Service Event Report # 160326

MSSAFE [redacted]

Better by design

Monday, March 28, 2016

Attention [redacted]

RE - No power generation fault - Lumenaus Ultra-400 VAWT Wind Turbine.

During our initial investigation into the wind turbine fault, we found that the Ecofront energy monitor was also defective and prevented us from connecting and monitoring power production.

An investigation into the energy monitor revealed that the wireless router and mobile internet device had failed due to water ingression and corrosion.

We consulted with [redacted] and arranged to meet on site for them to correct this secondary fault, during which time we inspected the wind turbine and related modules and include our findings and photos below.

Measurements noted during testing

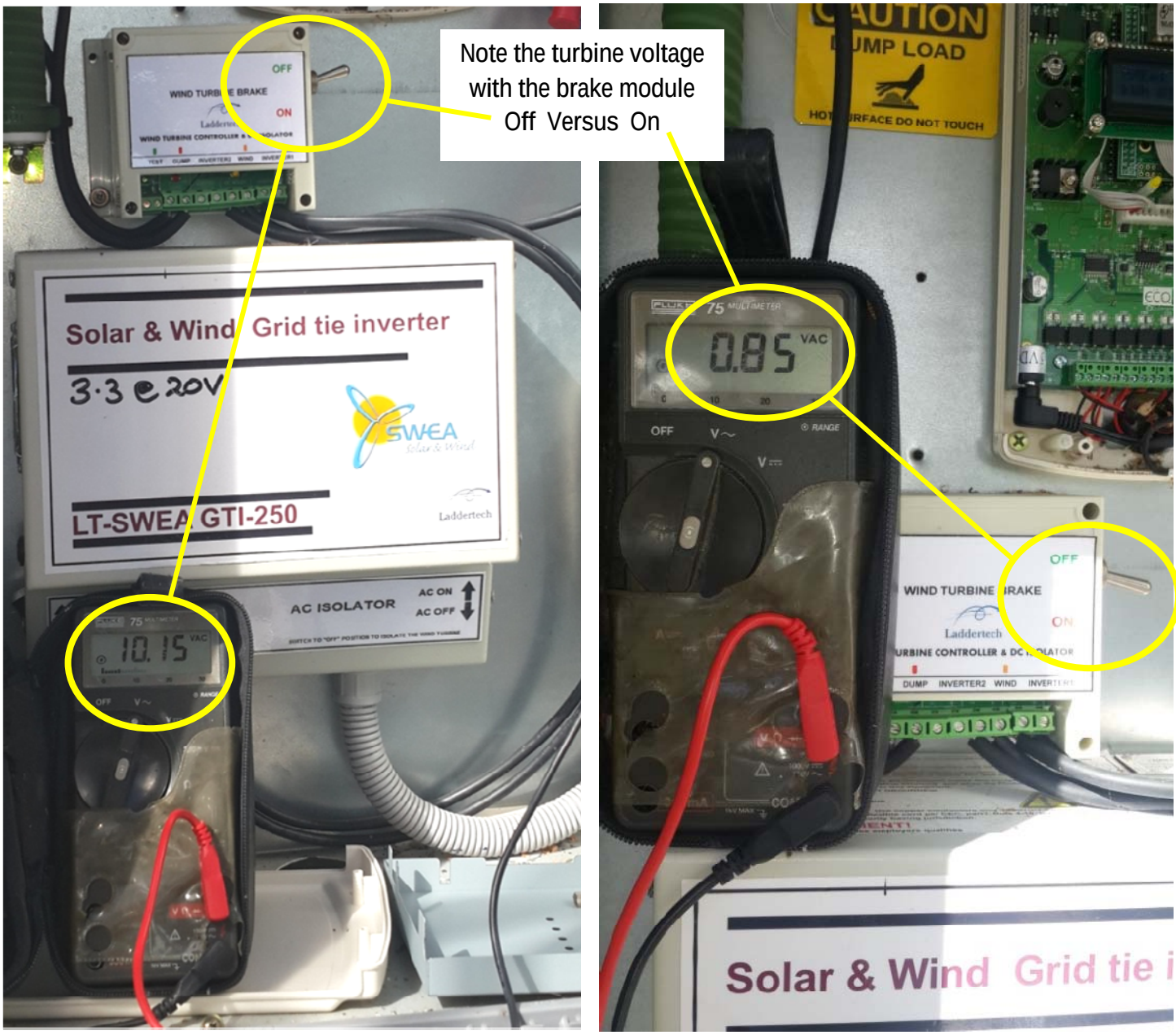
Voltage measured (Unloaded)

Rectifier Input	10 – 17Vac
Rectifier Output	9 – 15Vdc
Wind Speed	9Km/h (2.5m/s)
gusting to	22Km/h (6.1m/s).
Turbine speed	25.3 – 363rpm

At the commencement of testing, the Wind Turbine Brake and Inverter were switched off, allowing the Turbine to freely rotate without load. The measured speed was 218rpm 10Vac @ 0Amp.

Once the Turbine brake module was switched on, the Turbine slowed to 22 – 25rpm and voltage dropped to 0.85Vac. Further testing of the brake module revealed the unit was defective, with all energy being dumped into the brake load and stalling the Turbine.

(Under normal operation energy is only dumped as the rpm approach the max safe limits (1500rpm), effectively applying a braking system and keeping speeds at safe levels.)



So as to prove and test the power output from the Turbine and that the monitoring equipment was able to register power production, the dump load was disconnected from the system and the inverter was switched on.

We next logged into the now repaired Ecofront power monitor and the system began to work, indicating 21watts of power being fed into the grid at 227rpm and wind speed readings of 19 Km/h (5.27m/s).

Final Conclusions

Power production was found to be extremely low for a turbine of this type and size and so suspicions were cast on the condition of the Turbine itself. Due to the overall costs, the inability to source spare parts and the poor system reliability experienced thus far, it was determined to be more cost effective to decommission and remove the system.

Special note

Based on actual power measurements (21W), if the wind speed was to remain constant (19Km/h), and at $0.08/Kw feed in tariff, it would take a staggering 543.6 Years to recover the purchase and install costs for this system. Even assuming that the Turbine is faulty and is able to produce ten times that measured, cost recovery is still 54.36 Years.

Please feel free to contact us for further clarification.

Kind regards

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