Energy Management in Offgrid Systems

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Offgrid systems are often relatively complex to implement. There are specialists who size and install them, then those are given to their users who often do not have specific knowledge about the operation of such systems. These energy systems are nevertheless of great importance for end-users who are relatively powerless in front of technical aspects.

One observation made is that a structured monitoring is often sorely lacking. Although information is available through complex measurement systems, the analysis of these data is missing to pull meaning out of it. The next step is also often missing: take corrective action on the base of the measured data. The initiators of these projects install high-tech devices, online databases and many other technological gadgets, but the systematic analysis of the information collected is lacking. Worse, the mass of recorded data, sometimes GB of data, requires complicated tools beyond the reach of the non-specialists. Simplification is needed to make energy monitoring accessible to real users of offgrid systems.

A proper energy management can provide significant assistance in this context. This paper presents the methodology to use those data and practical examples in mountain huts in Switzerland. The methodology is strongly inspired by ISO50001 as used by ESCOs. This was adapted to the offgrid world and applied in various projects. Improvement on energy consumption was up to 30%. This experience with energy management have strongly modified our view with after sales services of offgrid system and now influences the development of new monitoring tools provided by Studer-Innotec.

The first step of the methodology is to set the will and the capacity to follow energy in the long term. The second step is to make a clear review of the energy use with the help of measurements. For this, it is important to present the different situations clearly: summer/winter, occupied/not occupied. The first energy review gives the reference situation and every year, a comparison to this is done. Then a continuous improvement circle is set up: fix improvement target, take actions, measure the results with the monitoring system, review improvements and set new goals.

The improvement in energy systems can be energetical, in term of saved kWh, but also financial with an OPEX optimization, or organisational: to diminish the worries of owner about the troubles with energy systems.

At the age of big data, we have today the tools to monitor installations. There are Gigabytes of sleeping datas in hard drives and SD cards and we have to learn to exploit it. The manufacturer of devices (inverter, solar chargers,…) have to provide the data but also to help to understand it. In that domain there is large space for innovation, mixing management tools, data analysis and UX.