



# Bati Energy Private Limited

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 IEC : 2414012919  
 GSTIN : 24AAF09023NIZ1

We have proudly provided Consultancy to : Airport Authority of India; Government of Ghana; Department of Energy, Faroe Islands

Customer : Welcome Hostel, Rotermanni Kvartal, Tallinn.

Date 21-07-2018

Location

Lat 59.439

Lon 24.757

## Wind Power Solution Generation Report without considering Feed In Tariff benefits

Monthly Averaged Wind Speed At 10 m Above The Surface Of The Earth (m/s)													
Lat 59.439 Lon 24.757	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
10-year Average	4.26	4.03	4.05	4.05	3.98	3.94	3.76	3.9	4.09	4.11	4.07	4.24	4.04

Monthly Averaged Percent Of Time The Wind Speed At 10 m Above The Surface Of The Earth Is Within The Indicated Range (%)													
Lat 59.439 Lon 24.757	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
0 - 2 m/s	14%	19%	20%	21%	20%	21%	24%	21%	18%	20%	17%	12%	19%
3 - 6 m/s	77%	74%	72%	72%	75%	74%	73%	74%	75%	71%	74%	79%	74%
7 - 10 m/s	9%	6%	80%	80%	5%	5%	3%	5%	7%	10%	9%	8%	7%
11 - 25m/s	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Monthly Averaged Wind availability in hours out of 24 hours a day for the wind flow at 10m above the surface of the Earth														
Lat 59.439 Lon 24.757	Jan-hours/ day	Feb- hours/day	Mar- hours/day	Apr- hours/day	May- hours/day	Jun- hours/day	Jul- hours/day	Aug- hours/day	Sep- hours/day	Oct- hours/day	Nov- hours/day	Dec- hours/day	Annual Average	
0 - 2 m/s	3.36	4.56	4.8	5.04	4.8	5.04	5.76	5.04	4.32	4.8	4.08	2.88	4.54	hours
3 - 6 m/s	18.48	17.76	17.28	17.28	18	17.76	17.52	17.76	18	17.04	17.76	18.96	17.8	hours
7 - 10 m/s	2.16	1.44	19.2	19.2	1.2	1.2	0.72	1.2	1.68	2.4	2.16	1.92	4.54	hours
11 - 25m/s	0	0	0	0	0	0	0	0	0	0	0	0	0	hours

Monthly average performance for a 5KW Hobbit VAWT at various wind speeds based on wind availability.													
Lat 59.439 Lon 24.757	Jan-KWh/ day	Feb- KWh/day	Mar- KWh/day	Apr- KWh/day	May- KWh/day	Jun- KWh/day	Jul- KWh/day	Aug- KWh/day	Sep- KWh/day	Oct- KWh/day	Nov- KWh/day	Dec- KWh/day	Annual Total
0 - 2 m/s	0	0	0	0	0	0	0	0	0	0	0	0	0
3 - 6 m/s	1145.76	994.56	1071.36	1036.8	1116	1065.6	1086.24	1101.12	1080	1056.48	1065.6	1175.52	12995
7 - 10 m/s	234.36	141.12	2083.2	2016	130.2	126	78.12	130.2	176.4	260.4	226.8	208.32	5811.12
11 - 25m/s	0	0	0	0	0	0	0	0	0	0	0	0	0

average generation factor at 3-6m/s windspeed of 0.40KWh/KW and at 7-10m/s of 0.70KWh/KW **Grand Total Generation of 5KW hobbit per annum 18806.2 KWh**

## Investment Required for proposed capacity

Power in KiloWatt	Investment in EUR	O & M Cost Life*	Lifetime Project Cost	AC power for life**	LCOE Power cost#
20KW	€ 41,990.00	€ 16,796.00	€ 58,786.00	€ 12,78,818.88	€ 0.046 /KWh
100KW	€ 1,63,990.00	€ 65,596.00	€ 2,29,586.00	€ 63,94,094.40	€ 0.036 /KWh

\* O&M cost at 2 % of initial project cost per annum for 20 years

20KW system will have 5KW x 4 VAWTs while 100KW will have 5KW x 20VAWTs

\*\* AC power for life for wind turbines of 5KW each capacity at 18806KWh per annum per turbine with 0.85 degradation

#LCOE Power cost: Levelized cost of generating wind power which is total life time project cost divided by power generated during life time of the project

## Break-Even Period Calculation ! Total Life time of project = 25 years

Power in KiloWatt	Investment in EUR	Cost of power/KWh*	Generation/ year	Power Value/ year**	Break-Even Time#
20KW	€ 41,990.00	€ 0.12 /KWh	75225 KWh	€ 9,026.96	4.65 years
100KW	€ 1,63,990.00	€ 0.12 /KWh	376123 KWh	€ 45,134.78	3.63 years

\* present cost of power at given location

\*\* Power Value Annual Value of power generated at current cost of power

# Break-Even period Is= Investment in power plant / power value per year

Cost of power per KWh at site 0.12 € per KWh

## Savings per KWh

power in KiloWatt	Cost of power/KWh	LCOE Power cost / KWh	Savings / KWh
20KW	€ 0.12 /KWh	€ 0.046 /KWh	€ 0.074 /KWh
100KW	€ 0.12 /KWh	€ 0.036 /KWh	€ 0.084 /KWh

## Property Investment Returns Vs Wind Investment Returns

Power in KiloWatt	Investment in EUR	Cost of power/KWh	Generation/ year	Property Return	Wind Return at	Wind Return %
				at 6.64% per year	present power cost	per year
20KW	€ 41,990.00	€ 0.12 /KWh	75225 KWh	€ 2,788.14	€ 9,026.96	21%
100KW	€ 1,63,990.00	€ 0.12 /KWh	376123 KWh	€ 10,888.94	€ 45,134.78	28%

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<h2>Bati Energy Private Limited</h2>	
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