Date: 15-Mar-06	**Type**: Monthly Report 8270 Appendix	**Author**: Ib I. Olsen
Subject: DCEC Residential Installation – February 2006		

Installation Summary:

This month the fuel cell ran uninterrupted for the whole period powering either the battery storage unit or in parallel with the utility. In the middle of the month, the hot tub was removed from the circuit in an effort to remedy the light flicker issue, and the battery storage system was brought online again. At the same time the satellite dish was realigned to reestablish the communication.

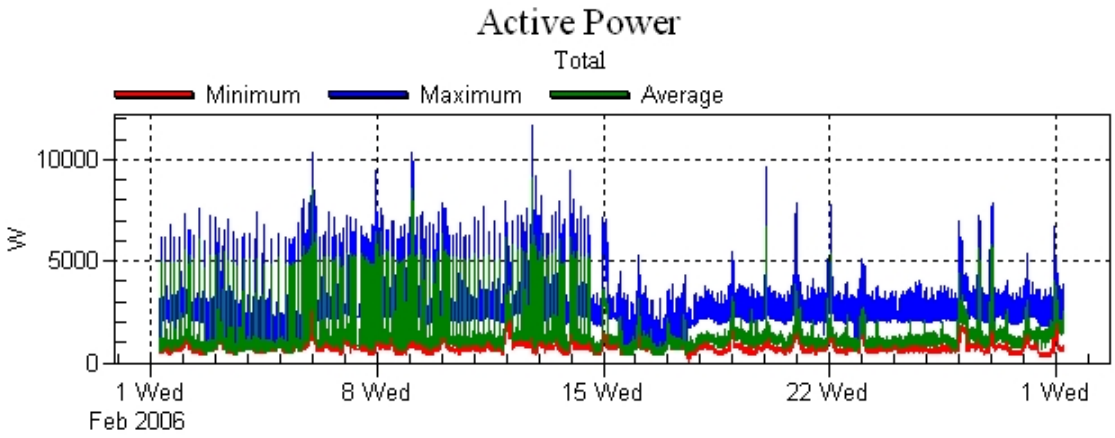

Figure 1: Total system load. The hot tub was removed from the system February 14th.

After operating for almost a day the resident decided to bypass the battery storage system again as he continued to perceive flickers in his lightings, which he associated with the system. We have scheduled a troubleshooting trip to see if we can understand the problem and reinstall the battery storage before the end of March.

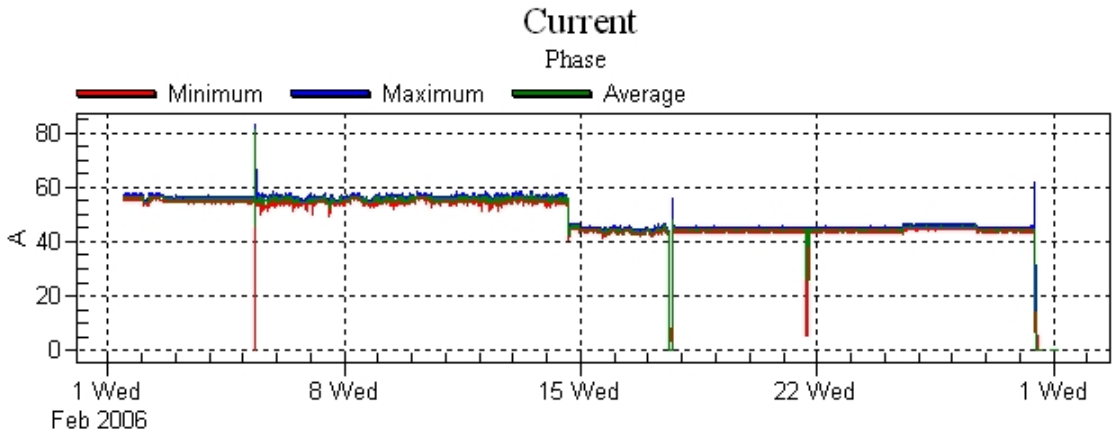

Figure 2: Fuel cell output. February 14th the battery storage was brought online, and it reduced the fuel cell set point in order to match the house load / battery charging needs.

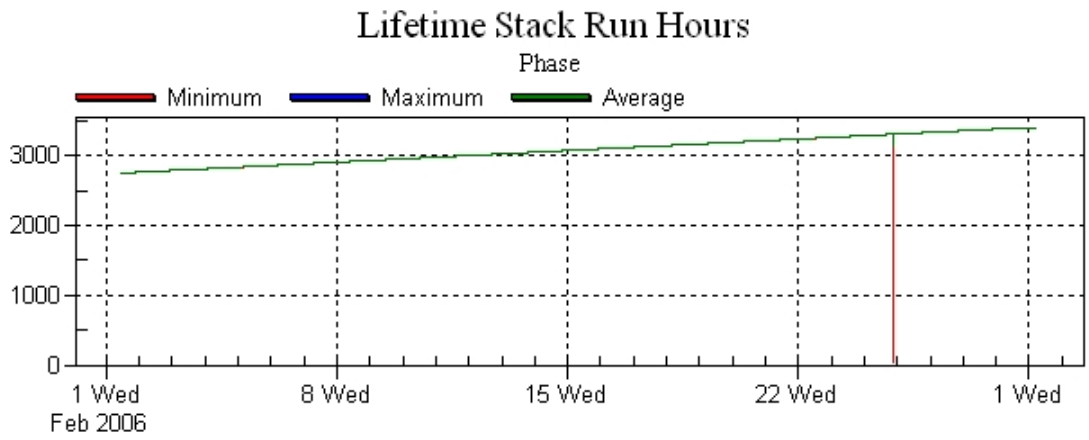

Figure 3: Accumulated run time of fuel cell stack

The fuel cell stack has now operated for more than 3000 hours most of the time at 30 to 60% capacity.

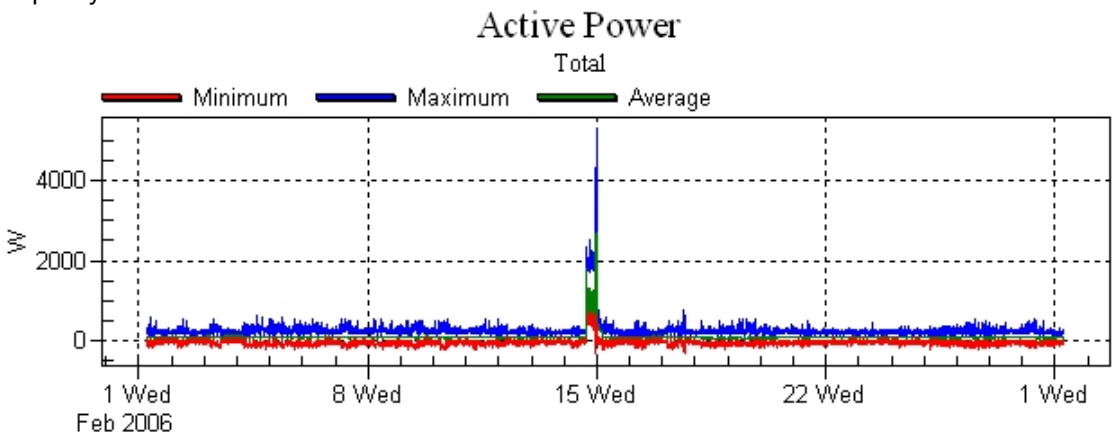

Figure 4: Battery storage power output for the month

Figure 4 shows that the battery storage delivered up to 5 kW during its operation February 14th. A further analysis of the system during the time the battery storage was online, shows that it performed as expected. In comparing the charts, it should be noted that some are reported in EST and some in GMT. In the future we may have to redraw the charts using the same time zone in order to make the comparison easier. Alternative, Enernex will have to reformat the timestamp on the server side.

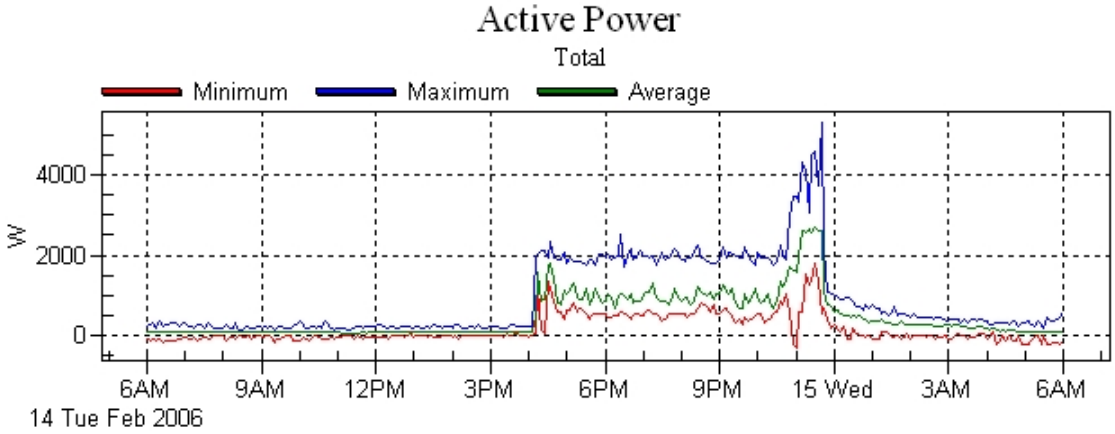

Figure 5: Battery storage power output for February 14th. Times are in GMT.

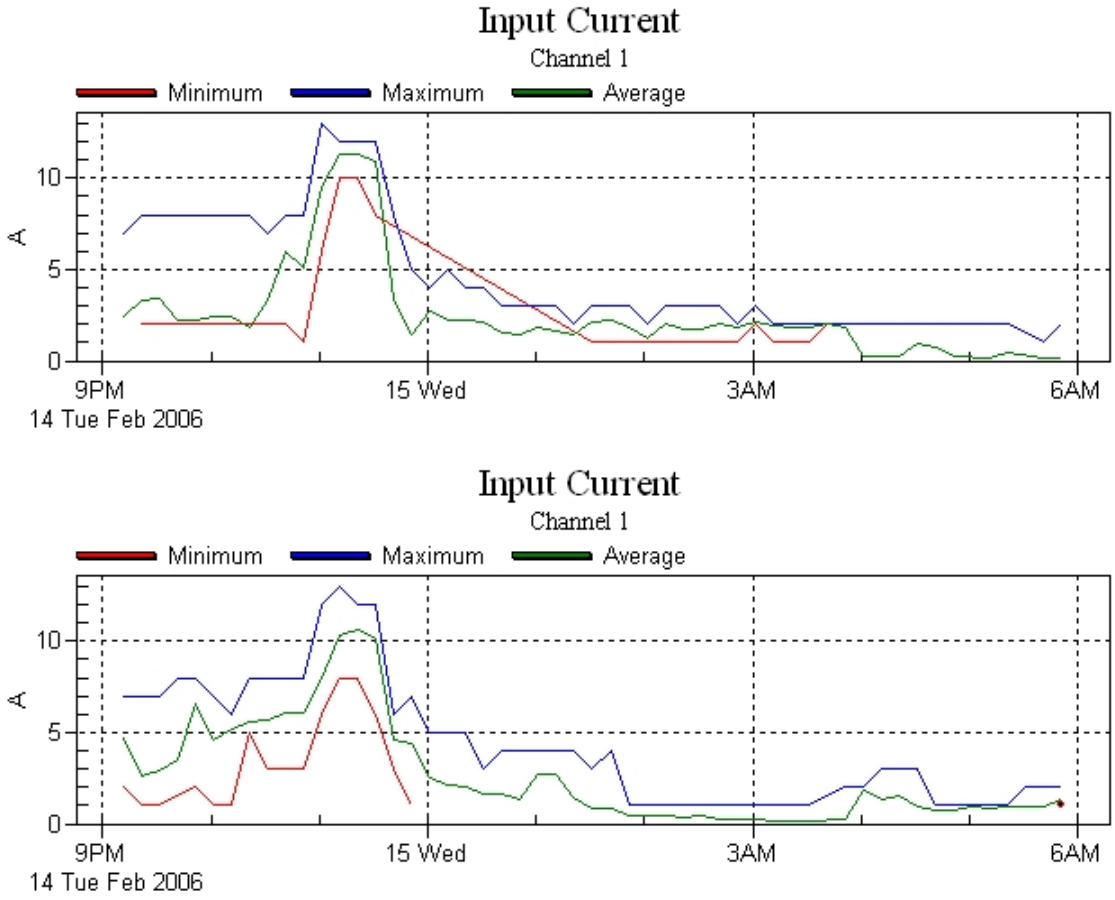

Figure 6: Inverter 1 (top) and 2 (bottom) - Input current. Time is given in GMT, which is 5 hours ahead of EST.

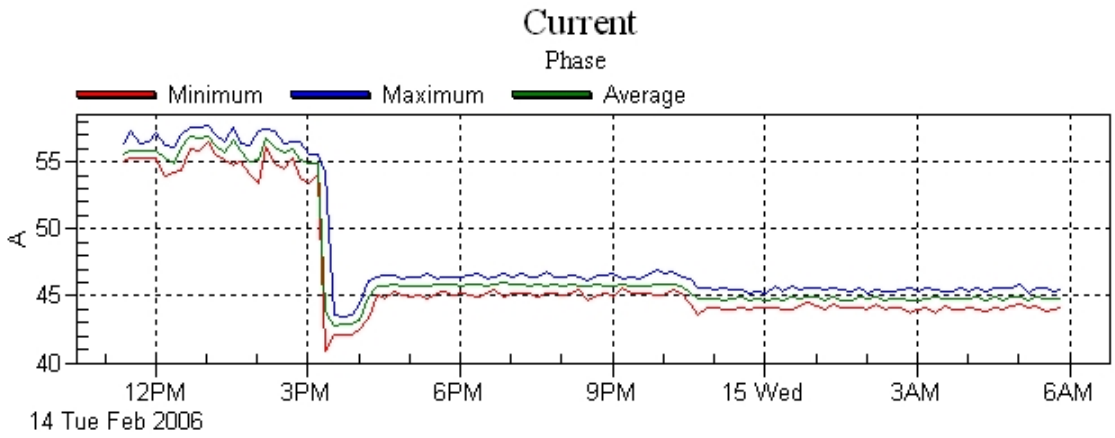

Figure 7: Fuel cell output. Time is given in EST.

For unknown reasons no input data for the battery storage are available prior to 9PM GMT, but it can be seen how the storage system reduced the fuel cell set point and subsequent increased it a little to compensate for increased usage.

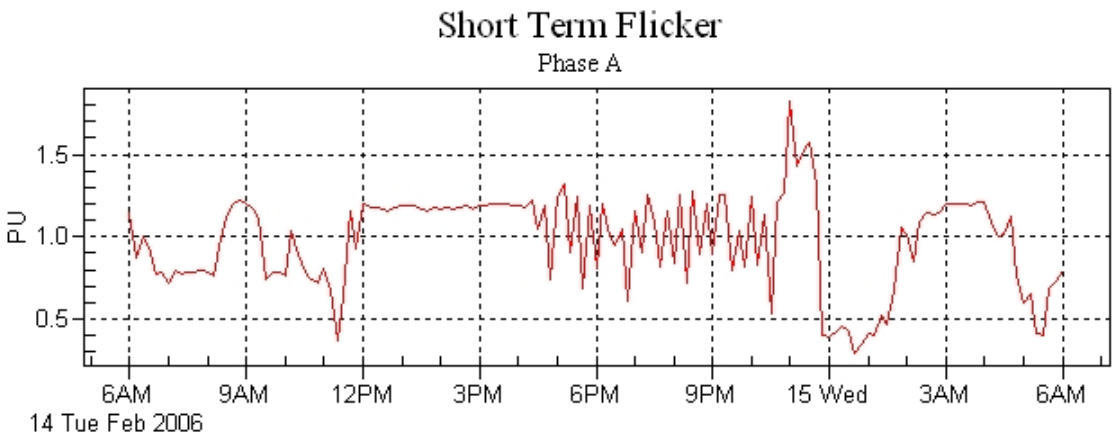

Figure 8: Short term flicker. Values below 1 are considered good. When the battery storage was online the flicker became more erratic. Times are in GMT.

The short term flicker reported in Figure 8 indicates that using the fuel cell in series with the energy storage unit introduced considerable short term flicker variation. Based on IEEE standards P_{st} should be below 1.0 95% of the time, and it is clear that this is not the case for this site. Even with the energy storage unit bypassed the site experience considerable flicker, but with less variation.

During our next visit to the site we will perform a thorough walk through to establish, if possible, the cause of this flicker