

A Personal Weather Station

I got myself a weather station from Rainbow Power Company for Christmas (2005). I live on solar, wind and hydro power and design renewable energy systems (solar, wind and hydro power systems) for customers as part of my job at Rainbow Power Company. I don't know of what value local weather data may be to me and recognise that long term data is of far greater value than short term data, but you have to start at some time. In any case I thought that collecting weather data would be an interesting exercise even if it never proved to be of great value. Only time will tell. Being a relatively cheap data logging weather station I cannot vouch for its accuracy, but whenever I have the opportunity I will measure its output against the output of any other measuring devices.

The weather station has an LCD screen that one can refer to at any time and a serial (RS-232C) port to connect to a computer. My new laptop doesn't have an RS-232C port as is the case with most new computers, but a USB to RS-232 adapter works perfectly in this case. Whenever I run the HeavyWeather program it automatically downloads the latest weather data from the weather station. I can then save that data as a text file which the spreadsheet program can then automatically turn into a spreadsheet. I use the Quattro Pro spreadsheet program from Corel (it usually comes with WordPerfect as an Office suite) where it immediately offers to convert the text file into a spreadsheet file without any further input. With Microsoft Excel an import Wizard automatically comes up and then you just click [next], [next] and [finish] for it to make it into a spreadsheet file. From here you can modify the file in any way that you like and produce graphs etc.

I was not happy with the date format which is interpreted by the spreadsheet as a line of text. The date format comes out as dd.mm.yyyy (eg 18.01.2006) and the only way that the spreadsheet program can interpret this as a line of text containing numbers as it knows of no numerical format containing two dots. I prefer to see the day, the month and the year being separated out into their own columns such that you can then access and manipulate these values elsewhere in the spreadsheet if you want. This can easily be done by extracting the values out of the line of text. In Quattro Pro I type “@Value(@Left(cell location,2))” to get the day value where cell location is the letters that represent the column and the numbers that represent the row with nothing (no space or punctuation) between the column and row. The 2 refers to the 2 digits that represent the day value. Something similar “@Value(@Mid(cell location,3,2))” gives the month value. The 3 refers to the required numerical value starting 3 digits from the left and the 2 refers to taking the next two digits. For the year value I use “@Value(@Right(cell location,4))” where the 4 refers to the 4 digits that represent the year value. The time is automatically introduced as a numerical value which represents a fraction of a day but shows up within the cell in a time format. I can now apply algorithms to these numbers to give a day number from any date that you wish to which you can add the time which then comes out as a fraction of a day. Once you have this it is a relatively simple exercise to calculate days or hours etc between two events over any time span. In my case the day number starts from the day I first turned the weather station on.

Although the weather station is constantly updating its data on the screen of the weather station, you can nominate at what time intervals you wish to record the data. This is done within the HeavyWeather program. The default value is 1 hour but I chose to reduce the interval to half hour. I added a column to give me wind direction but to give me no direction at all if the wind speed equals zero as this wind direction is really meaningless. I added two extra columns, one to give me rainfall for each half hour interval and another column to give me cumulative figures for rainfall starting at midnight every night. I also changed the headings to three rows such that I could make the columns narrower and hid all the columns I didn't want to see such that all the interesting columns could fit on the screen (or printout) at any one time without making the data microscopic in size. I also locked the titles so that when you scroll down the data the titles of the columns remain visible. And then whenever I want to extend the table I copy the data from the spreadsheet created from the text file and paste it to the one I made all the changes to.

I would have liked the weather station to have incorporated a pyranometer to give me solar power in terms of watts per square metre so that I can build up solar radiation data to relate to my solar power potential, but then most people living in the suburbs would not be interested in that (I presume) and the weather station is really aimed at the mass market.

The following page is from my spreadsheet with the Dewpoint and Wind Chill columns removed.

Peter Pedals

Relative Pressure [hPa]	Indoor Temp [°C]	Indoor Humidity [%]	Outdoor Temp [°C]	Outdoor Humidity [%]	Wind Speed [m/s]	Wind Direction	Rain (mm)	Rain Daily (mm)	Time	Day	Month	Year	Day Number
965.5	23.4	79	21.3	93	0.5	NE	0.0	0.0	0.3	6	1	2006	15.021
964.8	23.5	80	21.3	93	2.0	NE	0.6	0.6	1.0	6	1	2006	15.042
964.4	23.2	82	21.1	94	3.7	NE	0.0	0.6	1.3	6	1	2006	15.063
964.4	23.2	80	21.2	94	0.0		0.5	1.1	2.0	6	1	2006	15.083
964.6	23.1	80	21.2	93	0.3	SSW	0.5	1.6	2.3	6	1	2006	15.104
964.3	23.2	79	21.3	93	0.0		6.2	7.8	3.0	6	1	2006	15.125
963.7	23.2	79	21.0	93	0.0		0.5	8.3	3.3	6	1	2006	15.146
963.7	23.1	79	21.1	93	0.0		0.0	8.3	4.0	6	1	2006	15.167
964.2	23.1	78	21.2	93	0.0		0.0	8.3	4.3	6	1	2006	15.188
964.3	23.1	78	21.3	93	0.0		0.0	8.3	5.0	6	1	2006	15.208
964.4	23.0	79	21.1	93	0.0		0.0	8.3	5.3	6	1	2006	15.229
964.6	22.8	80	20.9	93	0.0		0.0	8.3	6.0	6	1	2006	15.250
964.9	22.8	79	21.0	93	0.0		0.0	8.3	6.3	6	1	2006	15.271
964.8	22.7	81	20.9	94	0.0		0.0	8.3	7.0	6	1	2006	15.292
964.7	23.2	80	21.2	94	0.0		0.0	8.3	7.3	6	1	2006	15.313
964.9	23.5	80	21.2	94	0.0		0.0	8.3	8.0	6	1	2006	15.333
965.2	23.7	79	21.3	94	0.0		0.6	8.9	8.3	6	1	2006	15.354
965.2	23.9	79	21.6	94	0.8	NE	0.0	8.9	9.0	6	1	2006	15.375
964.9	24.1	80	21.9	95	0.0		0.0	8.9	9.3	6	1	2006	15.396
964.8	24.6	81	22.9	95	0.0		0.0	8.9	10.0	6	1	2006	15.417
964.5	24.6	82	23.3	95	0.0		0.0	8.9	10.3	6	1	2006	15.438
964.3	24.9	82	23.8	93	0.0		0.0	8.9	11.0	6	1	2006	15.458
963.8	25.3	82	24.8	93	0.0		0.0	8.9	11.3	6	1	2006	15.479
963.6	25.9	81	25.4	87	0.0		0.0	8.9	12.0	6	1	2006	15.500
963.6	26.1	81	25.4	87	0.0		0.0	8.9	12.3	6	1	2006	15.521
963.1	26.3	80	25.4	87	0.0		0.0	8.9	13.0	6	1	2006	15.542
963.1	26.7	80	25.9	86	0.0		0.0	8.9	13.3	6	1	2006	15.563
962.9	27.0	80	25.9	85	0.0		0.0	8.9	14.0	6	1	2006	15.583
962.7	27.4	79	26.4	84	0.0		0.0	8.9	14.3	6	1	2006	15.604
962.6	27.9	78	26.9	81	0.0		0.0	8.9	15.0	6	1	2006	15.625
962.1	28.4	76	27.6	78	0.0		0.0	8.9	15.3	6	1	2006	15.646
961.8	28.6	74	27.4	80	0.6	WSW	0.0	8.9	16.0	6	1	2006	15.667
961.5	28.6	74	27.4	81	0.0		0.0	8.9	16.3	6	1	2006	15.688
961.2	28.6	74	27.4	81	1.1	WSW	0.0	8.9	17.0	6	1	2006	15.708
961.0	28.1	74	26.2	81	1.5	NE	0.0	8.9	17.3	6	1	2006	15.729
960.8	27.5	75	25.3	84	1.2	NE	0.0	8.9	18.0	6	1	2006	15.750
961.1	27.1	76	24.9	86	4.0	NE	0.0	8.9	18.3	6	1	2006	15.771
961.0	26.6	77	24.6	86	3.0	NE	0.0	8.9	19.0	6	1	2006	15.792
961.2	26.7	76	24.4	86	0.0		0.0	8.9	19.3	6	1	2006	15.813
962.7	26.4	73	22.6	87	1.0	NE	16.5	25.4	20.0	6	1	2006	15.833
964.1	26.0	73	21.7	90	0.0		1.1	26.5	20.3	6	1	2006	15.854
963.8	25.2	73	20.9	92	3.8	NE	2.0	28.5	21.0	6	1	2006	15.875
963.2	23.9	77	20.4	93	3.7	NE	0.6	29.1	21.3	6	1	2006	15.896
963.8	23.4	78	20.3	94	3.0	NE	0.5	29.6	22.0	6	1	2006	15.917
962.9	23.0	80	20.2	94	0.8	NE	0.5	30.1	22.3	6	1	2006	15.938
963.1	23.0	80	20.2	94	1.6	NE	0.5	30.6	23.0	6	1	2006	15.958
963.0	23.6	78	20.5	95	0.0		0.5	31.1	23.3	6	1	2006	15.979
963.0	24.0	77	20.3	94	0.5	SW	0.5	31.6	24.0	7	1	2006	16.000
962.0	23.8	76	20.5	94	1.4	SSW	0.0	0.0	0.3	7	1	2006	16.021
962.6	23.5	77	20.4	93	0.8	SW	0.0	0.0	1.0	7	1	2006	16.042
962.4	23.1	77	20.5	93	0.0		0.0	0.0	1.3	7	1	2006	16.063
962.1	22.9	78	20.5	93	0.0		0.0	0.0	2.0	7	1	2006	16.083
962.1	22.8	79	20.5	93	0.6	SSW	0.0	0.0	2.3	7	1	2006	16.104
962.2	22.7	79	20.5	93	1.1	SW	0.0	0.0	3.0	7	1	2006	16.125
962.0	22.6	79	20.5	94	0.8	SW	0.6	0.6	3.3	7	1	2006	16.146
962.4	22.5	79	20.5	94	0.4	SW	0.0	0.6	4.0	7	1	2006	16.167
962.3	22.4	79	20.4	94	0.9	SW	0.5	1.1	4.3	7	1	2006	16.188
962.3	22.4	80	20.4	94	0.0		0.0	1.1	5.0	7	1	2006	16.208
962.7	22.4	80	20.5	94	0.9	WSW	0.0	1.1	5.3	7	1	2006	16.229
963.0	22.3	80	20.5	94	0.0		0.0	1.1	6.0	7	1	2006	16.250
963.6	22.4	81	20.6	94	0.0		0.0	1.1	6.3	7	1	2006	16.271
963.6	23.0	80	20.6	94	0.0		0.0	1.1	7.0	7	1	2006	16.292
963.7	23.2	79	20.8	94	0.9	SW	0.5	1.6	7.3	7	1	2006	16.313
964.1	23.5	79	20.9	94	1.2	SW	0.0	1.6	8.0	7	1	2006	16.333
964.1	23.4	79	21.0	94	0.8	WSW	0.0	1.6	8.3	7	1	2006	16.354
964.2	23.1	80	20.9	94	0.8	SW	4.1	5.7	9.0	7	1	2006	16.375
964.3	23.0	81	21.1	94	0.6	WSW	0.0	5.7	9.3	7	1	2006	16.396
964.4	23.2	81	21.6	93	0.0		0.0	5.7	10.0	7	1	2006	16.417
964.3	23.4	81	22.1	93	1.0	WSW	0.0	5.7	10.3	7	1	2006	16.438
964.8	23.9	81	22.4	89	0.0		0.0	5.7	11.0	7	1	2006	16.458
964.6	24.2	81	22.6	88	4.1	SSW	0.6	6.3	11.3	7	1	2006	16.479
964.2	24.6	81	23.3	89	0.0		0.5	6.8	12.0	7	1	2006	16.500