

Project: Description:

Iglsø Ansvarsberænsning
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 Calculated:
 08/04/2024 09.03/4.0.540

PARK - Main Result

Calculation: Layout9 Iglsø 10 x V136 82mHH

Setup

AEP scaled to a full year based on number of samples
 Scaling factor from 1,0 years to 1 year: 1,001

Calculation performed in UTM (north)-WGS84 Zone: 32
 At the site centre the difference between grid north and true north is: 0,1°

Wake

Wake Model: N.O. Jensen (RISØ/EMD) Park 2 2018
 Wake decay constant:
 Wake decay constant: 0,090 DTU default onshore Hub height independent
 Reference WTG: VESTAS V136-4.5 4500 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (66)

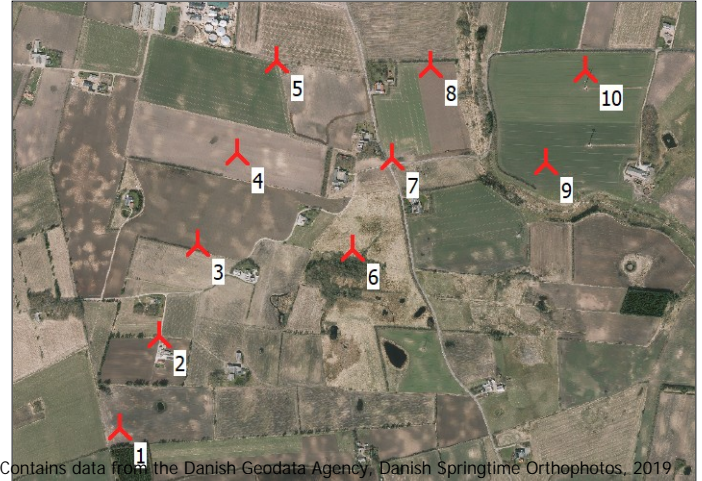
Scaler/wind data

Name: EMD Default Meso Scaler
 Terrain scaling: Meso-scale Data Downscaling
 Micro terrain flow model: WASP IBZ from Site Data
 Used period: 01/01/2017 - 31/12/2017 23.00.00
 Meteo object(s): EMD-WRF Europe+ (ERA5)_N56,45987_E009,116058 (4)
 WASP version: WASP 11 Version 11.06.0042

Power correction (All new WTGs)

Power curve correction (adjusted IEC method, improved to match turbine control)

	Min	Max	Avg	Corr. [%]	Neg. corr. [%]	Pos. corr. [%]
Air density						
From air density settings	[°C]	7,6	7,7	7,7		
From air density settings	[hPa]	997,7	999,5	998,6		
Resulting air density	[kg/m³]	1,238	1,240	1,239		
Relative to 15°C at sea level	[%]	101,1	101,2	101,1	0,8	0,0



Contains data from the Danish Geodata Agency, Danish Springtime Orthophotos, 2019

Scale 1:25.000

▲ New WTG

Calculated Annual Energy for Wind Farm

WTG combination	Result PARK [MWh/y]	GROSS (no loss) Free WTGs [MWh/y]	Wake loss [%]	Capacity factor [%]	Mean WTG result [MWh/y]	Full load hours [Hours/year]	Wind speed	
							free [m/s]	wake reduced [m/s]
Wind farm	123.538,0	145.709,5	15,2	32,4	12.353,8	2.840	7,1	6,6

*) Based on wake reduced results and any curtailments.

Calculated Annual Energy for each of 10 new WTGs with total 43,5 MW rated power

WTG type	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Power curve Creator	Name	Annual Energy		Wind speed	
									Result [MWh/y]	Wake loss [%]	free [m/s]	reduced [m/s]
1	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4/PO4-OS - 82m hh - 2021-09	14.494,3	7,2	7,17	6,91
2	Yes	VESTAS	V136-4.0/4.2 MW-4.000	4.000	136,0	82,0	USER	SO2 - below 104m hh - 2017-11	10.348,0	9,0	7,15	6,78
3	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4/PO4-OS - 82m hh - 2021-09	14.170,5	11,1	7,25	6,82
4	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4/PO4-OS - 82m hh - 2021-09	13.438,6	13,3	7,15	6,65
5	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4/PO4-OS - 82m hh - 2021-09	13.195,6	13,5	7,09	6,61
6	Yes	VESTAS	V136-4.0/4.2 MW-4.000	4.000	136,0	82,0	USER	SO2 - below 104m hh - 2017-11	9.550,4	13,7	7,01	6,45
7	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4/PO4-OS - 82m hh - 2021-09	11.835,9	22,1	7,08	6,30
8	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4/PO4-OS - 82m hh - 2021-09	12.031,6	21,8	7,12	6,35
9	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4/PO4-OS - 82m hh - 2021-09	12.478,8	19,1	7,13	6,46
10	Yes	VESTAS	V136-4.0/4.2 MW-4.000	4.000	136,0	82,0	USER	SO1 - below 104m hh - 2017-11	11.994,3	19,7	7,19	6,46

Annual Energy results includes shown losses. For expected NET AEP (expected sold production), see report Loss & Uncertainty.

WTG siting

	Danish Transv. Merc. DKTM2 Eastern Jylland (10°)-ETRS89				Calculation period	
	Easting	Northing	Z	Row data/Description	Start	End
1 New	343.164,73	1.259.793,25	40,0	VESTAS V136-4.5 4500 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (66)	01/01/2017	31/12/2017
2 New	343.299,20	1.260.094,61	38,6	VESTAS V136-4.0/4.2 MW 4000 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (67)	01/01/2017	31/12/2017
3 New	343.433,67	1.260.395,97	45,0	VESTAS V136-4.5 4500 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (68)	01/01/2017	31/12/2017
4 New	343.568,14	1.260.697,33	40,0	VESTAS V136-4.5 4500 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (69)	01/01/2017	31/12/2017
5 New	343.702,61	1.260.998,69	37,3	VESTAS V136-4.5 4500 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (70)	01/01/2017	31/12/2017
6 New	343.945,16	1.260.373,50	30,1	VESTAS V136-4.0/4.2 MW 4000 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (71)	01/01/2017	31/12/2017
7 New	344.079,63	1.260.674,86	34,2	VESTAS V136-4.5 4500 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (72)	01/01/2017	31/12/2017
8 New	344.214,10	1.260.976,22	37,8	VESTAS V136-4.5 4500 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (73)	01/01/2017	31/12/2017
9 New	344.591,12	1.260.652,40	36,3	VESTAS V136-4.5 4500 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (74)	01/01/2017	31/12/2017
10 New	344.725,59	1.260.953,76	41,4	VESTAS V136-4.0/4.2 MW 4000 136.0 !O! hub: 82,0 m (TOT: 150,0 m) (75)	01/01/2017	31/12/2017

*) Included in wake losses is influence from 11 WTG(s) in the neighborhood, which has status as "Reference WTGs", see separate report to identify these.