

## Description of 1kW Isolated Wind System

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### Description:

This standalone and isolated wind system is located in the south of Patagonia (Argentina). It provides energy for a small family with all the necessary household appliances in a relatively remote outskirt of Rio Gallegos. The region around Rio Gallegos is known for strong and good winds, so the site of the wind system has an average wind speed of about 7 to 8 m/s and thus is very well suited.

The wind system consists of a small wind turbine (1kW) with a rotor diameter of 2 meter, four storage batteries (12 V, 220 Ah) and a 2000W inverter to produce 220 V AC (50Hz). Furthermore there is a small dump load resistance heating installed which uses excess energy if the batteries are fully charged.

In order to secure a permanent energy supply there is also an 8HP petrol generator, owned previously by the family, connected but almost unused since the installation of the wind system.

The whole system costs around \$ 5,500 plus VAT (2001 prices).

### System Parts:

Wind turbine	EOLUX 1100W - 48V
Inverter	EOLUX 2000W
Batteries	4 Batteries EXIDE 12V / 220Ah - Deep Cycle
Rectifier / Regulator	Charge Regulator EOLUX + Circuit board
Generator	8HP Petrol Generator
Tower	Guyed Lattice Tower, 12m

### System Costs:

Quantity	Description	Totals
1	Aerogenerator EOLUX 1100W / 48V	
1	Charge Regulator EOLUX + Circuit board	
1	Inverter EOLUX 2000W	
4	Batteries EXIDE 12V / 220Ah (deep cycle)	
1	Guyed Lattice Tower, 12m	
1	Installation	
<b>TOTAL</b>		<b>\$ 5.480,00</b>



### Energy Requirements:

Quantity	Description	Power [W]	Power Total [W]	Peak Factor	Peak Power (WorstCase) <sup>[1]</sup> [W]	Hours of Use per Day	Energy [Wh]
9	Lights inside	21.0	189.0	1.0	189.0	6.0	1134.0
2	Lights outside	11.0	22.0	1.0	22.0	6.0	132.0
1	TV Colour 20"	150.0	150.0	1.3	195.0	6.0	900.0
1	Video	30.0	30.0	1.0	30.0	2.0	60.0
1	Music System	100.0	100.0	1.0	100.0	4.0	400.0
1	Computer	150.0	150.0	1.5	225.0	5.0	750.0
0	Washing Machine	250.0	0.0	1.0	0.0	1.0	0.0
0	Microwave	750.0	0.0	1.0	0.0	0.5	0.0
1	Various	120.0	120.0	2.0	240.0	2.0	240.0
1	Water pump	142.0	142.0	5.0	710.0	2.0	284.0
<b>TOTAL</b>			<b>903.0</b>		<b>1711.0</b>		<b>3900.0</b>

<b>TOTAL ENERGY [Wh / dia]</b>	<b>3900.0</b>	
<b>AVERAGE POWER REQUIRED [W]</b>	<b>903.0</b>	All appliances work simultaneously! (Worst case)
<b>MAXIMUM POWER REQUIRED [W]</b>	<b>1711.0</b>	Peak for all appliances working simultaneously! (Worst case)

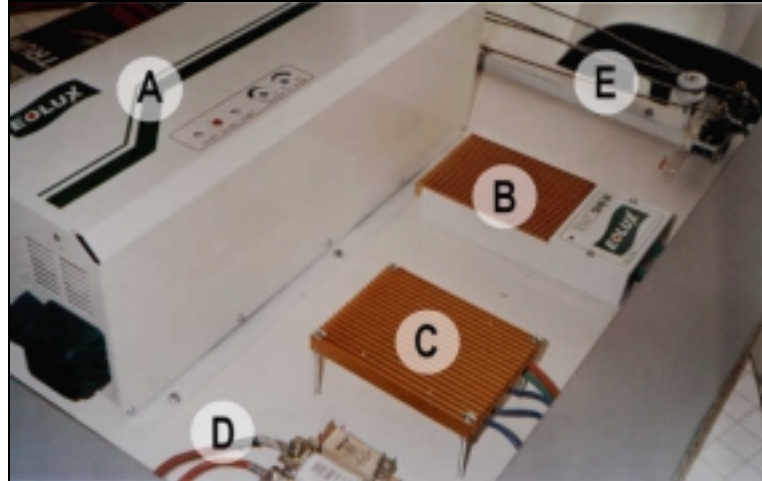
<sup>[1]</sup> This Power – Peak can occur when appliances are started or turned on.

Capacity of batteries, when considering energy losses ( Daily energy consumption of 3900 Wh)							
Quantity	Description	Voltage [V]	[Ah]	Energy [Wh]	Losses <sup>[2]</sup> [%]	Energy [Wh]	Days without wind <sup>[3]</sup>
<b>6V - Lead/Acid - Deep Cycle Units</b>							
4	BAT 6V, 220Ah	12.0	440.0	5280.0	25	3960.0	1.0
8	BAT 6V, 220Ah	12.0	880.0	10560.0	25	7920.0	2.0
16	BAT 6V, 220Ah	12.0	1760.0	21120.0	25	15840.0	4.1
<b>12V - Lead/Acid - Deep Cycle Units</b>							
2	BAT 12V, 220Ah	12.0	440.0	5280.0	25	3960.0	1.0
4	<b>BAT 12V, 220Ah</b>	<b>12.0</b>	<b>880.0</b>	<b>10560.0</b>	<b>25</b>	<b>7920.0</b>	<b>2.0</b>
8	BAT 12V, 220Ah	12.0	1760.0	21120.0	25	15840.0	4.1
16	BAT 12V, 220Ah	12.0	3520.0	42240.0	25	31680.0	8.1

<sup>[2]</sup> Losses occur in the inverter and also when charging the storage batteries.

<sup>[3]</sup> For this number of days the storage capacity of the batteries is sufficient.

Pictures:



In these two pictures you can see the electric converter and storage system. The picture on the left hand side gives a rough overview about the size of the system: On the ground you can see the 4 EXIDE Batteries (14V 220Ah) and you can also see the complete circuit board with Inverter (A), Regulator (B), Rectifier (C), Fuses (D) and the "Dump Load" resistance Heating (E).



These two pictures show how the 12 m Guyed Lattice Tower is erected. On the right side you can see the working wind generator.