

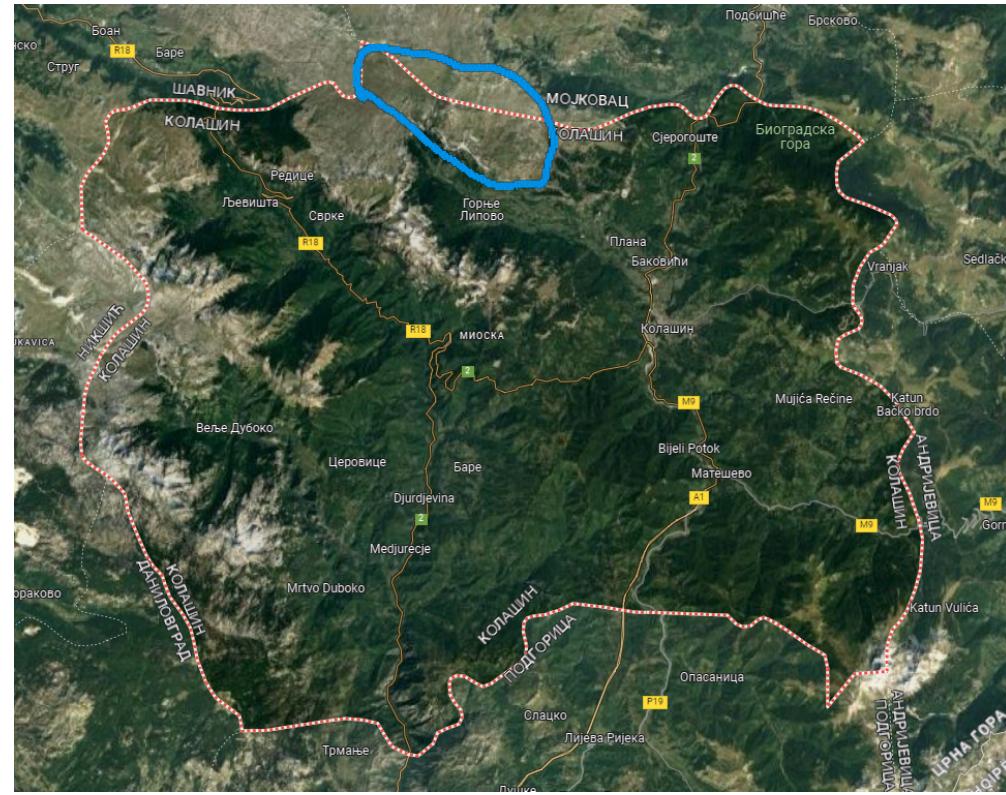
# Wind Farm Sinjajevina – Part 2



# Location

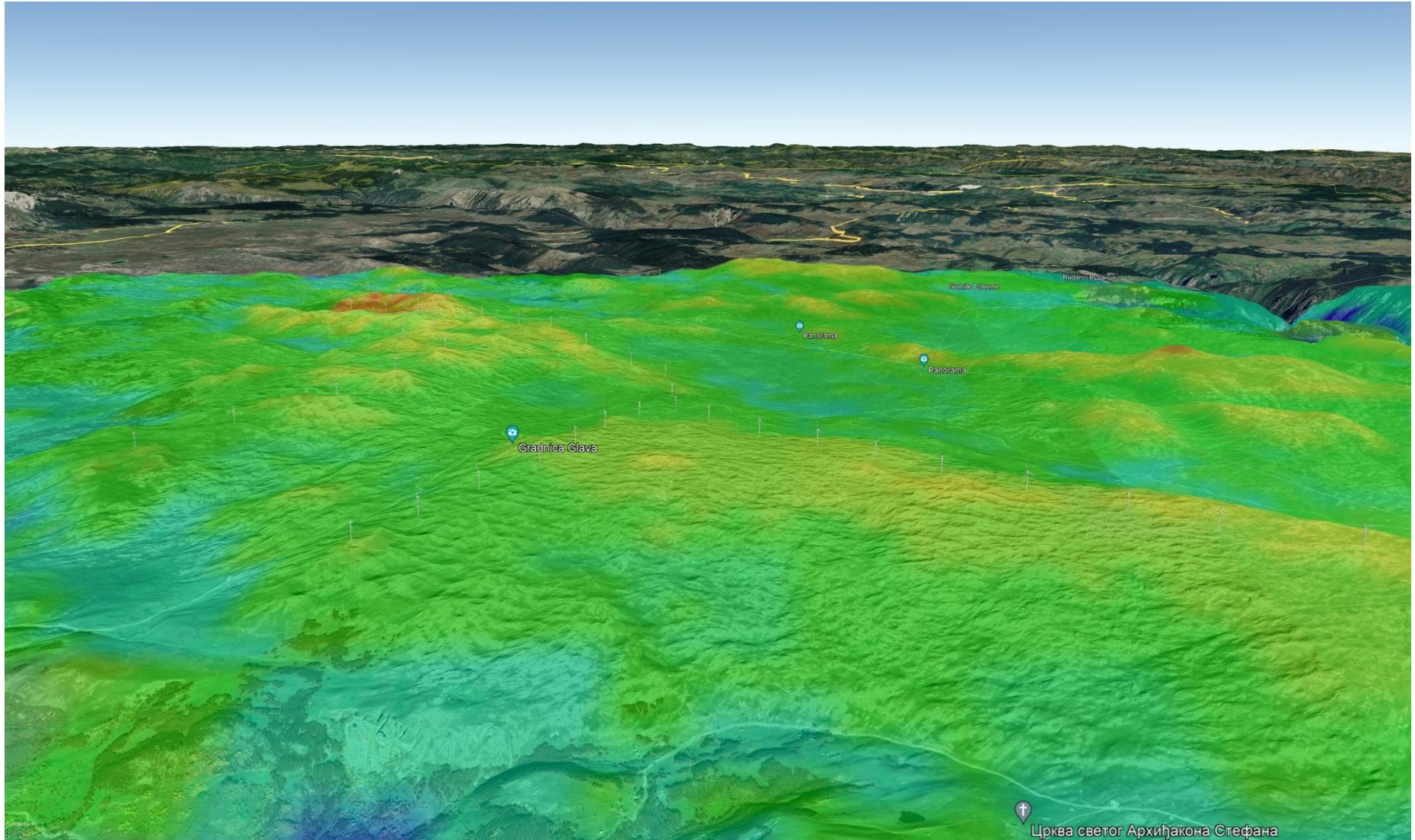
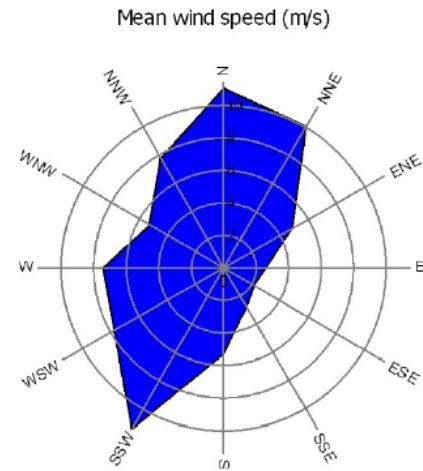
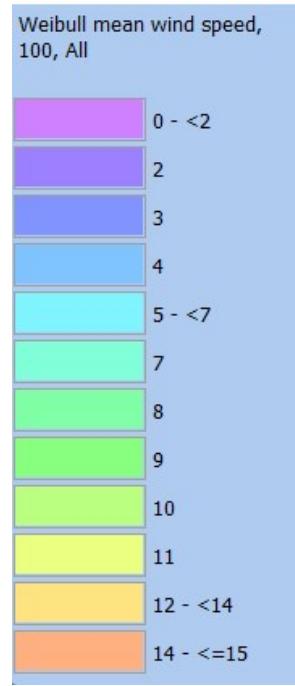


**Municipality of  
Kolašin and Šavnik  
Montenegro**



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

# Wind potential at location



# Wind generator

Manufacturer	Siemens Gamesa
Type/Version	SG 6.6-170
Rated power	6,600.0 kW
Secondary generator	
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
Maximum blade width	4.50 m *)
Blade width for 90% radius	1.50 m *)



# Map of Wind Power Plant

Number of wind generators: **44**

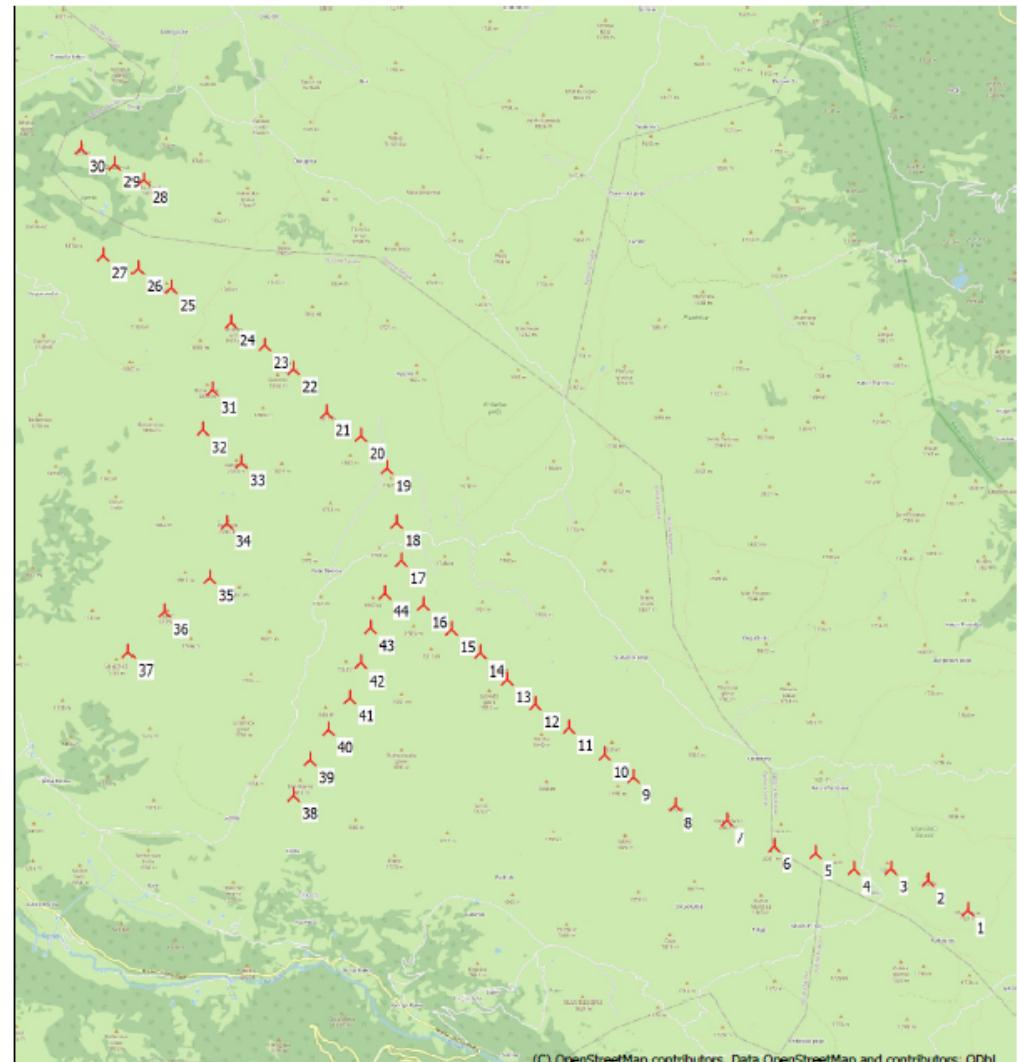
Unit power: **6.60 MW**

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



▲ New WTG

Map: EMD OpenStreetMap , Print scale 1:75,000, Map center Geo WGS84 East: 19.304190° E North: 42.980461° N

# Production - WindPro 3.6



## Calculated Annual Energy for Wind Farm

WTG combination	Result PARK [MWh/y]	Result-20.0% [MWh/y]	GROSS (no loss) Free WTGs [MWh/y]	Wake loss [%]	Specific results=)			Mean wind speed @hub height [m/s]
					Capacity factor [%]	Mean WTG result [MWh/y]	Full load hours [Hours/year]	
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	Links	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Power curve			Annual Energy		
								Creator	Name	[MWh/y]	Result	Result-20.0%	Wake loss
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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	26,963.0	21,570	4.6	8.96

To be continued on next page...

				rated	dia-meter	height	mean	wind	speed				
				[kW]	[m]	[m]	[MWh/y]	[MWh/y]	[%]				
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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	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 <sup>3</sup>	24,772.9	19,818	10.3	8.81