

# Wind Survey Report

Test site

Sample time: 3 days  
Jan 21, 2010 - Jan 23, 2010

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## Wind Survey Report: Assumed parameters

| Parameter           | Value             |
|---------------------|-------------------|
| Site Name           | Test site         |
| Description         | In the backyard   |
| Latitude            | 123.456 N         |
| Longitude           | 67.891 W          |
| Height above ground | 12 m              |
| Absolute altitude   | 700 m             |
| Efficiency          | 21%               |
| Cut-in (min) Speed  | 5.1 m/s           |
| Cut-out (max) Speed | 8.5 m/s           |
| Survival Speed      | 45 m/s            |
| Swept Area          | 18 m <sup>2</sup> |
| Max Generator Power | 0.8 kw            |
| Seasonal Adjustment | -15%              |
| Electricity Value   | \$0.15            |
| Subsidy             | \$2.50            |

## ***Average Daily Energy Potential***

In consideration of a wind turbine project, the most important single number is the average daily energy potential. This would be the amount of energy in the motion of the air molecules as they pass through an imaginary 1 meter squared of area. For this period, at this location, we measured:

### **4.1 kilowatt-hours/m<sup>2</sup>/day wind potential**

Some of this wind was going too slow to be useful. Since we are assuming a cut-in speed of 5.1 m/s, let's exclude the wind below that speed:

### **4.0 kilowatt-hours/m<sup>2</sup>/day excluding low winds**

Some of this wind was going too fast to be fully exploited. The winds may have been dangerously strong, to the point that the energy generation drops off to nothing. Excluding winds above 8.5 m/s, we have this amount of energy left:

### **4.0 kilowatt-hours/m<sup>2</sup>/day excluding high winds also**

What does this mean exactly? This is the amount of kinetic energy (energy of motion) which was contained in the air, on average, for one day. Since we are assuming an efficiency of 0.21%, let's adjust this for what we may capture:

### **0.8 kilowatt-hours/m<sup>2</sup>/day considering efficiency**

Since you are considering a turbine with 18 m<sup>2</sup> of area, you would get:

### **15.2 kilowatt-hours/day with a swept area of 18 m<sup>2</sup>**

The turbine may have been generating too much power for the generator to handle. Since we are assuming the max generator power is 800 watts, this is how much energy would have been retained:

### **14.1 kilowatt-hours/m<sup>2</sup>/day average 423.2 kilowatt-hours/month average**



## Wind Survey Report: Power

| Wind Speed Range | ~ Wind Power Range | Hours |
|------------------|--------------------|-------|
| 0.0 - 5.1 m/s    | 0.000 kW           | 4:36  |
| 5.1 - 5.5 m/s    | 0.300 - 0.370 kW   | 9:12  |
| 5.5 - 5.9 m/s    | 0.370 - 0.460 kW   | 9:12  |
| 5.9 - 6.3 m/s    | 0.460 - 0.560 kW   | 9:06  |
| 6.3 - 6.7 m/s    | 0.560 - 0.680 kW   | 9:30  |
| 6.7 - 7.1 m/s    | 0.680 - 0.800 kW   | 11:36 |
| 7.1 - 8.5 m/s    | 0.800 kW           | 18:42 |
| 8.5 - 9.0 m/s    | 0.000 kW           | 0:06  |

**The turbine didn't produce any energy when the wind was below 5.1 m/s or above 8.5 m/s**

**Instantaneous peak speed: 7.9 m/s**

**Capacity: 73.48%**

## Wind Survey Report: Idle time

| Duration           | # of Times |
|--------------------|------------|
| 5 consecutive days | 0          |
| 3 consecutive days | 0          |
| 2 consecutive days | 0          |
| 1 consecutive day  | 0          |

| Energy generation | # of Days |
|-------------------|-----------|
| 0 - 5 kw-hrs      | 0         |
| 5 - 10 kw-hrs     | 0         |
| 10 - 15 kw-hrs    | 3         |
| 15 - 20 kw-hrs    | 0         |

## Wind Survey Report: Best days

| Date     | Kw-hrs |
|----------|--------|
| 01/21/10 | 14.44  |
| 01/22/10 | 13.95  |
| 01/23/10 | 13.93  |



## Wind Survey Report: Value of electricity

| Month   | Value  |
|---------|--------|
| January | \$6.35 |

| Month   | Tons of Carbon |
|---------|----------------|
| January | 0.0487         |



## Wind Survey Report: Energy subsidies

| Subsidy/kw-hr in cents | Value   |
|------------------------|---------|
| 2.0                    | <value> |
| 2.5                    | <value> |
| 3.0                    | <value> |
| 3.5                    | <value> |
| 4.0                    | <value> |
| 4.5                    | <value> |
| 5.0                    | <value> |



# Wind Survey Report: Conclusions

|     |    |     |    |      |      |      |       |     |        |
|-----|----|-----|----|------|------|------|-------|-----|--------|
| Bad | No | Hmm | Ok | Fair | Fine | Good | Great | Wow | Exclnt |
|-----|----|-----|----|------|------|------|-------|-----|--------|

