

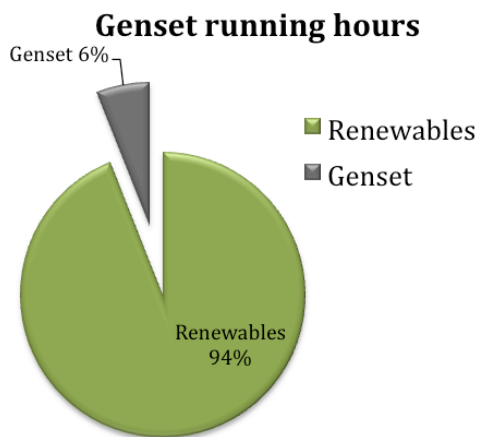
E-site® Case Study

This E-site® case study is based on information from a Flexenclosure Renewable Energy site solution in Africa.

A vast amount of data and performance statistics has been derived from the real-time intelligent control and management system, Diriflex® which is part of the E-site®. Presented below are the main conclusions from a six month measuring period on a trial site with an average total power requirement of 1.4 kW.

95% Diesel Reduction

As shown below, the diesel generator has run only 250 hours in six months, which is 6% of the total operating hours. Assuming that the average wind will remain at the same level for the next six months, the total diesel consumption will be less than 800 liters per year. Compared to a diesel driven site consuming 2 liters/hour, this would mean a yearly diesel saving of about 16 700 liters, adding up to a 95% diesel reduction.



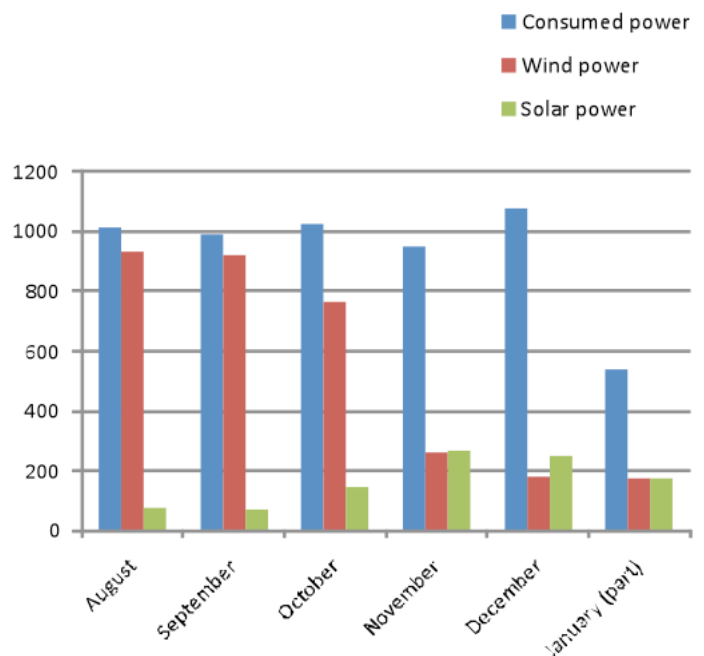
One yearly visit resulting in substantial OPEX reduction

Diriflex® allows for remote site operation, thus considerably reducing the need for site visits. Together with the limited diesel genset runhours, 250 hours during the 4 100 hour measuring period, this means that the need for fuelling and

maintenance visits to site is reduced to once annually(!). With off-grid sites, like the one in this case study, being very difficult and time-consuming to reach, reducing the number of site visits has reduced OPEX substantially.

The importance of integrated energy sources

The importance of combining different renewable energy sources and a diesel generator back-up can easily be seen in the statistics gathered by Diriflex®. The data below clearly shows how wind and sun complement each other during the measuring period.



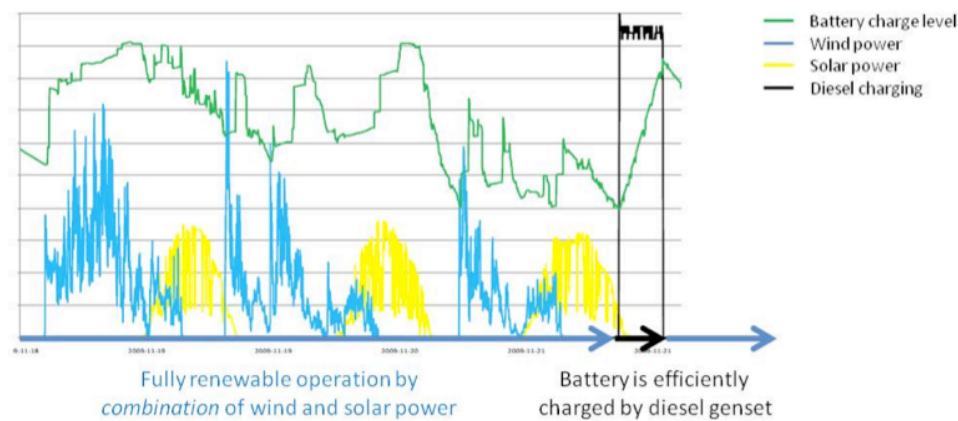
The average wind speed during the whole period was 5.3 m/s at the wind turbine. This corresponds to average wind speed of 3.8 m/s at 10 metres. These figures are derived from wind speed measurements on site with adjustments for the actual

height of the wind turbine, which in this case is 60 metres. Note that the 5,5kW wind turbine is placed on top of the telecom tower, which is a unique feature of the E-site[®] compared to other renewable site solutions.

The chart above shows that in the first three months wind conditions were very good with an average wind speed of 7.4 m/s at the wind turbine. This corresponds to 5.3 m/s at 10 metres. During this period wind power catered for 86% of the total consumption. Solar power complemented with 11% of the site's energy need. An important fact is that the Diriflex[®] never started the diesel generator during the first two months.

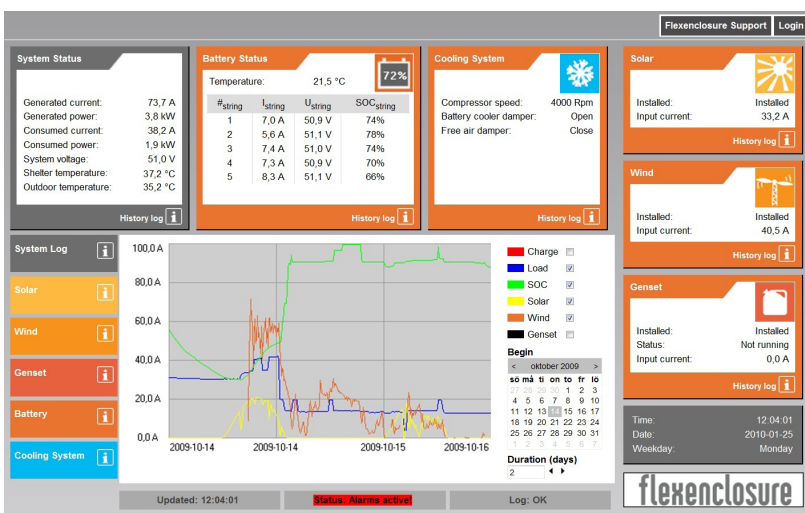
In the seasonal low wind period, November to January, the average wind speed at the wind turbine was 3.3 m/s, which corresponds to 2.3 m/s at 10 metres. Even with this low wind speed the wind power contributed with 24% of the total power consumption and solar power complemented with 27%.

The figure below shows Diriflex[®] data from a period of a few days in the low wind period. Initially, wind and solar power together ensured several days of fully renewable operation and at the end of the period Diriflex[®] ran the diesel generator with maximum efficiency to re-charge the battery. This was followed by another period using only renewable energy.



Conclusions

During the measured six months the site has performed with excellent results. The diesel generator did not start at all in the first two months and compared to a traditional diesel driven site, diesel consumption has been reduced by staggering 95%. Based on an integrated renewable site solution where our technology know-how allows for the wind turbine to be placed at the top of the tower or mast, the Diriflex control system has demonstrated its efficiency and superiority in reducing site OPEX. Furthermore, by reducing the maintenance and fuel visits to once per year, not only OPEX savings from the diesel reduction, but also the savings from avoiding to visit sites in far away rural areas site will be considerable.



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