

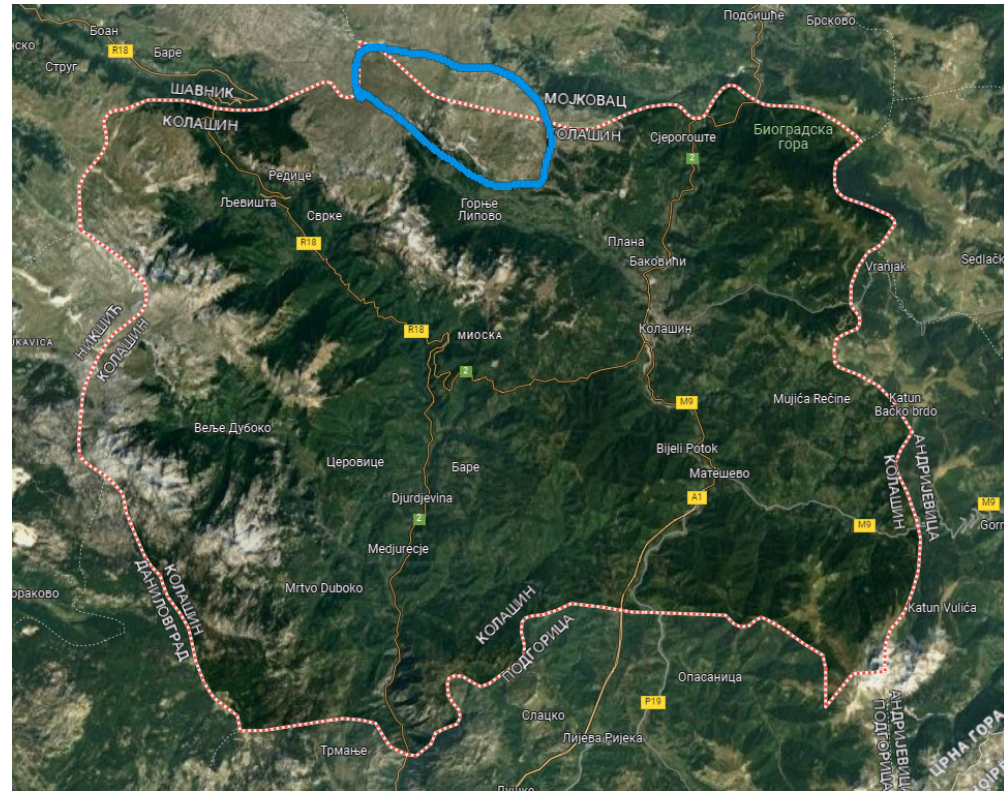
Wind Farm Sinjajevina – Part 2



Location

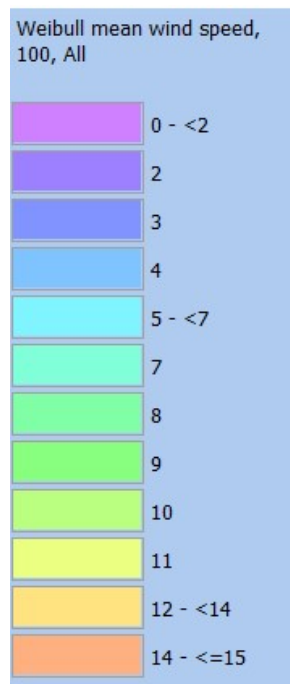


**Municipality of
Kolašin and Šavnik
Montenegro**

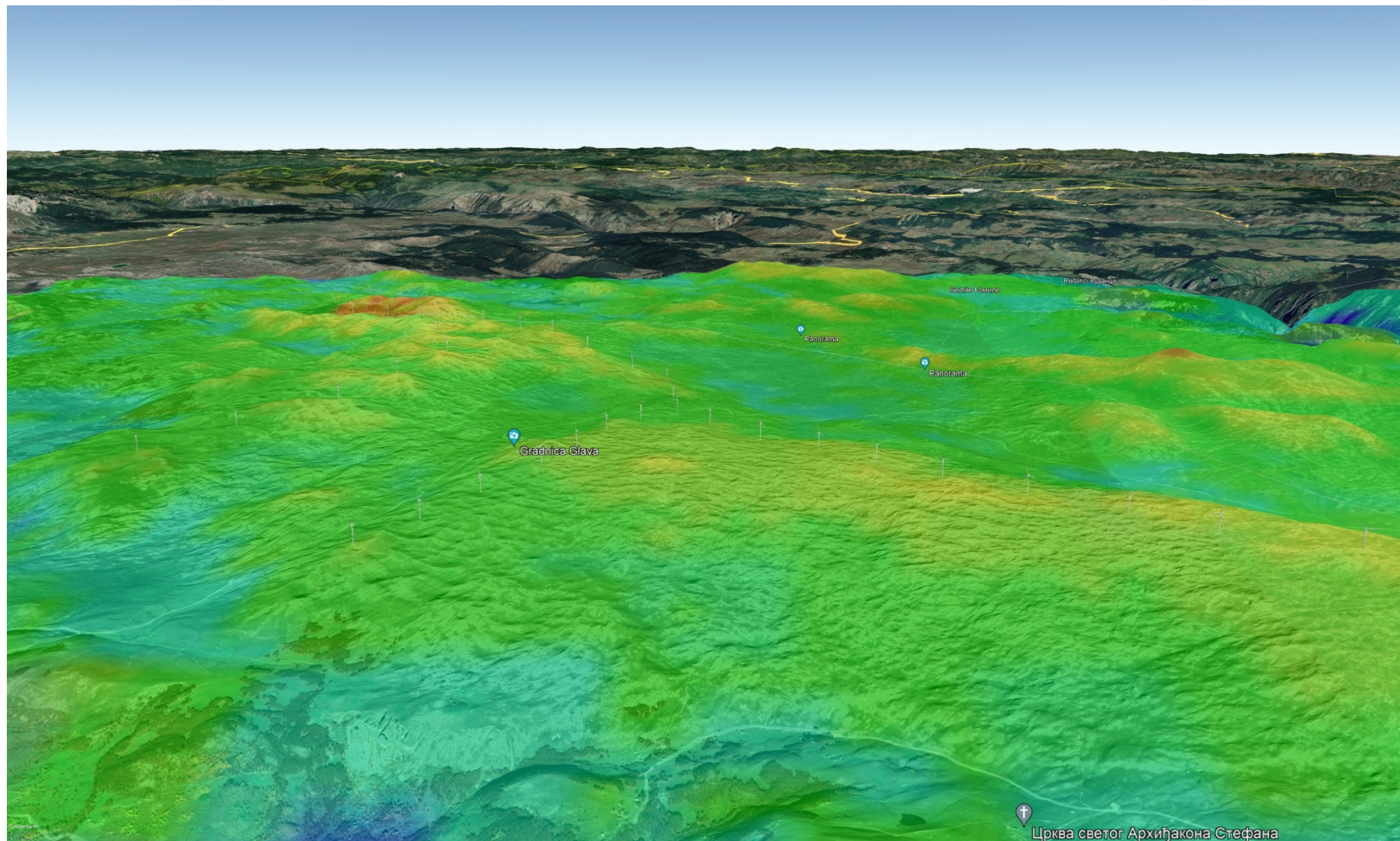
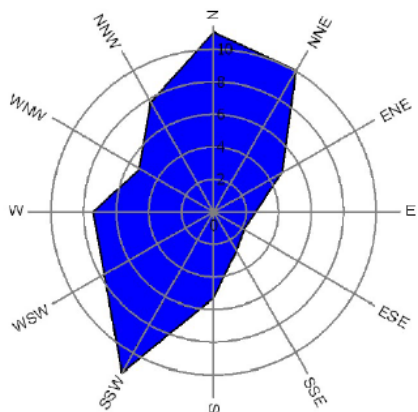


**Latitude: 42°
Longitude: 19°
Elevation≈ 1850 mnm**

Wind potential at location



Mean wind speed (m/s)



Wind generator

Manufacturer	Siemens Gamesa	
Type/Version	SG 6.6-170	
Rated power	6,600.0	kW
Secondary generator		kW
Rotor diameter	170.0	m
Tower	!O! Tubular	
Grid connection	50/60 Hz	
Country (origin)	Denmark	
Blade type		
Generator type	Variable	
Rated	8.8	rpm
Initial	5.1	rpm
Default hub height	115.0	m
Alternative hub heights (m)	115.0	▲
	135.0	
	145.0	▼
	<input type="button" value="Add"/> <input type="button" value="Remove"/>	
Maximum blade width	4.50	m *)
Blade width for 90% radius	1.50	m *)



Map of Wind Power Plant

Number of wind generators: **44**

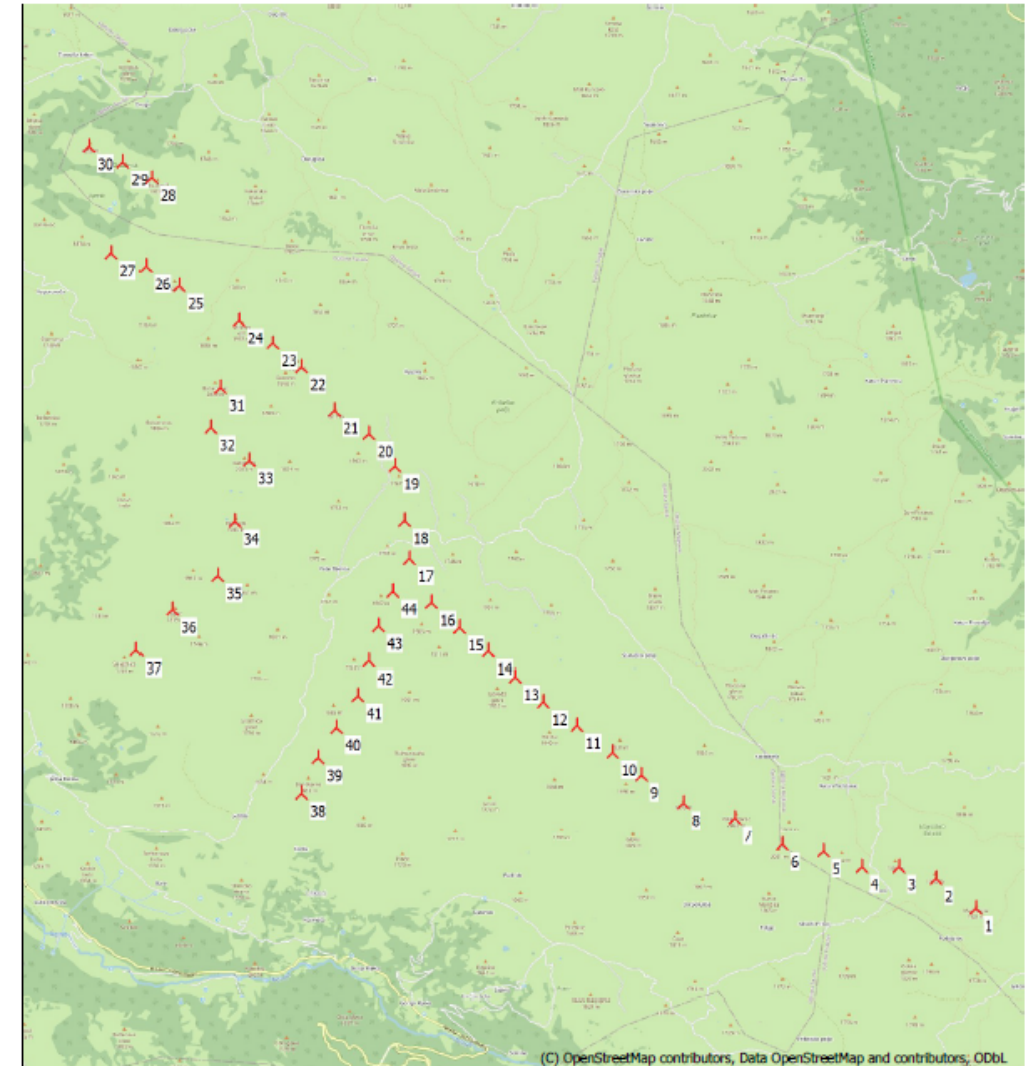
Unit power: **6.60 MW**

Total power: **290.40 MW**

Annual production: **964.857 GWh** (with 20% reduction)

The owner of the part of the land is the state of Montenegro.

PARK - Map



Production - WindPro 3.6



Calculated Annual Energy for Wind Farm

WTG combination	Result	Result-20.0%	GROSS (no loss)	Wake loss	Specific results=)			
	PARK [MWh/y]	[MWh/y]	Free WTGs [MWh/y]	[%]	Capacity factor [%]	Mean WTG result [MWh/y]	Full load hours [Hours/year]	Mean wind speed @hub height [m/s]
Wind farm	1,206,071.2	964,857.0	1,260,563.0	4.3	37.9	21,928.6	3,323	9.3

*) Based on Result-20.0%

Calculated Annual Energy for each of 44 new WTGs with total 290.4 MW rated power

	WTG type			Power, rated	Rotor diameter	Hub height	Power curve		Annual Energy			
	Links	Valid	Manufact.				Creator	Name	Result	Result-20.0%	Wake loss	Free mean wind speed
				[kW]	[m]	[m]			[MWh/y]	[MWh/y]	[%]	[m/s]
1 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	29,108.2	23,287	0.4	9.49
2 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	29,069.9	23,256	1.0	9.63
3 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	27,436.0	21,949	1.8	9.16
4 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	25,984.2	20,787	1.7	8.74
5 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,617.1	22,894	1.1	9.73
6 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	30,336.5	24,269	1.2	10.35
7 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	30,681.5	24,545	0.8	10.41
8 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	29,778.0	23,822	0.7	9.90
9 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,423.5	22,739	0.6	9.29
10 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,170.7	22,537	0.8	9.28
11 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,346.9	22,678	0.8	9.39
12 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,339.5	22,672	1.1	9.33
13 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	27,571.1	22,057	1.8	9.11
14 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	26,568.9	21,255	2.6	8.85
15 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	25,690.7	20,553	3.8	8.63
16 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	25,700.4	20,560	6.3	8.77
17 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	23,671.8	18,937	8.0	8.25
18 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	24,174.2	19,339	6.7	8.28
19 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	25,340.8	20,273	4.8	8.51
20 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	25,677.9	20,542	3.7	8.55
21 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,245.7	22,597	3.6	9.40
22 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,083.4	22,467	4.3	9.33
23 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	26,963.0	21,570	4.6	8.96

To be continued on next page...

				Power, rated	Rotor diameter	Hub height			Annual Energy			
									Result	Result-20.0%	Wake loss	Free mean wind speed
				[kW]	[m]	[m]			[MWh/y]	[MWh/y]	[%]	[m/s]
24 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	29,352.6	23,482	2.9	9.69
25 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	30,748.1	24,599	1.2	10.44
26 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	29,295.4	23,436	1.4	9.82
27 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	29,110.9	23,289	2.2	9.85
28 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	30,546.9	24,438	2.4	10.46
29 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	29,823.1	23,859	1.6	10.18
30 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	29,843.0	23,874	1.0	10.04
31 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,300.5	22,640	6.3	9.68
32 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,295.1	22,636	5.4	9.51
33 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,615.5	22,892	5.0	9.58
34 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,734.8	22,988	5.3	9.68
35 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	28,053.6	22,443	6.3	9.64
36 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	23,875.7	19,101	7.7	8.28
37 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	26,859.8	21,488	5.3	9.01
38 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	26,949.5	21,560	7.2	9.20
39 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	23,134.4	18,508	11.8	8.39
40 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	23,436.5	18,749	13.0	8.58
41 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	25,068.3	20,055	11.4	9.04
42 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	24,825.6	19,860	11.9	9.05
43 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	24,448.8	19,559	12.4	8.92
44 A	Yes	Siemens Gamesa	SG 6.6-170-6,600	6,600	170.0	115.0	EMD	(AM 0, 6.6MW) - 1.225 kg/m ³	24,772.9	19,818	10.3	8.81