wind speed [m/s]	Power control	CT curve type	Generator type	Specific power kW/m²
27/11/2018	USER	27/11/2018	27/11/2018	25.0	Pitch	Standard pitch	Variable	0.47

Date added: 27-11-2018
By: WPu
Document source: NA
Document date: NA
Document folder: NA

10 MW P-V curve of V164 8,0MW - Custom-made by Pondera for HKN project. Only use in this context!

HP curve comparison - Note: For standard air density

Vmean	[m/s]	5	6	7	8	9	10
HP value Pitch, variable speed (2013)	[MWh]	11,101	18,056	25,507	32,724	39,229	44,728
PONDERA VESTAS V164-10.0MW 10000 164.0 !O! V164 10 MW - HKN P-V curve	[MWh]	17,780	26,931	35,620	43,218	49,506	54,425
Check value	[%]	-38	-33	-28	-24	-21	-18

The table shows comparison between annual energy production calculated on basis of simplified "HP-curves" which assume that all WTGs performs quite similar - only specific power loading (kW/m^2) and single/dual speed or stall/pitch decides the calculated values. Productions are without wake losses.
For further details, ask at the Danish Energy Agency for project report J.nr. 51171/00-0016 or see windPRO manual chapter 3.5.2.
The method is refined in EMD report "20 Detailed Case Studies comparing Project Design Calculations and actual Energy Productions for Wind Energy Projects worldwide", jan 2003.
Use the table to evaluate if the given power curve is reasonable - if the check value are lower than -5%, the power curve probably is too optimistic due to uncertainty in power curve measurement.

Power curve

Original data, Air density: 1.225 kg/m³

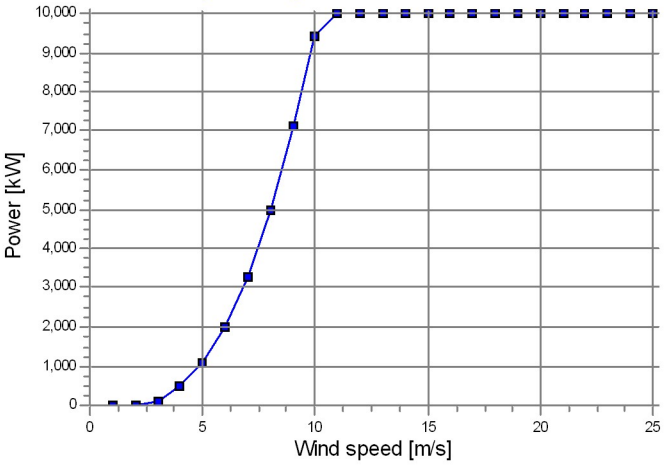
Wind speed [m/s]	Power [kW]	Cp	Wind speed [m/s]	Ct curve
3.0	95.0	0.27	1.0	0.10
4.0	500.0	0.60	2.0	0.10
5.0	1,082.0	0.67	3.0	0.10
6.0	1,981.0	0.71	4.0	0.80
7.0	3,250.0	0.73	5.0	0.82
8.0	4,974.0	0.75	6.0	0.84
9.0	7,135.0	0.76	7.0	0.79
10.0	9,400.0	0.73	8.0	0.72
10.5	9,900.0	0.66	9.0	0.66
11.0	10,000.0	0.58	10.0	0.59
12.0	10,000.0	0.45	11.0	0.53
13.0	10,000.0	0.35	12.0	0.46
14.0	10,000.0	0.28	13.0	0.40
15.0	10,000.0	0.23	14.0	0.33
16.0	10,000.0	0.19	15.0	0.28
17.0	10,000.0	0.16	16.0	0.23
18.0	10,000.0	0.13	17.0	0.20
19.0	10,000.0	0.11	18.0	0.16
20.0	10,000.0	0.10	19.0	0.13
21.0	10,000.0	0.08	20.0	0.12
22.0	10,000.0	0.07	21.0	0.12
23.0	10,000.0	0.06	22.0	0.11
24.0	10,000.0	0.06	23.0	0.11
25.0	10,000.0	0.05	24.0	0.10
26.0	10,000.0	0.00		
27.0	10,000.0	0.00		
28.0	10,000.0	0.00		

Power, Efficiency and energy vs. wind speed

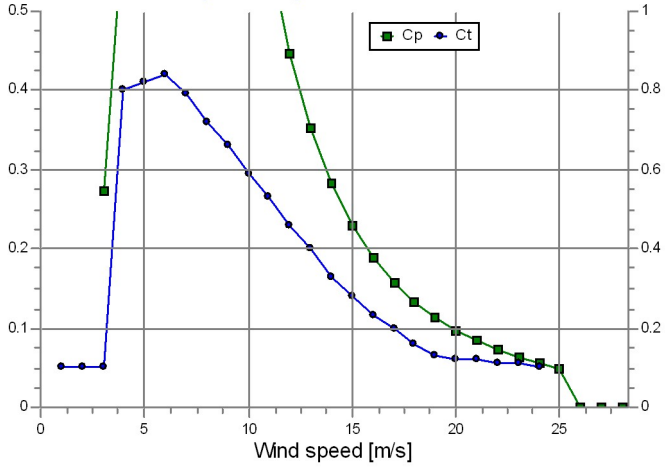
Data used in calculation, Air density: 1.225 kg/m³ New windPRO method (adjusted IEC method, improved to match turbine control) <RECOMMENDED>

Wind speed [m/s]	Power [kW]	Cp	Interval [m/s]	Energy [MWh]	Acc.Energy [MWh]	Relative [%]
1.0	0.0	0.00	0.50- 1.50	0.0	0.0	0.0
2.0	0.0	0.00	1.50- 2.50	0.0	0.0	0.0
3.0	95.0	0.27	2.50- 3.50	53.1	53.1	0.1
4.0	500.0	0.60	3.50- 4.50	235.9	289.1	0.6
5.0	1,082.0	0.67	4.50- 5.50	604.4	893.4	1.7
6.0	1,981.0	0.71	5.50- 6.50	1,227.7	2,121.1	4.1
7.0	3,250.0	0.73	6.50- 7.50	2,155.0	4,276.2	8.3
8.0	4,974.0	0.75	7.50- 8.50	3,373.2	7,649.3	14.8
9.0	7,135.0	0.76	8.50- 9.50	4,734.6	12,383.9	24.0
10.0	9,400.0	0.73	9.50-10.50	5,782.3	18,166.3	35.2
11.0	10,000.0	0.58	10.50-11.50	5,914.5	24,080.7	46.7
12.0	10,000.0	0.45	11.50-12.50	5,367.2	29,447.9	57.1
13.0	10,000.0	0.35	12.50-13.50	4,702.6	34,150.6	66.2
14.0	10,000.0	0.28	13.50-14.50	4,004.6	38,155.2	74.0
15.0	10,000.0	0.23	14.50-15.50	3,318.2	41,473.4	80.4
16.0	10,000.0	0.19	15.50-16.50	2,677.6	44,151.0	85.6
17.0	10,000.0	0.16	16.50-17.50	2,105.5	46,256.5	89.7
18.0	10,000.0	0.13	17.50-18.50	1,614.1	47,870.7	92.8
19.0	10,000.0	0.11	18.50-19.50	1,206.6	49,077.3	95.2
20.0	10,000.0	0.10	19.50-20.50	879.6	49,956.9	96.9
21.0	10,000.0	0.08	20.50-21.50	625.1	50,582.0	98.1
22.0	10,000.0	0.07	21.50-22.50	433.1	51,015.1	98.9
23.0	10,000.0	0.06	22.50-23.50	292.3	51,307.4	99.5
24.0	10,000.0	0.06	23.50-24.50	192.1	51,499.4	99.9
25.0	10,000.0	0.05	24.50-25.50	75.4	51,574.8	100.0

Power curve
For air density: 1.225 kg/m³ and reference climate data



Cp and Ct curve
For air density: 1.225 kg/m³ and reference climate data



PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: A - HKW-03; Hub height: 107.0

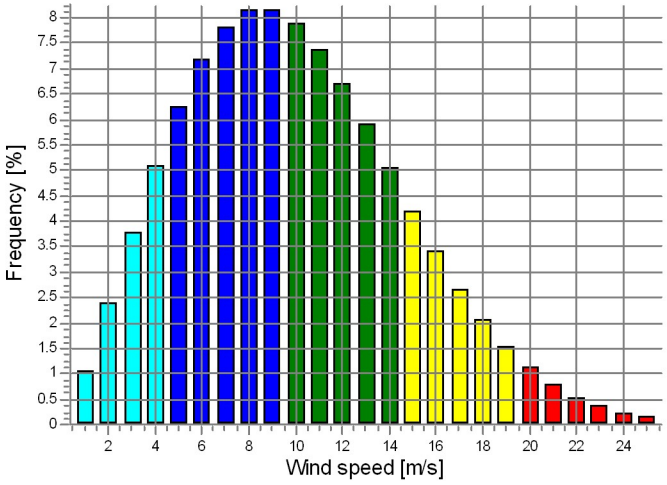
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 548,060 North: 5,829,150

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.994.wws

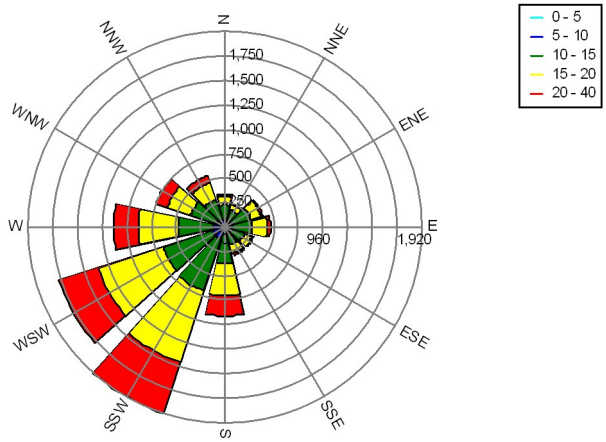
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.20	8.15	2.119	6.4
1 NNE	9.10	8.06	2.213	5.1
2 ENE	9.95	8.82	2.396	6.7
3 E	10.33	9.15	2.322	6.7
4 ESE	9.94	8.81	2.365	5.1
5 SSE	9.90	8.77	2.205	4.8
6 S	11.82	10.47	2.252	8.6
7 SSW	13.15	11.66	2.482	14.9
8 WSW	12.86	11.41	2.510	14.1
9 W	11.72	10.38	2.244	11.0
10 WNW	10.70	9.47	2.139	9.1
11 NNW	10.34	9.15	2.111	7.4
All	11.23	9.95	2.209	100.0

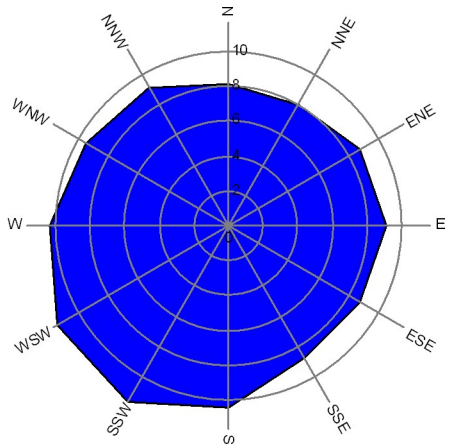
Weibull Distribution



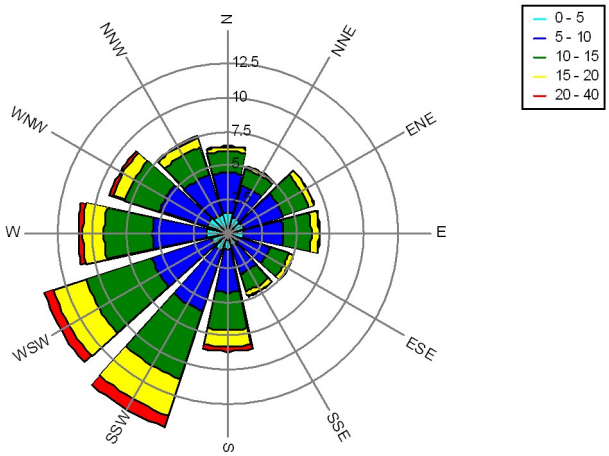
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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NL-7556 PE Hengelo
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Calculated:
16/05/2019 10:18/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: A - HKW-03; Hub height: 165.0

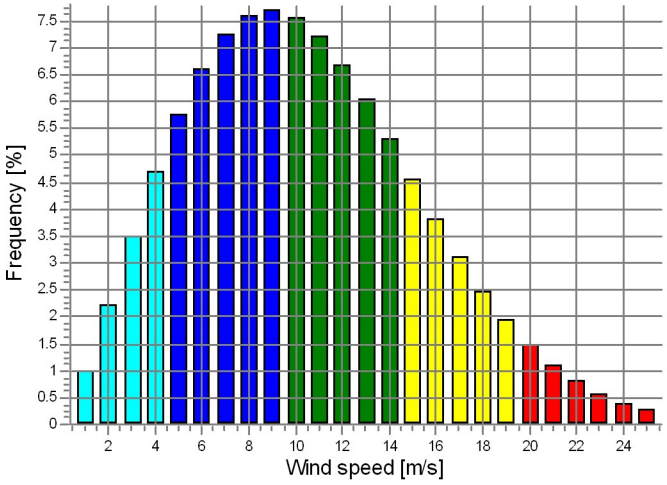
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 548,060 North: 5,829,150

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.994.wws

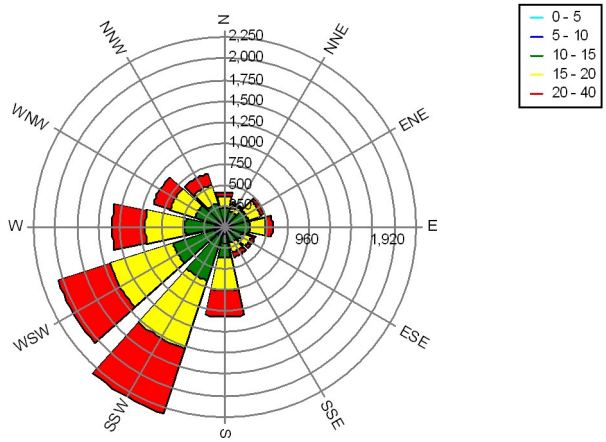
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.74	8.63	2.064	6.4
1 NNE	9.63	8.53	2.154	5.1
2 ENE	10.54	9.34	2.338	6.7
3 E	10.94	9.69	2.268	6.7
4 ESE	10.53	9.32	2.307	5.1
5 SSE	10.49	9.29	2.146	4.8
6 S	12.41	10.99	2.209	8.6
7 SSW	13.76	12.20	2.443	14.9
8 WSW	13.48	11.96	2.467	14.1
9 W	12.30	10.89	2.201	11.0
10 WNW	11.27	9.98	2.092	9.1
11 NNW	10.91	9.66	2.064	7.4
All	11.82	10.46	2.178	100.0

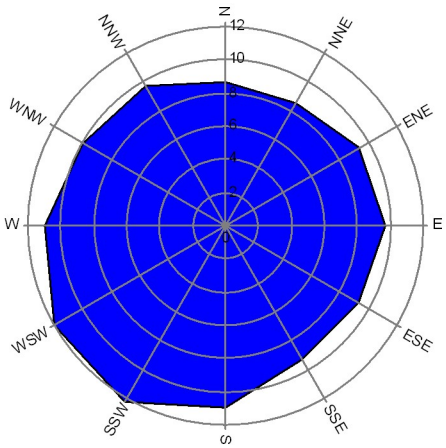
Weibull Distribution



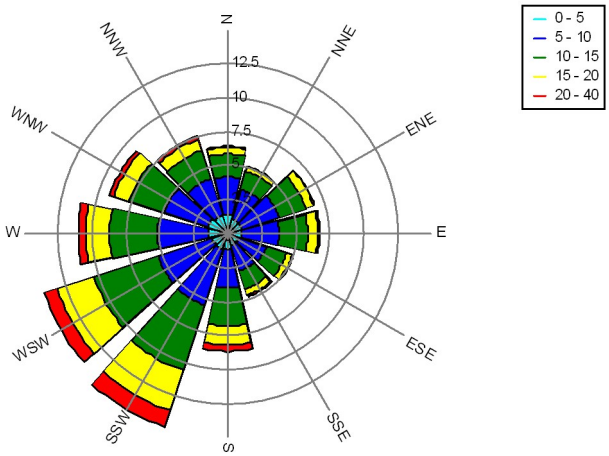
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: B - HKW-04; Hub height: 107.0

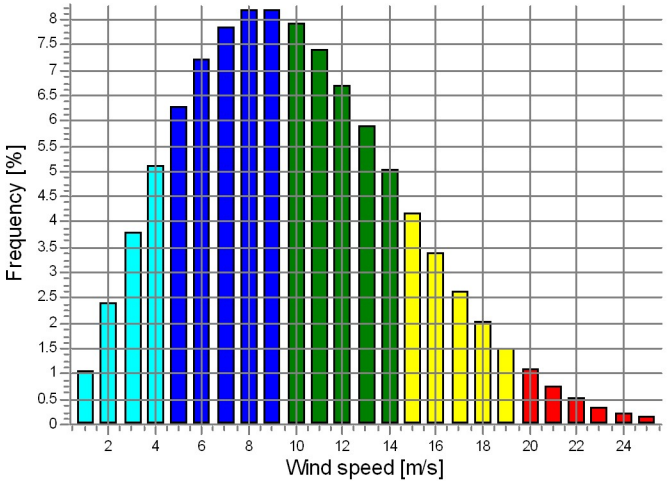
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 558,112 North: 5,839,246

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.991.wws

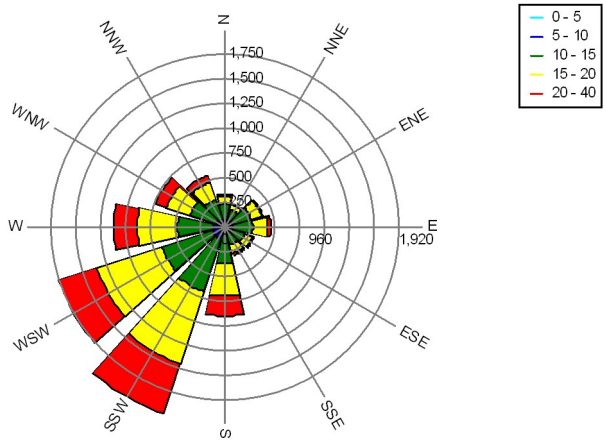
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.19	8.14	2.119	6.4
1 NNE	9.08	8.04	2.213	5.1
2 ENE	9.93	8.80	2.396	6.7
3 E	10.31	9.13	2.322	6.7
4 ESE	9.91	8.79	2.365	5.1
5 SSE	9.88	8.75	2.205	4.8
6 S	11.79	10.44	2.252	8.6
7 SSW	13.10	11.62	2.482	14.9
8 WSW	12.82	11.37	2.510	14.1
9 W	11.68	10.34	2.244	11.0
10 WNW	10.67	9.45	2.139	9.1
11 NNW	10.31	9.13	2.111	7.4
All	11.20	9.92	2.213	100.0

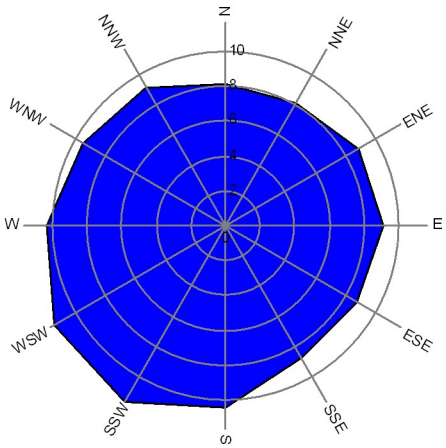
Weibull Distribution



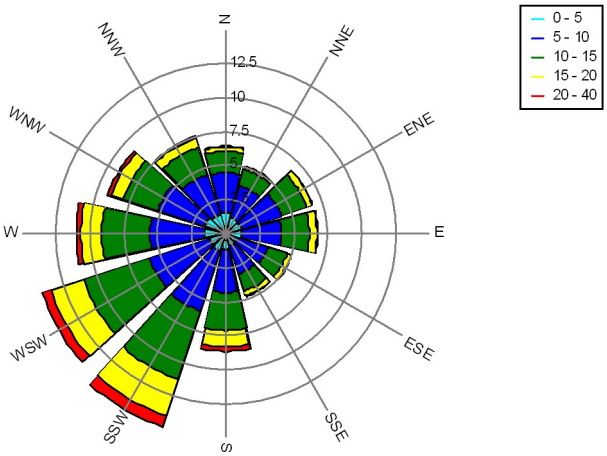
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
16/05/2019 10:18/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: B - HKW-04; Hub height: 165.0

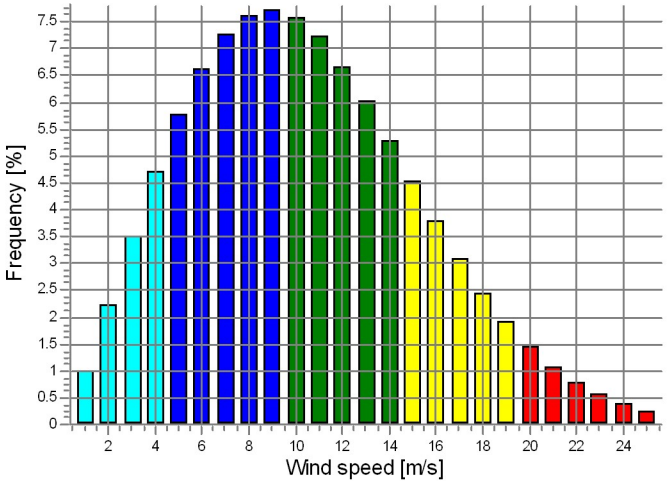
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 558,112 North: 5,839,246

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.991.wws

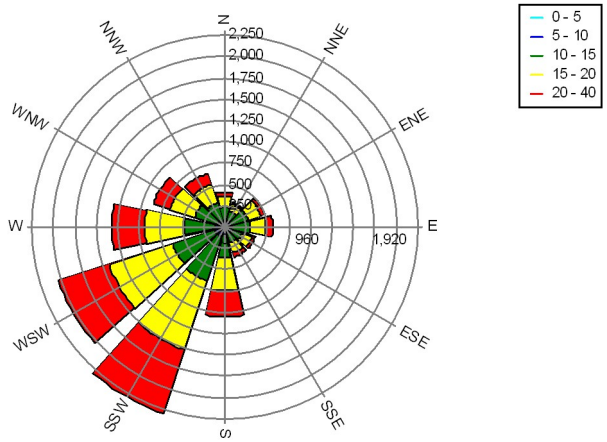
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.73	8.61	2.064	6.4
1 NNE	9.61	8.51	2.154	5.1
2 ENE	10.52	9.32	2.338	6.7
3 E	10.92	9.67	2.268	6.7
4 ESE	10.50	9.30	2.307	5.1
5 SSE	10.46	9.27	2.146	4.8
6 S	12.37	10.95	2.209	8.6
7 SSW	13.71	12.16	2.443	14.9
8 WSW	13.43	11.91	2.467	14.1
9 W	12.26	10.86	2.201	11.0
10 WNW	11.24	9.95	2.092	9.1
11 NNW	10.88	9.64	2.064	7.4
All	11.78	10.43	2.178	100.0

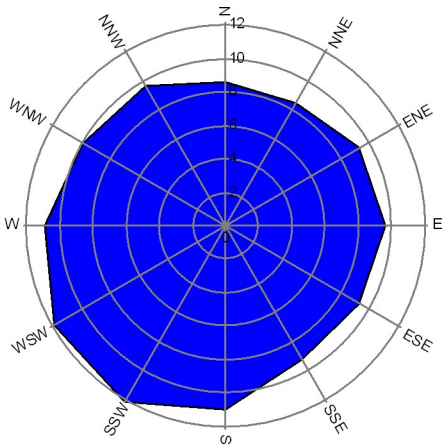
Weibull Distribution



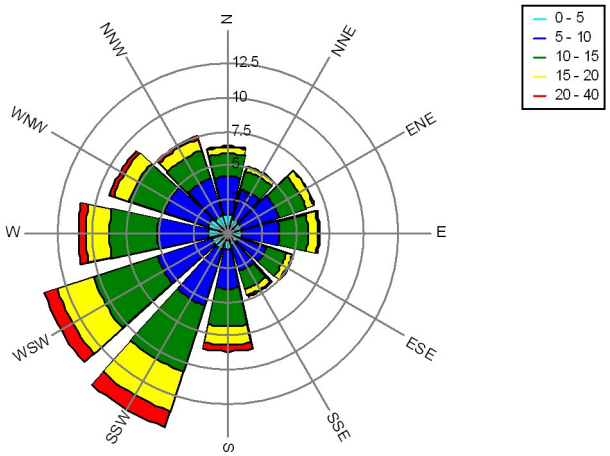
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
16/05/2019 10:18/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: C - HKW-05; Hub height: 107.0

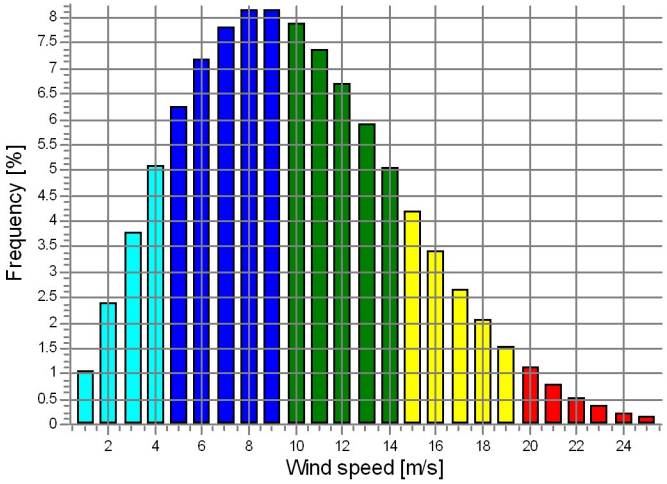
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 558,004 North: 5,849,256

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.994.wws

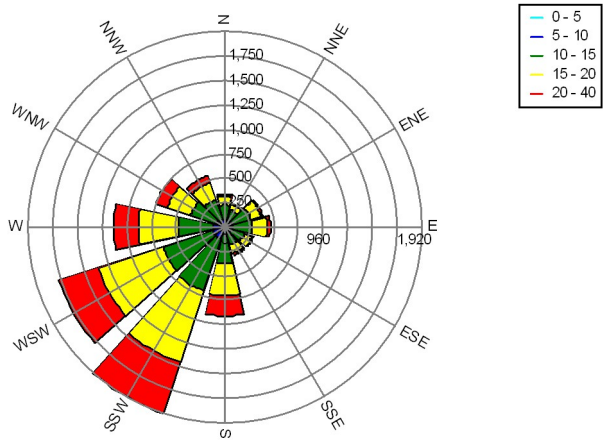
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.20	8.15	2.119	6.4
1 NNE	9.10	8.06	2.213	5.1
2 ENE	9.95	8.82	2.396	6.7
3 E	10.33	9.15	2.322	6.7
4 ESE	9.94	8.81	2.365	5.1
5 SSE	9.90	8.77	2.205	4.8
6 S	11.82	10.47	2.252	8.6
7 SSW	13.15	11.66	2.482	14.9
8 WSW	12.86	11.41	2.510	14.1
9 W	11.72	10.38	2.244	11.0
10 WNW	10.70	9.47	2.139	9.1
11 NNW	10.34	9.15	2.111	7.4
All	11.23	9.95	2.209	100.0

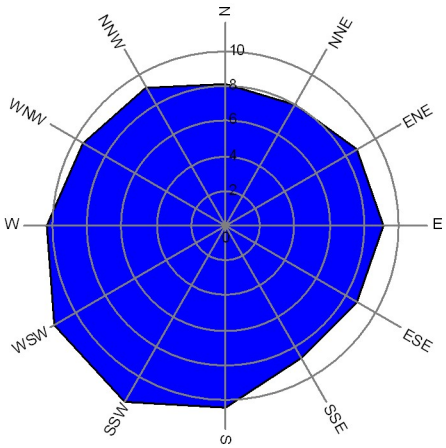
Weibull Distribution



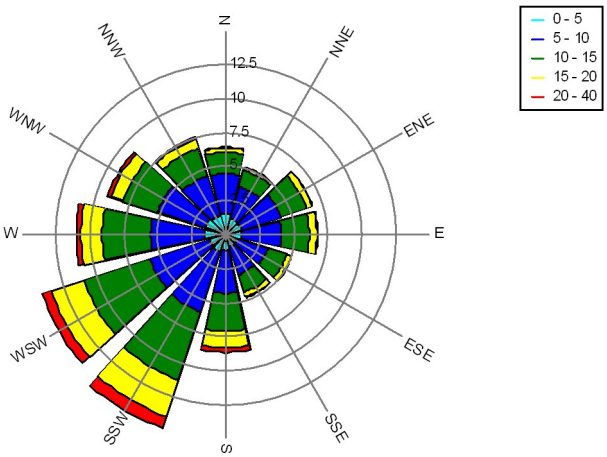
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
16/05/2019 10:18/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: C - HKW-05; Hub height: 165.0

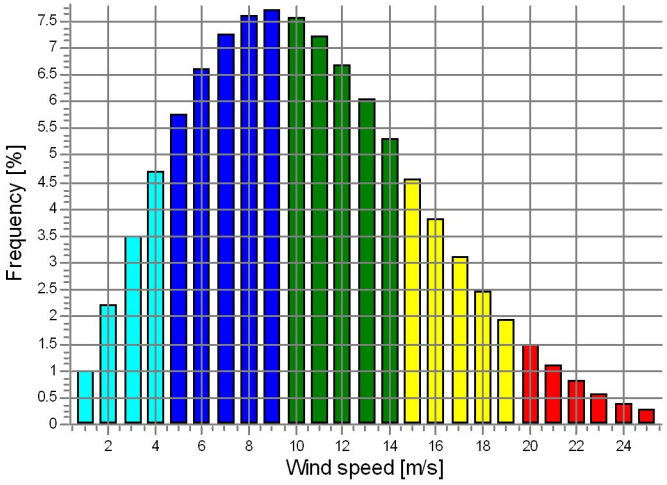
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 558,004 North: 5,849,256

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.994.wws

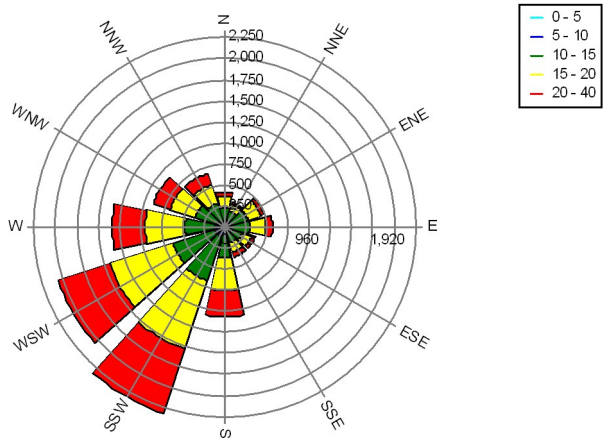
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.74	8.63	2.064	6.4
1 NNE	9.63	8.53	2.154	5.1
2 ENE	10.54	9.34	2.338	6.7
3 E	10.94	9.69	2.268	6.7
4 ESE	10.53	9.32	2.307	5.1
5 SSE	10.49	9.29	2.146	4.8
6 S	12.41	10.99	2.209	8.6
7 SSW	13.76	12.20	2.443	14.9
8 WSW	13.48	11.96	2.467	14.1
9 W	12.30	10.89	2.201	11.0
10 WNW	11.27	9.98	2.092	9.1
11 NNW	10.91	9.66	2.064	7.4
All	11.82	10.46	2.178	100.0

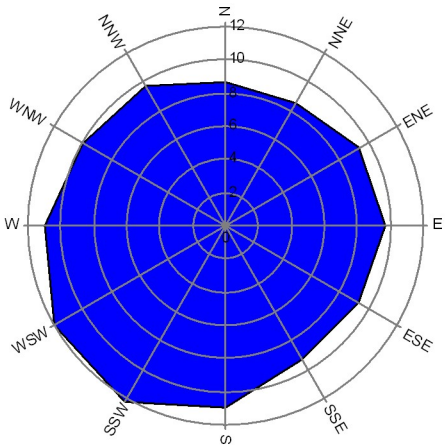
Weibull Distribution



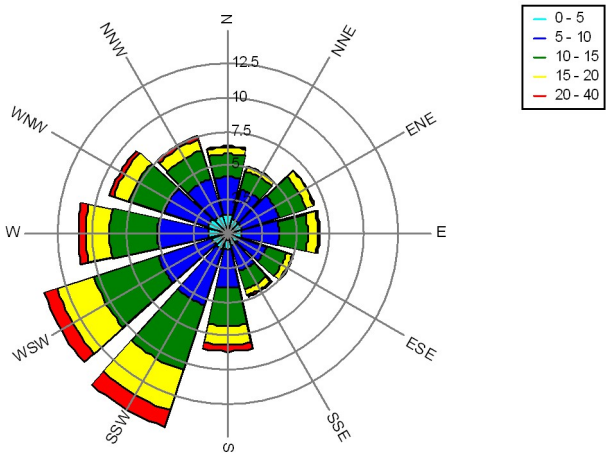
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
16/05/2019 10:18/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: D - OWEZ; Hub height: 165.0

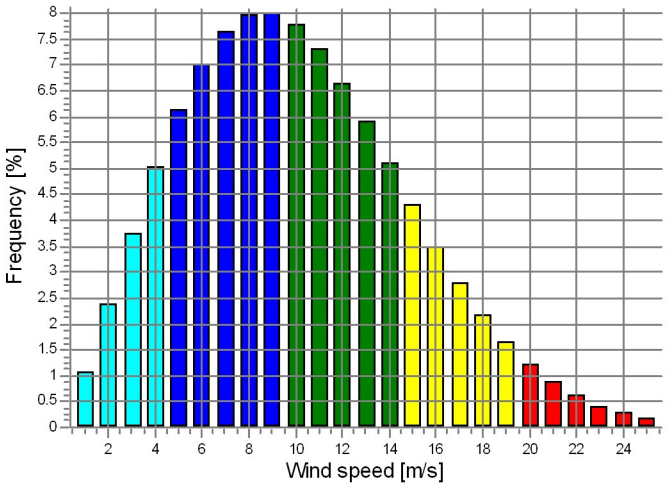
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 596,112 North: 5,829,642

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.955.wws

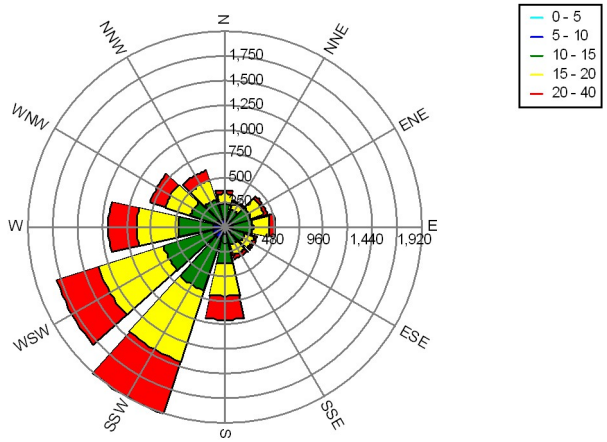
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.49	8.41	2.064	6.4
1 NNE	9.39	8.32	2.154	5.1
2 ENE	10.25	9.08	2.338	6.7
3 E	10.61	9.40	2.268	6.7
4 ESE	10.23	9.07	2.307	5.1
5 SSE	10.19	9.02	2.146	4.8
6 S	11.91	10.55	2.209	8.6
7 SSW	13.09	11.61	2.443	14.9
8 WSW	12.86	11.40	2.467	14.1
9 W	11.82	10.46	2.201	11.0
10 WNW	10.89	9.64	2.092	9.1
11 NNW	10.56	9.35	2.064	7.4
All	11.37	10.07	2.189	100.0

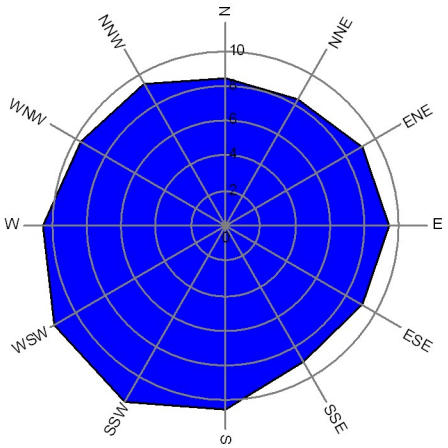
Weibull Distribution



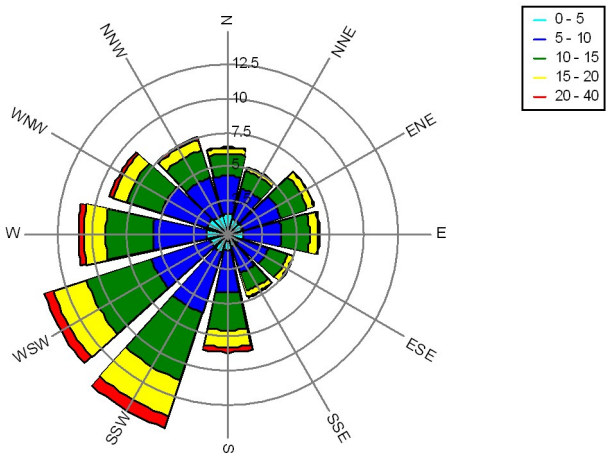
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: E - Prinses Amalia; Hub height: 165.0

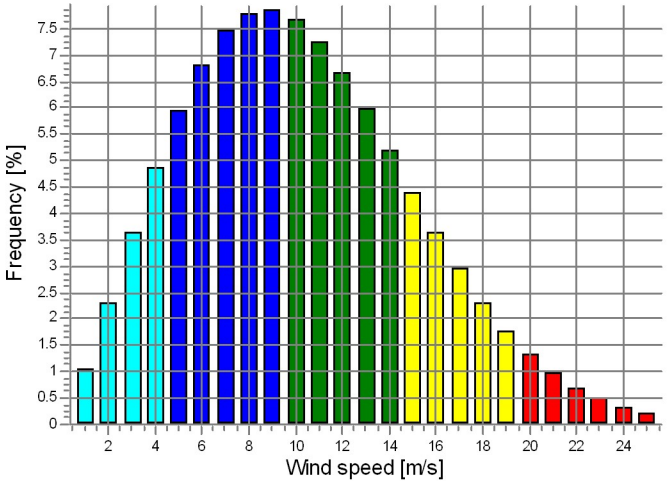
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 582,817 North: 5,827,056

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.974.wws

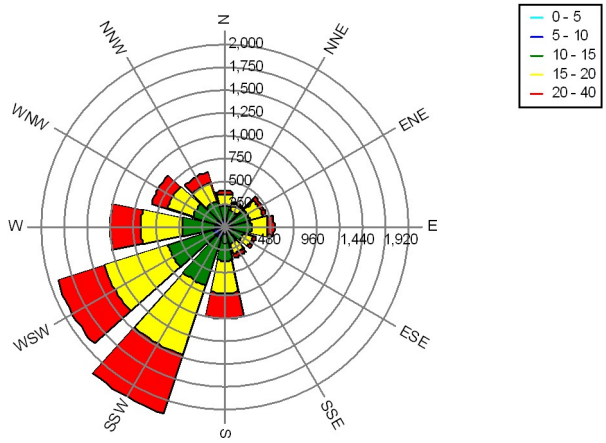
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.61	8.52	2.064	6.4
1 NNE	9.51	8.42	2.154	5.1
2 ENE	10.39	9.21	2.338	6.7
3 E	10.77	9.54	2.268	6.7
4 ESE	10.37	9.19	2.307	5.1
5 SSE	10.33	9.15	2.146	4.8
6 S	12.15	10.76	2.209	8.6
7 SSW	13.41	11.89	2.443	14.9
8 WSW	13.15	11.66	2.467	14.1
9 W	12.05	10.67	2.201	11.0
10 WNW	11.07	9.81	2.092	9.1
11 NNW	10.73	9.50	2.064	7.4
All	11.58	10.26	2.182	100.0

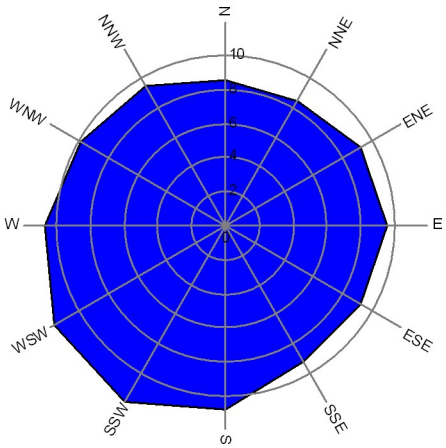
Weibull Distribution



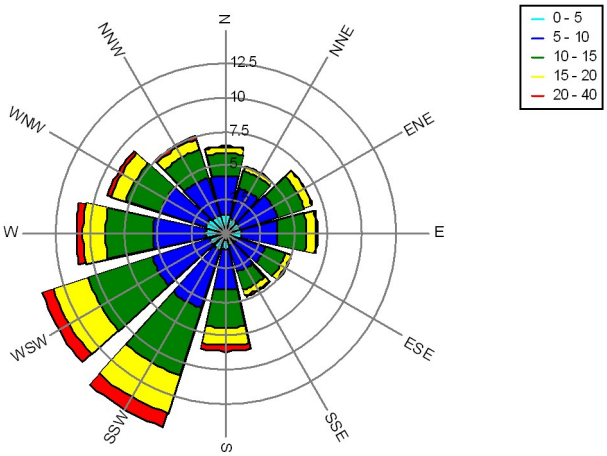
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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16/05/2019 10:18/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: F - Luchterduinen; Hub height: 165.0

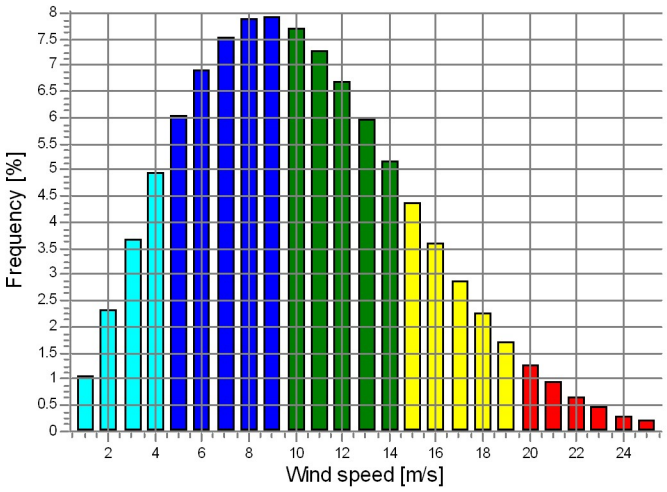
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 578,881 North: 5,806,416

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.966.wws

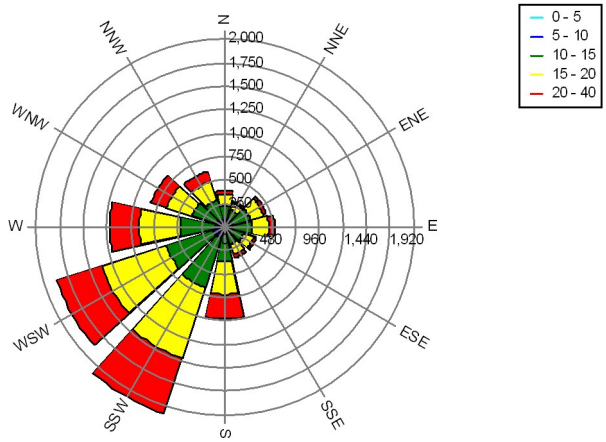
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.56	8.47	2.064	6.4
1 NNE	9.46	8.38	2.154	5.1
2 ENE	10.33	9.15	2.338	6.7
3 E	10.70	9.48	2.268	6.7
4 ESE	10.31	9.14	2.307	5.1
5 SSE	10.27	9.09	2.146	4.8
6 S	12.05	10.67	2.209	8.6
7 SSW	13.27	11.77	2.443	14.9
8 WSW	13.03	11.55	2.467	14.1
9 W	11.95	10.58	2.201	11.0
10 WNW	10.99	9.74	2.092	9.1
11 NNW	10.66	9.44	2.064	7.4
All	11.49	10.18	2.186	100.0

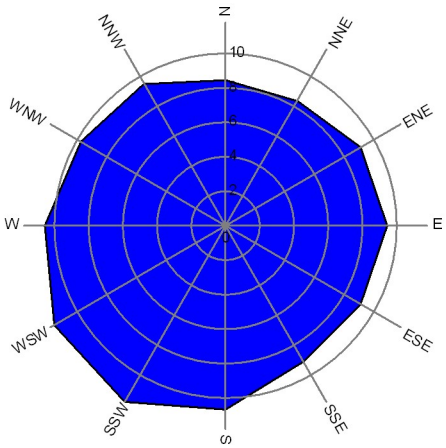
Weibull Distribution



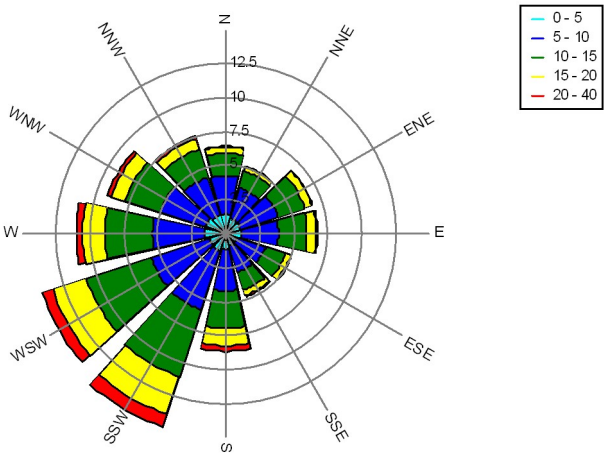
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
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PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: G - HKW-02; Hub height: 107.0

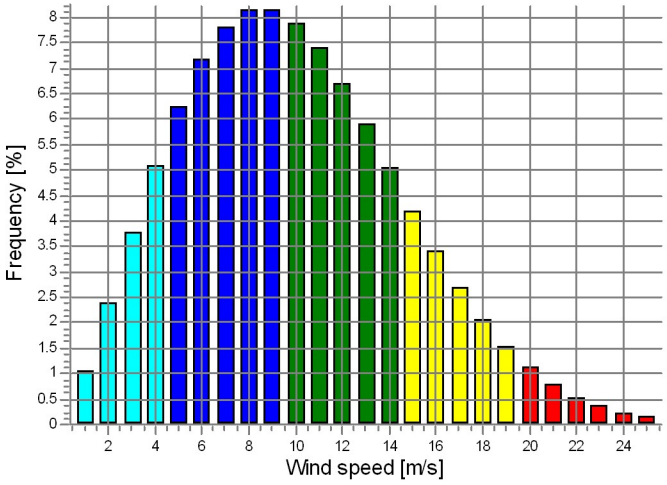
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 543,967 North: 5,835,763

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.995.wws

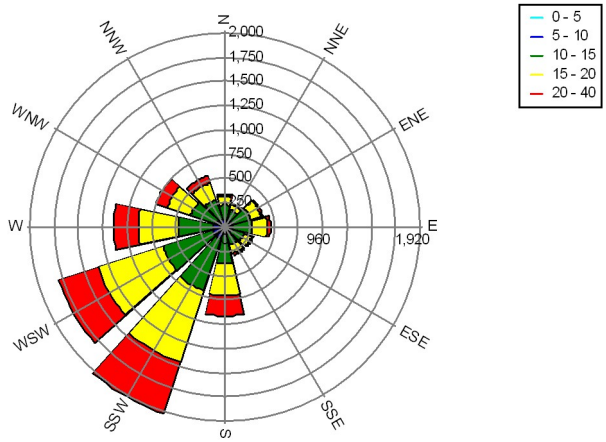
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.21	8.16	2.119	6.4
1 NNE	9.10	8.06	2.213	5.1
2 ENE	9.96	8.83	2.396	6.7
3 E	10.34	9.16	2.322	6.7
4 ESE	9.94	8.81	2.365	5.1
5 SSE	9.91	8.78	2.205	4.8
6 S	11.84	10.48	2.252	8.6
7 SSW	13.17	11.68	2.482	14.9
8 WSW	12.88	11.43	2.510	14.1
9 W	11.73	10.39	2.244	11.0
10 WNW	10.71	9.48	2.139	9.1
11 NNW	10.35	9.16	2.111	7.4
All	11.24	9.96	2.209	100.0

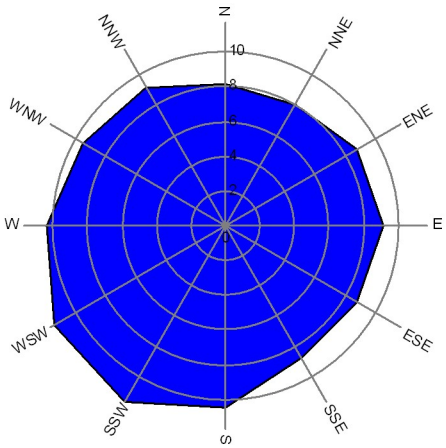
Weibull Distribution



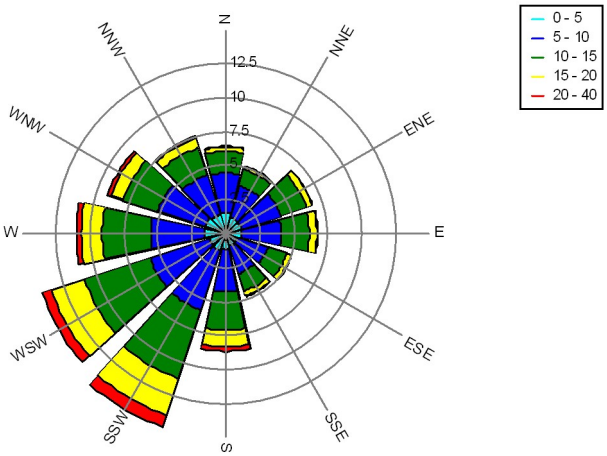
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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PARK - Wind Data Analysis

Calculation: HKW MER 10MW incl HKN&HKZWind data: G - HKW-02; Hub height: 165.0

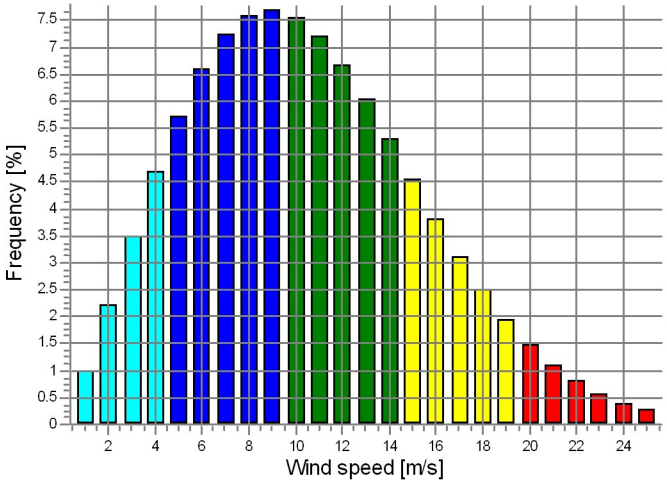
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 543,967 North: 5,835,763

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.995.wws

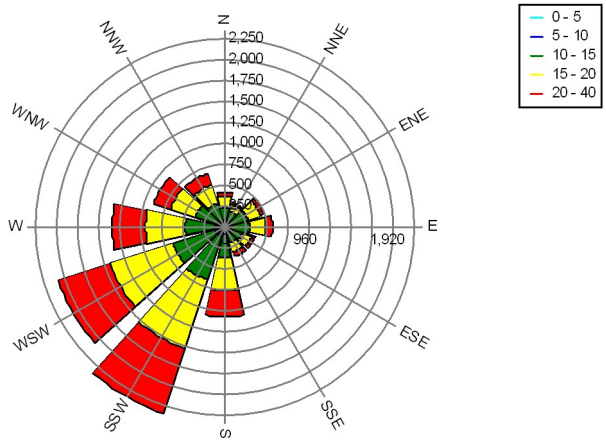
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.75	8.64	2.064	6.4
1 NNE	9.64	8.54	2.154	5.1
2 ENE	10.55	9.35	2.338	6.7
3 E	10.95	9.70	2.268	6.7
4 ESE	10.53	9.33	2.307	5.1
5 SSE	10.49	9.29	2.146	4.8
6 S	12.42	11.00	2.209	8.6
7 SSW	13.78	12.22	2.443	14.9
8 WSW	13.50	11.97	2.467	14.1
9 W	12.31	10.90	2.201	11.0
10 WNW	11.28	9.99	2.092	9.1
11 NNW	10.92	9.67	2.064	7.4
All	11.83	10.47	2.178	100.0

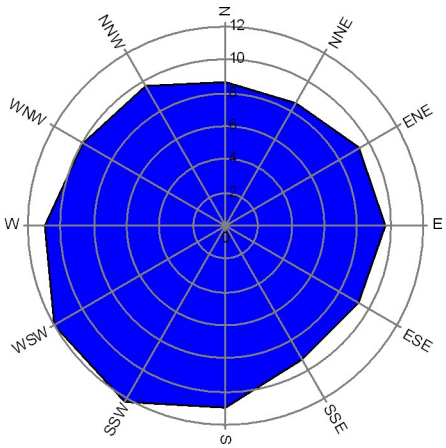
Weibull Distribution



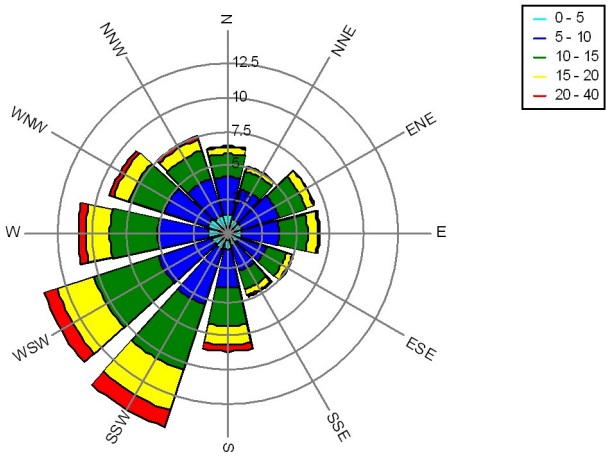
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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PARK - Park power curve

Calculation: HKW MER 10MW incl HKN&HKZ

Wind speed [m/s]	Power Free WTGs [kW]	Park WTGs [kW]	N [kW]	NNE [kW]	ENE [kW]	E [kW]	ESE [kW]	SSE [kW]	S [kW]	SSW [kW]	WSW [kW]	W [kW]	WNW [kW]	NNW [kW]
0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	45,220	36,653	35,982	35,360	36,943	36,472	38,189	36,910	35,951	35,216	37,104	36,731	38,547	37,207
4.5	120,232	87,592	85,736	82,436	87,435	87,264	93,895	88,958	85,564	81,976	87,982	88,506	95,145	90,255
5.5	232,788	169,378	164,994	159,330	169,530	168,459	181,933	172,390	164,665	158,081	170,945	170,801	184,380	174,907
6.5	397,556	291,992	284,490	274,665	292,472	290,343	313,097	297,277	283,947	272,350	294,933	294,576	317,371	301,828
7.5	625,024	469,015	457,193	442,039	470,430	466,323	501,139	478,020	456,347	438,013	474,482	472,618	507,652	484,964
8.5	920,284	711,886	694,063	674,626	716,018	707,721	755,708	725,262	692,997	668,440	721,693	715,930	764,408	734,421
9.5	1,256,660	1,015,150	991,029	969,499	1,024,336	1,009,235	1,067,339	1,032,554	989,957	961,986	1,030,719	1,018,511	1,077,101	1,042,875
10.5	1,504,800	1,320,586	1,293,019	1,279,863	1,340,063	1,313,327	1,364,181	1,338,316	1,292,721	1,274,419	1,343,987	1,318,516	1,369,422	1,343,789
11.5	1,520,000	1,470,672	1,450,590	1,451,720	1,495,173	1,463,090	1,482,202	1,480,111	1,450,386	1,454,207	1,492,810	1,464,669	1,482,250	1,480,990
12.5	1,520,000	1,509,015	1,502,066	1,500,923	1,518,288	1,508,611	1,509,729	1,512,826	1,501,614	1,503,217	1,517,865	1,508,660	1,509,545	1,512,925
13.5	1,520,000	1,518,659	1,517,508	1,517,483	1,519,935	1,519,072	1,518,633	1,519,238	1,516,942	1,517,899	1,519,935	1,518,975	1,518,664	1,519,282
14.5	1,520,000	1,519,976	1,519,961	1,519,975	1,520,000	1,519,995	1,519,985	1,519,994	1,519,906	1,519,980	1,520,000	1,519,993	1,519,989	1,519,996
15.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
16.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
17.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
18.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
19.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
20.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
21.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
22.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
23.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
24.5	1,520,000	1,519,996	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000	1,520,000
25.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Description:
The park power curve is similar to a WTG power curve, meaning that when a given wind speed appears in front of the park with same speed in the entire wind farm area (before influence from the park), the output from the park can be found in the park power curve. Another way to say this: The park power curve includes wake losses, but do NOT include terrain given variations in the wind speed over the park area.
Measuring a park power curve is not as simple as measuring a WTG power curve due to the fact that the park power curve depends on the wind direction and that the same wind speed normally will not appear for the entire park area at the same time (only in very flat non-complex terrain). The idea with this version of the park power curve is not to use it for validation based on measurements. This would require at least 2 measurement masts at two sides of the park, unless only a few direction sectors should be tested, AND non complex terrain (normally only useable off shore). Another park power curve version for complex terrain is available in windPRO.

The park power curve can be used for:

1. Forecast systems, based on more rough (approximated) wind data, the park power curve would be an efficient way to make the connection from wind speed (and direction) to power.
2. Construction of duration curves, telling how often a given power output will appear, the park power curve can be used together with the average wind distribution for the Wind farm area in hub height. The average wind distribution can eventually be obtained based on the Weibull parameters for each WTG position. These are found at print menu: >Result to file< in the >Park result< which can be saved to file or copied to clipboard and pasted in Excel.
3. Calculation of wind energy index based on the PARK production (see below).
4. Estimation of the expected PARK production for an existing wind farm based on wind measurements at minimum 2 measurement masts at two sides of wind farm. The masts must be used for obtaining the free wind speed. The free wind speed is used in the simulation of expected energy production with the PARK power curve. This procedure will only work suitable in non complex terrains. For complex terrain another park power curve calculation is available in windPRO (PPV-model).

Note:
From the >Result to file< the >Wind Speeds Inside Wind farm< is also available. These can (e.g. via Excel) be used for extracting the wake induced reductions in measured wind speed.

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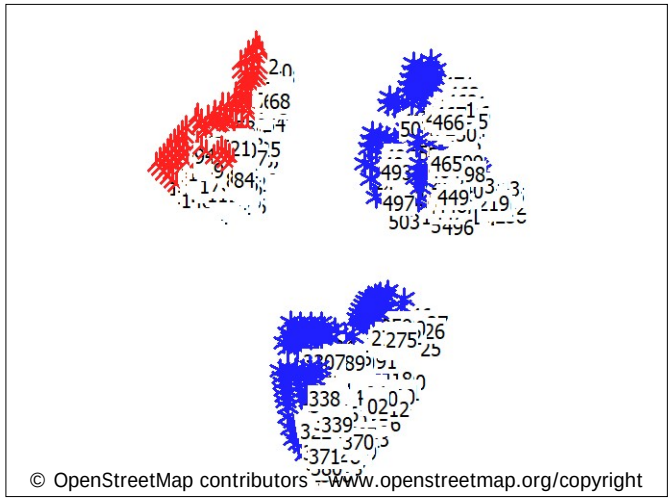
Calculated:
16/05/2019 10:18/3.2.712

PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

WTG distances

	Z [m]	Nearest WTG	Z [m]	Horizontal distance [m]	Distance in rotor diameters (max)	Distance in rotor diameters (min)
1	0.0	6	0.0	988	6.0	6.0
2	0.0	40	0.0	999	6.1	6.1
3	0.0	24	0.0	975	5.9	5.9
4	0.0	20	0.0	987	6.0	6.0
5	0.0	33	0.0	988	6.0	6.0
6	0.0	11	0.0	988	6.0	6.0
7	0.0	12	0.0	987	6.0	6.0
8	0.0	9	0.0	1,011	6.2	6.2
9	0.0	13	0.0	987	6.0	6.0
10	0.0	15	0.0	988	6.0	6.0
11	0.0	6	0.0	988	6.0	6.0
12	0.0	7	0.0	987	6.0	6.0
13	0.0	9	0.0	987	6.0	6.0
14	0.0	18	0.0	987	6.0	6.0
15	0.0	10	0.0	988	6.0	6.0
16	0.0	11	0.0	988	6.0	6.0
17	0.0	12	0.0	987	6.0	6.0
18	0.0	14	0.0	987	6.0	6.0
19	0.0	23	0.0	987	6.0	6.0
20	0.0	29	0.0	987	6.0	6.0
21	0.0	30	0.0	987	6.0	6.0
22	0.0	31	0.0	987	6.0	6.0
23	0.0	19	0.0	987	6.0	6.0
24	0.0	3	0.0	975	5.9	5.9
25	0.0	33	0.0	988	6.0	6.0
26	0.0	34	0.0	988	6.0	6.0
27	0.0	35	0.0	987	6.0	6.0
28	0.0	36	0.0	987	6.0	6.0
29	0.0	37	0.0	987	6.0	6.0
30	0.0	21	0.0	987	6.0	6.0
31	0.0	22	0.0	987	6.0	6.0
32	0.0	31	0.0	1,011	6.2	6.2
33	0.0	5	0.0	988	6.0	6.0
34	0.0	26	0.0	988	6.0	6.0
35	0.0	27	0.0	987	6.0	6.0
36	0.0	28	0.0	987	6.0	6.0
37	0.0	29	0.0	987	6.0	6.0
38	0.0	30	0.0	987	6.0	6.0
39	0.0	31	0.0	987	6.0	6.0
40	0.0	2	0.0	999	6.1	6.1
41	0.0	44	0.0	1,004	6.1	6.1
42	0.0	45	0.0	995	6.1	6.1
43	0.0	44	0.0	1,011	6.2	6.2
44	0.0	41	0.0	1,004	6.1	6.1
45	0.0	42	0.0	995	6.1	6.1
46	0.0	45	0.0	1,011	6.2	6.2
47	0.0	46	0.0	1,011	6.2	6.2
48	0.0	54	0.0	988	6.0	6.0
49	0.0	55	0.0	988	6.0	6.0
50	0.0	56	0.0	987	6.0	6.0
51	0.0	57	0.0	987	6.0	6.0
52	0.0	51	0.0	1,011	6.2	6.2
53	0.0	52	0.0	1,011	6.2	6.2
54	0.0	58	0.0	988	6.0	6.0
55	0.0	59	0.0	988	6.0	6.0
56	0.0	60	0.0	987	6.0	6.0
57	0.0	61	0.0	987	6.0	6.0
58	0.0	62	0.0	988	6.0	6.0
59	0.0	63	0.0	988	6.0	6.0
60	0.0	64	0.0	987	6.0	6.0
61	0.0	57	0.0	987	6.0	6.0
62	0.0	58	0.0	988	6.0	6.0
63	0.0	66	0.0	988	6.0	6.0



Scale 1:1,250,000

New WTG Existing WTG

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PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
64	0.0	67	0.0	987	6.0	6.0
65	0.0	68	0.0	988	6.0	6.0
66	0.0	69	0.0	988	6.0	6.0
67	0.0	70	0.0	987	6.0	6.0
68	0.0	71	0.0	988	6.0	6.0
69	0.0	72	0.0	988	6.0	6.0
70	0.0	73	0.0	987	6.0	6.0
71	0.0	75	0.0	988	6.0	6.0
72	0.0	76	0.0	988	6.0	6.0
73	0.0	70	0.0	987	6.0	6.0
74	0.0	73	0.0	1,011	6.2	6.2
75	0.0	71	0.0	988	6.0	6.0
76	0.0	72	0.0	988	6.0	6.0
77	0.0	94	0.0	996	6.1	6.1
78	0.0	101	0.0	997	6.1	6.1
79	0.0	80	0.0	984	6.0	6.0
80	0.0	81	0.0	984	6.0	6.0
81	0.0	80	0.0	984	6.0	6.0
82	0.0	81	0.0	984	6.0	6.0
83	0.0	84	0.0	984	6.0	6.0
84	0.0	85	0.0	984	6.0	6.0
85	0.0	84	0.0	984	6.0	6.0
86	0.0	85	0.0	984	6.0	6.0
87	0.0	88	0.0	984	6.0	6.0
88	0.0	89	0.0	984	6.0	6.0
89	0.0	88	0.0	984	6.0	6.0
90	0.0	89	0.0	984	6.0	6.0
91	0.0	92	0.0	984	6.0	6.0
92	0.0	93	0.0	984	6.0	6.0
93	0.0	92	0.0	984	6.0	6.0
94	0.0	95	0.0	984	6.0	6.0
95	0.0	94	0.0	984	6.0	6.0
96	0.0	97	0.0	984	6.0	6.0
97	0.0	98	0.0	984	6.0	6.0
98	0.0	97	0.0	984	6.0	6.0
99	0.0	98	0.0	984	6.0	6.0
100	0.0	101	0.0	984	6.0	6.0
101	0.0	100	0.0	984	6.0	6.0
102	0.0	103	0.0	984	6.0	6.0
103	0.0	104	0.0	984	6.0	6.0
104	0.0	103	0.0	984	6.0	6.0
105	0.0	104	0.0	984	6.0	6.0
106	0.0	105	0.0	984	6.0	6.0
107	0.0	108	0.0	984	6.0	6.0
108	0.0	109	0.0	984	6.0	6.0
109	0.0	108	0.0	984	6.0	6.0
110	0.0	109	0.0	984	6.0	6.0
111	0.0	112	0.0	984	6.0	6.0
112	0.0	113	0.0	984	6.0	6.0
113	0.0	112	0.0	984	6.0	6.0
114	0.0	113	0.0	984	6.0	6.0
115	0.0	114	0.0	984	6.0	6.0
116	0.0	117	0.0	984	6.0	6.0
117	0.0	118	0.0	984	6.0	6.0
118	0.0	117	0.0	984	6.0	6.0
119	0.0	120	0.0	984	6.0	6.0
120	0.0	121	0.0	984	6.0	6.0
121	0.0	120	0.0	984	6.0	6.0
122	0.0	121	0.0	984	6.0	6.0
123	0.0	124	0.0	984	6.0	6.0
124	0.0	125	0.0	984	6.0	6.0
125	0.0	124	0.0	984	6.0	6.0
126	0.0	125	0.0	984	6.0	6.0

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PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
127	0.0	126	0.0	984	6.0	6.0
128	0.0	127	0.0	984	6.0	6.0
129	0.0	130	0.0	984	6.0	6.0
130	0.0	129	0.0	984	6.0	6.0
131	0.0	132	0.0	984	6.0	6.0
132	0.0	133	0.0	984	6.0	6.0
133	0.0	132	0.0	984	6.0	6.0
134	0.0	133	0.0	984	6.0	6.0
135	0.0	134	0.0	984	6.0	6.0
136	0.0	135	0.0	984	6.0	6.0
137	0.0	136	0.0	984	6.0	6.0
138	0.0	139	0.0	984	6.0	6.0
139	0.0	140	0.0	984	6.0	6.0
140	0.0	139	0.0	984	6.0	6.0
141	0.0	140	0.0	984	6.0	6.0
142	0.0	141	0.0	984	6.0	6.0
143	0.0	142	0.0	984	6.0	6.0
144	0.0	143	0.0	984	6.0	6.0
145	0.0	146	0.0	984	6.0	6.0
146	0.0	147	0.0	984	6.0	6.0
147	0.0	146	0.0	984	6.0	6.0
148	0.0	147	0.0	984	6.0	6.0
149	0.0	148	0.0	984	6.0	6.0
150	0.0	149	0.0	984	6.0	6.0
151	0.0	150	0.0	984	6.0	6.0
152	0.0	151	0.0	984	6.0	6.0
153	0.0	154	0.0	550	6.9	6.9
154	0.0	153	0.0	550	6.9	6.9
155	0.0	156	0.0	550	6.9	6.9
156	0.0	155	0.0	550	6.9	6.9
157	0.0	153	0.0	550	6.9	6.9
158	0.0	160	0.0	550	6.9	6.9
159	0.0	161	0.0	549	6.9	6.9
160	0.0	168	0.0	550	6.9	6.9
161	0.0	159	0.0	549	6.9	6.9
162	0.0	165	0.0	550	6.9	6.9
163	0.0	166	0.0	550	6.9	6.9
164	0.0	163	0.0	550	6.9	6.9
165	0.0	162	0.0	550	6.9	6.9
166	0.0	163	0.0	550	6.9	6.9
167	0.0	169	0.0	550	6.9	6.9
168	0.0	166	0.0	550	6.9	6.9
169	0.0	167	0.0	550	6.9	6.9
170	0.0	178	0.0	550	6.9	6.9
171	0.0	169	0.0	550	6.9	6.9
172	0.0	173	0.0	550	6.9	6.9
173	0.0	172	0.0	550	6.9	6.9
174	0.0	172	0.0	550	6.9	6.9
175	0.0	178	0.0	550	6.9	6.9
176	0.0	171	0.0	551	6.9	6.9
177	0.0	179	0.0	550	6.9	6.9
178	0.0	175	0.0	550	6.9	6.9
179	0.0	177	0.0	550	6.9	6.9
180	0.0	187	0.0	549	6.9	6.9
181	0.0	183	0.0	550	6.9	6.9
182	0.0	179	0.0	550	6.9	6.9
183	0.0	181	0.0	550	6.9	6.9
184	0.0	181	0.0	550	6.9	6.9
185	0.0	187	0.0	550	6.9	6.9
186	0.0	188	0.0	549	6.9	6.9
187	0.0	180	0.0	549	6.9	6.9
188	0.0	186	0.0	549	6.9	6.9
189	0.0	195	0.0	550	6.9	6.9

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PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

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	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
190	0.0	192	0.0	550	6.9	6.9
191	0.0	193	0.0	550	6.9	6.9
192	0.0	194	0.0	550	6.9	6.9
193	0.0	191	0.0	550	6.9	6.9
194	0.0	192	0.0	550	6.9	6.9
195	0.0	189	0.0	550	6.9	6.9
196	0.0	198	0.0	550	6.9	6.9
197	0.0	194	0.0	550	6.9	6.9
198	0.0	201	0.0	550	6.9	6.9
199	0.0	203	0.0	550	6.9	6.9
200	0.0	208	0.0	550	6.9	6.9
201	0.0	198	0.0	550	6.9	6.9
202	0.0	204	0.0	549	6.9	6.9
203	0.0	199	0.0	550	6.9	6.9
204	0.0	202	0.0	549	6.9	6.9
205	0.0	197	0.0	550	6.9	6.9
206	0.0	207	0.0	550	6.9	6.9
207	0.0	206	0.0	550	6.9	6.9
208	0.0	209	0.0	549	6.9	6.9
209	0.0	208	0.0	549	6.9	6.9
210	0.0	211	0.0	549	6.9	6.9
211	0.0	210	0.0	549	6.9	6.9
212	0.0	209	0.0	552	6.9	6.9
213	0.0	214	0.0	646	7.2	7.2
214	0.0	215	0.0	644	7.2	7.2
215	0.0	216	0.0	644	7.2	7.2
216	0.0	215	0.0	644	7.2	7.2
217	0.0	216	0.0	644	7.2	7.2
218	0.0	217	0.0	644	7.2	7.2
219	0.0	220	0.0	644	7.2	7.2
220	0.0	221	0.0	643	7.1	7.1
221	0.0	220	0.0	643	7.1	7.1
222	0.0	224	0.0	644	7.2	7.2
223	0.0	226	0.0	632	7.0	7.0
224	0.0	222	0.0	644	7.2	7.2
225	0.0	227	0.0	644	7.2	7.2
226	0.0	223	0.0	632	7.0	7.0
227	0.0	228	0.0	642	7.1	7.1
228	0.0	227	0.0	642	7.1	7.1
229	0.0	226	0.0	646	7.2	7.2
230	0.0	233	0.0	643	7.1	7.1
231	0.0	232	0.0	646	7.2	7.2
232	0.0	234	0.0	644	7.2	7.2
233	0.0	230	0.0	643	7.1	7.1
234	0.0	232	0.0	644	7.2	7.2
235	0.0	234	0.0	644	7.2	7.2
236	0.0	238	0.0	643	7.1	7.1
237	0.0	235	0.0	724	8.0	8.0
238	0.0	236	0.0	643	7.1	7.1
239	0.0	242	0.0	647	7.2	7.2
240	0.0	241	0.0	644	7.2	7.2
241	0.0	243	0.0	642	7.1	7.1
242	0.0	239	0.0	647	7.2	7.2
243	0.0	241	0.0	642	7.1	7.1
244	0.0	243	0.0	644	7.2	7.2
245	0.0	244	0.0	736	8.2	8.2
246	0.0	249	0.0	863	7.7	7.7
247	0.0	250	0.0	668	6.0	6.0
248	0.0	250	0.0	553	4.9	4.9
249	0.0	254	0.0	688	6.1	6.1
250	0.0	248	0.0	553	4.9	4.9
251	0.0	253	0.0	534	4.8	4.8
252	0.0	250	0.0	586	5.2	5.2

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PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

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	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
253	0.0	255	0.0	533	4.8	4.8
254	0.0	252	0.0	633	5.7	5.7
255	0.0	253	0.0	533	4.8	4.8
256	0.0	255	0.0	534	4.8	4.8
257	0.0	259	0.0	544	4.9	4.9
258	0.0	260	0.0	535	4.8	4.8
259	0.0	257	0.0	544	4.9	4.9
260	0.0	258	0.0	535	4.8	4.8
261	0.0	262	0.0	553	4.9	4.9
262	0.0	264	0.0	543	4.8	4.8
263	0.0	265	0.0	575	5.1	5.1
264	0.0	262	0.0	543	4.8	4.8
265	0.0	267	0.0	563	5.0	5.0
266	0.0	264	0.0	582	5.2	5.2
267	0.0	265	0.0	563	5.0	5.0
268	0.0	267	0.0	573	5.1	5.1
269	0.0	271	0.0	558	5.0	5.0
270	0.0	272	0.0	557	5.0	5.0
271	0.0	269	0.0	558	5.0	5.0
272	0.0	270	0.0	557	5.0	5.0
273	0.0	271	0.0	570	5.1	5.1
274	0.0	273	0.0	591	5.3	5.3
275	0.0	278	0.0	580	5.2	5.2
276	0.0	277	0.0	575	5.1	5.1
277	0.0	276	0.0	575	5.1	5.1
278	0.0	275	0.0	580	5.2	5.2
279	0.0	277	0.0	592	5.3	5.3
280	0.0	281	0.0	588	5.2	5.2
281	0.0	280	0.0	588	5.2	5.2
282	0.0	283	0.0	586	5.2	5.2
283	0.0	282	0.0	586	5.2	5.2
284	0.0	281	0.0	613	5.5	5.5
285	0.0	283	0.0	622	5.6	5.6
286	0.0	287	0.0	596	5.3	5.3
287	0.0	286	0.0	596	5.3	5.3
288	0.0	287	0.0	696	6.2	6.2
289	0.0	300	0.0	1,122	6.8	6.8
290	0.0	289	0.0	1,313	8.0	8.0
291	0.0	290	0.0	1,438	8.8	8.8
292	0.0	296	0.0	1,059	6.5	6.5
293	0.0	297	0.0	1,059	6.5	6.5
294	0.0	298	0.0	1,059	6.5	6.5
295	0.0	299	0.0	1,059	6.5	6.5
296	0.0	292	0.0	1,059	6.5	6.5
297	0.0	293	0.0	1,059	6.5	6.5
298	0.0	294	0.0	1,059	6.5	6.5
299	0.0	295	0.0	1,059	6.5	6.5
300	0.0	289	0.0	1,122	6.8	6.8
301	0.0	306	0.0	1,060	6.5	6.5
302	0.0	307	0.0	1,060	6.5	6.5
303	0.0	308	0.0	1,059	6.5	6.5
304	0.0	309	0.0	1,059	6.5	6.5
305	0.0	310	0.0	1,059	6.5	6.5
306	0.0	312	0.0	1,059	6.5	6.5
307	0.0	302	0.0	1,060	6.5	6.5
308	0.0	303	0.0	1,059	6.5	6.5
309	0.0	304	0.0	1,059	6.5	6.5
310	0.0	305	0.0	1,059	6.5	6.5
311	0.0	316	0.0	1,059	6.5	6.5
312	0.0	306	0.0	1,059	6.5	6.5
313	0.0	307	0.0	1,060	6.5	6.5
314	0.0	308	0.0	1,059	6.5	6.5
315	0.0	309	0.0	1,059	6.5	6.5

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PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

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	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
316	0.0	311	0.0	1,059	6.5	6.5
317	0.0	312	0.0	1,060	6.5	6.5
318	0.0	327	0.0	1,179	7.2	7.2
319	0.0	333	0.0	1,028	6.3	6.3
320	0.0	338	0.0	959	5.8	5.8
321	0.0	349	0.0	925	5.6	5.6
322	0.0	323	0.0	1,015	6.2	6.2
323	0.0	324	0.0	1,015	6.2	6.2
324	0.0	325	0.0	1,015	6.2	6.2
325	0.0	326	0.0	1,015	6.2	6.2
326	0.0	327	0.0	1,015	6.2	6.2
327	0.0	326	0.0	1,015	6.2	6.2
328	0.0	329	0.0	1,016	6.2	6.2
329	0.0	330	0.0	1,015	6.2	6.2
330	0.0	331	0.0	1,015	6.2	6.2
331	0.0	330	0.0	1,015	6.2	6.2
332	0.0	333	0.0	1,015	6.2	6.2
333	0.0	332	0.0	1,015	6.2	6.2
334	0.0	335	0.0	1,015	6.2	6.2
335	0.0	334	0.0	1,015	6.2	6.2
336	0.0	337	0.0	1,015	6.2	6.2
337	0.0	338	0.0	1,015	6.2	6.2
338	0.0	320	0.0	959	5.8	5.8
339	0.0	340	0.0	1,015	6.2	6.2
340	0.0	341	0.0	1,015	6.2	6.2
341	0.0	342	0.0	1,015	6.2	6.2
342	0.0	341	0.0	1,015	6.2	6.2
343	0.0	344	0.0	1,015	6.2	6.2
344	0.0	343	0.0	1,015	6.2	6.2
345	0.0	346	0.0	1,015	6.2	6.2
346	0.0	347	0.0	1,015	6.2	6.2
347	0.0	348	0.0	1,015	6.2	6.2
348	0.0	349	0.0	1,015	6.2	6.2
349	0.0	321	0.0	925	5.6	5.6
350	0.0	351	0.0	1,015	6.2	6.2
351	0.0	352	0.0	1,014	6.2	6.2
352	0.0	351	0.0	1,014	6.2	6.2
353	0.0	354	0.0	1,015	6.2	6.2
354	0.0	355	0.0	1,015	6.2	6.2
355	0.0	354	0.0	1,015	6.2	6.2
356	0.0	361	0.0	1,176	7.2	7.2
357	0.0	362	0.0	1,176	7.2	7.2
358	0.0	363	0.0	1,176	7.2	7.2
359	0.0	364	0.0	1,175	7.2	7.2
360	0.0	365	0.0	1,176	7.2	7.2
361	0.0	356	0.0	1,176	7.2	7.2
362	0.0	368	0.0	1,175	7.2	7.2
363	0.0	369	0.0	1,175	7.2	7.2
364	0.0	359	0.0	1,175	7.2	7.2
365	0.0	390	0.0	1,163	7.1	7.1
366	0.0	371	0.0	1,177	7.2	7.2
367	0.0	372	0.0	1,176	7.2	7.2
368	0.0	362	0.0	1,175	7.2	7.2
369	0.0	389	0.0	1,055	6.4	6.4
370	0.0	364	0.0	1,175	7.2	7.2
371	0.0	376	0.0	1,176	7.2	7.2
372	0.0	367	0.0	1,176	7.2	7.2
373	0.0	379	0.0	1,174	7.2	7.2
374	0.0	390	0.0	1,090	6.6	6.6
375	0.0	380	0.0	1,176	7.2	7.2
376	0.0	371	0.0	1,176	7.2	7.2
377	0.0	372	0.0	1,176	7.2	7.2
378	0.0	383	0.0	1,176	7.2	7.2

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Calculated:
16/05/2019 10:18/3.2.712

PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
379	0.0	373	0.0	1,174	7.2	7.2
380	0.0	384	0.0	1,032	6.3	6.3
381	0.0	384	0.0	1,060	6.5	6.5
382	0.0	388	0.0	1,064	6.5	6.5
383	0.0	378	0.0	1,176	7.2	7.2
384	0.0	386	0.0	1,031	6.3	6.3
385	0.0	386	0.0	842	5.1	5.1
386	0.0	385	0.0	842	5.1	5.1
387	0.0	386	0.0	982	6.0	6.0
388	0.0	382	0.0	1,064	6.5	6.5
389	0.0	369	0.0	1,055	6.4	6.4
390	0.0	391	0.0	975	5.9	5.9
391	0.0	390	0.0	975	5.9	5.9
392	0.0	390	0.0	988	6.0	6.0
393	0.0	392	0.0	1,046	6.4	6.4
394	0.0	395	0.0	1,033	6.3	6.3
395	0.0	396	0.0	1,033	6.3	6.3
396	0.0	395	0.0	1,033	6.3	6.3
397	0.0	398	0.0	1,033	6.3	6.3
398	0.0	397	0.0	1,033	6.3	6.3
399	0.0	398	0.0	1,033	6.3	6.3
400	0.0	401	0.0	1,033	6.3	6.3
401	0.0	402	0.0	1,033	6.3	6.3
402	0.0	403	0.0	1,033	6.3	6.3
403	0.0	404	0.0	1,033	6.3	6.3
404	0.0	405	0.0	1,033	6.3	6.3
405	0.0	404	0.0	1,033	6.3	6.3
406	0.0	407	0.0	1,033	6.3	6.3
407	0.0	408	0.0	1,033	6.3	6.3
408	0.0	407	0.0	1,033	6.3	6.3
409	0.0	410	0.0	1,033	6.3	6.3
410	0.0	411	0.0	1,032	6.3	6.3
411	0.0	410	0.0	1,032	6.3	6.3
412	0.0	413	0.0	1,033	6.3	6.3
413	0.0	414	0.0	1,032	6.3	6.3
414	0.0	413	0.0	1,032	6.3	6.3
415	0.0	414	0.0	1,033	6.3	6.3
416	0.0	417	0.0	900	5.5	5.5
417	0.0	416	0.0	900	5.5	5.5
418	0.0	419	0.0	900	5.5	5.5
419	0.0	418	0.0	900	5.5	5.5
420	0.0	421	0.0	901	5.5	5.5
421	0.0	420	0.0	901	5.5	5.5
422	0.0	288	0.0	1,357	12.1	8.3
423	0.0	272	0.0	1,377	12.3	8.4
424	0.0	260	0.0	1,311	11.7	8.0
425	0.0	423	0.0	2,489	15.2	15.2
426	0.0	427	0.0	1,450	8.8	8.8
427	0.0	426	0.0	1,450	8.8	8.8
428	0.0	400	0.0	1,108	6.8	6.8
429	0.0	430	0.0	978	6.0	6.0
430	0.0	429	0.0	978	6.0	6.0
431	0.0	430	0.0	1,108	6.8	6.8
432	0.0	433	0.0	1,318	8.0	8.0
433	0.0	432	0.0	1,318	8.0	8.0
434	0.0	478	0.0	1,318	8.0	8.0
435	0.0	488	0.0	1,317	8.0	8.0
436	0.0	485	0.0	1,315	8.0	8.0
437	0.0	439	0.0	1,317	8.0	8.0
438	0.0	464	0.0	1,317	8.0	8.0
439	0.0	457	0.0	1,316	8.0	8.0
440	0.0	213	0.0	2,090	23.2	12.7
441	0.0	442	0.0	1,478	9.0	9.0

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PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

...continued from previous page

	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
442	0.0	447	0.0	1,318	8.0	8.0
443	0.0	448	0.0	1,318	8.0	8.0
444	0.0	451	0.0	1,316	8.0	8.0
445	0.0	452	0.0	1,315	8.0	8.0
446	0.0	453	0.0	1,315	8.0	8.0
447	0.0	442	0.0	1,318	8.0	8.0
448	0.0	455	0.0	1,318	8.0	8.0
449	0.0	448	0.0	1,320	8.0	8.0
450	0.0	458	0.0	1,315	8.0	8.0
451	0.0	459	0.0	1,315	8.0	8.0
452	0.0	460	0.0	1,314	8.0	8.0
453	0.0	461	0.0	1,314	8.0	8.0
454	0.0	462	0.0	1,314	8.0	8.0
455	0.0	456	0.0	1,223	7.5	7.5
456	0.0	455	0.0	1,223	7.5	7.5
457	0.0	439	0.0	1,316	8.0	8.0
458	0.0	450	0.0	1,315	8.0	8.0
459	0.0	466	0.0	1,313	8.0	8.0
460	0.0	467	0.0	1,313	8.0	8.0
461	0.0	468	0.0	1,313	8.0	8.0
462	0.0	469	0.0	1,312	8.0	8.0
463	0.0	470	0.0	1,312	8.0	8.0
464	0.0	465	0.0	1,195	7.3	7.3
465	0.0	464	0.0	1,195	7.3	7.3
466	0.0	459	0.0	1,313	8.0	8.0
467	0.0	460	0.0	1,313	8.0	8.0
468	0.0	461	0.0	1,313	8.0	8.0
469	0.0	462	0.0	1,312	8.0	8.0
470	0.0	463	0.0	1,312	8.0	8.0
471	0.0	470	0.0	1,320	8.0	8.0
472	0.0	473	0.0	1,280	7.8	7.8
473	0.0	480	0.0	1,202	7.3	7.3
474	0.0	481	0.0	1,313	8.0	8.0
475	0.0	482	0.0	1,313	8.0	8.0
476	0.0	483	0.0	1,312	8.0	8.0
477	0.0	484	0.0	1,312	8.0	8.0
478	0.0	434	0.0	1,318	8.0	8.0
479	0.0	437	0.0	1,318	8.0	8.0
480	0.0	473	0.0	1,202	7.3	7.3
481	0.0	480	0.0	1,266	7.7	7.7
482	0.0	475	0.0	1,313	8.0	8.0
483	0.0	476	0.0	1,312	8.0	8.0
484	0.0	477	0.0	1,312	8.0	8.0
485	0.0	507	0.0	1,315	8.0	8.0
486	0.0	489	0.0	1,288	7.9	7.9
487	0.0	491	0.0	1,318	8.0	8.0
488	0.0	492	0.0	1,317	8.0	8.0
489	0.0	486	0.0	1,288	7.9	7.9
490	0.0	493	0.0	1,317	8.0	8.0
491	0.0	494	0.0	1,317	8.0	8.0
492	0.0	495	0.0	1,317	8.0	8.0
493	0.0	490	0.0	1,317	8.0	8.0
494	0.0	491	0.0	1,317	8.0	8.0
495	0.0	492	0.0	1,317	8.0	8.0
496	0.0	506	0.0	2,021	12.3	12.3
497	0.0	502	0.0	2,088	12.7	12.7
498	0.0	499	0.0	1,925	11.7	11.7
499	0.0	498	0.0	1,925	11.7	11.7
500	0.0	465	0.0	1,907	11.6	11.6
501	0.0	504	0.0	1,543	9.4	9.4
502	0.0	195	0.0	1,182	14.8	7.2
503	0.0	156	0.0	1,173	14.7	7.2
504	0.0	465	0.0	1,514	9.2	9.2

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PARK - WTG distances

Calculation: HKW MER 10MW incl HKN&HKZ

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	Z [m]	Nearest WTG	Z [m]	Horizontal distance [m]	Distance in rotor diameters (max)	Distance in rotor diameters (min)
505	0.0	450	0.0	1,801	11.0	11.0
506	0.0	496	0.0	2,021	12.3	12.3
507	0.0	489	0.0	1,298	7.9	7.9
Min	0.0		0.0	533	4.8	4.8
Max	0.0		0.0	2,489	23.2	15.2

PARK - Wind statistics info

Calculation: HKW MER 10MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,994.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,994
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
Effective measurement length	300.0 Months

Note

To get the most correct calculation results, wind statistics shall be calculated with the SAME model and model parameters, as currently chosen in calculation. For WAsP versions before 10.0, the model is unchanged, but thereafter more model changes affecting the wind statistic is seen. Likewise WAsP CFD should always use WAsP CFD calculated wind statistics.

PARK - Wind statistics info

Calculation: HKW MER 10MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,991.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,991
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
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Note

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PARK - Wind statistics info

Calculation: HKW MER 10MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,994.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,994
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
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Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
Effective measurement length	300.0 Months

Note

To get the most correct calculation results, wind statistics shall be calculated with the SAME model and model parameters, as currently chosen in calculation. For WAsP versions before 10.0, the model is unchanged, but thereafter more model changes affecting the wind statistic is seen. Likewise WAsP CFD should always use WAsP CFD calculated wind statistics.

PARK - Wind statistics info

Calculation: HKW MER 10MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,955.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,955
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
Effective measurement length	300.0 Months

Note

To get the most correct calculation results, wind statistics shall be calculated with the SAME model and model parameters, as currently chosen in calculation. For WAsP versions before 10.0, the model is unchanged, but thereafter more model changes affecting the wind statistic is seen. Likewise WAsP CFD should always use WAsP CFD calculated wind statistics.

PARK - Wind statistics info

Calculation: HKW MER 10MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,974.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,974
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
Effective measurement length	300.0 Months

Note

To get the most correct calculation results, wind statistics shall be calculated with the SAME model and model parameters, as currently chosen in calculation. For WAsP versions before 10.0, the model is unchanged, but thereafter more model changes affecting the wind statistic is seen. Likewise WAsP CFD should always use WAsP CFD calculated wind statistics.

PARK - Wind statistics info

Calculation: HKW MER 10MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,966.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,966
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
Effective measurement length	300.0 Months

Note

To get the most correct calculation results, wind statistics shall be calculated with the SAME model and model parameters, as currently chosen in calculation. For WAsP versions before 10.0, the model is unchanged, but thereafter more model changes affecting the wind statistic is seen. Likewise WAsP CFD should always use WAsP CFD calculated wind statistics.

PARK - Wind statistics info

Calculation: HKW MER 10MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,995.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,995
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
Effective measurement length	300.0 Months

Note

To get the most correct calculation results, wind statistics shall be calculated with the SAME model and model parameters, as currently chosen in calculation. For WAsP versions before 10.0, the model is unchanged, but thereafter more model changes affecting the wind statistic is seen. Likewise WAsP CFD should always use WAsP CFD calculated wind statistics.

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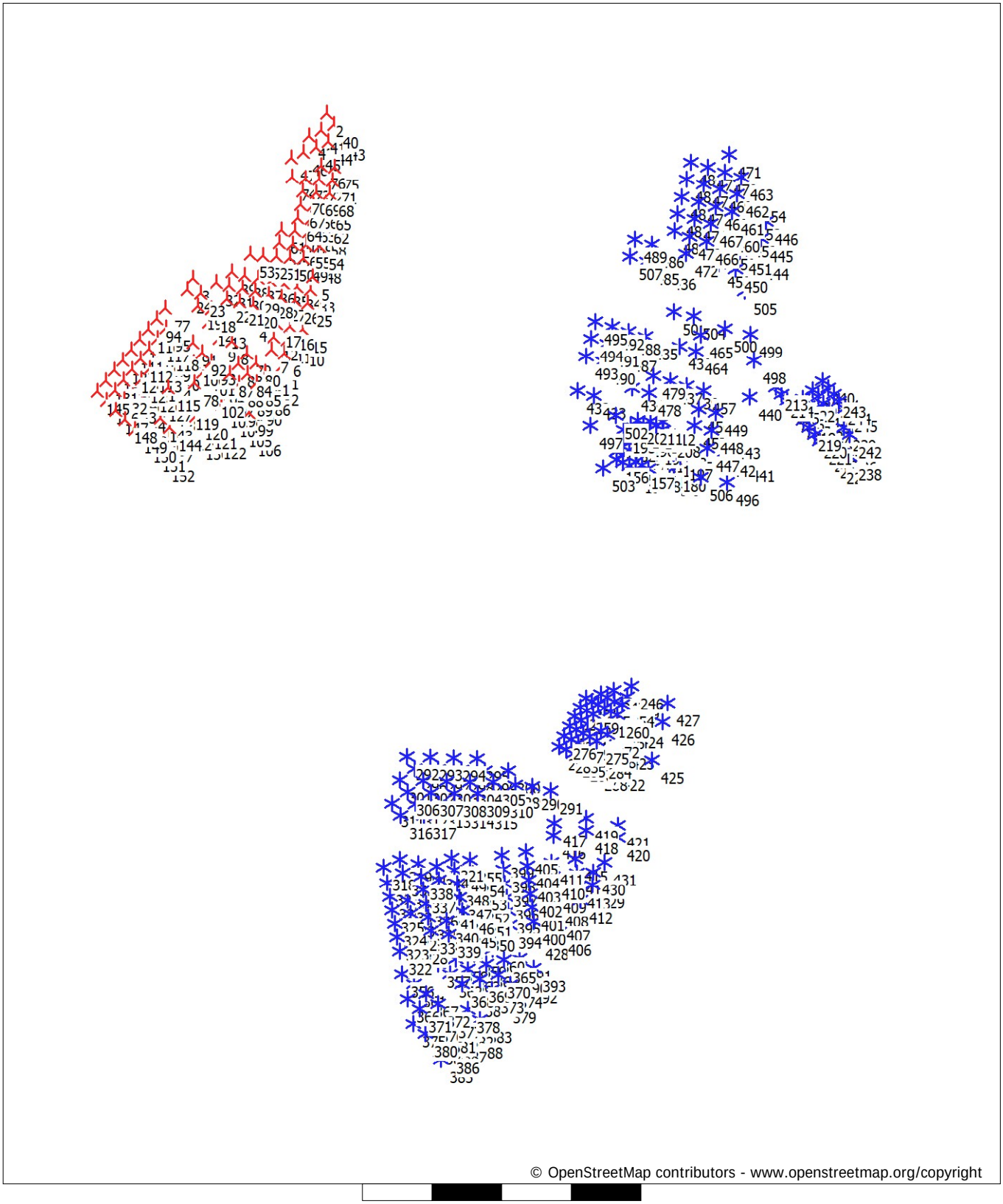
Calculated:
16/05/2019 10:18/3.2.712

PARK - Map

Calculation: HKW MER 10MW incl HKN&HKZ



Map: Open Street Map 001 , Print scale 1:400,000, Map center UTM (north)-ETRS89 Zone: 31 East: 569,735 North: 5,816,667

New WTG Existing WTG

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Calculated:
16/05/2019 11:32/3.2.712

PARK - Main Result

Calculation: HKW MER 16MW incl HKN&HKZ

Wake Model N.O. Jensen (EMD) : 2005
Include mirror wakes

Calculation performed in UTM (north)-WGS84 Zone: 31
At the site centre the difference between grid north and true north is: 2.2°

Power curve correction method
New windPRO method (adjusted IEC method, improved to match turbine control) <RECOMMENDED>
Air density calculation method
Fixed standard
Air density: 1.225 kg/m³ -> 100.0 % of Std

Wake Model Parameters

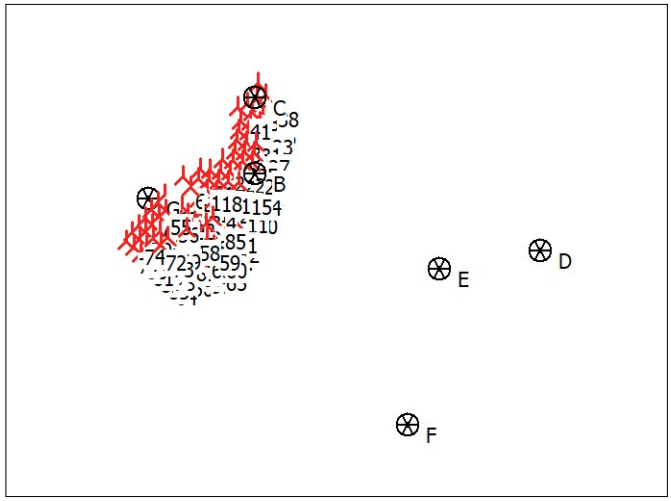
Terrain type	Wake decay constant
HH:100m Offshore	0.030

Omnidirectional displacement height from objects

Wake calculation settings

Angle [°]			Wind speed [m/s]		
start	end	step	start	end	step
0.5	360.0	1.0	0.5	30.5	1.0

WAsP version WAsP 11 Version 11.06.0028



Scale 1:1,000,000
New WTG Site Data

Key results for height 165.0 m above ground level

Terrain UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Name of wind distribution	Type	Wind energy	Mean wind speed	Equivalent roughness
					[kWh/m²]	[m/s]	
A	548,060	5,829,150	HKW-03	WAsP (WAsP 11 Version 11.06.0028)	10,182	10.5	0.0
B	558,112	5,839,246	HKW-04	WAsP (WAsP 11 Version 11.06.0028)	10,107	10.4	0.0
C	558,004	5,849,256	HKW-05	WAsP (WAsP 11 Version 11.06.0028)	10,182	10.5	0.0
D	596,112	5,829,642	OWEZ	WAsP (WAsP 11 Version 11.06.0028)	9,227	10.1	0.0
E	582,817	5,827,056	Prinses Amalia	WAsP (WAsP 11 Version 11.06.0028)	9,685	10.3	0.0
F	578,881	5,806,416	Luchterduinen	WAsP (WAsP 11 Version 11.06.0028)	9,489	10.2	0.0
G	543,967	5,835,763	HKW-02	WAsP (WAsP 11 Version 11.06.0028)	10,207	10.5	0.0

Calculated Annual Energy for Wind Farm

WTG combination	Result PARK	GROSS (no loss) Free WTGs	Wake loss	Specific results¤) Capacity factor	Mean WTG result	Full load hours	Mean wind speed @hub height
	[MWh/y]	[MWh/y]	[%]	[%]	[MWh/y]	[Hours/year]	[m/s]
Wind farm	7,478,756.8	8,313,150.7	10.0	56.7	79,561.2	4,973	10.5

¤) Based on wake reduced results, but no other losses included

Calculated Annual Energy for each of 94 new WTGs with total 1,504.0 MW rated power

	Links	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Power curve Creator	Name	Annual Energy Result	Wake loss	Free mean wind speed
					[kW]	[m]	[m]			[MWh/y]	[%]	[m/s]
1	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,053.6	9.3	10.43
2	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,712.5	12.2	10.46
3	G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,256.4	10.5	10.47
4	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,077.8	11.6	10.43
5	G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,631.8	9.0	10.47
6	G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,986.8	6.3	10.47
7	C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	85,346.9	3.6	10.46
8	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,480.2	11.1	10.43
9	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,614.4	12.1	10.43
10	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,362.5	9.0	10.43
11	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,661.0	10.9	10.43
12	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	76,996.0	12.8	10.43
13	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,547.2	12.2	10.43
14	B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,628.7	9.8	10.43

To be continued on next page...
*) Included in wake losses is influence from 355 WTG(s) in the neighborhood, which has status as "Reference WTGs", see separate report to identify these.

PARK - Main Result

Calculation: HKW MER 16MW incl HKN&HKZ

...continued from previous page

Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Power curve Name	Annual Energy Result [MWh/y]	Wake loss [%]	Free mean wind speed [m/s]
15 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,096.0	11.5	10.43
16 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,117.4	12.6	10.43
17 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,008.1	12.8	10.43
18 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,640.8	12.1	10.43
19 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,611.9	10.1	10.47
20 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,906.4	10.6	10.43
21 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,652.6	12.0	10.43
22 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,118.2	11.5	10.43
23 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,913.6	9.5	10.43
24 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,839.2	10.7	10.43
25 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,809.0	11.9	10.43
26 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,345.0	10.1	10.43
27 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,096.5	10.4	10.43
28 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,422.1	11.2	10.43
29 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,195.8	9.2	10.43
30 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,671.7	10.0	10.46
31 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,979.4	10.7	10.46
32 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,965.3	8.5	10.46
33 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,153.4	9.4	10.46
34 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,633.1	10.0	10.46
35 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	81,630.7	7.8	10.46
36 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,968.3	8.5	10.46
37 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,866.2	8.6	10.46
38 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	83,281.9	5.9	10.46
39 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,110.2	7.2	10.46
40 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,328.1	7.0	10.46
41 C	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	83,753.1	5.4	10.46
42 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,943.4	10.6	10.43
43 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,463.3	12.3	10.43
44 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,283.5	12.5	10.43
45 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,792.1	11.9	10.43
46 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,884.7	10.6	10.43
47 B	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,705.4	8.6	10.43
48 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	81,771.3	7.7	10.47
49 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,739.8	11.0	10.46
50 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,505.4	6.8	10.46
51 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,314.7	12.6	10.46
52 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,204.9	10.5	10.46
53 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,012.4	13.0	10.46
54 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,953.1	10.8	10.46
55 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	81,034.0	8.5	10.47
56 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,791.3	11.0	10.47
57 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,533.6	11.3	10.46
58 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,532.1	12.4	10.46
59 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,495.8	12.4	10.46
60 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,325.1	10.4	10.46
61 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,990.0	8.5	10.47
62 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,389.3	11.5	10.47
63 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,299.7	11.5	10.46
64 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,773.2	9.9	10.46
65 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,575.1	6.7	10.46
66 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,902.6	8.6	10.47
67 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,248.6	11.6	10.47
68 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,331.2	12.6	10.46
69 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,787.7	12.1	10.46
70 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	81,443.0	8.0	10.47
71 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	78,708.4	11.1	10.47
72 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,715.1	12.2	10.46
73 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,996.4	11.9	10.46
74 G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,339.1	7.0	10.47
75 A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,968.4	9.6	10.46

To be continued on next page...

PARK - Main Result

Calculation: HKW MER 16MW incl HKN&HKZ

...continued from previous page

	Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Annual Energy Result [MWh/y]	Wake loss [%]	Free mean wind speed [m/s]
76	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,050.8	10.7	10.46
77	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,119.0	10.6	10.46
78	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,920.1	9.7	10.46
79	G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	84,363.2	4.7	10.47
80	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,725.4	6.5	10.46
81	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,197.5	7.1	10.46
82	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,231.8	7.1	10.46
83	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,743.9	6.5	10.46
84	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	83,847.9	5.2	10.46
85	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,078.8	12.9	10.46
86	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	76,598.9	13.4	10.46
87	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	76,832.8	13.2	10.46
88	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,866.3	12.0	10.46
89	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,620.5	10.0	10.46
90	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	80,260.6	9.3	10.46
91	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	82,162.1	7.2	10.46
92	G	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	79,826.4	9.9	10.47
93	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,902.6	12.0	10.46
94	A	No	Pondera	RD279HH165-16,000	16,000	279.0	164.5	USER	Theoretical PV curve at 16MW	77,184.1	12.8	10.46

Annual Energy results do not include any losses apart from wake losses. For expected NET AEP (expected sold production), see report Loss & Uncertainty.

WTG siting

		UTM (north)-ETRS89 Zone: 31 Easting	Northing	Z [m]	Row data/Description
1	New	555,418	5,832,984	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8053)
2	New	550,836	5,833,940	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8054)
3	New	550,605	5,835,862	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8056)
4	New	552,591	5,835,772	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8059)
5	New	549,538	5,837,302	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8060)
6	New	548,471	5,838,743	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8062)
7	New	558,315	5,851,100	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8073)
8	New	555,114	5,834,331	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8055.1)
9	New	553,797	5,834,473	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8055.2)
10	New	556,681	5,835,489	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8058.1)
11	New	555,364	5,835,630	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8058.2)
12	New	553,002	5,836,932	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8061.1)
13	New	551,681	5,837,034	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8061.2)
14	New	557,175	5,837,934	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8063.1)
15	New	555,854	5,838,035	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8063.2)
16	New	554,533	5,838,136	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8063.3)
17	New	553,213	5,838,237	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8063.4)
18	New	551,892	5,838,339	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8063.5)
19	New	550,571	5,838,441	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8063.6)
20	New	557,680	5,840,684	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8064.1)
21	New	556,363	5,840,825	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8064.2)
22	New	555,046	5,840,965	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8064.3)
23	New	553,729	5,841,106	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8064.4)
24	New	557,930	5,841,983	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8065.1)
25	New	556,613	5,842,123	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8065.2)
26	New	555,296	5,842,264	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8065.3)
27	New	558,180	5,843,281	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8066.1)
28	New	556,863	5,843,422	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8066.2)
29	New	555,546	5,843,562	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8066.3)
30	New	558,430	5,844,580	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8067.1)
31	New	557,113	5,844,720	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8067.2)
32	New	555,795	5,844,861	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8067.3)
33	New	558,680	5,845,879	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8068.1)

To be continued on next page...

Licensed user:
Pondera Consult B.V.
Welbergweg 49
NL-7556 PE Hengelo
0031742489940

Calculated:
16/05/2019 11:32/3.2.712

PARK - Main Result

Calculation: HKW MER 16MW incl HKN&HKZ

...continued from previous page

UTM (north)-ETRS89 Zone: 31

		Easting	Northing	Z [m]	Row data/Description
34	New	557,363	5,846,019	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8068.2)
35	New	556,045	5,846,159	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8068.3)
36	New	558,930	5,847,178	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8069.1)
37	New	557,612	5,847,318	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8069.2)
38	New	559,360	5,849,570	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8070.1)
39	New	558,146	5,849,041	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8070.2)
40	New	556,931	5,848,512	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8070.3)
41	New	555,716	5,847,983	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8070.4)
42	New	557,389	5,839,233	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8072.1)
43	New	556,068	5,839,334	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8072.2)
44	New	554,748	5,839,434	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8072.3)
45	New	553,427	5,839,536	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8072.4)
46	New	552,106	5,839,637	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8072.5)
47	New	550,785	5,839,739	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8072.6)
48	New	546,091	5,836,249	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8116)
49	New	548,330	5,830,759	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8122)
50	New	548,177	5,827,136	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8126.2)
51	New	553,432	5,832,601	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8115.1)
52	New	554,377	5,831,688	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8115.2)
53	New	552,583	5,831,596	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8117.1)
54	New	553,528	5,830,683	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8117.2)
55	New	545,243	5,835,245	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8118.1)
56	New	546,186	5,834,331	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8118.2)
57	New	548,238	5,832,880	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8119.1)
58	New	549,074	5,831,866	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8119.2)
59	New	551,734	5,830,591	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8120.1)
60	New	552,679	5,829,678	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8120.2)
61	New	544,330	5,834,322	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8121.1)
62	New	545,361	5,833,507	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8121.2)
63	New	550,722	5,829,666	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8123.1)
64	New	551,731	5,828,823	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8123.2)
65	New	552,740	5,827,981	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8123.3)
66	New	543,504	5,833,240	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8124.1)
67	New	544,506	5,832,390	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8124.2)
68	New	545,508	5,831,540	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8124.3)
69	New	546,511	5,830,690	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8124.4)
70	New	542,631	5,832,274	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8125.1)
71	New	543,633	5,831,424	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8125.2)
72	New	544,635	5,830,573	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8125.3)
73	New	545,637	5,829,723	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8125.4)
74	New	541,781	5,831,285	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8127.1)
75	New	542,782	5,830,434	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8127.2)
76	New	543,784	5,829,584	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8127.3)
77	New	544,786	5,828,734	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8127.4)
78	New	545,788	5,827,883	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8127.5)
79	New	541,001	5,830,227	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8128.1)
80	New	542,003	5,829,376	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8128.2)
81	New	543,004	5,828,526	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8128.3)
82	New	544,006	5,827,675	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8128.4)
83	New	545,008	5,826,825	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8128.5)
84	New	546,010	5,825,974	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8128.6)
85	New	552,494	5,833,504	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8129.1)
86	New	551,643	5,832,502	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8129.2)
87	New	550,793	5,831,500	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8129.3)
88	New	549,942	5,830,499	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8129.4)
89	New	548,719	5,829,277	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8130.1)
90	New	549,721	5,828,428	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8130.2)
91	New	550,724	5,827,578	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8130.3)
92	New	548,367	5,834,783	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8133.1)
93	New	549,203	5,833,769	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8133.2)
94	New	550,040	5,832,756	0.0	Pondera RD279HH165 16000 279.0 !O! hub: 164.5 m (TOT: 304.0 m) (8133.3)

Licensed user:
Pondera Consult B.V.
Welbergweg 49
NL-7556 PE Hengelo
0031742489940

Calculated:
16/05/2019 11:32/3.2.712

PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

Wake Model N.O. Jensen (EMD) : 2005
Include mirror wakes

Calculation performed in UTM (north)-WGS84 Zone: 31
At the site centre the difference between grid north and true north is: 2.2°

Power curve correction method
New windPRO method (adjusted IEC method, improved to match turbine control) <RECOMMENDED>
Air density calculation method
Fixed standard
Air density: 1.225 kg/m³ -> 100.0 % of Std

Wake Model Parameters

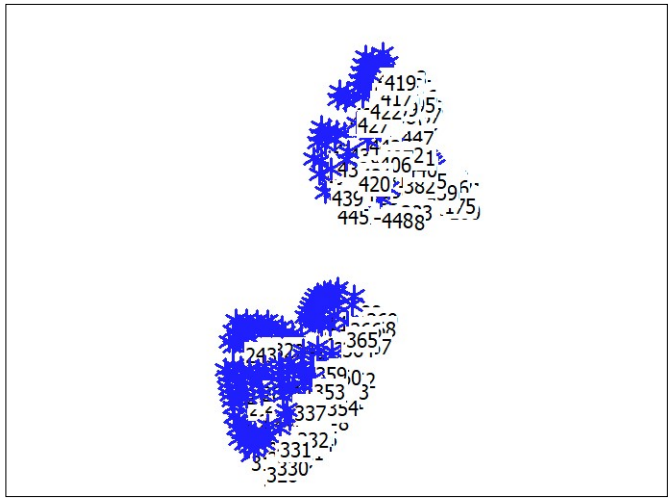
Terrain type	Wake decay constant
HH:100m Offshore	0.030

Omnidirectional displacement height from objects

Wake calculation settings

Angle [°]			Wind speed [m/s]		
start	end	step	start	end	step
0.5	360.0	1.0	0.5	30.5	1.0

WAsP version WAsP 11 Version 11.06.0028



Scale 1:1,250,000
New WTG
Existing WTG

Key results for height 165.0 m above ground level

Terrain UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Name of wind distribution	Type	Wind energy [kWh/m²]	Mean wind speed [m/s]	Equivalent roughness
A	548,060	5,829,150	HKW-03	WAsP (WAsP 11 Version 11.06.0028)	10,182	10.5	0.0
B	558,112	5,839,246	HKW-04	WAsP (WAsP 11 Version 11.06.0028)	10,107	10.4	0.0
C	558,004	5,849,256	HKW-05	WAsP (WAsP 11 Version 11.06.0028)	10,182	10.5	0.0
D	596,112	5,829,642	OWEZ	WAsP (WAsP 11 Version 11.06.0028)	9,227	10.1	0.0
E	582,817	5,827,056	Prinses Amalia	WAsP (WAsP 11 Version 11.06.0028)	9,685	10.3	0.0
F	578,881	5,806,416	Luchterduinen	WAsP (WAsP 11 Version 11.06.0028)	9,489	10.2	0.0
G	543,967	5,835,763	HKW-02	WAsP (WAsP 11 Version 11.06.0028)	10,207	10.5	0.0

Calculated Annual Energy for reference WTGs

Calculated prod. without new WTGs	GROSS (no loss) Free WTGs	Wake loss	Specific results Capacity factor	Specific results Mean WTG result	Full load hours	Mean wind speed @hub height	Actual wind corrected energy	Goodness Factor
[MWh/y]	[MWh/y]	[%]	[%]	[MWh/y]	[Hours/year]	[m/s]	[MWh/y]	[%]
12,888,725.0	13,814,928.4	6.8	57.9	36,306.3	5,078	9.6	0.0	

Calculated Annual Energy for each of 355 reference WTGs with total 2,538.0 MW rated power

Links	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Power curve Creator	Name	Calculated prod. without new WTGs	Goodness Factor
				[kW]	[m]	[m]			[MWh/y]	[%]
95 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,086.1	0
96 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,035.8	0
97 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,043.3	0
98 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,174.9	0
99 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,761.3	0
100 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,928.0	0
101 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,682.7	0
102 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,056.3	0
103 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,700.7	0
104 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,820.2	0
105 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,580.7	0
106 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,522.2	0
107 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,074.2	0
108 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,626.8	0
109 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,533.3	0
110 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,784.5	0

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

...continued from previous page

Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
111 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,648.8	0
112 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,053.7	0
113 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,757.5	0
114 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,411.2	0
115 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,457.7	0
116 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,408.1	0
117 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,498.6	0
118 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,110.4	0
119 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,476.2	0
120 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,662.2	0
121 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,581.0	0
122 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,917.9	0
123 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,336.9	0
124 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,831.2	0
125 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,371.8	0
126 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,354.6	0
127 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,463.0	0
128 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,386.9	0
129 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,624.8	0
130 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,480.7	0
131 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,658.4	0
132 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,354.1	0
133 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,346.5	0
134 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,404.1	0
135 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,380.1	0
136 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,474.9	0
137 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	8,000.4	0
138 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,450.6	0
139 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,758.5	0
140 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,597.0	0
141 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,440.7	0
142 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,388.9	0
143 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,817.5	0
144 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,377.4	0
145 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,527.5	0
146 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,445.9	0
147 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,654.5	0
148 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,565.0	0
149 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,819.8	0
150 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,546.3	0
151 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,473.4	0
152 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,494.3	0
153 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,671.9	0
154 E	Yes	VESTAS	V80-2.0MW offshore-2,000	2,000	80.0	60.0	EMD	Level 0 - calculated - - 09/2001	7,709.2	0
155 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,478.7	0
156 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,407.7	0
157 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,371.2	0
158 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,337.6	0
159 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,309.8	0
160 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,323.7	0
161 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,342.2	0
162 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,390.1	0
163 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,410.4	0
164 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,161.8	0
165 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,443.1	0
166 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,051.6	0
167 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,045.3	0
168 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,492.1	0
169 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,056.3	0
170 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,133.4	0
171 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,575.4	0
172 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,211.4	0
173 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,204.7	0
174 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,057.1	0
175 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,245.9	0
176 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,020.2	0
177 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,043.2	0
178 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,348.5	0
179 D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,166.1	0

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PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

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	Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
180	D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,576.2	0
181	D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,217.1	0
182	D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,345.3	0
183	D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,203.2	0
184	D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,301.2	0
185	D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,166.4	0
186	D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,209.8	0
187	D	Yes	VESTAS	V90-3,000	3,000	90.0	70.0	EMD	Mode 0	11,314.0	0
188	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,569.3	0
189	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,146.7	0
190	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,069.4	0
191	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,168.1	0
192	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,735.4	0
193	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,291.2	0
194	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,663.2	0
195	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,757.9	0
196	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,929.8	0
197	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,565.5	0
198	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,459.9	0
199	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,108.4	0
200	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,462.0	0
201	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,612.2	0
202	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,724.5	0
203	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,419.1	0
204	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,325.2	0
205	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,069.5	0
206	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,347.7	0
207	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,580.6	0
208	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,648.5	0
209	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,398.2	0
210	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,337.6	0
211	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,079.7	0
212	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,367.6	0
213	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,617.9	0
214	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,577.1	0
215	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,459.9	0
216	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,391.1	0
217	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,458.5	0
218	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,165.6	0
219	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,759.7	0
220	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,688.1	0
221	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,642.0	0
222	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,588.4	0
223	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,637.5	0
224	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,410.9	0
225	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,086.4	0
226	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	13,885.7	0
227	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,038.4	0
228	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,004.5	0
229	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,062.6	0
230	F	Yes	VESTAS	V112 offshore-3,000	3,000	112.0	81.0	EMD	Level 0 - Estimated - Mode 0 - 08-2011	14,318.0	0
231	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,087.1	0
232	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,705.0	0
233	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,107.1	0
234	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,959.9	0
235	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,873.4	0
236	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,552.5	0
237	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,555.0	0
238	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,701.3	0
239	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,954.5	0
240	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,715.8	0
241	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,860.3	0
242	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,370.9	0
243	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,521.1	0
244	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,088.9	0
245	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,614.4	0
246	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,512.9	0
247	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,674.1	0
248	F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,588.2	0

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PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

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Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
249 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,766.7	0
250 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,487.8	0
251 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,565.0	0
252 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,947.6	0
253 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,778.9	0
254 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,330.6	0
255 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,866.4	0
256 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,983.3	0
257 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,159.5	0
258 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,292.5	0
259 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,554.4	0
260 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,684.4	0
261 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,692.5	0
262 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,622.8	0
263 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,428.5	0
264 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,297.7	0
265 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,938.7	0
266 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,790.1	0
267 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,759.4	0
268 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,811.9	0
269 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,001.3	0
270 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,884.0	0
271 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,340.6	0
272 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,176.7	0
273 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,202.4	0
274 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,364.0	0
275 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,735.3	0
276 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,160.2	0
277 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,656.6	0
278 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,530.6	0
279 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,587.4	0
280 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,864.8	0
281 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,311.6	0
282 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,618.6	0
283 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,260.0	0
284 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,246.8	0
285 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,395.1	0
286 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,002.4	0
287 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,726.1	0
288 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,325.4	0
289 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,167.7	0
290 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,244.6	0
291 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,579.3	0
292 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,193.9	0
293 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,704.1	0
294 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,454.8	0
295 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,497.0	0
296 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,677.9	0
297 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,219.3	0
298 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,694.3	0
299 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,019.0	0
300 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,157.5	0
301 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,826.1	0
302 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,028.1	0
303 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,639.0	0
304 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,518.5	0
305 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,791.5	0
306 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,644.9	0
307 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,767.5	0
308 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,438.2	0
309 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,045.3	0
310 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,377.9	0
311 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,872.2	0
312 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	50,783.8	0
313 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,409.8	0
314 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,604.3	0
315 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,407.5	0
316 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,503.2	0
317 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,622.5	0

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PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

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Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
318 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,941.3	0
319 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,445.2	0
320 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,603.2	0
321 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,646.9	0
322 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,110.2	0
323 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,661.8	0
324 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,738.7	0
325 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,163.7	0
326 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,922.4	0
327 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,161.4	0
328 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,866.1	0
329 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,141.0	0
330 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,845.8	0
331 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,361.3	0
332 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,141.6	0
333 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,317.9	0
334 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,246.5	0
335 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,265.5	0
336 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,572.4	0
337 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,239.9	0
338 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,168.0	0
339 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,180.4	0
340 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,358.9	0
341 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,855.8	0
342 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,676.2	0
343 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,397.9	0
344 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,298.9	0
345 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,285.3	0
346 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,471.7	0
347 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,018.4	0
348 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,895.0	0
349 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,193.9	0
350 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,738.6	0
351 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,529.9	0
352 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,501.2	0
353 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,753.1	0
354 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,664.4	0
355 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,815.4	0
356 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,643.2	0
357 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,067.4	0
358 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,416.4	0
359 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,569.7	0
360 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,689.3	0
361 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,818.0	0
362 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,374.0	0
363 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,241.1	0
364 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,908.2	0
365 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,441.2	0
366 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,576.0	0
367 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,009.7	0
368 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,898.6	0
369 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,063.3	0
370 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,179.0	0
371 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,505.1	0
372 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,027.2	0
373 F	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,734.0	0
374 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,886.7	0
375 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,351.4	0
376 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,618.2	0
377 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,610.7	0
378 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,822.0	0
379 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,306.4	0
380 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,642.6	0
381 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,381.3	0
382 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,188.6	0
383 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,280.7	0
384 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,579.2	0
385 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,300.8	0
386 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,473.1	0

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PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

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Links	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Calculated prod. without new WTGs [MWh/y]	Goodness Factor [%]
387 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,218.6	0
388 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,420.2	0
389 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,505.8	0
390 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,009.5	0
391 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,136.4	0
392 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,494.8	0
393 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,794.0	0
394 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,558.3	0
395 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,689.2	0
396 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,216.4	0
397 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,207.1	0
398 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,029.7	0
399 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,370.9	0
400 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,381.7	0
401 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,738.6	0
402 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,392.8	0
403 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,421.3	0
404 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,719.7	0
405 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,473.8	0
406 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,470.3	0
407 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,275.2	0
408 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,721.4	0
409 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,396.0	0
410 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,473.2	0
411 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,713.0	0
412 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,266.2	0
413 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,264.8	0
414 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,284.3	0
415 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,723.3	0
416 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,570.4	0
417 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,771.7	0
418 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	51,962.5	0
419 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,577.5	0
420 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,296.3	0
421 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,332.9	0
422 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,378.9	0
423 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,478.1	0
424 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,629.6	0
425 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,891.9	0
426 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,538.3	0
427 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,818.9	0
428 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,665.7	0
429 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,383.0	0
430 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,400.8	0
431 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,379.6	0
432 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,889.1	0
433 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,341.2	0
434 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,658.9	0
435 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,424.7	0
436 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,164.8	0
437 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,483.3	0
438 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,646.6	0
439 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,735.4	0
440 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,422.0	0
441 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,303.9	0
442 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	52,973.7	0
443 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,937.0	0
444 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,033.4	0
445 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,941.3	0
446 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,710.5	0
447 D	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	53,266.0	0
448 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,446.1	0
449 E	No	PONDERA VESTAS	V164-10.0MW-10,000	10,000	164.0	125.0	USER	V164 10 MW - HKN P-V curve	54,433.6	0

Licensed user:
Pondera Consult B.V.
Welbergweg 49
NL-7556 PE Hengelo
0031742489940

PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

WTG siting

UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z	Row data/Description	Production source	Statistical basis for normalized production: [Months]
			[m]			
95	582,037	5,825,515	0.0	WMPA 60		
96	581,541	5,825,752	0.0	WMPA 59		
97	581,045	5,825,990	0.0	WMPA 58		
98	580,549	5,826,228	0.0	WMPA 57		
99	582,496	5,825,818	0.0	WMPA 54		
100	582,988	5,825,571	0.0	WMPA 55		
101	582,004	5,826,064	0.0	WMPA 53		
102	583,480	5,825,325	0.0	WMPA 56		
103	581,513	5,826,310	0.0	WMPA 52		
104	581,021	5,826,556	0.0	WMPA 51		
105	582,970	5,826,130	0.0	WMPA 46		
106	582,483	5,826,385	0.0	WMPA 45		
107	580,529	5,826,802	0.0	WMPA 50		
108	583,457	5,825,875	0.0	WMPA 47		
109	581,995	5,826,640	0.0	WMPA 44		
110	583,944	5,825,620	0.0	WMPA 48		
111	581,508	5,826,895	0.0	WMPA 43		
112	584,432	5,825,365	0.0	WMPA 49		
113	581,021	5,827,150	0.0	WMPA 42		
114	582,972	5,826,707	0.0	WMPA 36		
115	583,454	5,826,443	0.0	WMPA 37		
116	582,490	5,826,971	0.0	WMPA 35		
117	583,937	5,826,179	0.0	WMPA 38		
118	580,533	5,827,405	0.0	WMPA 41		
119	582,007	5,827,235	0.0	WMPA 34		
120	584,419	5,825,915	0.0	WMPA 39		
121	581,525	5,827,499	0.0	WMPA 33		
122	584,902	5,825,651	0.0	WMPA 40		
123	583,457	5,827,020	0.0	WMPA 28		
124	581,043	5,827,763	0.0	WMPA 32		
125	583,934	5,826,747	0.0	WMPA 29		
126	582,980	5,827,293	0.0	WMPA 27		
127	584,412	5,826,473	0.0	WMPA 30		
128	582,502	5,827,566	0.0	WMPA 26		
129	584,889	5,826,200	0.0	WMPA 31		
130	582,026	5,827,839	0.0	WMPA 25		
131	581,547	5,828,111	0.0	WMPA 24		
132	583,948	5,827,323	0.0	WMPA 19		
133	583,476	5,827,606	0.0	WMPA 18		
134	584,420	5,827,041	0.0	WMPA 20		
135	583,004	5,827,888	0.0	WMPA 17		
136	584,892	5,826,759	0.0	WMPA 21		
137	581,070	5,828,385	0.0	WMPA 23		
138	582,531	5,828,170	0.0	WMPA 16		
139	585,364	5,826,477	0.0	WMPA 22		
140	582,059	5,828,452	0.0	WMPA 15		
141	584,439	5,827,608	0.0	WMPA 11		
142	583,972	5,827,900	0.0	WMPA 10		
143	581,587	5,828,734	0.0	WMPA 14		
144	583,505	5,828,191	0.0	WMPA 9		
145	584,906	5,827,318	0.0	WMPA 12		
146	583,039	5,828,481	0.0	WMPA 8		
147	585,373	5,827,027	0.0	WMPA 13		
148	582,572	5,828,772	0.0	WMPA 7		
149	582,105	5,829,063	0.0	WMPA 6		
150	584,457	5,828,159	0.0	WMPA 5		
151	583,996	5,828,458	0.0	WMPA 4		
152	583,534	5,828,757	0.0	WMPA 3		
153	583,073	5,829,056	0.0	WMPA 2		
154	584,027	5,829,008	0.0	WMPA 1		
155	592,510	5,831,701	0.0	Offshore Windpark Egmond aan Zee / 12		
156	592,935	5,831,215	0.0	Offshore Windpark Egmond aan Zee / 11		

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

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UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z [m]	Row data/Description	Production source	Statistical basis for normalized production: [Months]
157	593,367	5,830,738	0.0	Offshore Windpark Egmond aan Zee / 10		
158	593,785	5,830,248	0.0	Offshore Windpark Egmond aan Zee / 9		
159	594,210	5,829,765	0.0	Offshore Windpark Egmond aan Zee / 8		
160	594,635	5,829,282	0.0	Offshore Windpark Egmond aan Zee / 7		
161	595,066	5,828,790	0.0	Offshore Windpark Egmond aan Zee / 6		
162	595,491	5,828,306	0.0	Offshore Windpark Egmond aan Zee / 5		
163	595,915	5,827,823	0.0	Offshore Windpark Egmond aan Zee / 4		
164	594,536	5,830,909	0.0	Offshore Windpark Egmond aan Zee / 21		
165	596,341	5,827,337	0.0	Offshore Windpark Egmond aan Zee / 3		
166	594,961	5,830,426	0.0	Offshore Windpark Egmond aan Zee / 20		
167	595,386	5,829,939	0.0	Offshore Windpark Egmond aan Zee / 19		
168	596,758	5,826,863	0.0	Offshore Windpark Egmond aan Zee / 2		
169	595,811	5,829,456	0.0	Offshore Windpark Egmond aan Zee / 18		
170	596,235	5,828,973	0.0	Offshore Windpark Egmond aan Zee / 17		
171	597,270	5,826,468	0.0	Offshore Windpark Egmond aan Zee / 1		
172	596,916	5,828,199	0.0	Offshore Windpark Egmond aan Zee / 16		
173	595,287	5,831,569	0.0	Offshore Windpark Egmond aan Zee / 29		
174	595,712	5,831,083	0.0	Offshore Windpark Egmond aan Zee / 28		
175	597,340	5,827,716	0.0	Offshore Windpark Egmond aan Zee / 15		
176	596,137	5,830,600	0.0	Offshore Windpark Egmond aan Zee / 27		
177	596,562	5,830,117	0.0	Offshore Windpark Egmond aan Zee / 26		
178	597,766	5,827,233	0.0	Offshore Windpark Egmond aan Zee / 14		
179	597,040	5,829,573	0.0	Offshore Windpark Egmond aan Zee / 25		
180	598,190	5,826,750	0.0	Offshore Windpark Egmond aan Zee / 13		
181	597,696	5,828,826	0.0	Offshore Windpark Egmond aan Zee / 24		
182	596,039	5,832,227	0.0	Offshore Windpark Egmond aan Zee / 36		
183	596,464	5,831,744	0.0	Offshore Windpark Egmond aan Zee / 35		
184	598,120	5,828,337	0.0	Offshore Windpark Egmond aan Zee / 23		
185	596,888	5,831,261	0.0	Offshore Windpark Egmond aan Zee / 34		
186	597,313	5,830,778	0.0	Offshore Windpark Egmond aan Zee / 33		
187	597,798	5,830,225	0.0	Offshore Windpark Egmond aan Zee / 32		
188	581,938	5,809,670	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (94)		
189	580,605	5,809,303	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (95)		
190	579,652	5,809,041	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (96)		
191	581,625	5,808,865	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (97)		
192	580,154	5,808,809	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (98)		
193	578,496	5,808,723	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (99)		
194	580,657	5,808,508	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (100)		
195	578,974	5,808,485	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (101)		
196	581,251	5,808,288	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (102)		
197	579,448	5,808,239	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (103)		
198	579,929	5,808,008	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (104)		
199	578,087	5,808,012	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (105)		
200	580,412	5,807,760	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (106)		
201	578,577	5,807,774	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (107)		
202	580,882	5,807,505	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (108)		
203	579,071	5,807,520	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (109)		
204	579,568	5,807,277	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (110)		
205	577,660	5,807,334	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (111)		
206	580,042	5,807,014	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (112)		
207	578,169	5,807,067	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (113)		
208	580,537	5,806,707	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (114)		
209	578,674	5,806,818	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (115)		
210	579,182	5,806,551	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (116)		
211	577,306	5,806,630	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (117)		
212	579,693	5,806,276	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (118)		
213	577,809	5,806,387	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (119)		
214	580,188	5,806,021	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (120)		
215	578,316	5,806,128	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (121)		
216	578,848	5,805,870	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (122)		
217	579,380	5,805,570	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (123)		
218	576,916	5,805,900	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (124)		

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PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

...continued from previous page

UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z [m]	Row data/Description	Production source	Statistical basis for normalized production: [Months]
219	577,439	5,805,661	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (125)		
220	579,904	5,805,320	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (126)		
221	577,963	5,805,386	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (127)		
222	578,511	5,805,087	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (128)		
223	579,035	5,804,820	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (129)		
224	576,540	5,805,102	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (130)		
225	577,094	5,804,911	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (131)		
226	579,583	5,804,546	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (132)		
227	577,634	5,804,603	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (133)		
228	578,191	5,804,321	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (134)		
229	578,715	5,804,038	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (135)		
230	579,289	5,803,644	0.0	VESTAS V112 offshore 3000 112.0 !O! hub: 81.0 m (TOT: 137.0 m) (136)		
231	573,220	5,802,271	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1276)		
232	574,531	5,802,197	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1277)		
233	575,939	5,801,904	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1278)		
234	564,980	5,804,195	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1279)		
235	566,755	5,804,176	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1280)		
236	568,529	5,804,158	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1281)		
237	570,304	5,804,140	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1282)		
238	565,599	5,803,336	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1283)		
239	567,374	5,803,317	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1284)		
240	569,148	5,803,299	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1285)		
241	570,923	5,803,281	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1286)		
242	572,697	5,803,264	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1287)		
243	564,445	5,802,495	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1288)		
244	566,219	5,802,476	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1289)		
245	567,994	5,802,457	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1290)		
246	569,769	5,802,439	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1291)		
247	571,543	5,802,422	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1292)		
248	565,064	5,801,635	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1293)		
249	566,838	5,801,616	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1294)		
250	568,613	5,801,598	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1295)		
251	570,388	5,801,580	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1296)		
252	572,162	5,801,563	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1297)		
253	563,910	5,800,795	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1298)		
254	565,684	5,800,776	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1299)		
255	567,459	5,800,757	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1300)		
256	569,233	5,800,739	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1301)		
257	571,008	5,800,721	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1302)		
258	564,528	5,799,935	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1303)		
259	566,303	5,799,916	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1304)		
260	563,306	5,796,102	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1305)		
261	564,547	5,796,713	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1306)		
262	565,906	5,796,392	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1307)		
263	568,451	5,796,861	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1308)		
264	564,590	5,789,985	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1309)		
265	564,392	5,790,980	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1310)		
266	564,194	5,791,975	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1311)		
267	563,996	5,792,970	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1312)		
268	563,798	5,793,965	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1313)		
269	563,600	5,794,960	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1314)		
270	565,770	5,790,735	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1315)		
271	565,571	5,791,731	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1316)		
272	565,373	5,792,726	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1317)		
273	565,175	5,793,721	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1318)		
274	564,976	5,794,716	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1319)		
275	564,778	5,795,711	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1320)		
276	566,949	5,791,486	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1321)		
277	566,751	5,792,481	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1322)		
278	566,552	5,793,476	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1323)		
279	566,353	5,794,471	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1324)		
280	566,155	5,795,466	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1325)		

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

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UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z [m]	Row data/Description	Production source	Statistical basis for normalized production: [Months]
281	568,327	5,791,242	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1326)		
282	568,128	5,792,237	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1327)		
283	567,929	5,793,232	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1328)		
284	567,731	5,794,227	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1329)		
285	567,532	5,795,222	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1330)		
286	567,333	5,796,217	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1331)		
287	569,506	5,791,993	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1332)		
288	569,307	5,792,988	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1333)		
289	569,108	5,793,983	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1334)		
290	568,909	5,794,978	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1335)		
291	568,710	5,795,973	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1336)		
292	570,884	5,791,749	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1337)		
293	570,685	5,792,744	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1338)		
294	570,486	5,793,738	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1339)		
295	570,286	5,794,733	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1340)		
296	570,087	5,795,728	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1341)		
297	569,888	5,796,723	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1342)		
298	564,771	5,788,336	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1343)		
299	567,523	5,789,081	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1344)		
300	568,898	5,789,454	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1345)		
301	570,274	5,789,828	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1346)		
302	571,649	5,790,202	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1347)		
303	565,696	5,787,610	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1348)		
304	568,448	5,788,355	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1349)		
305	569,823	5,788,728	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1350)		
306	571,198	5,789,102	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1351)		
307	572,574	5,789,476	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1352)		
308	565,246	5,786,511	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1353)		
309	566,621	5,786,883	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1354)		
310	569,372	5,787,629	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1355)		
311	570,748	5,788,003	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1356)		
312	572,123	5,788,377	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1357)		
313	566,171	5,785,784	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1358)		
314	567,546	5,786,157	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1359)		
315	571,673	5,787,277	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1360)		
316	573,048	5,787,651	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1361)		
317	565,720	5,784,685	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1362)		
318	567,096	5,785,058	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1363)		
319	568,471	5,785,431	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1364)		
320	569,847	5,785,804	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1365)		
321	572,597	5,786,552	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1366)		
322	566,645	5,783,959	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1367)		
323	568,021	5,784,331	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1368)		
324	569,396	5,784,705	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1369)		
325	570,772	5,785,078	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1370)		
326	567,513	5,783,401	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1371)		
327	567,843	5,782,096	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1372)		
328	568,335	5,782,779	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1373)		
329	568,844	5,783,619	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1374)		
330	570,098	5,783,905	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1375)		
331	570,463	5,786,987	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1376)		
332	573,418	5,788,676	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1377)		
333	573,742	5,789,596	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1378)		
334	574,171	5,788,036	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1379)		
335	574,816	5,788,859	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1380)		
336	572,953	5,791,985	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1381)		
337	572,815	5,793,009	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1382)		
338	572,678	5,794,033	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1383)		
339	572,540	5,795,057	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1384)		
340	572,403	5,796,081	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1385)		
341	572,265	5,797,105	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1386)		
342	574,779	5,792,275	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1387)		

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

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UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z [m]	Row data/Description	Production source	Statistical basis for normalized production: [Months]
343	574,641	5,793,299	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1388)		
344	574,503	5,794,323	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1389)		
345	574,365	5,795,347	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1390)		
346	574,227	5,796,371	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1391)		
347	574,090	5,797,395	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1392)		
348	576,744	5,791,541	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1393)		
349	576,605	5,792,565	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1394)		
350	576,467	5,793,589	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1395)		
351	576,328	5,794,613	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1396)		
352	576,190	5,795,637	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1397)		
353	576,052	5,796,660	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1398)		
354	578,292	5,793,879	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1399)		
355	578,153	5,794,903	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1400)		
356	578,015	5,795,926	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1401)		
357	577,876	5,796,950	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1402)		
358	576,220	5,798,604	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1403)		
359	576,221	5,799,504	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1404)		
360	578,659	5,799,014	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1405)		
361	578,660	5,799,914	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1406)		
362	581,098	5,798,523	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1407)		
363	581,098	5,799,424	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1408)		
364	580,646	5,803,664	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1409)		
365	581,314	5,805,227	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1410)		
366	581,981	5,806,790	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1411)		
367	583,606	5,804,256	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1412)		
368	584,343	5,807,061	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1413)		
369	584,712	5,808,463	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1414)		
370	575,031	5,791,196	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1415)		
371	579,227	5,795,022	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1416)		
372	579,230	5,796,000	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1417)		
373	580,081	5,796,709	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1418)		
374	577,510	5,831,183	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1419)		
375	578,783	5,830,842	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1420)		
376	581,651	5,831,440	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1421)		
377	582,616	5,835,281	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1422)		
378	583,903	5,840,401	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1423)		
379	584,517	5,832,038	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1424)		
380	585,160	5,834,599	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1425)		
381	585,790	5,831,697	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1426)		
382	590,570	5,830,924	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1427)		
383	590,080	5,826,466	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1428)		
384	588,648	5,826,832	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1429)		
385	588,967	5,828,113	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1430)		
386	590,895	5,841,260	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1431)		
387	591,214	5,842,541	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1432)		
388	591,533	5,843,822	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1433)		
389	587,374	5,827,174	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1434)		
390	587,694	5,828,454	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1435)		
391	588,014	5,829,735	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1436)		
392	589,305	5,840,320	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1437)		
393	589,624	5,841,601	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1438)		
394	589,943	5,842,882	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1439)		
395	590,262	5,844,162	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1440)		
396	590,582	5,845,443	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1441)		
397	586,421	5,828,795	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1442)		
398	586,715	5,829,983	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1443)		
399	587,061	5,831,357	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1444)		
400	588,035	5,840,660	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1445)		
401	588,355	5,841,941	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1446)		
402	588,674	5,843,222	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1447)		
403	588,993	5,844,503	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1448)		
404	589,313	5,845,783	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1449)		

To be continued on next page...

PARK - Reference WTGs

Calculation: HKW MER 16MW incl HKN&HKZ

...continued from previous page

UTM (north)-ETRS89 Zone: 31

	Easting	Northing	Z	Row data/Description	Production source	Statistical basis for normalized production: [Months]
			[m]			
405	589,632	5,847,064	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1450)		
406	586,431	5,834,258	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1451)		
407	586,753	5,835,409	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1452)		
408	587,086	5,842,281	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1453)		
409	587,406	5,843,562	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1454)		
410	587,725	5,844,842	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1455)		
411	588,045	5,846,123	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1456)		
412	588,365	5,847,404	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1457)		
413	588,684	5,848,685	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1458)		
414	585,527	5,841,374	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1459)		
415	585,815	5,842,622	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1460)		
416	586,135	5,843,902	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1461)		
417	586,455	5,845,183	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1462)		
418	586,775	5,846,463	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1463)		
419	587,095	5,847,744	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1464)		
420	582,924	5,831,099	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1465)		
421	583,244	5,832,379	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1466)		
422	584,671	5,842,992	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1467)		
423	584,867	5,844,242	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1468)		
424	585,187	5,845,523	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1469)		
425	585,508	5,846,803	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1470)		
426	585,828	5,848,084	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1471)		
427	582,633	5,840,742	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1472)		
428	582,954	5,842,022	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1473)		
429	581,022	5,834,341	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1474)		
430	581,344	5,835,622	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1475)		
431	581,704	5,842,334	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1476)		
432	579,428	5,833,402	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1477)		
433	579,750	5,834,682	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1478)		
434	580,071	5,835,962	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1479)		
435	578,156	5,833,743	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1480)		
436	578,478	5,835,023	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1481)		
437	578,800	5,836,303	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1482)		
438	588,929	5,824,713	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1483)		
439	578,530	5,828,638	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1484)		
440	590,798	5,833,624	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1485)		
441	590,523	5,835,530	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1486)		
442	588,583	5,835,947	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1487)		
443	584,699	5,837,102	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1488)		
444	580,472	5,829,404	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1489)		
445	579,572	5,825,576	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1490)		
446	586,217	5,836,824	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1491)		
447	590,047	5,838,679	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1492)		
448	586,929	5,825,009	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1493)		
449	581,362	5,841,082	0.0	PONDERA VESTAS V164-10.0MW 10000 164.0 !O! hub: 125.0 m (TOT: 207.0 m) (1494)		

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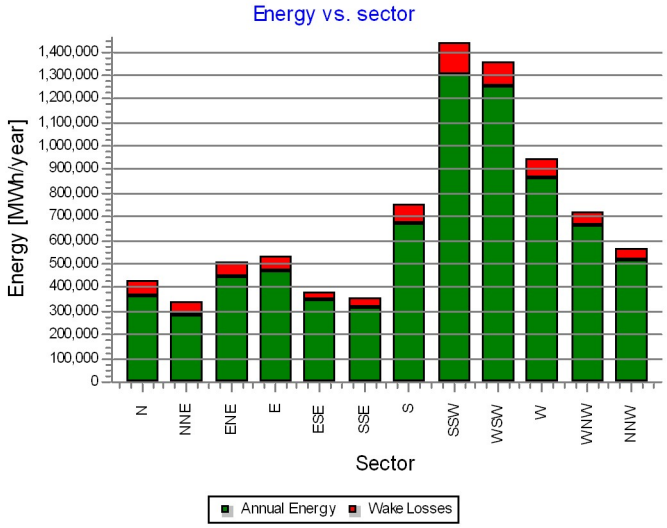
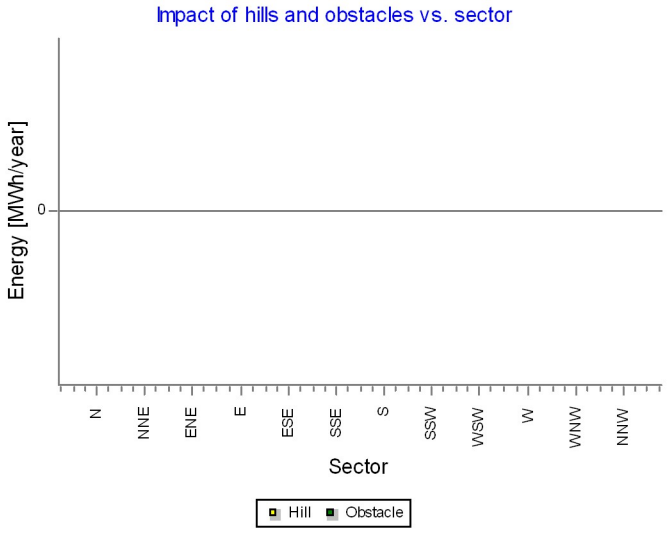
PARK - Production Analysis

Calculation: HKW MER 16MW incl HKN&HKZWTG: All new WTGs, Air density 1.225 kg/m³
Directional Analysis

Sector		0 N	1 NNE	2 ENE	3 E	4 ESE	5 SSE	6 S	7 SSW	8 WSW	9 W	10 WNW	11 NNW	Total
Roughness based energy	[MWh]	428,013.2	341,213.3	507,899.9	528,732.6	382,838.2	353,929.2	749,750.6	1,436,494.5	1,356,246.6	948,111.4	714,644.2	565,276.8	8,313,178.5
-Decrease due to wake losses	[MWh]	64,313.2	58,004.1	64,739.6	61,864.2	35,336.4	35,324.2	78,883.9	137,725.7	106,908.1	87,256.2	54,348.3	49,689.9	834,394.2
Resulting energy	[MWh]	363,699.8	283,208.9	443,159.8	466,868.7	347,502.1	318,604.7	670,867.1	1,298,768.1	1,249,338.8	860,855.5	660,296.5	515,586.7	7,478,752.5
Specific energy	[kWh/m²]													1,301
Specific energy	[kWh/kW]													4,973
Decrease due to wake losses	[%]	15.0	17.0	12.7	11.7	9.2	10.0	10.5	9.6	7.9	9.2	7.6	8.8	10.04
Utilization	[%]	15.5	16.3	15.9	14.6	16.4	15.1	11.1	9.9	10.6	11.4	13.1	13.6	12.1
Operational	[Hours/year]	546	437	570	575	432	409	736	1,268	1,206	938	775	635	8,526
Full Load Equivalent	[Hours/year]	242	188	295	310	231	212	446	864	831	572	439	343	4,973





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PARK - Power Curve Analysis

Calculation: HKW MER 16MW incl HKN&HKZWTG: 1 - Pondera RD279HH165 16000 279.0 !O!, Hub height: 164.5 m

Name: Theoretical PV curve at 16MW
Source: Pondera

Source/Date	Created by	Created	Edited	Stop wind speed [m/s]	Power control	CT curve type	Generator type	Specific power kW/m²
25/04/2019	USER	25/04/2019	25/04/2019	25.0	Pitch	Standard pitch	Variable	0.26

NB: Theoretical power curve
Date: 25-04-2016
Author: WPu

HP curve comparison - Note: For standard air density

Vmean	[m/s]	5	6	7	8	9	10
HP value Pitch, variable speed (2013)	[MWh]	30,176	44,919	58,724	70,718	80,648	88,464
Pondera RD279HH165 16000 279.0 !O! Theoretical PV curve at 16MW	[MWh]	24,652	38,289	51,771	63,925	74,223	82,442
Check value	[%]	22	17	13	11	9	7

The table shows comparison between annual energy production calculated on basis of simplified "HP-curves" which assume that all WTGs performs quite similar - only specific power loading (kW/m^2) and single/dual speed or stall/pitch decides the calculated values. Productions are without wake losses.
For further details, ask at the Danish Energy Agency for project report J.nr. 51171/00-0016 or see windPRO manual chapter 3.5.2.
The method is refined in EMD report "20 Detailed Case Studies comparing Project Design Calculations and actual Energy Productions for Wind Energy Projects worldwide", jan 2003.
Use the table to evaluate if the given power curve is reasonable - if the check value are lower than -5%, the power curve probably is too optimistic due to uncertainty in power curve measurement.

Power curve

Original data, Air density: 1.225 kg/m³

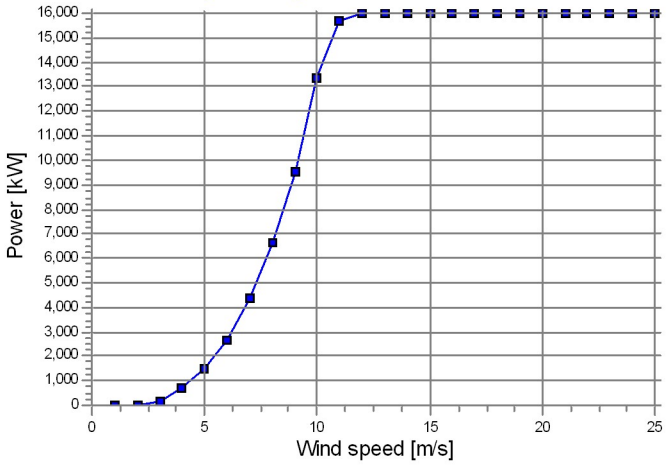
Wind speed [m/s]	Power [kW]	Cp	Wind speed [m/s]	Ct curve
3.0	133.0	0.13	1.0	0.10
4.0	667.0	0.28	2.0	0.10
5.0	1,467.0	0.31	3.0	0.10
6.0	2,667.0	0.33	4.0	0.80
7.0	4,333.0	0.34	5.0	0.82
8.0	6,667.0	0.35	6.0	0.84
9.0	9,533.0	0.35	7.0	0.79
10.0	13,333.0	0.36	8.0	0.72
11.0	15,667.0	0.31	9.0	0.66
12.0	16,000.0	0.25	10.0	0.59
13.0	16,000.0	0.19	11.0	0.53
14.0	16,000.0	0.16	12.0	0.46
15.0	16,000.0	0.13	13.0	0.40
16.0	16,000.0	0.10	14.0	0.33
17.0	16,000.0	0.09	15.0	0.28
18.0	16,000.0	0.07	16.0	0.23
19.0	16,000.0	0.06	17.0	0.20
20.0	16,000.0	0.05	18.0	0.16
21.0	16,000.0	0.05	19.0	0.13
22.0	16,000.0	0.04	20.0	0.12
23.0	16,000.0	0.04	21.0	0.12
24.0	16,000.0	0.03	22.0	0.11
25.0	16,000.0	0.03	23.0	0.11
26.0	16,000.0	0.00	24.0	0.10
27.0	16,000.0	0.00		
28.0	16,000.0	0.00		

Power, Efficiency and energy vs. wind speed

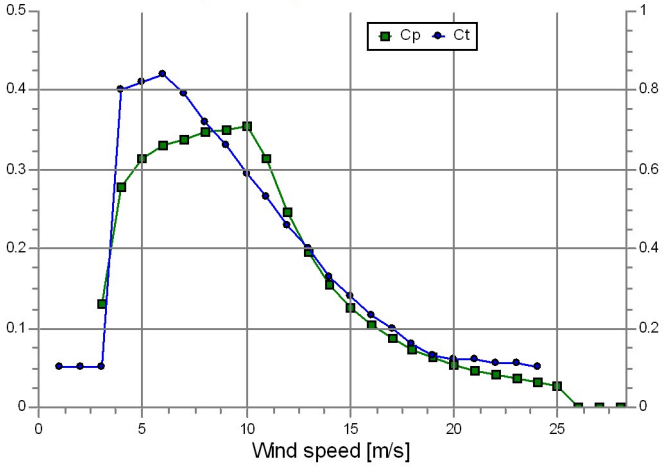
Data used in calculation, Air density: 1.225 kg/m³ New windPRO method (adjusted IEC method, improved to match turbine control) <RECOMMENDED>

Wind speed [m/s]	Power [kW]	Cp	Interval [m/s]	Energy [MWh]	Acc.Energy [MWh]	Relative [%]
1.0	0.0	0.00	0.50- 1.50	0.0	0.0	0.0
2.0	0.0	0.00	1.50- 2.50	0.0	0.0	0.0
3.0	133.0	0.13	2.50- 3.50	65.1	65.1	0.1
4.0	667.0	0.28	3.50- 4.50	288.4	353.5	0.4
5.0	1,467.0	0.31	4.50- 5.50	737.6	1,091.1	1.4
6.0	2,667.0	0.33	5.50- 6.50	1,492.1	2,583.2	3.2
7.0	4,333.0	0.34	6.50- 7.50	2,624.3	5,207.5	6.5
8.0	6,667.0	0.35	7.50- 8.50	4,144.6	9,352.0	11.7
9.0	9,533.0	0.35	8.50- 9.50	6,005.5	15,357.5	19.2
10.0	13,333.0	0.36	9.50-10.50	7,794.5	23,152.0	28.9
11.0	15,667.0	0.31	10.50-11.50	8,668.2	31,820.2	39.7
12.0	16,000.0	0.25	11.50-12.50	8,411.7	40,231.9	50.3
13.0	16,000.0	0.19	12.50-13.50	7,605.5	47,837.4	59.8
14.0	16,000.0	0.16	13.50-14.50	6,667.1	54,504.5	68.1
15.0	16,000.0	0.13	14.50-15.50	5,703.1	60,207.6	75.2
16.0	16,000.0	0.10	15.50-16.50	4,764.2	64,971.8	81.2
17.0	16,000.0	0.09	16.50-17.50	3,889.1	68,860.9	86.0
18.0	16,000.0	0.07	17.50-18.50	3,103.7	71,964.6	89.9
19.0	16,000.0	0.06	18.50-19.50	2,422.2	74,386.9	92.9
20.0	16,000.0	0.05	19.50-20.50	1,849.0	76,235.9	95.2
21.0	16,000.0	0.05	20.50-21.50	1,380.7	77,616.5	97.0
22.0	16,000.0	0.04	21.50-22.50	1,008.4	78,624.9	98.2
23.0	16,000.0	0.04	22.50-23.50	720.3	79,345.3	99.1
24.0	16,000.0	0.03	23.50-24.50	503.1	79,848.3	99.7
25.0	16,000.0	0.03	24.50-25.50	205.3	80,053.6	100.0

Power curve
For air density: 1.225 kg/m³ and reference climate data



Cp and Ct curve
For air density: 1.225 kg/m³ and reference climate data



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PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: A - HKW-03; Hub height: 164.5

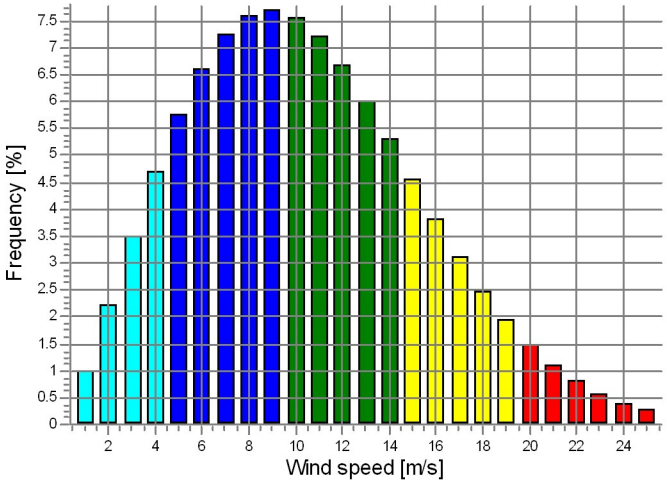
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 548,060 North: 5,829,150

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.994.wws

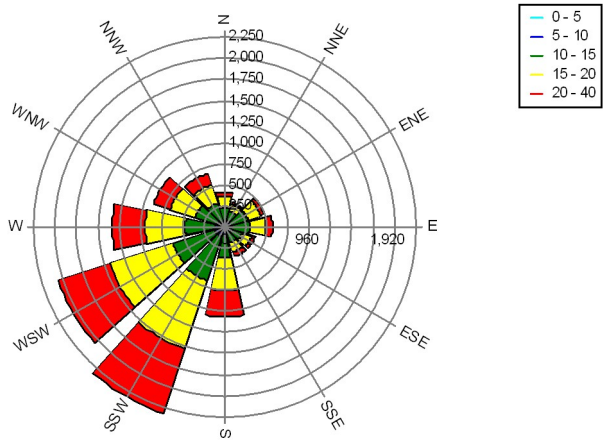
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.74	8.63	2.064	6.4
1 NNE	9.63	8.53	2.158	5.1
2 ENE	10.54	9.34	2.338	6.7
3 E	10.94	9.69	2.268	6.7
4 ESE	10.52	9.32	2.307	5.1
5 SSE	10.48	9.28	2.150	4.8
6 S	12.40	10.99	2.209	8.6
7 SSW	13.76	12.20	2.443	14.9
8 WSW	13.47	11.95	2.467	14.1
9 W	12.29	10.89	2.201	11.0
10 WNW	11.26	9.98	2.092	9.1
11 NNW	10.90	9.66	2.064	7.4
All	11.81	10.46	2.178	100.0

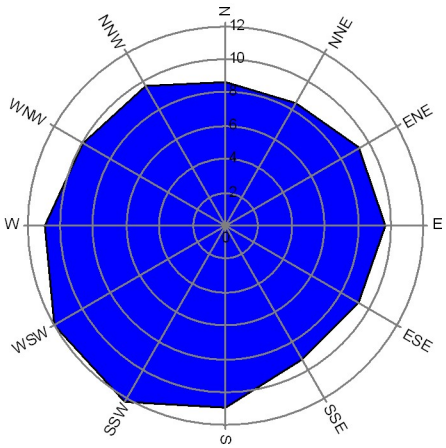
Weibull Distribution



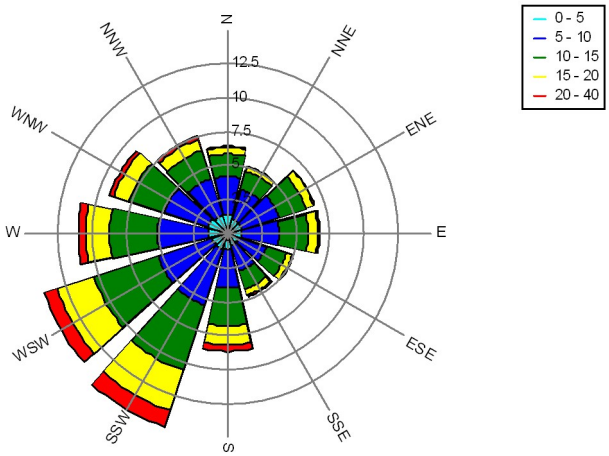
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
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PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: A - HKW-03; Hub height: 165.0

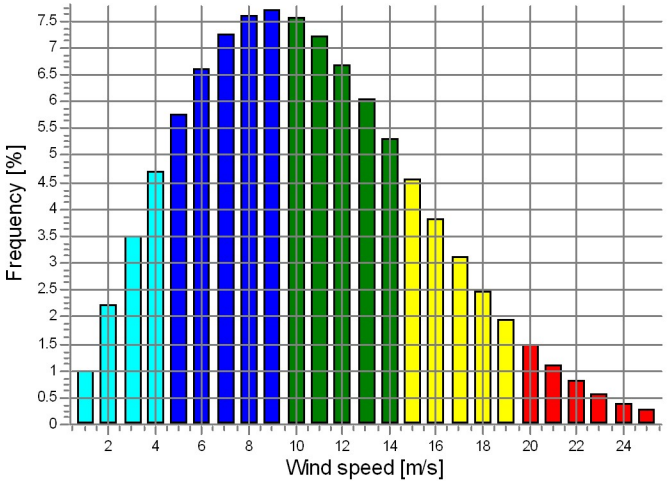
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 548,060 North: 5,829,150

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.994.wws

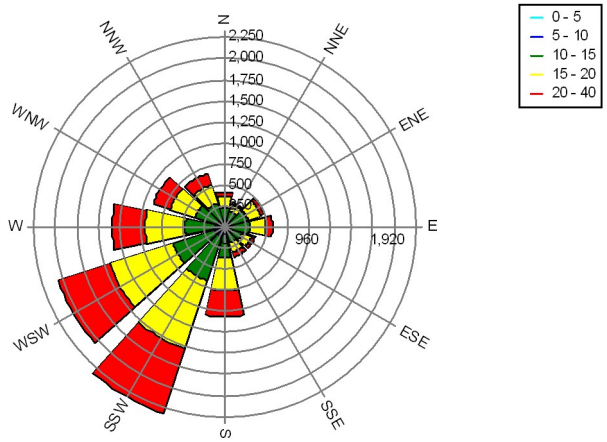
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.74	8.63	2.064	6.4
1 NNE	9.63	8.53	2.154	5.1
2 ENE	10.54	9.34	2.338	6.7
3 E	10.94	9.69	2.268	6.7
4 ESE	10.53	9.32	2.307	5.1
5 SSE	10.49	9.29	2.146	4.8
6 S	12.41	10.99	2.209	8.6
7 SSW	13.76	12.20	2.443	14.9
8 WSW	13.48	11.96	2.467	14.1
9 W	12.30	10.89	2.201	11.0
10 WNW	11.27	9.98	2.092	9.1
11 NNW	10.91	9.66	2.064	7.4
All	11.82	10.46	2.178	100.0

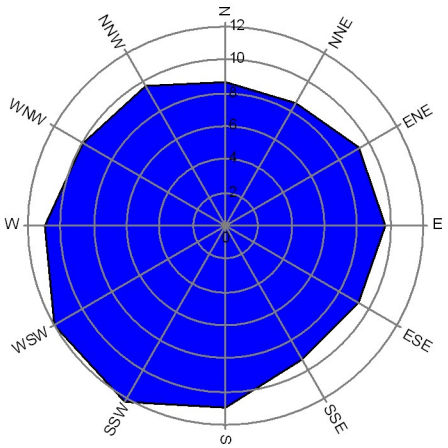
Weibull Distribution



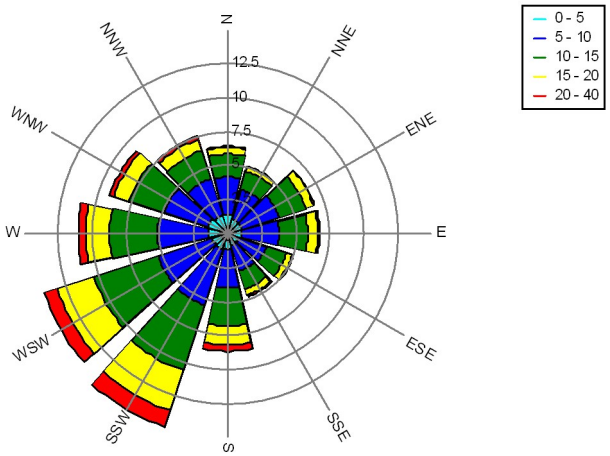
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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0031742489940

Calculated:
16/05/2019 11:32/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: B - HKW-04; Hub height: 164.5

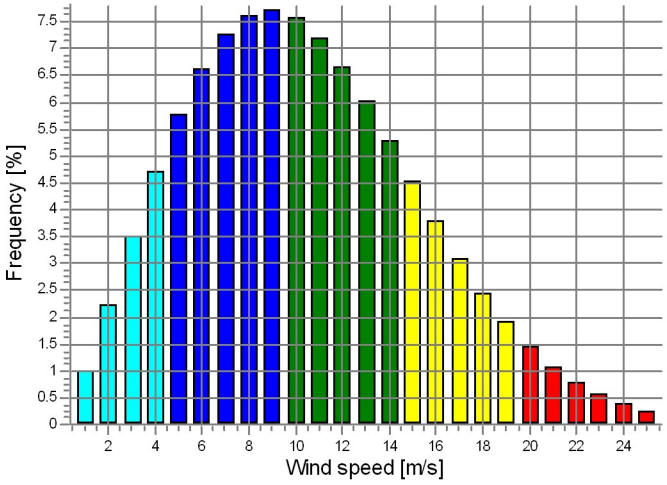
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 558,112 North: 5,839,246

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.991.wws

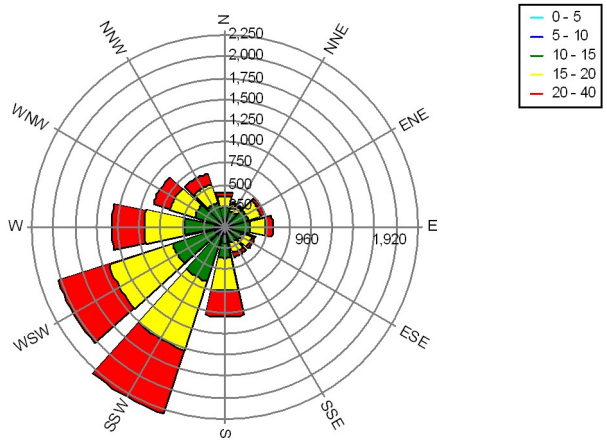
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.72	8.61	2.064	6.4
1 NNE	9.61	8.51	2.158	5.1
2 ENE	10.51	9.32	2.338	6.7
3 E	10.91	9.67	2.268	6.7
4 ESE	10.50	9.30	2.307	5.1
5 SSE	10.46	9.26	2.150	4.8
6 S	12.36	10.95	2.209	8.6
7 SSW	13.70	12.15	2.443	14.9
8 WSW	13.42	11.91	2.467	14.1
9 W	12.26	10.85	2.201	11.0
10 WNW	11.23	9.95	2.092	9.1
11 NNW	10.87	9.63	2.064	7.4
All	11.78	10.43	2.178	100.0

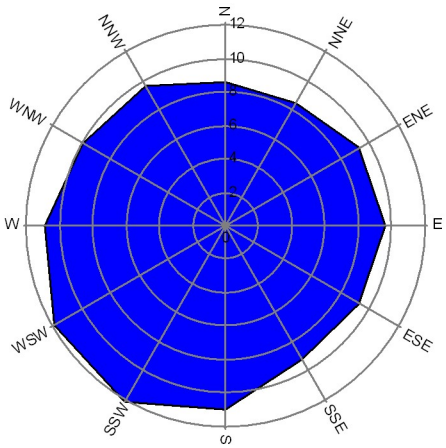
Weibull Distribution



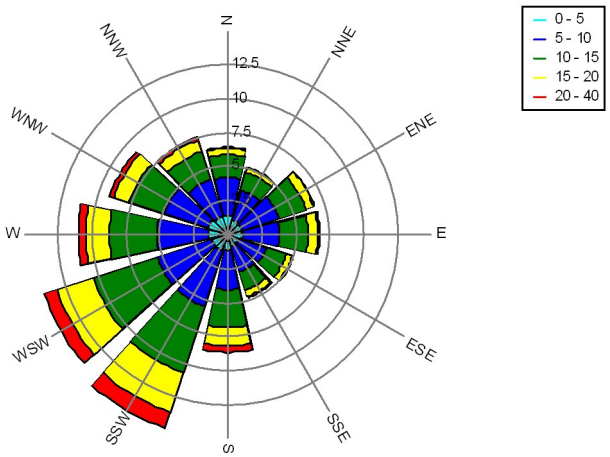
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
16/05/2019 11:32/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: B - HKW-04; Hub height: 165.0

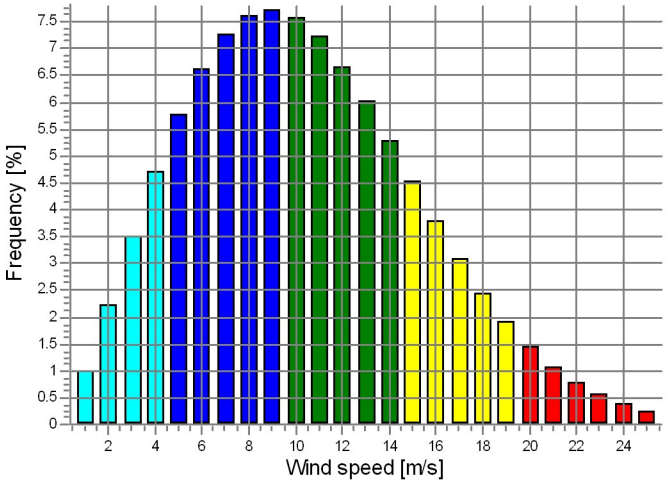
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 558,112 North: 5,839,246

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.991.wws

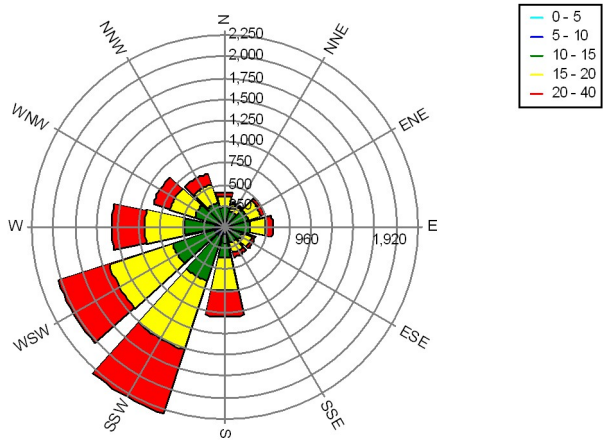
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.73	8.61	2.064	6.4
1 NNE	9.61	8.51	2.154	5.1
2 ENE	10.52	9.32	2.338	6.7
3 E	10.92	9.67	2.268	6.7
4 ESE	10.50	9.30	2.307	5.1
5 SSE	10.46	9.27	2.146	4.8
6 S	12.37	10.95	2.209	8.6
7 SSW	13.71	12.16	2.443	14.9
8 WSW	13.43	11.91	2.467	14.1
9 W	12.26	10.86	2.201	11.0
10 WNW	11.24	9.95	2.092	9.1
11 NNW	10.88	9.64	2.064	7.4
All	11.78	10.43	2.178	100.0

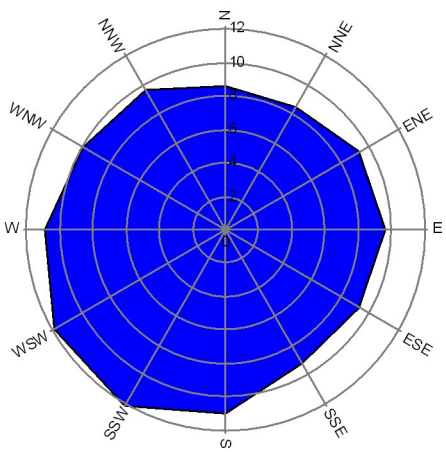
Weibull Distribution



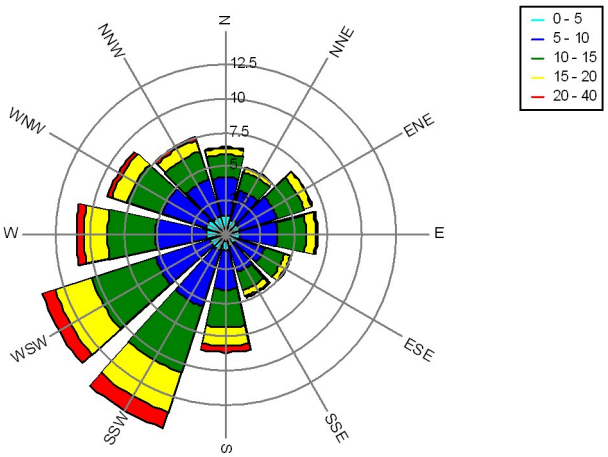
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: C - HKW-05; Hub height: 164.5

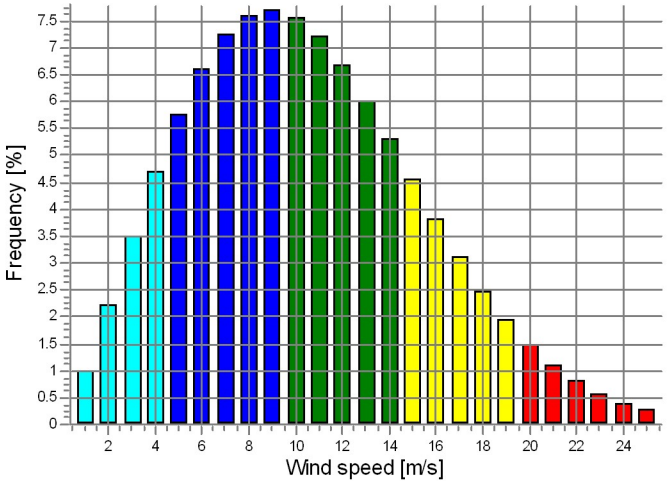
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 558,004 North: 5,849,256

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.994.wws

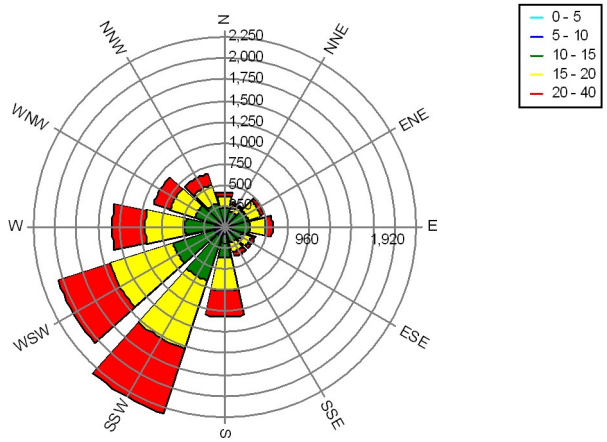
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.74	8.63	2.064	6.4
1 NNE	9.63	8.53	2.158	5.1
2 ENE	10.54	9.34	2.338	6.7
3 E	10.94	9.69	2.268	6.7
4 ESE	10.52	9.32	2.307	5.1
5 SSE	10.48	9.28	2.150	4.8
6 S	12.40	10.99	2.209	8.6
7 SSW	13.76	12.20	2.443	14.9
8 WSW	13.47	11.95	2.467	14.1
9 W	12.29	10.89	2.201	11.0
10 WNW	11.26	9.98	2.092	9.1
11 NNW	10.90	9.66	2.064	7.4
All	11.81	10.46	2.178	100.0

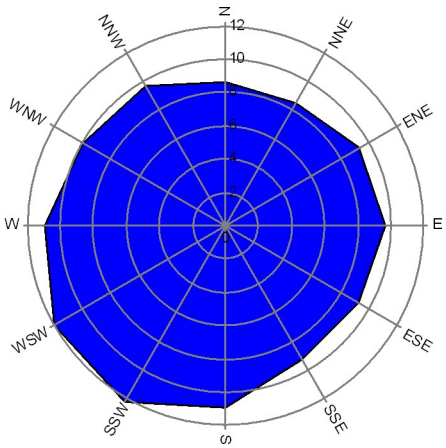
Weibull Distribution



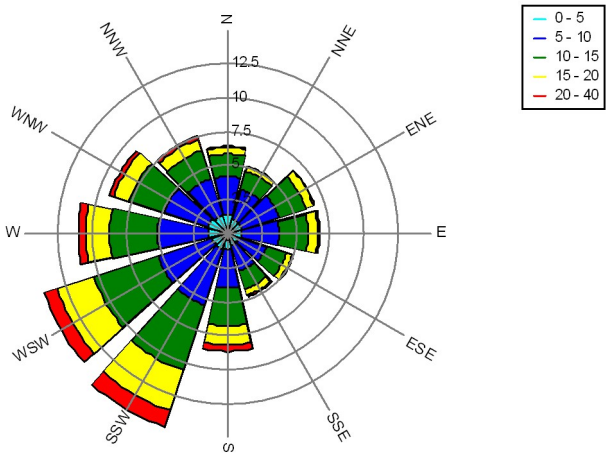
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
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PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: C - HKW-05; Hub height: 165.0

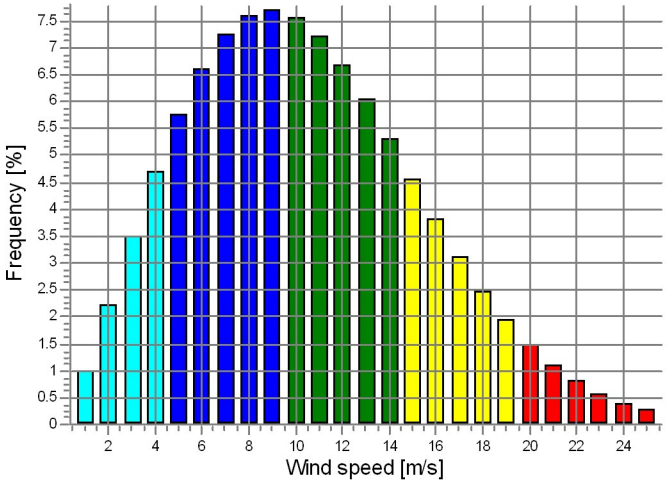
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 558,004 North: 5,849,256

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.994.wws

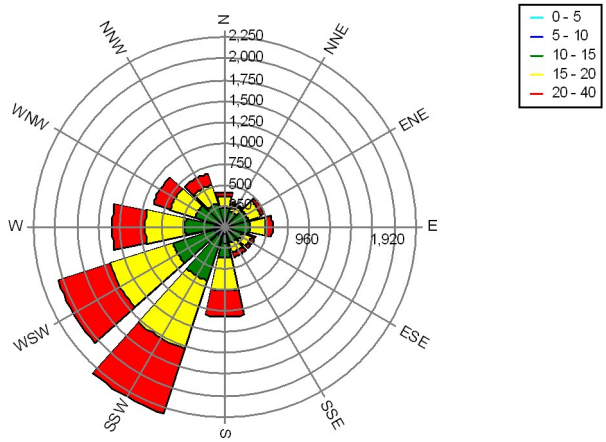
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.74	8.63	2.064	6.4
1 NNE	9.63	8.53	2.154	5.1
2 ENE	10.54	9.34	2.338	6.7
3 E	10.94	9.69	2.268	6.7
4 ESE	10.53	9.32	2.307	5.1
5 SSE	10.49	9.29	2.146	4.8
6 S	12.41	10.99	2.209	8.6
7 SSW	13.76	12.20	2.443	14.9
8 WSW	13.48	11.96	2.467	14.1
9 W	12.30	10.89	2.201	11.0
10 WNW	11.27	9.98	2.092	9.1
11 NNW	10.91	9.66	2.064	7.4
All	11.82	10.46	2.178	100.0

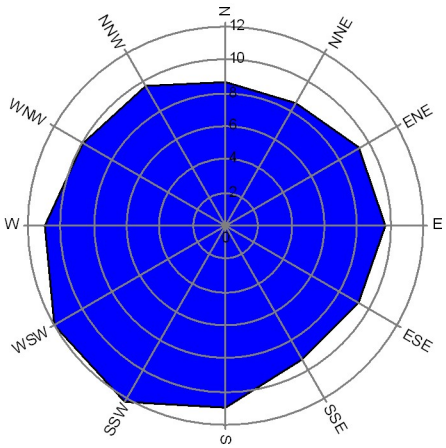
Weibull Distribution



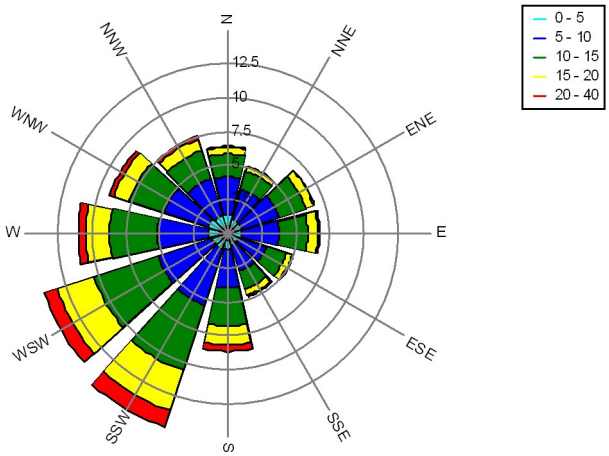
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
16/05/2019 11:32/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: D - OWEZ; Hub height: 165.0

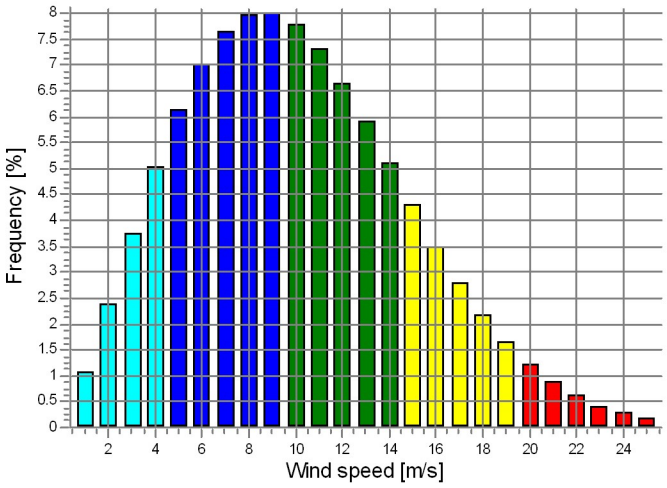
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 596,112 North: 5,829,642

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.955.wws

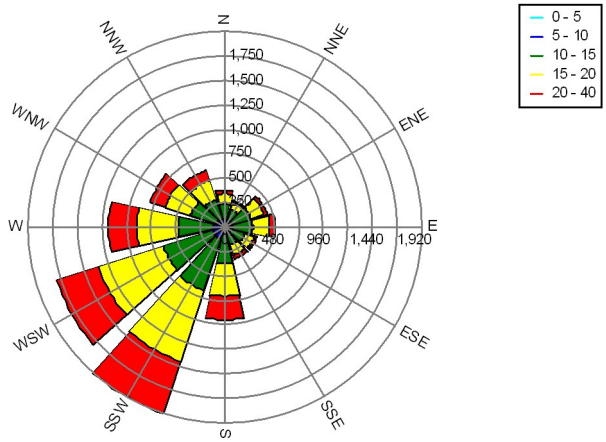
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.49	8.41	2.064	6.4
1 NNE	9.39	8.32	2.154	5.1
2 ENE	10.25	9.08	2.338	6.7
3 E	10.61	9.40	2.268	6.7
4 ESE	10.23	9.07	2.307	5.1
5 SSE	10.19	9.02	2.146	4.8
6 S	11.91	10.55	2.209	8.6
7 SSW	13.09	11.61	2.443	14.9
8 WSW	12.86	11.40	2.467	14.1
9 W	11.82	10.46	2.201	11.0
10 WNW	10.89	9.64	2.092	9.1
11 NNW	10.56	9.35	2.064	7.4
All	11.37	10.07	2.189	100.0

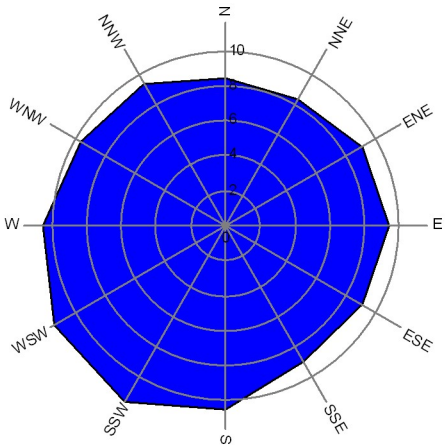
Weibull Distribution



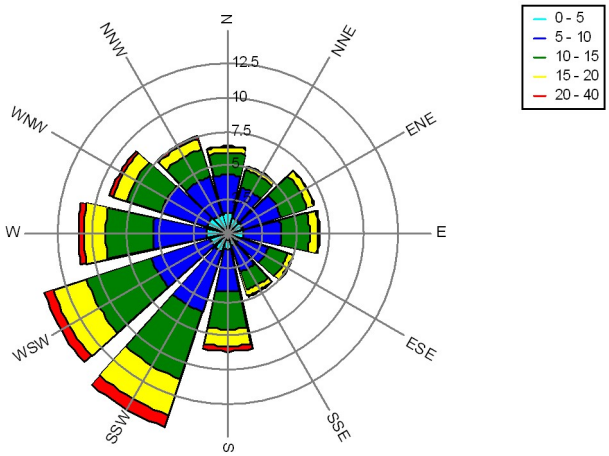
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: E - Prinses Amalia; Hub height: 165.0

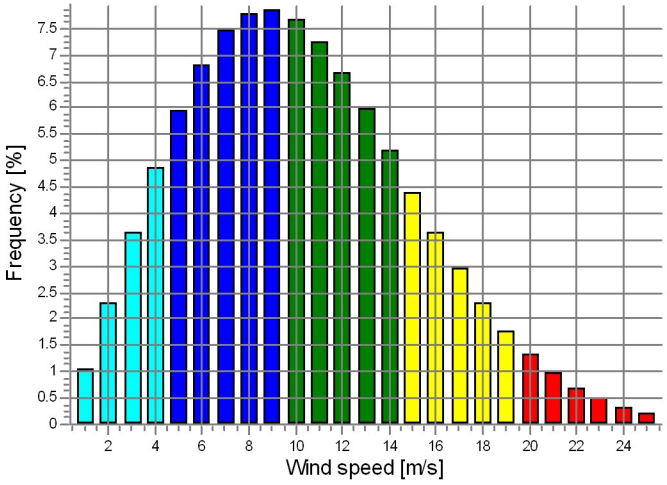
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 582,817 North: 5,827,056

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.974.wws

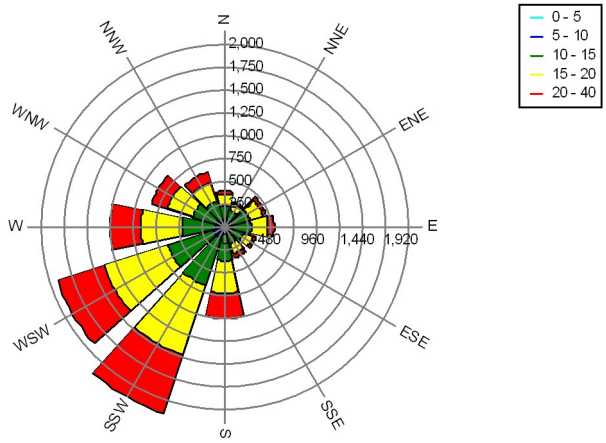
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.61	8.52	2.064	6.4
1 NNE	9.51	8.42	2.154	5.1
2 ENE	10.39	9.21	2.338	6.7
3 E	10.77	9.54	2.268	6.7
4 ESE	10.37	9.19	2.307	5.1
5 SSE	10.33	9.15	2.146	4.8
6 S	12.15	10.76	2.209	8.6
7 SSW	13.41	11.89	2.443	14.9
8 WSW	13.15	11.66	2.467	14.1
9 W	12.05	10.67	2.201	11.0
10 WNW	11.07	9.81	2.092	9.1
11 NNW	10.73	9.50	2.064	7.4
All	11.58	10.26	2.182	100.0

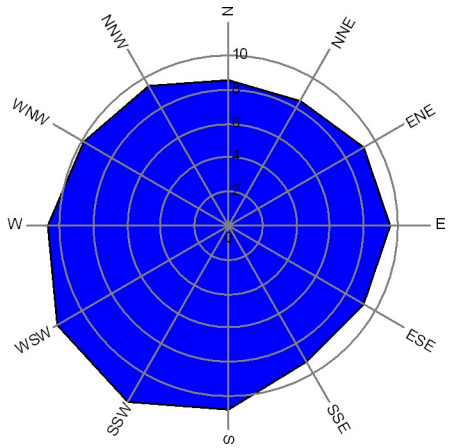
Weibull Distribution



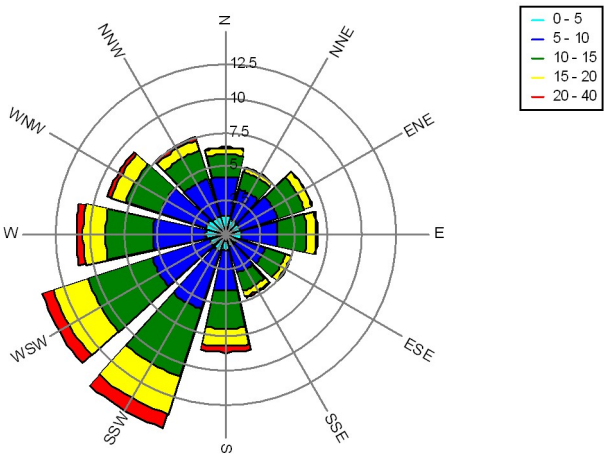
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: F - Luchterduinen; Hub height: 165.0

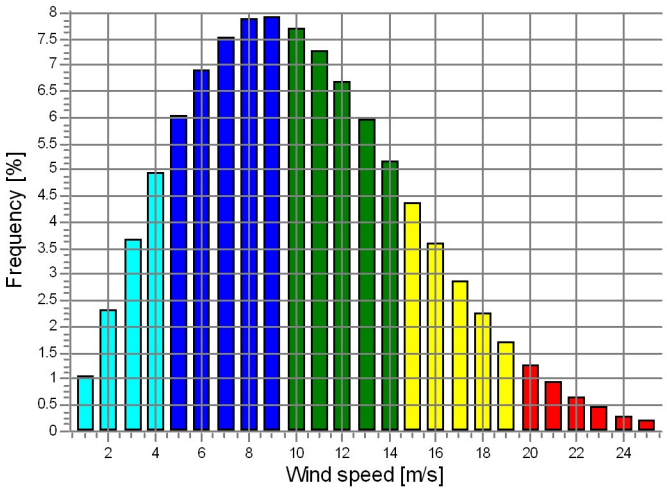
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 578,881 North: 5,806,416

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.966.wws

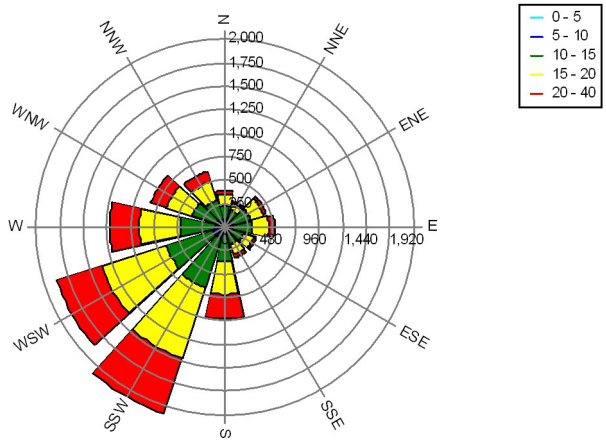
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.56	8.47	2.064	6.4
1 NNE	9.46	8.38	2.154	5.1
2 ENE	10.33	9.15	2.338	6.7
3 E	10.70	9.48	2.268	6.7
4 ESE	10.31	9.14	2.307	5.1
5 SSE	10.27	9.09	2.146	4.8
6 S	12.05	10.67	2.209	8.6
7 SSW	13.27	11.77	2.443	14.9
8 WSW	13.03	11.55	2.467	14.1
9 W	11.95	10.58	2.201	11.0
10 WNW	10.99	9.74	2.092	9.1
11 NNW	10.66	9.44	2.064	7.4
All	11.49	10.18	2.186	100.0

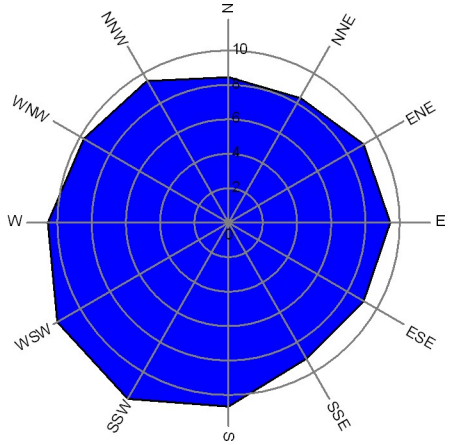
Weibull Distribution



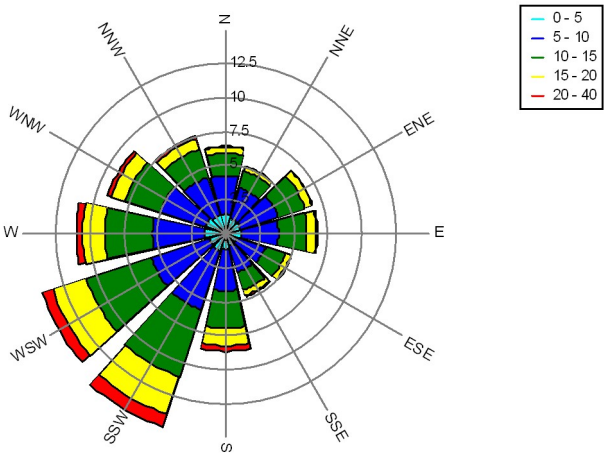
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Welbergweg 49
NL-7556 PE Hengelo
0031742489940

Calculated:
16/05/2019 11:32/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: G - HKW-02; Hub height: 164.5

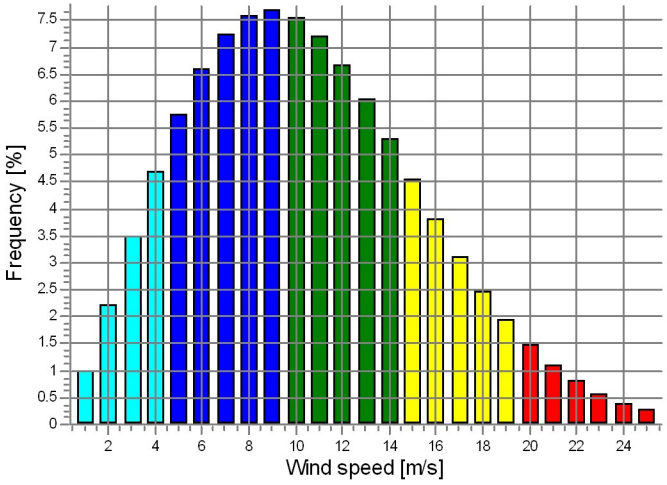
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 543,967 North: 5,835,763

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.995.wws

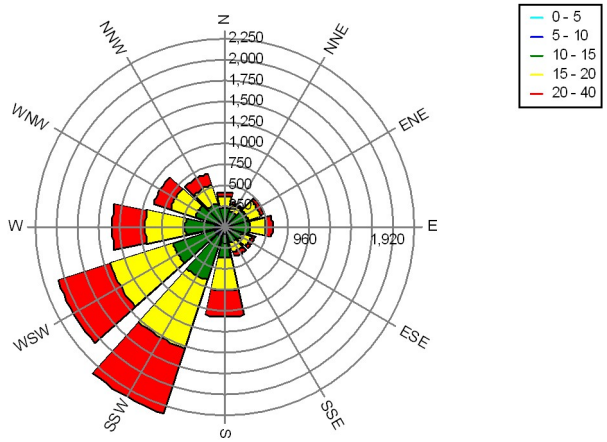
Weibull Data

Sector	A- parameter [m/s]	Current site Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.75	8.63	2.064	6.4
1 NNE	9.63	8.53	2.158	5.1
2 ENE	10.54	9.34	2.338	6.7
3 E	10.95	9.70	2.268	6.7
4 ESE	10.53	9.33	2.307	5.1
5 SSE	10.49	9.29	2.150	4.8
6 S	12.42	11.00	2.209	8.6
7 SSW	13.78	12.22	2.443	14.9
8 WSW	13.49	11.97	2.467	14.1
9 W	12.31	10.90	2.201	11.0
10 WNW	11.27	9.98	2.092	9.1
11 NNW	10.91	9.67	2.064	7.4
All	11.82	10.47	2.178	100.0

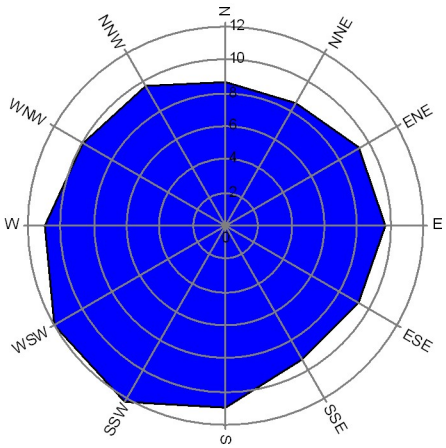
Weibull Distribution



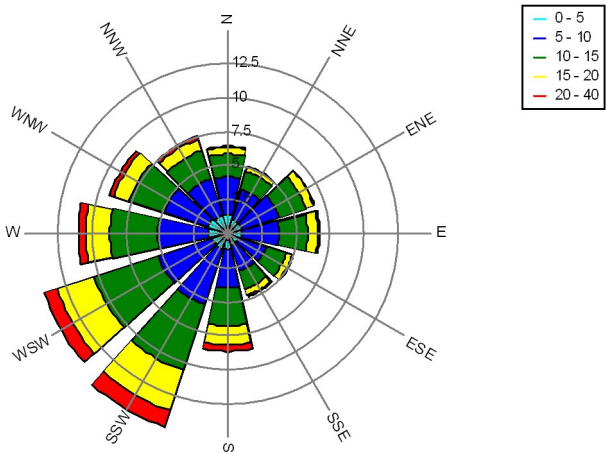
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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16/05/2019 11:32/3.2.712

PARK - Wind Data Analysis

Calculation: HKW MER 16MW incl HKN&HKZWind data: G - HKW-02; Hub height: 165.0

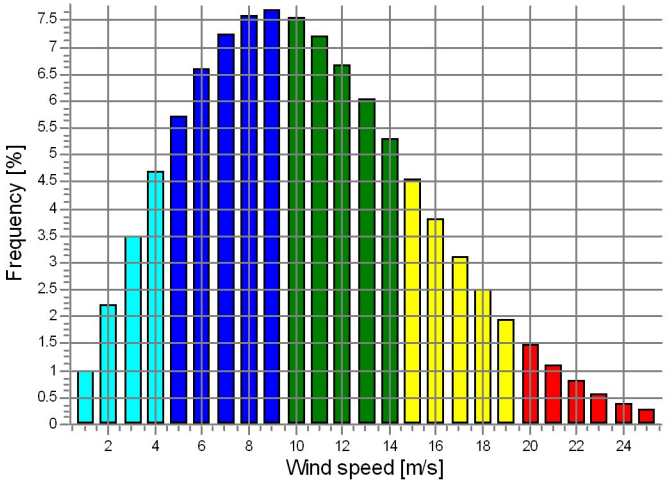
Site coordinates
UTM (north)-ETRS89 Zone: 31
East: 543,967 North: 5,835,763

Wind statistics
IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0.995.wws

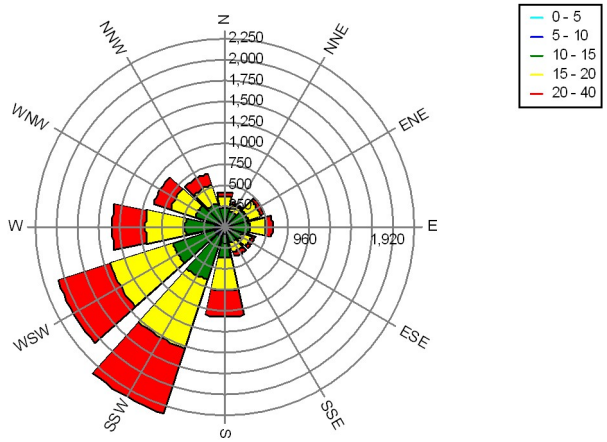
Weibull Data

Sector	Current site A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]
0 N	9.75	8.64	2.064	6.4
1 NNE	9.64	8.54	2.154	5.1
2 ENE	10.55	9.35	2.338	6.7
3 E	10.95	9.70	2.268	6.7
4 ESE	10.53	9.33	2.307	5.1
5 SSE	10.49	9.29	2.146	4.8
6 S	12.42	11.00	2.209	8.6
7 SSW	13.78	12.22	2.443	14.9
8 WSW	13.50	11.97	2.467	14.1
9 W	12.31	10.90	2.201	11.0
10 WNW	11.28	9.99	2.092	9.1
11 NNW	10.92	9.67	2.064	7.4
All	11.83	10.47	2.178	100.0

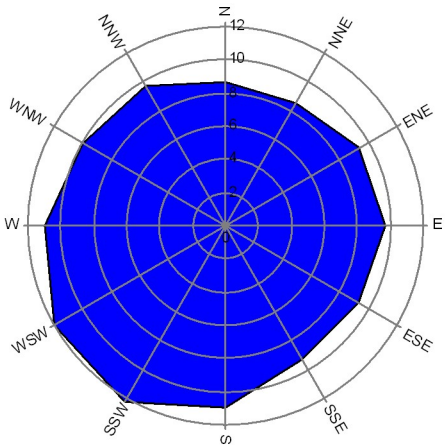
Weibull Distribution



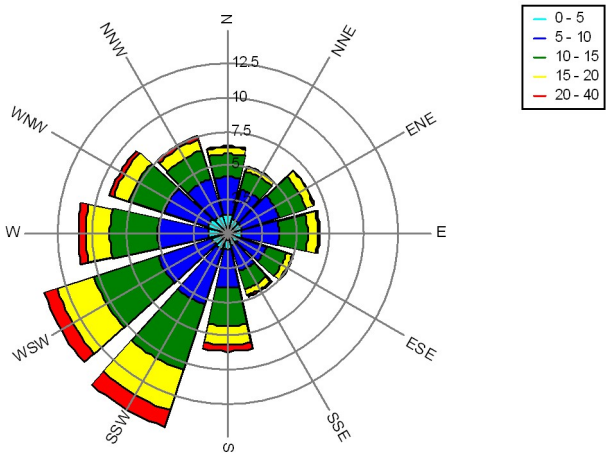
Energy Rose (kWh/m²/year)



Mean wind speed (m/s)



Frequency (%)



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Calculated:
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PARK - Park power curve

Calculation: HKW MER 16MW incl HKN&HKZ

Wind speed [m/s]	Power Free WTGs [kW]	Park WTGs [kW]	N [kW]	NNE [kW]	ENE [kW]	E [kW]	ESE [kW]	SSE [kW]	S [kW]	SSW [kW]	WSW [kW]	W [kW]	WNW [kW]	NNW [kW]
0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	37,600	28,874	28,073	27,510	28,723	28,734	30,746	29,895	28,096	27,327	28,879	28,931	31,020	30,102
4.5	100,298	68,008	65,962	62,578	66,556	67,655	75,261	71,498	65,921	62,112	67,180	68,645	76,298	72,644
5.5	194,298	132,178	127,415	121,218	129,278	131,669	146,809	139,682	127,322	120,235	130,786	133,444	148,854	141,977
6.5	329,000	226,534	218,367	207,769	222,043	225,582	251,012	239,614	218,240	205,683	224,540	228,972	254,439	243,648
7.5	517,000	363,625	351,159	333,779	356,503	362,273	401,602	384,858	350,925	330,284	360,634	367,565	406,948	391,243
8.5	761,400	553,332	534,483	511,363	544,179	551,793	606,592	585,120	534,484	505,445	550,209	558,745	613,508	593,243
9.5	1,074,702	804,687	778,117	749,055	794,261	802,253	874,037	847,762	778,228	740,698	802,088	811,885	883,526	858,918
10.5	1,363,000	1,095,573	1,061,521	1,034,652	1,088,772	1,094,339	1,171,093	1,148,494	1,062,894	1,025,045	1,096,753	1,101,662	1,177,223	1,156,272
11.5	1,488,349	1,335,892	1,301,865	1,293,613	1,344,234	1,333,417	1,382,429	1,378,096	1,302,747	1,291,238	1,345,518	1,336,009	1,383,642	1,380,942
12.5	1,504,000	1,456,689	1,432,604	1,436,840	1,471,012	1,455,654	1,468,525	1,477,802	1,431,535	1,441,920	1,469,107	1,455,554	1,468,758	1,479,458
13.5	1,504,000	1,493,708	1,482,012	1,487,496	1,500,668	1,494,176	1,495,222	1,501,067	1,480,023	1,491,031	1,500,321	1,493,931	1,495,315	1,501,953
14.5	1,504,000	1,502,390	1,499,135	1,501,803	1,503,898	1,502,645	1,502,833	1,503,892	1,497,943	1,502,566	1,503,896	1,502,493	1,502,874	1,503,980
15.5	1,504,000	1,503,890	1,503,626	1,503,923	1,504,000	1,503,937	1,503,959	1,504,000	1,503,366	1,503,968	1,504,000	1,503,918	1,503,962	1,504,000
16.5	1,504,000	1,503,996	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
17.5	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
18.5	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
19.5	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
20.5	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
21.5	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
22.5	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
23.5	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
24.5	1,504,000	1,503,997	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000	1,504,000
25.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Description:
The park power curve is similar to a WTG power curve, meaning that when a given wind speed appears in front of the park with same speed in the entire wind farm area (before influence from the park), the output from the park can be found in the park power curve. Another way to say this: The park power curve includes wake losses, but do NOT include terrain given variations in the wind speed over the park area.
Measuring a park power curve is not as simple as measuring a WTG power curve due to the fact that the park power curve depends on the wind direction and that the same wind speed normally will not appear for the entire park area at the same time (only in very flat non-complex terrain). The idea with this version of the park power curve is not to use it for validation based on measurements. This would require at least 2 measurement masts at two sides of the park, unless only a few direction sectors should be tested, AND non complex terrain (normally only useable off shore). Another park power curve version for complex terrain is available in windPRO.

The park power curve can be used for:

1. Forecast systems, based on more rough (approximated) wind data, the park power curve would be an efficient way to make the connection from wind speed (and direction) to power.
2. Construction of duration curves, telling how often a given power output will appear, the park power curve can be used together with the average wind distribution for the Wind farm area in hub height. The average wind distribution can eventually be obtained based on the Weibull parameters for each WTG position. These are found at print menu: >Result to file< in the >Park result< which can be saved to file or copied to clipboard and pasted in Excel.
3. Calculation of wind energy index based on the PARK production (see below).
4. Estimation of the expected PARK production for an existing wind farm based on wind measurements at minimum 2 measurement masts at two sides of wind farm. The masts must be used for obtaining the free wind speed. The free wind speed is used in the simulation of expected energy production with the PARK power curve. This procedure will only work suitable in non complex terrains. For complex terrain another park power curve calculation is available in windPRO (PPV-model).

Note:
From the >Result to file< the >Wind Speeds Inside Wind farm< is also available. These can (e.g. via Excel) be used for extracting the wake induced reductions in measured wind speed.

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Calculated:
16/05/2019 11:32/3.2.712

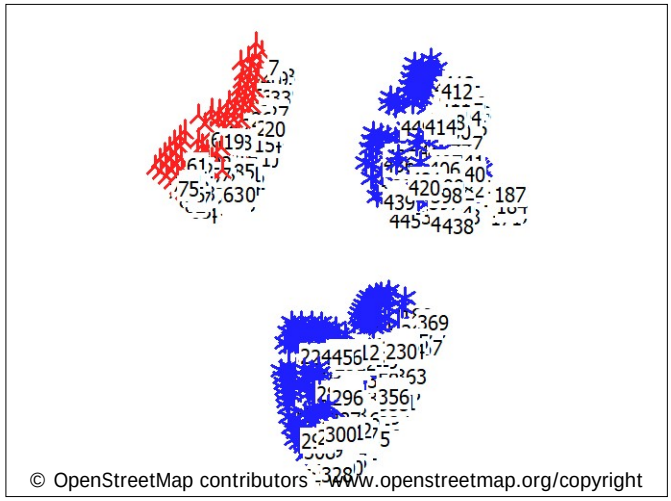
PARK - WTG distances

Calculation: HKW MER 16MW incl HKN&HKZ

WTG distances

	Z [m]	Nearest WTG	Z [m]	Horizontal distance [m]	Distance in rotor diameters (max)	Distance in rotor diameters (min)
1	0.0	8	0.0	1,381	5.0	5.0
2	0.0	94	0.0	1,428	5.1	5.1
3	0.0	13	0.0	1,591	5.7	5.7
4	0.0	12	0.0	1,230	4.4	4.4
5	0.0	19	0.0	1,537	5.5	5.5
6	0.0	5	0.0	1,793	6.4	6.4
7	0.0	38	0.0	1,853	6.6	6.6
8	0.0	11	0.0	1,322	4.7	4.7
9	0.0	8	0.0	1,325	4.7	4.7
10	0.0	11	0.0	1,325	4.7	4.7
11	0.0	8	0.0	1,322	4.7	4.7
12	0.0	4	0.0	1,230	4.4	4.4
13	0.0	18	0.0	1,322	4.7	4.7
14	0.0	42	0.0	1,316	4.7	4.7
15	0.0	43	0.0	1,316	4.7	4.7
16	0.0	44	0.0	1,316	4.7	4.7
17	0.0	45	0.0	1,316	4.7	4.7
18	0.0	46	0.0	1,316	4.7	4.7
19	0.0	47	0.0	1,316	4.7	4.7
20	0.0	24	0.0	1,323	4.7	4.7
21	0.0	25	0.0	1,322	4.7	4.7
22	0.0	26	0.0	1,322	4.7	4.7
23	0.0	22	0.0	1,325	4.7	4.7
24	0.0	20	0.0	1,323	4.7	4.7
25	0.0	28	0.0	1,322	4.7	4.7
26	0.0	29	0.0	1,322	4.7	4.7
27	0.0	24	0.0	1,323	4.7	4.7
28	0.0	31	0.0	1,322	4.7	4.7
29	0.0	32	0.0	1,322	4.7	4.7
30	0.0	27	0.0	1,323	4.7	4.7
31	0.0	34	0.0	1,322	4.7	4.7
32	0.0	35	0.0	1,322	4.7	4.7
33	0.0	36	0.0	1,323	4.7	4.7
34	0.0	37	0.0	1,322	4.7	4.7
35	0.0	32	0.0	1,322	4.7	4.7
36	0.0	33	0.0	1,323	4.7	4.7
37	0.0	34	0.0	1,322	4.7	4.7
38	0.0	39	0.0	1,325	4.7	4.7
39	0.0	38	0.0	1,325	4.7	4.7
40	0.0	39	0.0	1,325	4.7	4.7
41	0.0	40	0.0	1,325	4.7	4.7
42	0.0	14	0.0	1,316	4.7	4.7
43	0.0	15	0.0	1,316	4.7	4.7
44	0.0	16	0.0	1,316	4.7	4.7
45	0.0	17	0.0	1,316	4.7	4.7
46	0.0	18	0.0	1,316	4.7	4.7
47	0.0	19	0.0	1,316	4.7	4.7
48	0.0	55	0.0	1,314	4.7	4.7
49	0.0	58	0.0	1,334	4.8	4.8
50	0.0	90	0.0	2,013	7.2	7.2
51	0.0	85	0.0	1,302	4.7	4.7
52	0.0	51	0.0	1,314	4.7	4.7
53	0.0	86	0.0	1,306	4.7	4.7
54	0.0	53	0.0	1,314	4.7	4.7
55	0.0	61	0.0	1,299	4.7	4.7
56	0.0	62	0.0	1,166	4.2	4.2
57	0.0	93	0.0	1,313	4.7	4.7
58	0.0	94	0.0	1,313	4.7	4.7
59	0.0	87	0.0	1,309	4.7	4.7
60	0.0	64	0.0	1,276	4.6	4.6
61	0.0	55	0.0	1,299	4.7	4.7
62	0.0	56	0.0	1,166	4.2	4.2
63	0.0	88	0.0	1,141	4.1	4.1

To be continued on next page...



Scale 1:1,250,000

New WTG Existing WTG

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Calculated:
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PARK - WTG distances

Calculation: HKW MER 16MW incl HKN&HKZ

...continued from previous page

	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
64	0.0	60	0.0	1,276	4.6	4.6
65	0.0	64	0.0	1,314	4.7	4.7
66	0.0	70	0.0	1,302	4.7	4.7
67	0.0	71	0.0	1,303	4.7	4.7
68	0.0	72	0.0	1,303	4.7	4.7
69	0.0	73	0.0	1,303	4.7	4.7
70	0.0	66	0.0	1,302	4.7	4.7
71	0.0	67	0.0	1,303	4.7	4.7
72	0.0	68	0.0	1,303	4.7	4.7
73	0.0	69	0.0	1,303	4.7	4.7
74	0.0	70	0.0	1,304	4.7	4.7
75	0.0	71	0.0	1,304	4.7	4.7
76	0.0	72	0.0	1,305	4.7	4.7
77	0.0	73	0.0	1,305	4.7	4.7
78	0.0	77	0.0	1,314	4.7	4.7
79	0.0	80	0.0	1,314	4.7	4.7
80	0.0	81	0.0	1,314	4.7	4.7
81	0.0	80	0.0	1,314	4.7	4.7
82	0.0	81	0.0	1,314	4.7	4.7
83	0.0	82	0.0	1,314	4.7	4.7
84	0.0	83	0.0	1,314	4.7	4.7
85	0.0	51	0.0	1,302	4.7	4.7
86	0.0	53	0.0	1,306	4.7	4.7
87	0.0	59	0.0	1,309	4.7	4.7
88	0.0	63	0.0	1,141	4.1	4.1
89	0.0	90	0.0	1,314	4.7	4.7
90	0.0	91	0.0	1,314	4.7	4.7
91	0.0	90	0.0	1,314	4.7	4.7
92	0.0	93	0.0	1,314	4.7	4.7
93	0.0	57	0.0	1,313	4.7	4.7
94	0.0	58	0.0	1,313	4.7	4.7
95	0.0	96	0.0	550	6.9	6.9
96	0.0	95	0.0	550	6.9	6.9
97	0.0	98	0.0	550	6.9	6.9
98	0.0	97	0.0	550	6.9	6.9
99	0.0	95	0.0	550	6.9	6.9
100	0.0	102	0.0	550	6.9	6.9
101	0.0	103	0.0	549	6.9	6.9
102	0.0	110	0.0	550	6.9	6.9
103	0.0	101	0.0	549	6.9	6.9
104	0.0	107	0.0	550	6.9	6.9
105	0.0	108	0.0	550	6.9	6.9
106	0.0	105	0.0	550	6.9	6.9
107	0.0	104	0.0	550	6.9	6.9
108	0.0	105	0.0	550	6.9	6.9
109	0.0	111	0.0	550	6.9	6.9
110	0.0	108	0.0	550	6.9	6.9
111	0.0	109	0.0	550	6.9	6.9
112	0.0	120	0.0	550	6.9	6.9
113	0.0	111	0.0	550	6.9	6.9
114	0.0	115	0.0	550	6.9	6.9
115	0.0	114	0.0	550	6.9	6.9
116	0.0	114	0.0	550	6.9	6.9
117	0.0	120	0.0	550	6.9	6.9
118	0.0	113	0.0	551	6.9	6.9
119	0.0	121	0.0	550	6.9	6.9
120	0.0	117	0.0	550	6.9	6.9
121	0.0	119	0.0	550	6.9	6.9
122	0.0	129	0.0	549	6.9	6.9
123	0.0	125	0.0	550	6.9	6.9
124	0.0	121	0.0	550	6.9	6.9
125	0.0	123	0.0	550	6.9	6.9
126	0.0	123	0.0	550	6.9	6.9

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PARK - WTG distances

Calculation: HKW MER 16MW incl HKN&HKZ

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	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
127	0.0	129	0.0	550	6.9	6.9
128	0.0	130	0.0	549	6.9	6.9
129	0.0	122	0.0	549	6.9	6.9
130	0.0	128	0.0	549	6.9	6.9
131	0.0	137	0.0	550	6.9	6.9
132	0.0	134	0.0	550	6.9	6.9
133	0.0	135	0.0	550	6.9	6.9
134	0.0	136	0.0	550	6.9	6.9
135	0.0	133	0.0	550	6.9	6.9
136	0.0	134	0.0	550	6.9	6.9
137	0.0	131	0.0	550	6.9	6.9
138	0.0	140	0.0	550	6.9	6.9
139	0.0	136	0.0	550	6.9	6.9
140	0.0	143	0.0	550	6.9	6.9
141	0.0	145	0.0	550	6.9	6.9
142	0.0	150	0.0	550	6.9	6.9
143	0.0	140	0.0	550	6.9	6.9
144	0.0	146	0.0	549	6.9	6.9
145	0.0	141	0.0	550	6.9	6.9
146	0.0	144	0.0	549	6.9	6.9
147	0.0	139	0.0	550	6.9	6.9
148	0.0	149	0.0	550	6.9	6.9
149	0.0	148	0.0	550	6.9	6.9
150	0.0	151	0.0	549	6.9	6.9
151	0.0	150	0.0	549	6.9	6.9
152	0.0	153	0.0	549	6.9	6.9
153	0.0	152	0.0	549	6.9	6.9
154	0.0	151	0.0	552	6.9	6.9
155	0.0	156	0.0	646	7.2	7.2
156	0.0	157	0.0	644	7.2	7.2
157	0.0	158	0.0	644	7.2	7.2
158	0.0	157	0.0	644	7.2	7.2
159	0.0	158	0.0	644	7.2	7.2
160	0.0	159	0.0	644	7.2	7.2
161	0.0	162	0.0	644	7.2	7.2
162	0.0	163	0.0	643	7.1	7.1
163	0.0	162	0.0	643	7.1	7.1
164	0.0	166	0.0	644	7.2	7.2
165	0.0	168	0.0	632	7.0	7.0
166	0.0	164	0.0	644	7.2	7.2
167	0.0	169	0.0	644	7.2	7.2
168	0.0	165	0.0	632	7.0	7.0
169	0.0	170	0.0	642	7.1	7.1
170	0.0	169	0.0	642	7.1	7.1
171	0.0	168	0.0	646	7.2	7.2
172	0.0	175	0.0	643	7.1	7.1
173	0.0	174	0.0	646	7.2	7.2
174	0.0	176	0.0	644	7.2	7.2
175	0.0	172	0.0	643	7.1	7.1
176	0.0	174	0.0	644	7.2	7.2
177	0.0	176	0.0	644	7.2	7.2
178	0.0	180	0.0	643	7.1	7.1
179	0.0	177	0.0	724	8.0	8.0
180	0.0	178	0.0	643	7.1	7.1
181	0.0	184	0.0	647	7.2	7.2
182	0.0	183	0.0	644	7.2	7.2
183	0.0	185	0.0	642	7.1	7.1
184	0.0	181	0.0	647	7.2	7.2
185	0.0	183	0.0	642	7.1	7.1
186	0.0	185	0.0	644	7.2	7.2
187	0.0	186	0.0	736	8.2	8.2
188	0.0	191	0.0	863	7.7	7.7
189	0.0	192	0.0	668	6.0	6.0

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PARK - WTG distances

Calculation: HKW MER 16MW incl HKN&HKZ

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	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
190	0.0	192	0.0	553	4.9	4.9
191	0.0	196	0.0	688	6.1	6.1
192	0.0	190	0.0	553	4.9	4.9
193	0.0	195	0.0	534	4.8	4.8
194	0.0	192	0.0	586	5.2	5.2
195	0.0	197	0.0	533	4.8	4.8
196	0.0	194	0.0	633	5.7	5.7
197	0.0	195	0.0	533	4.8	4.8
198	0.0	197	0.0	534	4.8	4.8
199	0.0	201	0.0	544	4.9	4.9
200	0.0	202	0.0	535	4.8	4.8
201	0.0	199	0.0	544	4.9	4.9
202	0.0	200	0.0	535	4.8	4.8
203	0.0	204	0.0	553	4.9	4.9
204	0.0	206	0.0	543	4.8	4.8
205	0.0	207	0.0	575	5.1	5.1
206	0.0	204	0.0	543	4.8	4.8
207	0.0	209	0.0	563	5.0	5.0
208	0.0	206	0.0	582	5.2	5.2
209	0.0	207	0.0	563	5.0	5.0
210	0.0	209	0.0	573	5.1	5.1
211	0.0	213	0.0	558	5.0	5.0
212	0.0	214	0.0	557	5.0	5.0
213	0.0	211	0.0	558	5.0	5.0
214	0.0	212	0.0	557	5.0	5.0
215	0.0	213	0.0	570	5.1	5.1
216	0.0	215	0.0	591	5.3	5.3
217	0.0	220	0.0	580	5.2	5.2
218	0.0	219	0.0	575	5.1	5.1
219	0.0	218	0.0	575	5.1	5.1
220	0.0	217	0.0	580	5.2	5.2
221	0.0	219	0.0	592	5.3	5.3
222	0.0	223	0.0	588	5.2	5.2
223	0.0	222	0.0	588	5.2	5.2
224	0.0	225	0.0	586	5.2	5.2
225	0.0	224	0.0	586	5.2	5.2
226	0.0	223	0.0	613	5.5	5.5
227	0.0	225	0.0	622	5.6	5.6
228	0.0	229	0.0	596	5.3	5.3
229	0.0	228	0.0	596	5.3	5.3
230	0.0	229	0.0	696	6.2	6.2
231	0.0	242	0.0	1,122	6.8	6.8
232	0.0	231	0.0	1,313	8.0	8.0
233	0.0	232	0.0	1,438	8.8	8.8
234	0.0	238	0.0	1,059	6.5	6.5
235	0.0	239	0.0	1,059	6.5	6.5
236	0.0	240	0.0	1,059	6.5	6.5
237	0.0	241	0.0	1,059	6.5	6.5
238	0.0	234	0.0	1,059	6.5	6.5
239	0.0	235	0.0	1,059	6.5	6.5
240	0.0	236	0.0	1,059	6.5	6.5
241	0.0	237	0.0	1,059	6.5	6.5
242	0.0	231	0.0	1,122	6.8	6.8
243	0.0	248	0.0	1,060	6.5	6.5
244	0.0	249	0.0	1,060	6.5	6.5
245	0.0	250	0.0	1,059	6.5	6.5
246	0.0	251	0.0	1,059	6.5	6.5
247	0.0	252	0.0	1,059	6.5	6.5
248	0.0	254	0.0	1,059	6.5	6.5
249	0.0	244	0.0	1,060	6.5	6.5
250	0.0	245	0.0	1,059	6.5	6.5
251	0.0	246	0.0	1,059	6.5	6.5
252	0.0	247	0.0	1,059	6.5	6.5

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PARK - WTG distances

Calculation: HKW MER 16MW incl HKN&HKZ

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	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
253	0.0	258	0.0	1,059	6.5	6.5
254	0.0	248	0.0	1,059	6.5	6.5
255	0.0	249	0.0	1,060	6.5	6.5
256	0.0	250	0.0	1,059	6.5	6.5
257	0.0	251	0.0	1,059	6.5	6.5
258	0.0	253	0.0	1,059	6.5	6.5
259	0.0	254	0.0	1,060	6.5	6.5
260	0.0	269	0.0	1,179	7.2	7.2
261	0.0	275	0.0	1,028	6.3	6.3
262	0.0	280	0.0	959	5.8	5.8
263	0.0	291	0.0	925	5.6	5.6
264	0.0	265	0.0	1,015	6.2	6.2
265	0.0	266	0.0	1,015	6.2	6.2
266	0.0	267	0.0	1,015	6.2	6.2
267	0.0	268	0.0	1,015	6.2	6.2
268	0.0	269	0.0	1,015	6.2	6.2
269	0.0	268	0.0	1,015	6.2	6.2
270	0.0	271	0.0	1,016	6.2	6.2
271	0.0	272	0.0	1,015	6.2	6.2
272	0.0	273	0.0	1,015	6.2	6.2
273	0.0	272	0.0	1,015	6.2	6.2
274	0.0	275	0.0	1,015	6.2	6.2
275	0.0	274	0.0	1,015	6.2	6.2
276	0.0	277	0.0	1,015	6.2	6.2
277	0.0	276	0.0	1,015	6.2	6.2
278	0.0	279	0.0	1,015	6.2	6.2
279	0.0	280	0.0	1,015	6.2	6.2
280	0.0	262	0.0	959	5.8	5.8
281	0.0	282	0.0	1,015	6.2	6.2
282	0.0	283	0.0	1,015	6.2	6.2
283	0.0	284	0.0	1,015	6.2	6.2
284	0.0	283	0.0	1,015	6.2	6.2
285	0.0	286	0.0	1,015	6.2	6.2
286	0.0	285	0.0	1,015	6.2	6.2
287	0.0	288	0.0	1,015	6.2	6.2
288	0.0	289	0.0	1,015	6.2	6.2
289	0.0	290	0.0	1,015	6.2	6.2
290	0.0	291	0.0	1,015	6.2	6.2
291	0.0	263	0.0	925	5.6	5.6
292	0.0	293	0.0	1,015	6.2	6.2
293	0.0	294	0.0	1,014	6.2	6.2
294	0.0	293	0.0	1,014	6.2	6.2
295	0.0	296	0.0	1,015	6.2	6.2
296	0.0	297	0.0	1,015	6.2	6.2
297	0.0	296	0.0	1,015	6.2	6.2
298	0.0	303	0.0	1,176	7.2	7.2
299	0.0	304	0.0	1,176	7.2	7.2
300	0.0	305	0.0	1,176	7.2	7.2
301	0.0	306	0.0	1,175	7.2	7.2
302	0.0	307	0.0	1,176	7.2	7.2
303	0.0	298	0.0	1,176	7.2	7.2
304	0.0	310	0.0	1,175	7.2	7.2
305	0.0	311	0.0	1,175	7.2	7.2
306	0.0	301	0.0	1,175	7.2	7.2
307	0.0	332	0.0	1,163	7.1	7.1
308	0.0	313	0.0	1,177	7.2	7.2
309	0.0	314	0.0	1,176	7.2	7.2
310	0.0	304	0.0	1,175	7.2	7.2
311	0.0	331	0.0	1,055	6.4	6.4
312	0.0	306	0.0	1,175	7.2	7.2
313	0.0	318	0.0	1,176	7.2	7.2
314	0.0	309	0.0	1,176	7.2	7.2
315	0.0	321	0.0	1,174	7.2	7.2

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PARK - WTG distances

Calculation: HKW MER 16MW incl HKN&HKZ

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	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
316	0.0	332	0.0	1,090	6.6	6.6
317	0.0	322	0.0	1,176	7.2	7.2
318	0.0	313	0.0	1,176	7.2	7.2
319	0.0	314	0.0	1,176	7.2	7.2
320	0.0	325	0.0	1,176	7.2	7.2
321	0.0	315	0.0	1,174	7.2	7.2
322	0.0	326	0.0	1,032	6.3	6.3
323	0.0	326	0.0	1,060	6.5	6.5
324	0.0	330	0.0	1,064	6.5	6.5
325	0.0	320	0.0	1,176	7.2	7.2
326	0.0	328	0.0	1,031	6.3	6.3
327	0.0	328	0.0	842	5.1	5.1
328	0.0	327	0.0	842	5.1	5.1
329	0.0	328	0.0	982	6.0	6.0
330	0.0	324	0.0	1,064	6.5	6.5
331	0.0	311	0.0	1,055	6.4	6.4
332	0.0	333	0.0	975	5.9	5.9
333	0.0	332	0.0	975	5.9	5.9
334	0.0	332	0.0	988	6.0	6.0
335	0.0	334	0.0	1,046	6.4	6.4
336	0.0	337	0.0	1,033	6.3	6.3
337	0.0	338	0.0	1,033	6.3	6.3
338	0.0	337	0.0	1,033	6.3	6.3
339	0.0	340	0.0	1,033	6.3	6.3
340	0.0	339	0.0	1,033	6.3	6.3
341	0.0	340	0.0	1,033	6.3	6.3
342	0.0	343	0.0	1,033	6.3	6.3
343	0.0	344	0.0	1,033	6.3	6.3
344	0.0	345	0.0	1,033	6.3	6.3
345	0.0	346	0.0	1,033	6.3	6.3
346	0.0	347	0.0	1,033	6.3	6.3
347	0.0	346	0.0	1,033	6.3	6.3
348	0.0	349	0.0	1,033	6.3	6.3
349	0.0	350	0.0	1,033	6.3	6.3
350	0.0	349	0.0	1,033	6.3	6.3
351	0.0	352	0.0	1,033	6.3	6.3
352	0.0	353	0.0	1,032	6.3	6.3
353	0.0	352	0.0	1,032	6.3	6.3
354	0.0	355	0.0	1,033	6.3	6.3
355	0.0	356	0.0	1,032	6.3	6.3
356	0.0	355	0.0	1,032	6.3	6.3
357	0.0	356	0.0	1,033	6.3	6.3
358	0.0	359	0.0	900	5.5	5.5
359	0.0	358	0.0	900	5.5	5.5
360	0.0	361	0.0	900	5.5	5.5
361	0.0	360	0.0	900	5.5	5.5
362	0.0	363	0.0	901	5.5	5.5
363	0.0	362	0.0	901	5.5	5.5
364	0.0	230	0.0	1,357	12.1	8.3
365	0.0	214	0.0	1,377	12.3	8.4
366	0.0	202	0.0	1,311	11.7	8.0
367	0.0	365	0.0	2,489	15.2	15.2
368	0.0	369	0.0	1,450	8.8	8.8
369	0.0	368	0.0	1,450	8.8	8.8
370	0.0	342	0.0	1,108	6.8	6.8
371	0.0	372	0.0	978	6.0	6.0
372	0.0	371	0.0	978	6.0	6.0
373	0.0	372	0.0	1,108	6.8	6.8
374	0.0	375	0.0	1,318	8.0	8.0
375	0.0	374	0.0	1,318	8.0	8.0
376	0.0	420	0.0	1,318	8.0	8.0
377	0.0	430	0.0	1,317	8.0	8.0
378	0.0	427	0.0	1,315	8.0	8.0

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PARK - WTG distances

Calculation: HKW MER 16MW incl HKN&HKZ

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	Z	Nearest WTG	Z	Horizontal distance	Distance in rotor diameters (max)	Distance in rotor diameters (min)
	[m]		[m]	[m]		
379	0.0	381	0.0	1,317	8.0	8.0
380	0.0	406	0.0	1,317	8.0	8.0
381	0.0	399	0.0	1,316	8.0	8.0
382	0.0	155	0.0	2,090	23.2	12.7
383	0.0	384	0.0	1,478	9.0	9.0
384	0.0	389	0.0	1,318	8.0	8.0
385	0.0	390	0.0	1,318	8.0	8.0
386	0.0	393	0.0	1,316	8.0	8.0
387	0.0	394	0.0	1,315	8.0	8.0
388	0.0	395	0.0	1,315	8.0	8.0
389	0.0	384	0.0	1,318	8.0	8.0
390	0.0	397	0.0	1,318	8.0	8.0
391	0.0	390	0.0	1,320	8.0	8.0
392	0.0	400	0.0	1,315	8.0	8.0
393	0.0	401	0.0	1,315	8.0	8.0
394	0.0	402	0.0	1,314	8.0	8.0
395	0.0	403	0.0	1,314	8.0	8.0
396	0.0	404	0.0	1,314	8.0	8.0
397	0.0	398	0.0	1,223	7.5	7.5
398	0.0	397	0.0	1,223	7.5	7.5
399	0.0	381	0.0	1,316	8.0	8.0
400	0.0	392	0.0	1,315	8.0	8.0
401	0.0	408	0.0	1,313	8.0	8.0
402	0.0	409	0.0	1,313	8.0	8.0
403	0.0	410	0.0	1,313	8.0	8.0
404	0.0	411	0.0	1,312	8.0	8.0
405	0.0	412	0.0	1,312	8.0	8.0
406	0.0	407	0.0	1,195	7.3	7.3
407	0.0	406	0.0	1,195	7.3	7.3
408	0.0	401	0.0	1,313	8.0	8.0
409	0.0	402	0.0	1,313	8.0	8.0
410	0.0	403	0.0	1,313	8.0	8.0
411	0.0	404	0.0	1,312	8.0	8.0
412	0.0	405	0.0	1,312	8.0	8.0
413	0.0	412	0.0	1,320	8.0	8.0
414	0.0	415	0.0	1,280	7.8	7.8
415	0.0	422	0.0	1,202	7.3	7.3
416	0.0	423	0.0	1,313	8.0	8.0
417	0.0	424	0.0	1,313	8.0	8.0
418	0.0	425	0.0	1,312	8.0	8.0
419	0.0	426	0.0	1,312	8.0	8.0
420	0.0	376	0.0	1,318	8.0	8.0
421	0.0	379	0.0	1,318	8.0	8.0
422	0.0	415	0.0	1,202	7.3	7.3
423	0.0	422	0.0	1,266	7.7	7.7
424	0.0	417	0.0	1,313	8.0	8.0
425	0.0	418	0.0	1,312	8.0	8.0
426	0.0	419	0.0	1,312	8.0	8.0
427	0.0	449	0.0	1,315	8.0	8.0
428	0.0	431	0.0	1,288	7.9	7.9
429	0.0	433	0.0	1,318	8.0	8.0
430	0.0	434	0.0	1,317	8.0	8.0
431	0.0	428	0.0	1,288	7.9	7.9
432	0.0	435	0.0	1,317	8.0	8.0
433	0.0	436	0.0	1,317	8.0	8.0
434	0.0	437	0.0	1,317	8.0	8.0
435	0.0	432	0.0	1,317	8.0	8.0
436	0.0	433	0.0	1,317	8.0	8.0
437	0.0	434	0.0	1,317	8.0	8.0
438	0.0	448	0.0	2,021	12.3	12.3
439	0.0	444	0.0	2,088	12.7	12.7
440	0.0	441	0.0	1,925	11.7	11.7
441	0.0	440	0.0	1,925	11.7	11.7

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PARK - WTG distances

Calculation: HKW MER 16MW incl HKN&HKZ

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	Z [m]	Nearest WTG	Z [m]	Horizontal distance [m]	Distance in rotor diameters (max)	Distance in rotor diameters (min)
442	0.0	407	0.0	1,907	11.6	11.6
443	0.0	446	0.0	1,543	9.4	9.4
444	0.0	137	0.0	1,182	14.8	7.2
445	0.0	98	0.0	1,173	14.7	7.2
446	0.0	407	0.0	1,514	9.2	9.2
447	0.0	392	0.0	1,801	11.0	11.0
448	0.0	438	0.0	2,021	12.3	12.3
449	0.0	431	0.0	1,298	7.9	7.9
Min	0.0		0.0	533	4.1	4.1
Max	0.0		0.0	2,489	23.2	15.2

PARK - Wind statistics info

Calculation: HKW MER 16MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,994.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,994
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
Effective measurement length	300.0 Months

Note

To get the most correct calculation results, wind statistics shall be calculated with the SAME model and model parameters, as currently chosen in calculation. For WAsP versions before 10.0, the model is unchanged, but thereafter more model changes affecting the wind statistic is seen. Likewise WAsP CFD should always use WAsP CFD calculated wind statistics.

PARK - Wind statistics info

Calculation: HKW MER 16MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,991.wws
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PARK - Wind statistics info

Calculation: HKW MER 16MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,994.wws
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Note

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PARK - Wind statistics info

Calculation: HKW MER 16MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,955.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,955
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
Recovery rate	100.0 %
Effective measurement length	300.0 Months

Note

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PARK - Wind statistics info

Calculation: HKW MER 16MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,974.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,974
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
Sectors	12
WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
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Note

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PARK - Wind statistics info

Calculation: HKW MER 16MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,966.wws
Name	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,966
Country	Netherlands
Source	User
Mast coordinates	UTM (north)-ETRS89 Zone: 31 East: 529,340 North: 5,855,469
Created	23/05/2018
Edited	23/05/2018
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WAsP version	WAsP 11 Version 11.06.0028
Coordinate system	UTM (north)-WGS84 Zone: 31
Displacement height	None

Additional info for wind statistic

Source data	IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1))
Data from	27/02/1993
Data to	28/02/2018
Measurement length	300.0 Months
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PARK - Wind statistics info

Calculation: HKW MER 16MW incl HKN&HKZ

Main data for wind statistic

File	\\pd-fs01.pondera.local\projecten\Extern\2017\717029 Expert support RVO offshore WF Zones\TO\WP\IJmuiden Mast (Regression MCP using EmdConwx_N52.850_E003.440 (1)) - E Synth 100.00 m-Corr0,995.wws
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Note

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Calculated:
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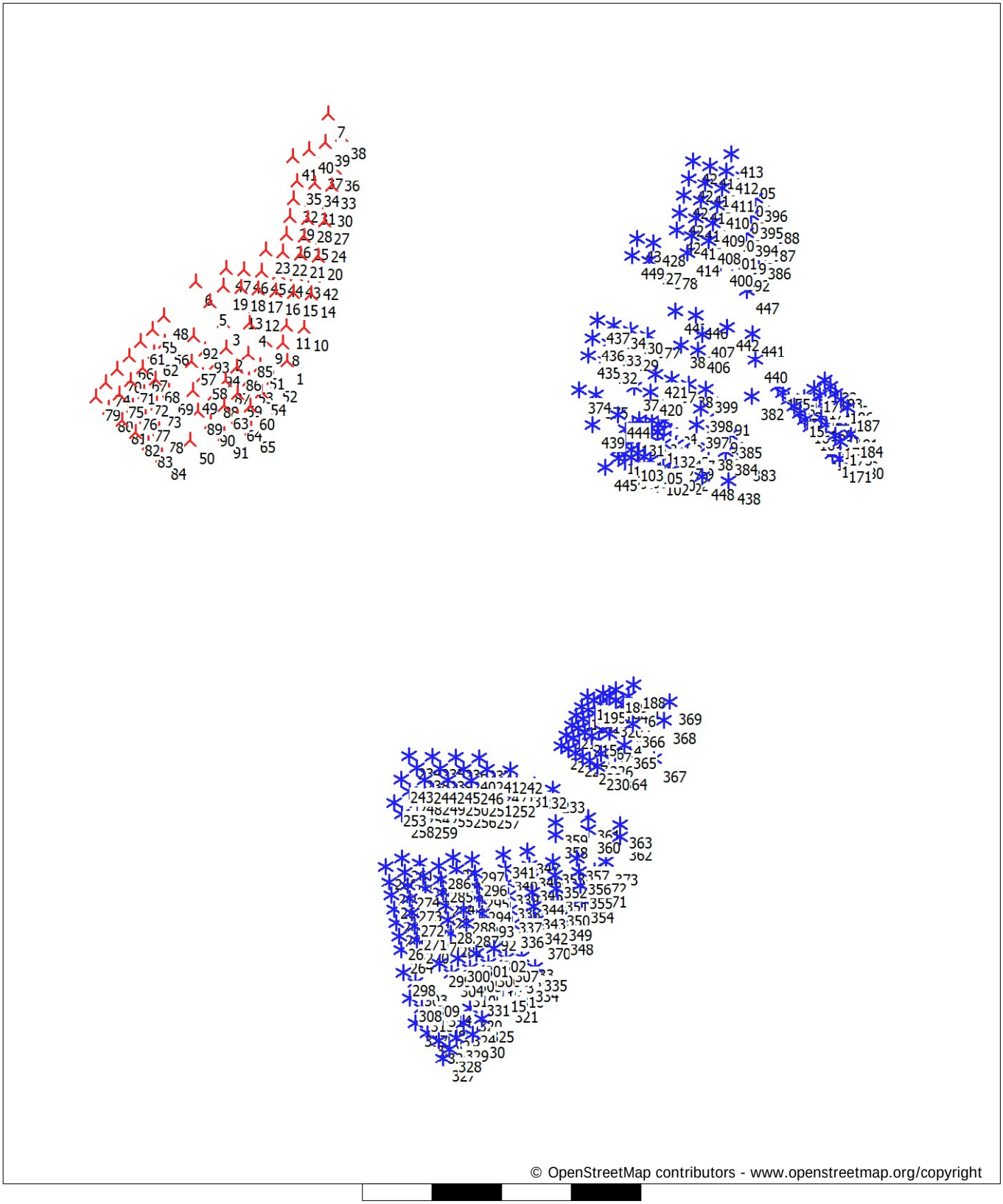
PARK - Map

Calculation: HKW MER 16MW incl HKN&HKZ



Map: Open Street Map 001 , Print scale 1:400,000, Map center UTM (north)-ETRS89 Zone: 31 East: 569,595 North: 5,816,598

New WTG Existing WTG

BIJLAGE 11

Milieueffecten gewijzigde kavelindeling

1 INLEIDING

In hoofdstuk 12 van dit MER is beschreven dat de oorspronkelijke kavelindeling van kavel VI en VII in het windenergiegebied Hollandse Kust (west), waarop het effectenonderzoek in het MER is gebaseerd, gewijzigd wordt door recente ontwikkelingen. Dit hangt samen met nieuwe informatie over de aanstaande buitengebruikstelling van een deel van de mijnbouwinfrastructuur in het windenergiegebied en over de status van een in het gebied gelegen telecomkabel. Deze informatie is ontvangen na de terinzagelegging van de NRD en na de oplevering van het concept-milieueffectrapport. In de aangepaste verkaveling zijn onderhoudszones van niet meer in gebruik zijnde pijpleidingen in omvang beperkt en is geen rekening meer gehouden met een obstakelvrije helikopterzone rond platform P6A. Tevens is naar aanleiding van het onlangs ondertekende Noordzeeakkoord gerichter rekening gehouden met het scheepvaartverkeer. In de nieuwe verkaveling is respectievelijk tussen de kavels VI en VII en tussen de kavels VII en VI alternatief een ruimte open gehouden die in de toekomst kan dienen als doorvaartpassage voor de scheepvaart.

Door de verkaveling anticiperend op bovenstaande ontwikkelingen aan te passen, ontstaat per kavel meer gebruiksruimte voor de windparkontwikkelaars. Daarmee wordt meer flexibiliteit geboden om het windpark zo optimaal mogelijk te ontwerpen zonder dat van het uitgangspunt van compacte kavels wordt afgestapt. Door het aanwijzen van twee kavels in het noorden (VI) en in het centrum (VII) of in het centrum (VII) en in het zuiden (VI alternatief) van het windenergiegebied blijft aan de zuidkant dan wel aan de noordkant vooralsnog ruimte over voor bestaand gebruik.[1] Binnen de kavels staan de windturbines met een beoogde tussenliggende afstand van viermaal de rotordiameter nog steeds ruim uit elkaar.

Figuur 1.1 laat de gewijzigde kavelindeling en de omgeving van de kavels zien. Figuur 1.2 laat de gewijzigde kavelindeling t.o.v. de oorspronkelijke kavelindeling zien. De gewijzigde kavelindeling van HKW (kavel VI, VII en VI alternatief) kent daarbij de volgende wijzigingen:

1. Tussen kavel VI en VII wordt een ruimte van 1.200 meter breed open gehouden, en tussen kavel VII en VI (alternatief) wordt een ruimte van 1.050 meter breed open gehouden. Beide ruimtes kunnen in de toekomst worden benut als doorvaartpassages. Deze functie wordt niet in het kavelbesluit zelf vastgelegd. De ligging van de open ruimtes is mede gekozen zodat de verwachte windafvang en elektriciteitsopbrengsten van de turbines in de kavels onderling vergelijkbaar is. Hierbij is de grens tussen kavel VI en VII zo veel mogelijk naar het noorden verplaatst. De grens tussen kavel VII en VI (alternatief) is een stuk gekanteld, mede zodat bij een aanwijzing als doorvaartpassage de koers logisch is in relatie tot het ten westen gelegen windenergiegebied IJmuiden Ver.
2. De telecomkabel welke kavel VI doorkruist en de onderhoudszone van 500 meter aan weerszijden komt in zijn geheel te vervallen. De telecomkabel zal buiten gebruik en -

[1] Het is niet uitgesloten dat het niet te benutten deel van Hollandse Kust (west) in de toekomst alsnog wordt gebruikt voor windenergie. Ook om die reden wordt nu gekozen voor een compacte verkaveling van het windenergiegebied met daarin ruimte voor drie kavels.

zoveel mogelijk - geruimd zijn ten tijde van de realisatie van kavel VI. Dit vergroot de netto ruimte in kavel VI.

3. De platformen P06-A, P06-B en P06-D zullen buiten gebruik worden gesteld en verwijdering zal niet interfereren met de realisatie van het windpark. Dit vergroot de netto ruimte in kavel VI. Voor platform P06-A blijft er een mogelijkheid voor hergebruik bestaan. In dat geval is het uitgangspunt dat het platform nog beperkt bereikbaar is voor helikopters. Rondom afgesloten boorputten wordt in kavelbesluiten een zone van 100 meter vastgelegd waar geen turbines mogen worden geplaatst. Met de operator van de platforms wordt afgestemd over het tijdstip van verwijderen in relatie tot de bouw van de windturbines. Uitgangspunt is dat er geen interferentie is tussen de bouw van het windpark en de verwijdering van de platforms.
4. De obstakelvrijezone van 2,5 NM t.b.v. het helikopterplatform op platform P06-A komt te vervallen. Ook bij eventueel hergebruik zal dit platform geen of verminderde helikopterbereikbaarheid krijgen. Dit vergroot de netto ruimte in kavel VI.
5. De leidingen tussen P06-A, P06-B en P06-D zullen buiten gebruik gesteld zijn ten tijde van de realisatie van de windparken in de kavels. De onderhoudszones van deze verlaten pijpleidingen die de kavels doorkruisen worden aan weerszijden teruggebracht van 500 tot 150 meter. Deze onderhoudszone van 150 meter zal ook gelden voor de reeds buitengebruik zijnde pijpleidingen lopend vanaf platform P06-B naar de locaties P6-C en P06-South waar in de oorspronkelijke verkaveling ten onrechte geen rekening mee is gehouden, en voor de pijpleiding tussen P12-SW en P6-A. Tabel 1.2 geeft een overzicht van de toekomstige status van de nu aanwezige leidingen (in gebruik dan wel buiten gebruik) in de omgeving van HKW. Rondom de leidingen van Wintershall geldt een onderhoudszone van 150 meter aan beide zijdes. Deze aangepaste uitgangspunten vergroten de netto ruimte in kavels VI en VII.
6. Het exporttracé (en diens onderhoudszone) vanaf transformatorstation Hollandse Kust (west) Beta krijgt een andere ligging.
7. De interlink-kabel (en diens onderhoudszone) tussen platform HKW Alpha en Beta krijgt een andere ligging.
8. De onderhoudszone van de interlink-kabel tussen platform HKW Alpha en Beta is teruggebracht van 500 naar 100 meter aan weerszijden. Dit vergroot de netto ruimte in kavel VI en VII.

Na het doorvoeren van de bovenstaande wijzigingen is de nu voorgestelde verkaveling mede tot stand gekomen naar aanleiding van een studie waarin de effecten van verschillende kavelindelingen op de Levelized Cost of Energy (LCoE) in beeld zijn gebracht[2]. De resultaten van deze studie hebben er aan bijgedragen dat kavel VI, VII en VI (alternatief) in de hier beschreven kavelindeling een LCoE hebben die onderling vrijwel gelijk is. Dit betekent dat de elektriciteitsopbrengst per kavel ongeveer gelijk zal zijn. Dit draagt bij aan een gelijke verdeling van de baten tijdens de uiteindelijke exploitatie van de windparken.

Door bovenstaande wijzigingen verandert zowel de ligging als het bruto en netto oppervlak van de kavels VI, VII en VI (alternatief). Binnen alle kavels komt hierdoor meer netto ruimte beschikbaar voor de plaatsing van windturbines (zie tabel 1.1). Dit is de ruimte binnen de kavel

[2] Study into Levelized Cost of Energy of variants for wind farm site boundaries of Hollandse Kust (west), 26 June 2020, Blix & Pondera, WOZ2180100.

die vrij is van onderhoudszones of andere zones waar geen turbines in geplaatst mogen worden (zie ook Figuur 1.1).

Tabel 1.1 Oppervlak oorspronkelijke en gewijzigde kavels

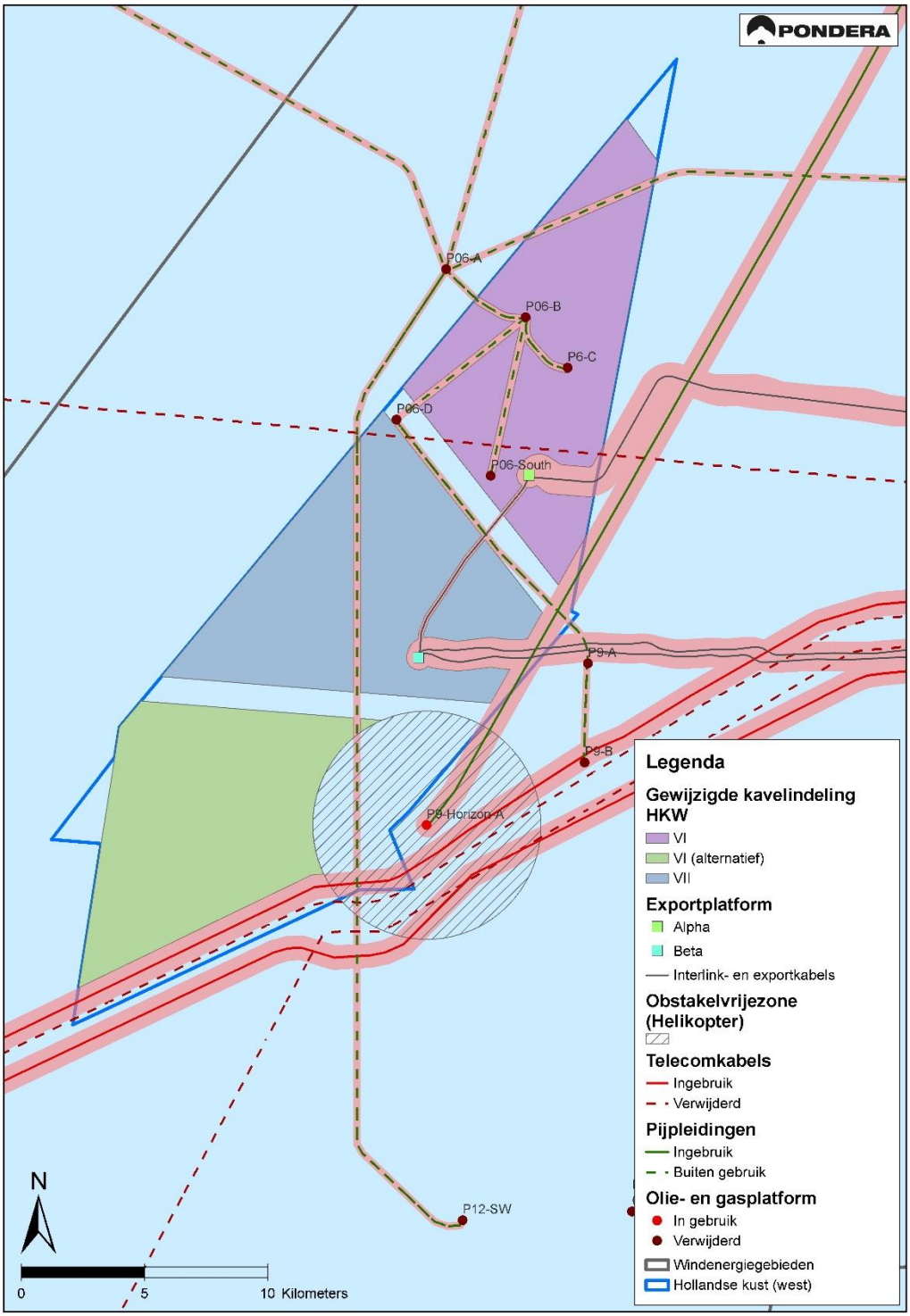
	Oorspronkelijke kavelindeling (cNRD) (km²)		Gewijzigde kavelindeling (km²)	
	Bruto oppervlak	Netto oppervlak	Bruto oppervlak	Netto oppervlak
Kavel VI	90	67	90	80
Kavel VII	87	75	97	88
Kavel VI (alternatief)	75	69	80	80
Totaal	**252**	**221**	**268**	**248**

In deze bijlage wordt per milieuaspect aangegeven wat de effecten zijn van deze wijzigingen voor kavel VI, VII en VI (alternatief). Ter informatie worden tevens de coördinaten van de hoekpunten van het gewijzigde kavels VI, VII en VI (alternatief) gepresenteerd aan het eind van dit document.

Tabel 1.2 Pijpleidingen in de omgeving van HKW (na aanstaande buitengebruikstelling van een deel van de mijnbouwinfrastructuur)

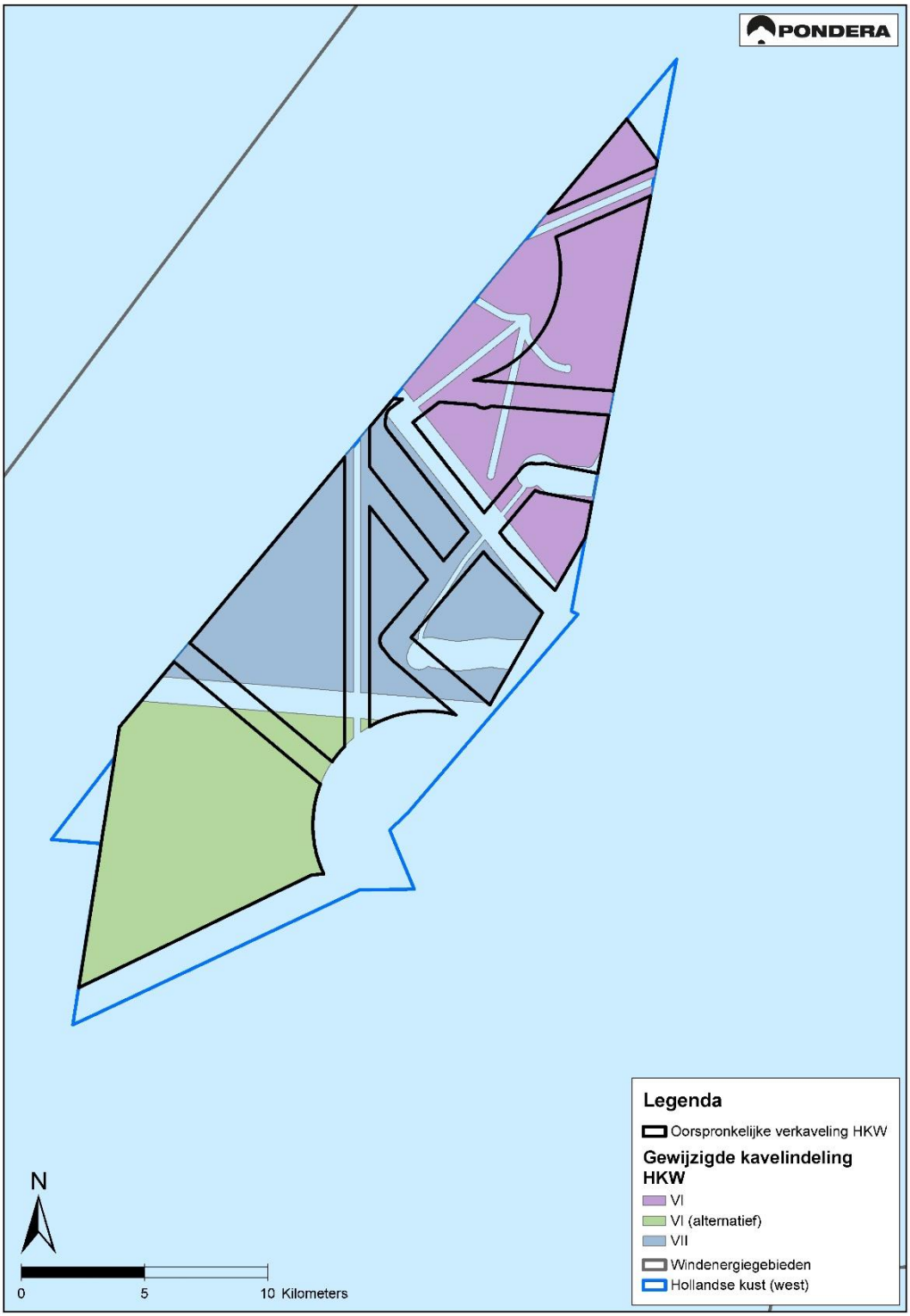
Leiding nr.	Exploitant	Tracé van	Tracé tot	Status
PL0125_PR	Wintershall Noordzee B.V.	P2-NE	P6-A	Buiten gebruik
PL0126_PR	Wintershall Noordzee B.V.	P6-S	P6-B	Buiten gebruik
PL0053_HS	Wintershall Noordzee B.V.	P6-B	P6-A	Buiten gebruik
PL0054_HS	Wintershall Noordzee B.V.	P6-C	P6-B	Buiten gebruik
PL0054_PR	Wintershall Noordzee B.V.	P6-C	P6-B	Buiten gebruik
PL0148_PR	Wintershall Noordzee B.V.	Q4-A	P6-A	Buiten gebruik
PL0053_PR	Wintershall Noordzee B.V.	P6-B	P6-A	Buiten gebruik
PL0109_PR	Petrogas E&P LLC	P9-Horizon-A	Q1-Helder-AW	In gebruik
PL0085_PR	Wintershall Noordzee B.V.	P12-SW	P6-A	Buiten gebruik
PL0032_PR	Wintershall Noordzee B.V.	P6-A	L10-AR	Buiten gebruik
PL0157_PR	Wintershall Noordzee B.V.	P6-D	P6-B	Buiten gebruik
PL0085_HS	Wintershall Noordzee B.V.	P12-SW	P6-A	Buiten gebruik
PL0207_UM	Wintershall Noordzee B.V.	P9-B	P6-D	Buiten gebruik
PL0207_PR	Wintershall Noordzee B.V.	P9-B	P6-D	Buiten gebruik

Figuur 1.1 Gewijzigde kavelindeling en omgeving



Bron: Pondera

Figuur 1.1 Oorspronkelijke en gewijzigde kavelindeling



Bron: Pondera

2 EFFECTBESCHRIJVING

2.1 Inleiding

In het MER zijn de volgende effecthoofdstukken/aspecten onderscheiden die in de volgende paragrafen achtereenvolgens centraal staan:

- Morfologie en hydrologie (2.2);
- Vogels en vleermuizen (2.3);
- Onderwaterleven (2.4);
- Scheepvaart (2.5);
- Landschap (2.6);
- Overige gebruiksfuncties (2.7);
- Elektriciteitsopbrengst (2.8).

2.2 Morfologie en hydrologie

Voor morfologie en hydrologie zijn in hoofdstuk 5 van dit MER een zevental aspecten bepaald: golven, waterbeweging, waterdiepte en bodemvormen, bodemsamenstelling, troebelheid en waterkwaliteit, sedimenttransport en kustverdediging.

De effecten die optreden bij alle aspecten zijn zeer gering (of verwaarloosbaar) en lokaal rondom de turbinefunderingen. Doordat het aantal turbinefunderingen niet verandert, treden er ook geen noemenswaardig andere effecten op bij de gewijzigde verkaveling. De turbines staan logischerwijs iets ruimer uit elkaar, hetgeen leidt tot een grotere totale lengte aan kabels. Dit zal echter relatief gering zijn en niet leiden tot een andere score. Het effect was bij de oorspronkelijke kavelindeling als neutraal beoordeeld (0) of licht negatief (0/-) als het ging om het aspect ‘waterbeweging’ bij alternatief 2 (gravity based fundering) en deze scores blijven gehandhaafd.

2.3 Vogels en vleermuizen

Voor vogels en vleermuizen zijn in hoofdstuk 6 van dit MER een viertal typen effecten bepaald: aanvaring, barrièrewerking, habitatverlies en indirecte effecten.

2.3.1 Aanvaringen

Het effect op vogels en vleermuizen in aantal te verwachten aanvaringsslachtoffers is berekend op basis van het aantal te plaatsen turbines. In de aangepaste verkaveling wordt alleen de oppervlakte waarop de turbines geplaatst worden vergroot en blijft het aantal turbines dat geplaatst gaat worden gelijk. Doordat het aantal turbines en de afmetingen van de windturbines gelijk blijven, zijn er geen veranderingen in het aantal te verwachten aanvaringsslachtoffers.

2.3.2 Barrièrewerking

Met de aanpassing van de kavels zal voor lokaal verblijvende niet-broedvogels, kolonievogels en vleermuizen geen verandering optreden in de barrièrewerking; er wordt geen barrièrewerking voorzien voor die soorten. Voor vogels op seizoenstrek kan wel sprake zijn van barrièrewerking.

In een modelstudie[3] werd echter aangetoond dat de afstand (en het daarmee gepaard gaande energieverlies) van omvliegen als gevolg van het windpark minimaal is in verhouding tot de totale trekroute. Daarom zijn de effecten van alle kavels als marginaal negatief beoordeeld. De oppervlaktes van de kavels zijn in de gewijzigde verkaveling groter dan de oorspronkelijke oppervlaktes (zie tabel 1.1). Echter, de toename is voor alle kavels gering, waardoor de nieuwe verkaveling niet leidt tot een aanpassing in de beoordeling. De effecten van barrièrewerking van de gewijzigde kavels op vogels op seizoenstrek zullen daarom onveranderd als marginaal negatief worden beoordeeld.

2.3.3 Habitatverlies

Zeevogels rusten en zoeken voedsel op zee. Habitatverlies bij het bouwen van een windpark treedt op, maar is afhankelijk van de grootte van de kavel. Een grotere kavel zal tot meer sterfte door habitatverlies leiden dan een kleinere kavel. Door de grotere oppervlakte van de kavels in de aangepaste verkaveling zal het aantal verwachte slachtoffers door habitatverlies voor enkele lokale zeevogelsoorten toenemen (zie de volgende tabel 2.1).

Tabel 2.1 Maximaal aantal slachtoffers dat verwacht wordt als gevolg van habitatverlies in Kavel VI, Kavel VII en Kavel VI (alternatief) (cf. Bradbury et al. 2014) op basis van dichtheden van zeevogels uit ESAS scheepstellingen en MWTL vliegtuigtellingen (Rijkswaterstaat 2015). Het verwacht aantal slachtoffers is per kavel weergegeven voor de oorspronkelijke verkaveling (Oud) de aangepaste verkaveling (Nieuw)

	Kavel VI		Kavel VII		Kavel VI (alt)	
Bruto Kavelgrootte	**Oud**	**Nieuw**	**Oud**	**Nieuw**	**Oud**	**Nieuw**
Soort	90 km^2	90 km^2	87 km^2	97 km^2	75 km^2	80 km^2
Ongedetermineerde duiker	0	0	0	0	0	0
Noordse stormvogel	3	3	2	2	3	3
Stormvogeltje	0	0	0	0	0	0
Jan van gent	3	3	2	2	2	2
Grote jager	0	0	0	0	0	0
Dwergmeeuw	1	1	1	1	0	0
Kokmeeuw	0	0	0	0	0	0
Stormmeeuw	1	1	1	1	0	0
Kleine mantelmeeuw	4	4	3	3	3	3
Zilvermeeuw	4	4	4	4	3	3
Grote mantelmeeuw	2	2	2	2	1	1
Drieteenmeeuw	3	3	4	4	2	**3**
Grote stern	0	0	0	0	0	0
Visdief/noordse stern	1	1	1	**2**	1	1
Zeekoet	28	28	27	**31**	22	**24**
Alk	7	7	7	**8**	10	10
Kleine alk	0	0	0	0	0	0
Papegaaiduiker	0	0	0	0	0	0

[3] Masden, E.A., Haydon, D.T., Fox, A.D., Furness, R.W., 2010. Barriers to movement: Modelling energetic costs of avoiding marine wind farms amongst breeding seabirds. Marine Pollution Bulletin 60, 1085-1091

Het aantal slachtoffers door habitatverlies staat in lineair verband met de oppervlakte van de kavel. Als de kavelgrootte bijvoorbeeld met 10% toeneemt, zullen de slachtofferaantallen ook met circa 10% toenemen. In de aangepaste verkaveling is de toename van de oppervlaktes van de kavels echter zo klein, dat voor de meeste soorten geen toename in het verwachte aantal slachtoffers door habitatverlies wordt verwacht. Enkel onder de zeekoet, visdief/noordse stern, alk en drieteenmeeuw is een toename van minimaal 1 tot maximaal 4 slachtoffers te verwachten (zie tabel 2.1).

Van kolonievogels is in bijlage 4 van het MER berekend dat er in Kavel VI en Kavel VII respectievelijk 13 en 9 kleine mantelmeeuwen van de kolonie op Texel sterven als gevolg van habitatverlies bij de kaveloppervlaktes in de oorspronkelijke verkaveling. Door de kavels te vergroten zal de sterfte als gevolg van habitatverlies in Kavel VII toenemen naar 10 kleine mantelmeeuwen uit de kolonie op Texel. De sterfte door habitatverlies als gevolg van Kavel VI zal ook in de aangepaste verkaveling 13 vogels bedragen. Voor beide kavels geldt dat de verwachte additionele sterfte onder kleine mantelmeeuwen niet wezenlijk verandert in de aangepaste verkaveling. Het effect van beide kavels op kolonievogels wordt daarom onveranderd als negatief beoordeeld. Het verkavelingsalternatief van Kavel VI ligt buiten de maximale foerageerafstand van broedende kleine mantelmeeuwen uit het Natura-2000 gebied Duinen en Lage Land Texel, waardoor geen slachtoffers onder kolonievogels zijn te verwachten voor deze kavel.

Zoals is geconcludeerd in het achtergronddocument van Bureau Waardenburg (bijlage 4 van dit MER) treedt geen habitatverlies op voor vleermuizen. Een andere kavelgrootte heeft naar verwachting daarom ook geen effect.

2.3.4 Indirecte effecten

De indirecte effecten zullen niet of nauwelijks veranderen bij de wijziging in kavelgrootte. Hieronder vallen onder andere de mogelijke effecten op vispopulaties en daarmee de (vogel)voedselvoorziening door heigeluiden, en een toename in visbeschikbaarheid door het afnemen van visserij waardoor een toename in het aantal vliegbewegingen, en daarmee slachtoffers, van viseters kan ontstaan.

2.4 Onderwaterleven

Ten aanzien van onderwaterleven zijn drie categorieën onderzocht in hoofdstuk 7 van het MER: bodemdieren, vissen en zeezoogdieren.

2.4.1 Bodemdieren

De vergroting van het totale oppervlakte van kavels VI en VII heeft mogelijk een toename in de totale lengte van de parkbekabeling tot gevolg. De herverkaveling heeft echter geen invloed op het aantal windturbines en daarmee geen invloed op het toegevoegde hardsubstraat en de werkzaamheden van aanleg. Aangezien het verschil in de totale lengte van de parkbekabeling relatief gering zal zijn, verandert de herverkaveling van kavels VI en VII de beoordeling van de effecten ten aanzien van bodemdieren niet.

2.4.2 Vissen

De effecten ten aanzien van vissen wijzigen gering door de toename in het oppervlak van kavels VI en VII. Evenals bij bodemdieren is aangegeven, wijzigen de bodemberoerende werkzaamheden nagenoeg niet, waardoor de effectbeoordeling op dit aspect ongewijzigd blijft. Ook de effecten van geluid en trillingen zullen niet wijzigen, aangezien het aantal turbines niet wijzigt en de locatie van de windturbines ten aanzien van vissen binnen het windenergiegebied niet relevant is voor de effectbeoordeling. De effecten van habitatverlies voor vissen beperkt zich tot de totale oppervlakte van de windturbines. Dit blijft ongewijzigd, waardoor de effecten niet wijzigen ten opzichte van de beoordeling in het MER.

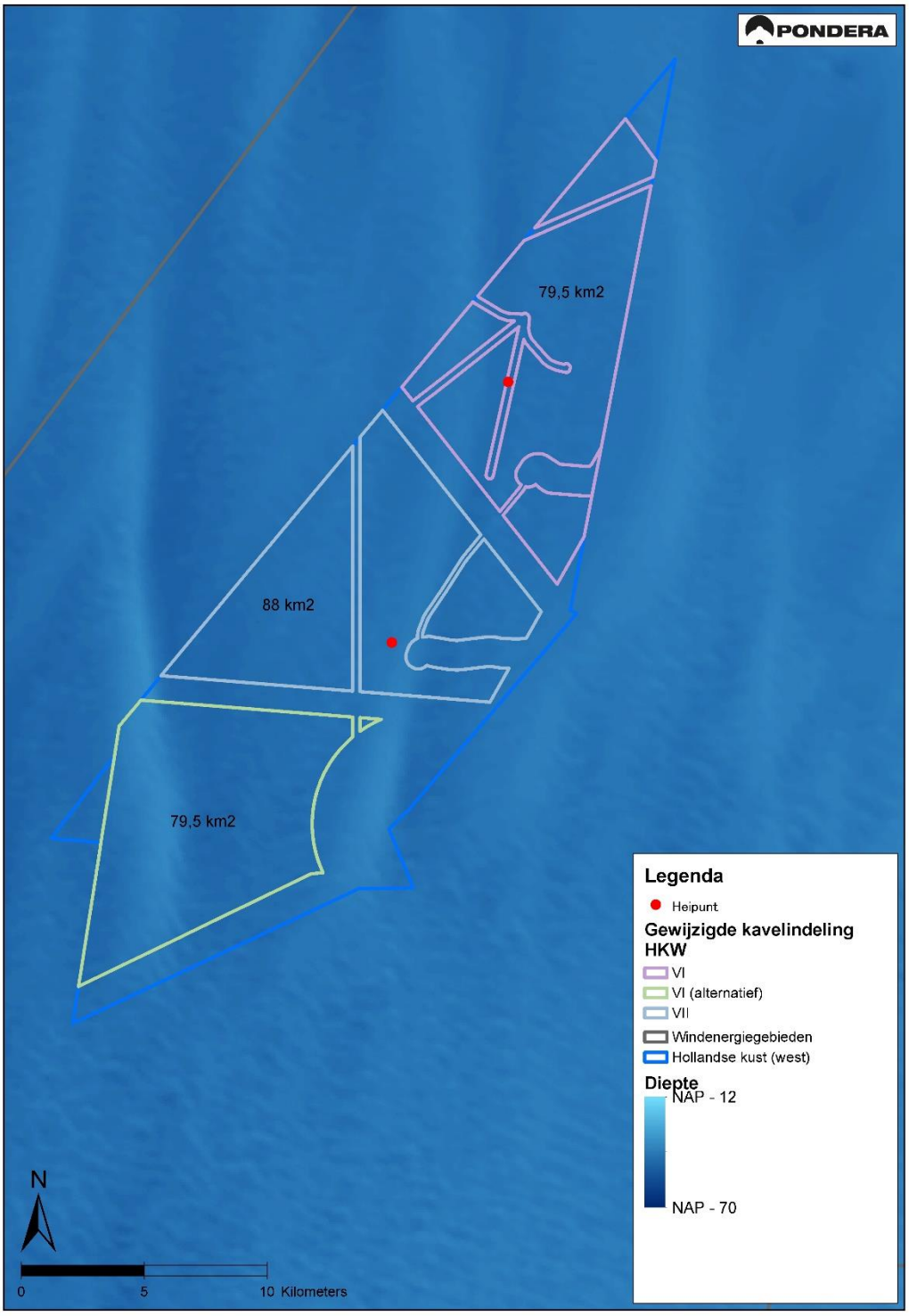
2.4.3 Zeezoogdieren

De effecten op zeezoogdieren zijn nader toegelicht naar de meest voorkomende soorten in de Noordzee; bruinvissen en zeehonden, waarvan de laatste wordt onderverdeeld in de gewone – en de grijze zeehond. Zoals in hoofdstuk 7 van het MER is toegelicht zijn andere soorten zeezoogdieren dermate incidenteel aanwezig dat geen belangrijke effecten op die soorten zijn te verwachten.

Bruinvissen

Uit het MER en de notitie van HWE (bijlage 5) blijkt dat de mogelijke effecten op bruinvissen zijn berekend aan de hand van twee hei-locaties. Deze zijn in figuur 2.1 weergegeven. De hei-locaties bevinden zich relatief in het midden van kavel VI en kavel VII. Op basis van de verstoringscontour ter plaatse én de algemene verspreiding en voorkomen van bruinvissen is vervolgens de potentiële populatiereductie berekend. Aangezien de waterdiepte en de verspreiding van bruinvissen in het windenergiegebied nagenoeg gelijk zijn, heeft de herverkaveling geen invloed op het berekende effect op bruinvissen. Dit is in lijn met het niet onderscheidend zijn van de verkavelingsalternatieven voor kavel VI.

Figuur 2.1 Paalposities van windpark Hollandse Kust (west) waarvoor berekeningen met AQUARIUS zijn uitgevoerd i.h.k.v. KEC 3.0, en de gewijzigde kavelindeling.

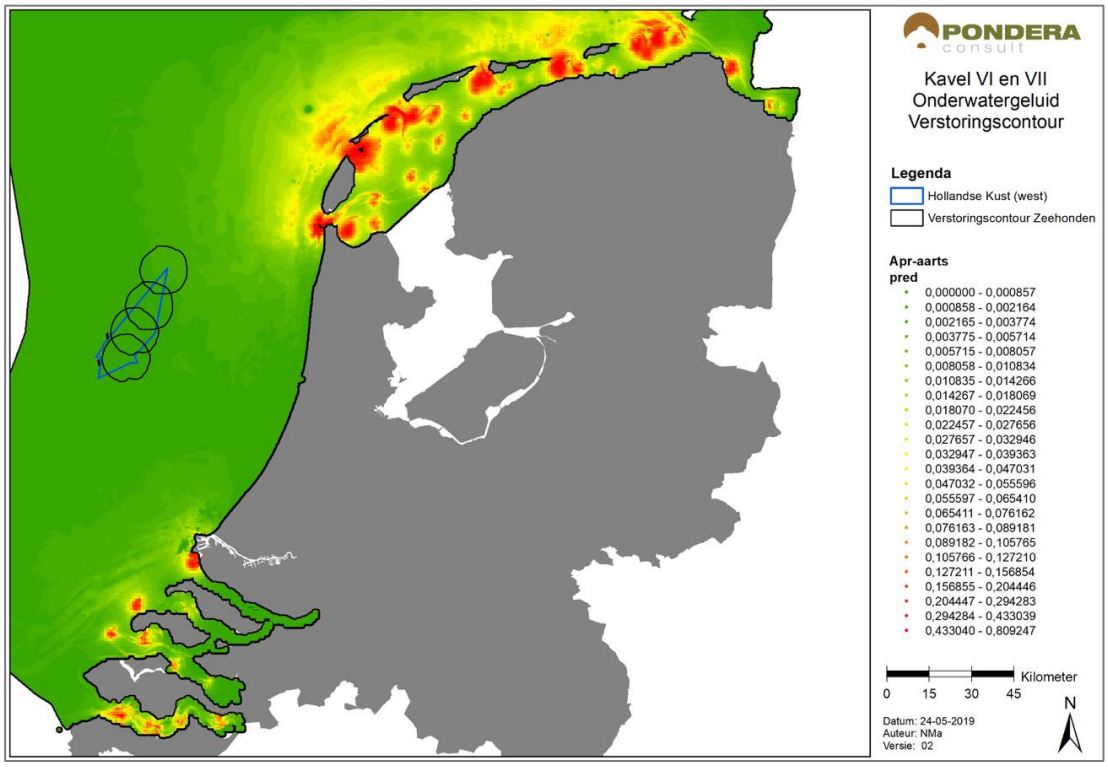


Bron: Pondera

Zeehonden

In het MER en de notitie van HWE (bijlage 5) is voor de meest noordelijke, meest zuidelijke én twee posities in het windenergiegebied bepaald wat de potentiële effecten zijn op de zeehondenpopulatie. De locaties zijn te herleiden door het midden van de verstoringscontouren te nemen, zoals zijn weergegeven in figuur 2.2. Aangezien de hoogste dichtheden in de zeehondenpopulaties aan de noordoost- (Waddenzee) en zuidoostzijde (Voordelta) van het windenergiegebied liggen, heeft de herverkaveling geen invloed op de effectbepaling zoals in het MER is weergegeven. Ook heeft de wijziging van de kavelgrootte geen negatieve gevolgen voor de beschikbaarheid van migratieroutes van zeehonden tussen de Waddenzee en het Deltagebied. De effecten blijven gelijk.

Figuur 2.2 Verstoringscontour onderwatergeluid



Bron: Pondera

2.5 Scheepvaart

Voor scheepvaart heeft MARIN in het MER een veiligheidsstudie uitgevoerd (bijlage 9 bij het MER) voor de oorspronkelijke verkaveling. Voor de nieuwe verkaveling is voor scheepvaart met name de introductie van zogenaamde “passagestroken” voor het verkeer tot een lengte van 46m relevant. In de veiligheidsstudie voor de oorspronkelijke kavelindeling is uitgegaan van een integraal doorvaartscenario voor schepen met een lengte tot 45m, dit bekent dat alle verkeer tot 45m overal door het park zou mogen varen.

Voor een goede beschrijving van de effecten op scheepvaartveiligheid is het belangrijk deze wijzigingen mee te nemen in de beoordeling. Daarom is voor de nieuwe verkaveling een herberekening uitgevoerd. In de bijlage (van onderhavig document, bijlage 11) is in een memo

kort beschreven wat de werkwijze en de resultaten van deze herberekening zijn. In deze paragraaf is de conclusie daarvan opgenomen.

De verkaveling waarmee deze berekening is uitgevoerd verschilt op enkele details van de uiteindelijke verkaveling zoals deze in onderhavig document is beschreven. De verkaveling waarmee de herberekening is uitgevoerd heeft tussen kavel VI en VII een vrije zone van 1.050 meter breed, in tegenstelling tot 1.200 meter. De verwachting is dat dit geringe verschil in de breedte van de vrije zone geen significant effect op de resultaten heeft.

In het SAMSON-model zijn aanvaar- en aandrijffrequenties berekend in de nieuwe verkaveling, ervan uit gaande dat de ruimte tussen kavels VI en VII en tussen kavels VII en VI (alternatief) gebruikt worden als passagestroken voor schepen tot 46 meter.

In de volgende tabellen zijn de frequenties per kavel weergegeven. In tabel 2.2 eerst ter vergelijking de frequenties weergegeven van de oorspronkelijke verkaveling (en met integrale doorvaart tot 45 meter). In tabel 2.3 de frequenties voor de nieuwe verkaveling.

Tabel 2.2 Verwacht aantal aanvaringen/aandrijvingen per jaar voor het windenergiegebied per variant originele kavel indeling (integrale doorvaart tot 45m)

Variant	Aantal turbines	Aantal aanvaringen (rammen) per jaar			Aantal aandrijvingen (driften) per jaar			Totaal aantal per jaar	Eens per … jaar
		R-schepen	N-schepen	Totaal	R-schepen	N-schepen	Totaal		
Kavel VI	76	0.006352	0.074331	0.080683	0.025862	0.002737	0.028599	0.109282	9.2
Kavel VI – ALT	76	0.018998	0.065514	0.084512	0.031093	0.002344	0.033437	0.117949	8.5
Kavel VII	76	0.004999	0.067178	0.072177	0.026671	0.002347	0.029018	0.101195	9.9

Tabel 2.3 Verwacht aantal aanvaringen/aandrijvingen per jaar voor het windenergiegebied per variant alternatieve/herziene kavel indeling (passagestroken tot 46m)

Variant	Aantal turbines	Aantal aanvaringen (rammen) per jaar			Aantal aandrijvingen (driften) per jaar			Totaal aantal per jaar	Eens per … jaar
		R-schepen	N-schepen	Totaal	R-schepen	N-schepen	Totaal		
Kavel VI	76	0.005787	0.028436	0.034223	0.025941	0.002163	0.028104	0.062326	16.0
Kavel VI – ALT	76	0.012112	0.045201	0.057313	0.030367	0.002388	0.032755	0.090067	11.1
Kavel VII	76	0.004539	0.042489	0.047028	0.026278	0.002423	0.028701	0.075728	13.2

De volgende conclusies zijn hierbij te trekken:

- Grootste verschil tussen de integrale doorvaart variant en de variant met de passagestroken is de kans op rammen door een niet-routegebonden schip. Doordat deze schepen (tot 46 m) nu meer geconcentreerd zijn in grid cellen (2x2km) in de passagestroken is de algemene kans op een aanvaring (rammen) met een turbine kleiner, dan voor het doorvaartscenario (tot 45m).
- De aanvaar- en aandrijffrequenties voor het routegebonden verkeer is vrijwel gelijk gebleven.
- Ook de aandrijffrequenties voor het niet-routegebonden verkeer is niet veel gewijzigd t.o.v. de resultaten waarbij het volledige doorvaartscenario tot 45m gold.
- De algemene beoordeling van het effect van deze varianten is dus iets gunstiger dan het originele doorvaart scenario van 45m. Wel is de aanvaar- en aandrijffrequentie van

enkele individuele turbines hoger dan in het algemene doorvaart scenario. Met name de turbines langs de passagestroken.

Dit betekent voor de beoordeling van alle kavels dat bij de nieuwe verkaveling én het uitgangspunt dat doorvaartpassages worden gebruikt voor schepen tot 46 meter de totale kans op aanvaring en aandrijving minder wordt en daardoor ook de totale kans op gevolgschade van aanvaringen en aandrijvingen. De score voor kavel VI en VII waren al licht negatief (0/-) in de oorspronkelijke verkaveling, en veranderen daardoor niet (er is immers nog steeds sprake van een toename van aanvaar- en aandrijfkansen door plaatsing van windturbines). Voor kavel VI (alternatief) was de score negatief (-) en dit wordt bij de nieuwe verkaveling ook licht negatief (0/-). In de beoordeling is er dan geen onderscheid meer in de verschillende kavels, maar uit de tabellen 2.2. en 2.3 is wel het verschil te zien tussen de kavels en daar blijft in relatieve zin kavel VI (alternatief) de hoogste kans op aanvaring en aandrijving hebben, ook bij de nieuwe verkaveling.

2.6 Landschap

De zichtbaarheid van windturbines in de gewijzigde kavels wijzigt niet. De minimale afstand tot de kust blijft ongewijzigd, evenals de invulling van de alternatieven (aantal en afmetingen van de windturbines. De effecten op zichtbaarheid blijven gelijk zoals beschreven is in hoofdstuk 9 van het MER.

2.7 Overige gebruiksfuncties

Voor het thema overige gebruiksfuncties zijn in hoofdstuk 10 van dit MER meerdere deelaspecten onderscheiden:

- visserij;
- olie- en gaswinning;
- luchtvaart;
- zand-, grind- en schelpenwinning;
- baggerstort;
- scheeps-, wal- en luchtvaartradar;
- kabels en leidingen;
- telecommunicatie;
- munitiestortgebieden en militaire activiteiten;
- recreatie en toerisme;
- cultuurhistorie en archeologie;
- schelpdierkweek;
- windparken;
- lokale en regionale economie.

De gewijzigde kavelindeling leidt niet tot een verandering in effecten voor de deelaspecten: zand-, grind- en schelpenwinning, baggerstort, scheeps-, wal- en luchtvaartradar, munitiestortgebieden en militaire activiteiten, recreatie en toerisme, cultuurhistorie en archeologie, schelpdierkweek, windparken, en lokale en regionale economie. De effectbeoordeling blijft voor deze deelaspecten onveranderd. Voor de overige deelaspecten is

er wel sprake van een verandering in effecten. In de volgende paragrafen zijn de effecten van de gewijzigde kavelindeling op deze deelaspecten en diens beoordelingen beschreven.

2.7.1 Visserij

Door de gewijzigde kavelindeling neemt het netto oppervlak van kavel VI en VII gezamenlijk toe van 142 naar 168 km^2.Bruto is dat van 177 naar 187 km^2. Het netto oppervlak van kavel VI (alternatief) en VII neemt gezamenlijk toe van 144 naar (tevens) 168 km^2. Bruto verandert dat van 162 naar 177 km^2. Het totale netto kaveloppervlak neemt daarmee toe met respectievelijk 27 en 27 km^2, en het totale bruto kaveloppervlak met respectievelijk 10 en 15 km^2.

Door deze toename blijft er een kleiner gebied van de Noordzee beschikbaar voor de visserij. Het netto ruimtebeslag van de gewijzigde kavelindeling voor kavel VI, VII en VI (alternatief) is respectievelijk 0,14%, 0,15% en 0,14% van het NCP, ten opzichte van 0,12%, 0,13% en 0,12% voor de oorspronkelijke kavelindeling. Binnen de gewijzigde kavelindeling liggen voor de demersale visserij geen aanzienlijke andere hotspots of visbestekken. De gemiddelde vangst door de Nederlandse demersale visserij in de gewijzigde kavelindeling is binnen kavel VI, VII en VI (alternatief) respectievelijk 39.420 kg, 42.486 kg, en 35.040 kg. De gemiddelde opbrengst bedraagt respectievelijk € 144.810, € 156.03 en € 128.720, en de gemiddelde bruto toegevoegde waarde bedraagt respectievelijk € 55.530, € 59.849 en € 49.360.[4] Per kavel is dit een toename van respectievelijk 0%, 11% en 7% (evenredig met de toename in het bruto oppervlak).

De effecten op de visserij zijn daarmee iets ongunstiger, maar niet significant genoeg om de beoordeling te wijzigen. De effecten van de gewijzigde kavelindeling op de visserij blijft voor beide kavels beoordeeld als licht negatief (effectbeoordeling: 0/-).

2.7.2 Olie- en gaswinning

Door de toename in kaveloppervlak zal er een groter ruimtebeslag worden gelegd op vergunningsgebieden P06, P09d en P09e. Ook zal kavel VI een grotere overlap met aanwezige gasvelden hebben. De winningsplatforms van deze gasvelden (P06-A, P-06-B en P06-D) zullen echter voor gaswinning buitengebruik gesteld worden voorafgaand aan de realisatie van het windpark, waarmee de exploitatie (en mogelijke hinder daarop) ten einde komt. Betreffende de toekomstige mogelijkheden voor hergebruik van platform P06-A is het uitgangspunt dat deze plannen niet concreet genoeg zijn om mee te nemen in dit MER. Om die reden wordt hier uitgegaan van verwijdering van alle drie de platforms (P06-A, P06-B en P06-D) waardoor enkel rekening gehouden wordt met diens afgesloten boorputten en een vrije zone van 100 meter daar omheen. Deze vrije zone valt reeds binnen de 150 meter vrije zone rondom pijpleidingen.

Mochten er zich toch ontwikkelingen voordoen voor hergebruik van platform P06-A dan zullen deze worden beoordeeld tegen de achtergrond dat er een windpark gerealiseerd wordt, en zullen dan als zodanig meegenomen worden in het MER van het desbetreffende project. Door de gewijzigde kavelindeling valt kavel VI (alternatief) voor een groter deel over het onontwikkelde olieveld P08-A Horizon-West waar Petrogas in de nabije toekomst van plan is

[4] Op basis van kentallen uit Wageningen Economic Research, 2019 Wind op Zee: bepaling van de waarde van geplande windparkgebieden voor de visserij. Mol, Arie; Oostenbrugge, Hans van; Röckmann, Christine; Hintzen, Niels

om exploitatie te starten (zie Figuur 2.3). Technisch wordt exploitatie hierdoor niet onmogelijk, maar mogelijk wel minder aantrekkelijk door de noodzaak van een mogelijk langere schuine boring.

De effecten worden door de buitengebruikstelling van de winningsplatforms grotendeels geneutraliseerd. Daarmee worden de effecten van de gewijzigde kavelindeling op de olie-en gaswinning voor kavel VI en VII beoordeeld als geen effect hebbende (effectbeoordeling: 0). Voor kavel VI (alternatief) blijft de effectbeoordeling licht negatief (effectbeoordeling: 0/-)

2.7.3 Luchtvaart

Er treden door de gewijzigde kavelindeling geen andere effecten op ten opzichte van burgerluchtvaart en militaire luchtvaart.

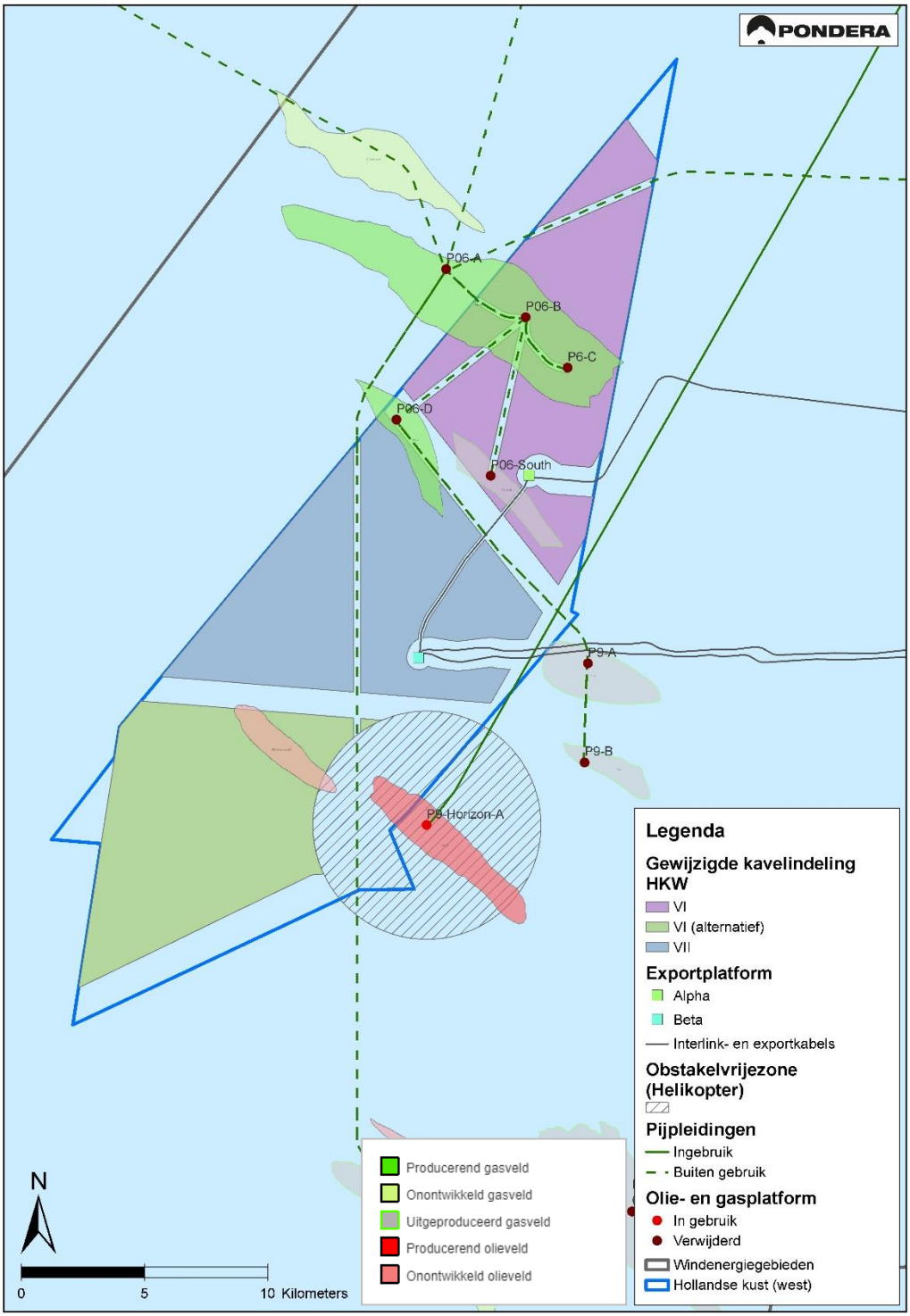
Met het buitengebruik nemen van de winningsplatforms P06-A, P-06-B en P06-D zal ook de noodzaak vervallen van de Helicopter Protection Zone (HPZ) van deze platforms, evenals de noodzaak voor mogelijke Search and Rescue (SAR) operaties voor deze platforms. Voor de Helicopter Main Route (HMR) KZ53 (KY653), die door kavel VI loopt, is het momenteel nog niet duidelijk of deze route wordt aangepast of buitengebruik wordt genomen. Dit is onder meer afhankelijk van de ontwikkelingen van enkele Engelse windparken.

De Helicopter Traffic Zone (HTZ) van platform P9-Horizon-A zal blijven bestaan en grenzen aan kavel VII en VI (alternatief). Net als in de originele kavelindeling is er rekening gehouden met een obstakelvrije zone van 2,5 NM rondom P9-Horizon-A.

De effecten op helikopterverkeer en SAR-operaties worden daarmee gunstiger en worden voor kavel VI beoordeeld als geen effect hebbende (effectbeoordeling: 0). De beoordeling voor kavel VII en VI (alternatief) blijft licht negatief (effectbeoordeling: 0/-) door de aanwezigheid van de HTZ.

Wanneer in toekomstige ontwikkelingen winningsplatform P06-A hergebruikt wordt zal ook de helikopterbereikbaarheid worden beoordeeld tegen de achtergrond dat er een windpark gerealiseerd wordt of is, en zal als zodanig meegenomen worden in het MER van het desbetreffende project.

Figuur 2.3 Olie- en gasvelden in de omgeving van HKW



Bron: Pondera

2.7.4 Kabels en leidingen

Zoals in de inleiding is beschreven is de gewijzigde kavelindeling mede tot stand gekomen door het verkleinen van onderhoudszones rondom de in de kavels aanwezige leidingen. Uit overleggen met Wintershall is gebleken dat een onderhoudszone van 150 meter voldoende is voor zowel hun ingebruik-, als buitengebruik zijnde pijpleidingen. Petrogas heeft aangegeven de oorspronkelijke onderhoudszone van 500 meter aan te houden. De mogelijke hinder in bereikbaarheid op de buitengebruik zijnde pijpleidingen blijft bestaan omdat deze periodiek gecontroleerd, en wanneer nodig ook gerepareerd worden.

Ook is rekening gehouden met het verwijderen van de telecomkabel die kavel VI doorkruiste. De mogelijke hinder van een windpark op de exploitatie van deze kabel vervalt daarmee. De effecten van de gewijzigde kavelindeling op kabels en leidingen wordt hierdoor iets gunstiger, maar omdat kruisingen van parkbekabeling met de buiten gebruik genomen leidingen nodig blijven blijft de effectbeoordeling gelijk. De effecten blijven daarmee beoordeeld als licht negatief voor kavel VI en VII (effectbeoordeling: 0/-) en als neutraal voor kavel VI (alternatief) (effectbeoordeling: 0).

Wanneer in toekomstige ontwikkelingen winningsplatform P06-A hergebruikt wordt is de kans aanwezig dat ook pijpleidingen hergebruikt worden. Mochten er zich dergelijke ontwikkelingen voordoen voor hergebruik dan zullen deze worden beoordeeld tegen de achtergrond dat er een windpark gerealiseerd wordt of is, en zullen als zodanig meegenomen worden in het MER van het desbetreffende project.

2.7.5 Telecommunicatie

Met het buitengebruik nemen van de winningsplatforms zal ook de noodzaak van de straalpaden vervallen die momenteel door alle kavels lopen. De effecten van de gewijzigde kavelindeling op telecommunicatie worden daarom gunstiger voor kavel VI, VII en VI (alternatief) en beoordeeld als geen effect hebbende (effectbeoordeling: 0).

Wanneer in toekomstige ontwikkelingen winningsplatforms P06-A hergebruikt wordt is de kans aanwezig dat er opnieuw straalpaden gebruikt zullen worden. Mochten er zich dergelijke ontwikkelingen voordoen voor hergebruik dan zullen deze worden beoordeeld tegen de achtergrond dat er een windpark gerealiseerd wordt of is, en zullen als zodanig meegenomen worden in het MER voor het desbetreffende project.

2.8 Elektriciteitsopbrengst en vermeden emissies

Wat betreft elektriciteitsopbrengst en daarmee samenhangend de vermeden emissies is het allereerst van belang om te weten dat de elektriciteitsopbrengst afhankelijk is van het geïnstalleerd vermogen. Dat wijzigt niet. Nog steeds is 760 MW mogelijk per kavel. Het enige verschil is dat dit vermogen op een groter gebied wordt geplaatst, waardoor windturbines verder uit elkaar kunnen worden geplaatst en dus ook minder wind van elkaar afvangen. Dit veroorzaakt een hogere elektriciteitsopbrengst en daardoor meer vermeden emissies.

De verkaveling waarmee deze berekening is uitgevoerd verschilt op enkele details van de uiteindelijke verkaveling zoals deze in onderhavig document is beschreven. De verkaveling waarmee de herberekening is uitgevoerd heeft tussen kavel VI en VII een vrije zone van 1.050

meter breed, in tegenstelling tot 1.200 meter. De verwachting is dat dit verschil geen significant effect op de resultaten heeft.

3 CONCLUSIE

De effecten die in de effecthoofdstukken van het MER zijn beschreven, zijn gebaseerd op een kavelindeling die om diverse redenen gewijzigd is. Zo is er meer ruimte gekomen voor de kavels in het windenergiegebied. In deze bijlage is beschreven welke consequenties dit heeft voor de effectbeschrijving.

Vanwege het feit dat het aantal turbines en de bandbreedte van de te plaatsen turbines qua afmetingen niet verandert, zijn veel effecten ook min of meer gelijk. Alleen bij die aspecten die een sterke ruimtelijke relatie hebben wijzigen de effecten, vanwege het grotere oppervlak van de kavels.

In de volgende tabel is aangegeven op hoofdlijnen welke effecten wijzigen als gevolg van de nieuwe kavelindeling. Tevens is in de laatste kolom aangegeven of de beoordeling van de effecten ook wijzigt.

Tabel 3.1 Wijziging effecten als gevolg van nieuwe kavelindeling

Aspect	Andere effecten te verwachten t.o.v. oorspronkelijke kavelindeling?	Consequentie voor de beoordeling?
Morfologie en hydrologie	Lengte kabels neemt wat toe door de grotere kavels, maar dit effect is gering anders.	Nee
Vogels en vleermuizen		
Aanvaringen	Het effect op vogels en vleermuizen in aantal te verwachten aanvaringsslachtoffers is berekend op basis van het aantal te plaatsen turbines. Dit wijzigt niet.	Nee
Barrièrewerking	Er is iets meer barrièrewerking te verwachten van de grotere kavels, voor vogels die op seizoenstrek zijn. Effect is gering anders.	Nee
Habitatverlies	Voor sommige zeevogels is het habitatverlies door de grotere kavels iets groter. Voor kolonievogels (kleine mantelmeeuwen van kolonie Texel) zal het habitatverlies ook groter zijn voor kavel VI en VII. Het aantal slachtoffers als gevolg van habitatverlies door kavel VII zal dan toenemen van 9 naar 10 vogelslachtoffers per jaar. Bij de andere kavels blijft dit gelijk.	Nee
Onderwaterleven		
Bodemdieren	Door langer kabeltracé meer bodemberoerende werkzaamheden, maar dit effect is gering anders.	Nee
Vissen	Door langer kabeltracé meer bodemberoerende werkzaamheden, maar dit effect is gering anders.	Nee
Zeezoogdieren	Effecten voor bruinvissen en zeehonden blijven gelijk.	Nee
Scheepvaart	Kansen op aanvaringen en aandrijvingen zijn verminderd door het uitgangspunt dat schepen tot 46 meter door passages varen in plaats van integrale doorvaart door de kavels voor schepen tot 45 meter.	Ja, positiever. Kavel VI (alternatief) scoort 0/- i.p.v. – bij kans op

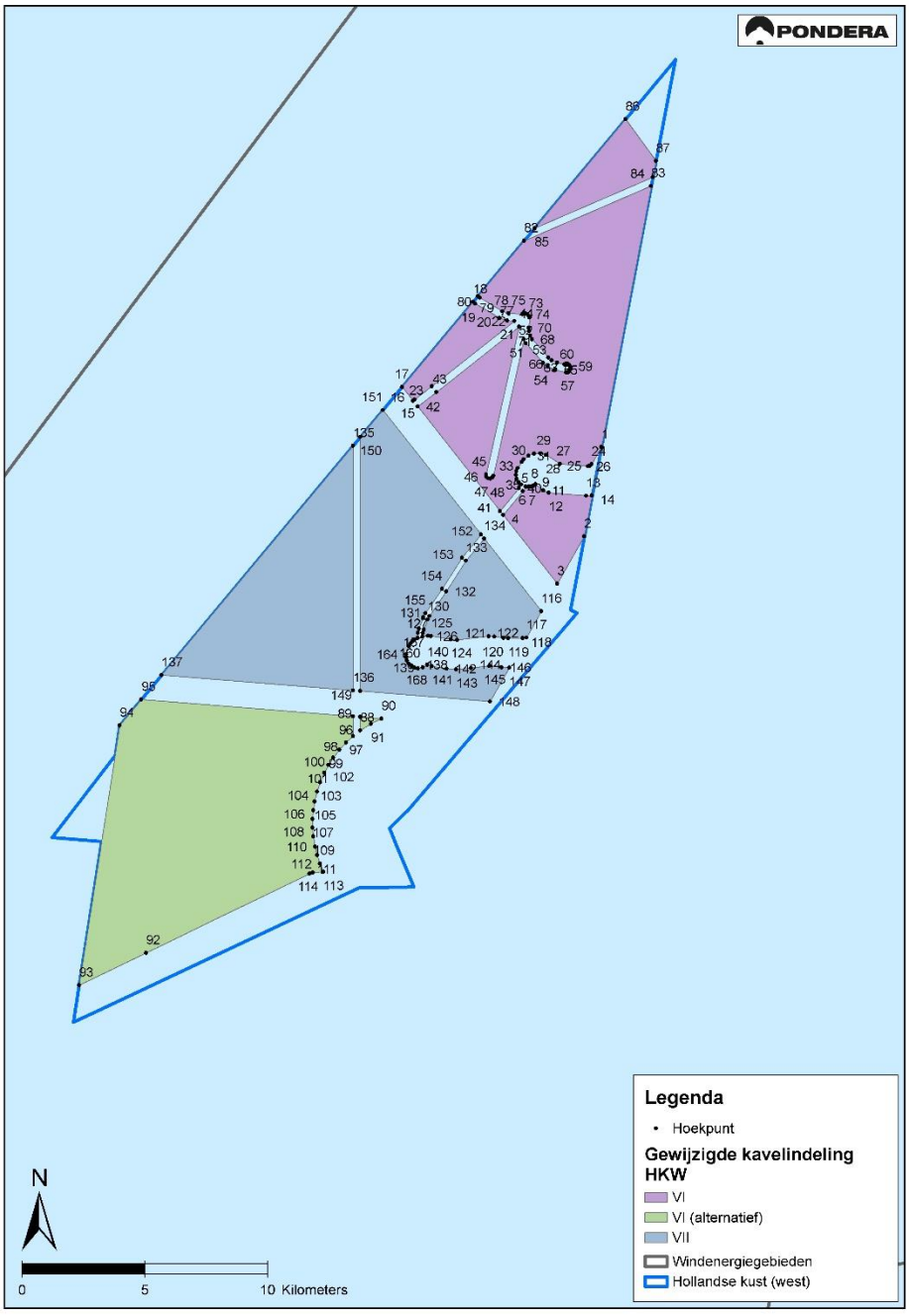
		aanvaring/aandrijving en gevolgschade
Landschap	Effecten op het landschap blijven gelijk.	Nee
Overige gebruiksfuncties		
Visserij	Door veranderingen in oppervlaktes nemen de effecten iets toe, maar dit effect is gering anders.	Nee
Olie- en gaswinning	Door buitengebruikname van productieplatforms zijn er minder effecten van een windpark te verwachten. De beoordeling wordt daardoor positiever.	Ja, positiever. Kavel VI en VII scoren elk 0 i.p.v. 0/-. Kavel VI (alternatief) blijft 0/- scoren.
Luchtvaart	Door buitengebruikname van productieplatforms vervalt de noodzaak voor enkele luchtvaartgebieden en ziin er minder effecten van een windpark in kavel VI te verwachten. De beoordeling wordt daardoor deels positiever.	Ja, positiever. Kavel VI scoort 0 i.p.v. – voor aspect interferentie helikopterverkeer, en 0 i.p.v. 0/- voor interferentie kustwacht.
Kabels en leidingen	Door het verwijderen van een telekomkabel, buitengebruikname van leidingen en kleinere onderhoudszones treden iets andere effecten op, maar niet voldoende voor een aangepaste beoordeling.	Nee
Telecommunicatie	Door buitengebruikname van productieplatforms vervalt de noodzaak voor straalpaden en zijn er minder effecten van een windpark te verwachten voor kavel VI, VII en VI (alternatief). De beoordeling wordt daardoor positiever.	Ja, positiever. Kavel VI scoort 0 i.p.v. -, kavel VII en VI (alternatief) scoren 0 i.p.v. 0/-).
Elektriciteitsopbrengst en vermeden emissies	Doordat windturbines verder uit elkaar kunnen staan, is een hogere elektriciteitsproductie per kavel mogelijk, hetgeen een positief effect is. Echter worden niet meer turbines geplaatst, dus de productie neemt slechts licht toe.	Nee

Kortom, qua effecten treden marginale verschillen op van de nieuwe verkaveling ten opzichte van de oorspronkelijke verkaveling. Omdat de verschillen veelal dermate gering zijn, komt dit niet altijd in de effectbeoordeling tot uitdrukking in een andere score. Een uitzondering hierbij is een aantal aspecten die vallen onder de categorie ‘Overige gebruiksfuncties’, waarbij positieve effecten optreden door de wijziging van de kavelindeling. Dit leidt tot positievere beoordelingsscores voor olie- en gaswinning, luchtvaart en telecommunicatie. Ook voor scheepvaart zijn positieve effecten te verwachten voor alle kavels, doordat aanvaar- en aandrijfkansen afnemen wanneer de passages worden gebruikt voor schepen tot 46 meter.

4 COÖRDINATEN HOEKPUNTEN GEWIJZIGDE KAVELS

De hoekpunten van de gewijzigde kavels in het windenergiegebied Hollandse Kust (west) zijn weergegeven in onderstaande tabel (conform coördinatenstelsel ETRS 1989 UTM Zone N31) en Figuur 4.1. Omdat de kavels uit een zeer groot aantal hoekpunten bestaan is de vorm licht versimpeld zodat het aantal hoekpunten beter presenteerbaar is. Hierdoor zijn enkel zeer kleine details weggevallen.

Figuur 4.1 Hoekpunten



Bron: Pondera

Tabel 4.1 Kavel hoekpunten en coördinaten (ETRS 1989 UTM Zone N31)

Nr	X	Y
1	557366	5838068
2	556673	5834434
3	555572	5832506
4	553373	5835296
5	554172	5836275
6	554292	5836463
7	554408	5836452
8	554504	5836464
9	554614	5836502
10	554697	5836553
11	555007	5836300
12	555229	5836213
13	556750	5836081
14	556981	5836092
15	549766	5839999
16	549703	5839951
17	549259	5840513
18	552152	5843979
19	552235	5843901
20	553219	5843316
21	553537	5843214
22	553826	5843195
23	550471	5840539
24	556969	5837369
25	556902	5837309
26	556827	5837284
27	555691	5837377
28	555118	5837739
29	554883	5837804
30	554638	5837796
31	554408	5837713

32	554209	5837562
33	554127	5837458
34	553965	5837207
35	553912	5837083
36	553896	5836928
37	553927	5836777
38	554003	5836642
39	554108	5836543
40	554013	5836397
41	553246	5835457
42	549889	5839715
43	550655	5840303
44	554016	5842963
45	552678	5836952
46	552694	5836859
47	552763	5836794
48	552847	5836782
49	552932	5836824
50	552973	5836898
51	554211	5842455
52	554298	5842285
53	554997	5841490
54	555189	5841341
55	555480	5841214
56	555939	5841106
57	556001	5841118
58	556060	5841163
59	556085	5841210
60	556106	5841320
61	556078	5841400
62	556009	5841452
63	555936	5841461
64	555863	5841429
65	555576	5841500

66	555343	5841601
67	555204	5841710
68	554548	5842455
69	554476	5842595
70	554424	5842774
71	554410	5842926
72	554445	5843341
73	554422	5843397
74	554352	5843481
75	554273	5843510
76	554210	5843501
77	554164	5843474
78	553593	5843511
79	553343	5843591
80	552417	5844142
81	552345	5844210
82	554228	5846466
83	559396	5848700
84	559464	5849056
85	554655	5846978
86	558354	5851409
87	559589	5849713
88	547557	5826528
89	547557	5827080
90	548418	5827011
91	547992	5826802
92	538831	5817477
93	536107	5816157
94	537761	5826739
95	538642	5827794
96	547257	5827104
97	547257	5826295
98	546975	5826037
99	546703	5825742

100	546458	5825424
101	546264	5825125
102	546091	5824807
103	545921	5824420
104	545796	5824049
105	545697	5823642
106	545642	5823287
107	545615	5822929
108	545615	5822570
109	545643	5822212
110	545711	5821799
111	545799	5821451
112	545913	5821111
113	546054	5820781
114	545626	5820742
115	545487	5820703
116	554931	5831382
117	554316	5830306
118	554168	5830287
119	553576	5830283
120	553378	5830297
121	553017	5830353
122	552781	5830361
123	551496	5830218
124	551239	5830239
125	550435	5830376
126	550308	5830378
127	550091	5830354
128	550106	5830497
129	550139	5830630
130	550302	5831051
131	550371	5831183
132	551050	5832188
133	551859	5833440

134	552595	5834345
135	547257	5838115
136	547257	5828157
137	539466	5828781
138	549907	5829061
139	550103	5829094
140	550280	5829206
141	550472	5829148
142	551073	5829050
143	551457	5829017
144	552066	5829070
145	552820	5829162
146	553304	5829098
147	553618	5829083
148	552835	5827711
149	547557	5828133
150	547557	5838475
151	548473	5839572
152	552468	5834505
153	551697	5833558
154	550883	5832297
155	550208	5831300
156	550120	5831133
157	549944	5830676
158	549904	5830504
159	549888	5830300
160	549779	5830240
161	549681	5830161
162	549599	5830066
163	549535	5829957
164	549425	5829631
165	549420	5829513
166	549453	5829377
167	549523	5829256

168	549639	5829147
169	549770	5829084

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