

**WINDWARD ENGINEERING**

October 18, 2009

The turbine has run with the following statistics for the end of September and early October 2009. This time period represents time with the most recent inverter.

- Data collected 207 hours
- Average wind speed 4.74 m/s (10.6 mph)
- The turbine produced 41 kWh over this period of time

Figure 1 shows how the new inverter power curve compares to the previous version. There is considerably more data in the May and June power curve so some difference could be attributed to that but it does appear that the latest inverter shows some performance improvements.

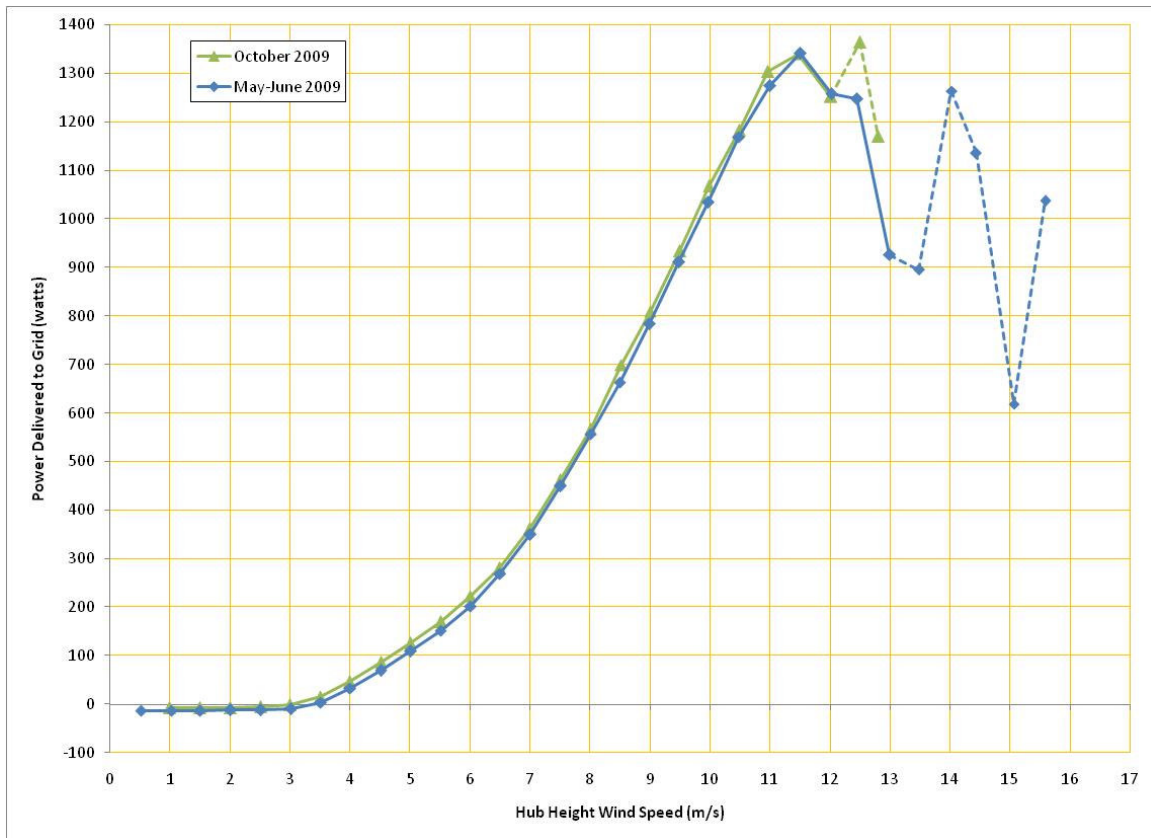


Figure 1. Latest power curve compared to early summer power curve (2009). The October power curve is with the latest inverter design and settings. Both power curves have been adjusted to sea-level air density. Dashed lines represent bins with little data.

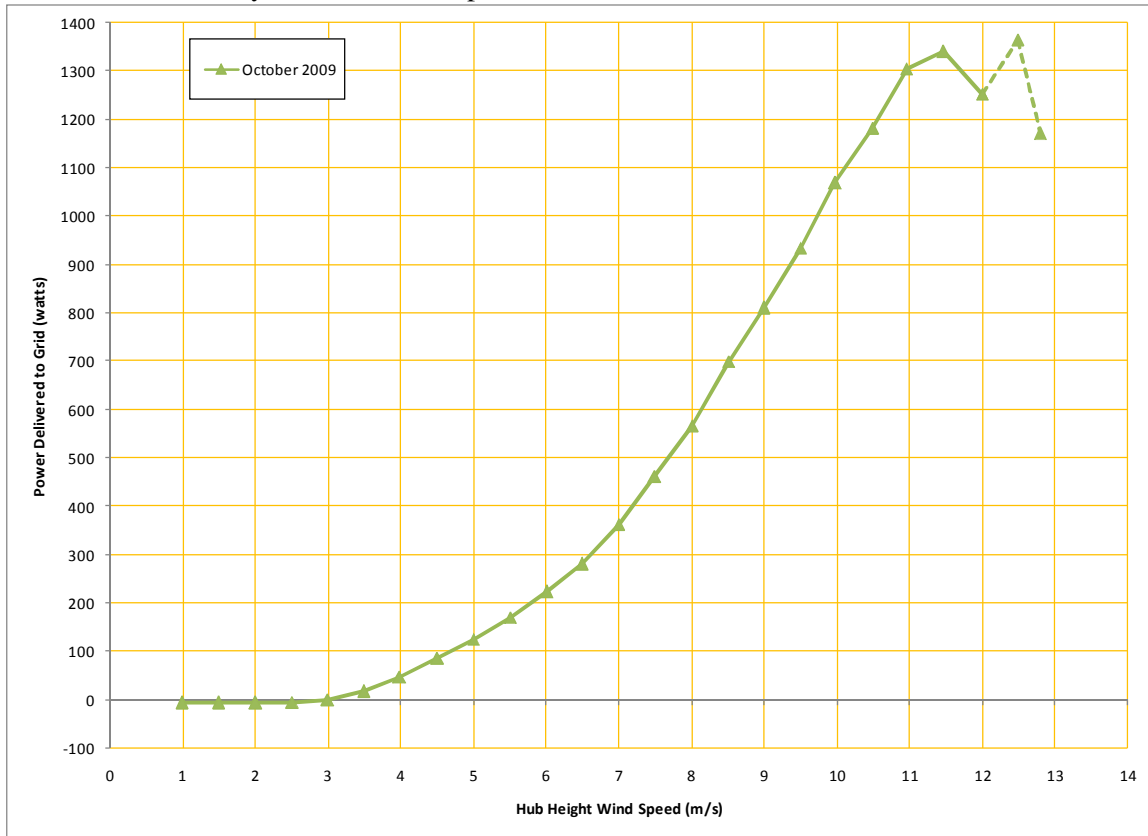


Figure 2. Latest power curve.

WS20 m/s	Counts minutes	Power watts	RPM rpm	WDir deg	Pres kPa	Temp °C	Density kg/m <sup>3</sup>	TSR -	DenCorPwr watts
0.50	831	-7.1	2	196	86.88	12.5	1.060	0.3	-7.1
0.99	832	-7.1	8	182	86.84	12.7	1.059	0.5	-7.1
1.50	680	-7.0	20	196	86.86	13.9	1.055	0.9	-7.0
2.01	626	-6.8	42	206	86.8	13.9	1.054	1.3	-6.8
2.51	676	-5.7	78	197	86.76	12.3	1.059	2.0	-5.7
3.00	670	-1.0	114	186	86.79	11.6	1.062	2.4	-1.0
3.49	661	14.2	144	174	86.74	12.7	1.058	2.6	16.5
3.98	646	40.3	165	169	86.7	12.1	1.060	2.6	46.5
4.51	681	75.1	184	160	86.73	10.4	1.067	2.6	86.2
5.00	797	109.8	194	159	86.72	9.5	1.070	2.5	125.7
5.51	762	148.5	205	155	86.73	9.4	1.070	2.4	170.0
6.00	793	194.5	218	157	86.69	9.9	1.068	2.3	223.1
6.50	710	242.2	233	154	86.64	12.7	1.057	2.3	280.7
6.99	560	312.4	253	155	86.61	12.8	1.056	2.3	362.4
7.49	448	397.9	273	151	86.78	13.5	1.055	2.3	462.0

8.00	384	488.6	292	152	86.97	13.9	1.056	2.3	566.8
8.51	411	605.5	313	151	87.14	13.1	1.061	2.4	699.1
9.00	363	703.3	328	149	87.21	12.4	1.064	2.3	809.7
9.49	320	813.8	344	150	87.25	11.8	1.067	2.3	934.3
9.98	250	930.5	358	149	87.27	11.9	1.067	2.3	1068.3
10.49	166	1030.0	365	148	87.18	11.7	1.067	2.2	1182.5
10.96	83	1136.0	377	147	87.06	11.2	1.067	2.2	1304.2
11.47	30	1164.0	369	143	86.89	11.5	1.064	2.1	1340.1
12.01	25	1088.0	332	143	86.7	10.8	1.064	1.8	1252.6
12.49	12	1193.0	341	137	86.54	8.4	1.071	1.7	1364.5
12.80	2	1024.0	321	133	86.56	8.2	1.072	1.6	1170.1

Small changes in the power curve can result in substantial differences in the AEP. This can be seen in the following comparison for the above two power curves.

WS mph	AEP	AEP
	HH ref kWh/yr May-June	HH ref kWh/yr October
<b>6</b>	118	195
<b>7</b>	316	403
<b>8</b>	587	683
<b>9</b>	928	1032
<b>10</b>	1330	1437
<b>11</b>	1770	1875
<b>12</b>	2221	2313
<b>13</b>	2655	2724
<b>14</b>	3051	3088
<b>15</b>	3394	3391
<b>16</b>	3676	3629
<b>17</b>	3896	3805
<b>18</b>	4057	3922