TECHNICAL ASSISTANCE REQUEST

SIGUE is a PV off-grid energy management system that base its innovation into two main facts:

1. Energy excess is calculated as a result of radiation-temperature measurements.
2. Communication of SIGUE between the different parts of the PV installation should be possible in a different number of possibilities, including Modbus, dry contacts and http requests.

Our prototype, working on a Fronius-Victron microgrid, has been already working for months showing an excellent robustness. But, in order to convert it into a commercial product, some changes and improvements should be made.
Our actual prototype counts with the next parts (Figure 1):

1. Industruino PLC Arduino based.
2. Reference Cell.
3. Thermocouple for modules temperature measurement.
4. Consumption meter.

Our Industruino reads the necessary data from:

1. Fronius Inverter. Communication protocol Modbus RTU. Data: Instant power production and micro-grid frequency.
2. Reference Cell. Communication: Analog Read, with amplifier (mV – 0-20 mA). Data: Instant solar radiation.
3. Thermocouple. Communication: Analog Read, with amplifier (mV – 0-5 V). Data: Instant modules temperature.
4. Consumption meter. Communication protocol: Modbus RTU. Data: Instant power consumed by the final installation.

Our Industruino reads from and writes data into:

1. Blynk application. Mobile app to monitor and control the loads.
2. Alexa skill. By now, private skill.

Our Industruino communicate with loads in different ways:

1. Using digital signals (0-24VDC, 0-10VDC, 0-5VDC).
2. Using NO/NC contacts.
3. Using modbus RTU communication protocol. This method is now being tested.
4. Using http protocol.

Our needs from third parties are:

1. Design of our own hardware, finding affordable solar radiation meters that allow radiation and temperature measurements using Modbus RTU protocol in order to speed up the data read.
2. Improve the solar radiation to available power conversion, with an autotuning method.
3. Find third parties manufactures (typically AC manufacturers) that allow us to switch on and off their equipment via http requests. Find third parties manufactures (typically AC manufacturers), that allow us to switch on and off their equipment via http requests.
4. Find third party manufacturers (typically AC manufacturers) that allow us to control, within certain limits, the power at which their equipment work (control the power of a AC not by the temperature demand but the excess of energy if desired).
5. Build of our own mobile app and http server to control and monitor the system. This app should have a user's management method.
6. Testing our prototype with different loads (electric motors, resistances, etc.) to check our assumptions for different types of loads: reactive, resistive and inductive.
7. Helping in the future development for using our system in grid-tied, zero-feed installations.
8. Implementing weather forecast to advise about the use of energy to our users. Ideally, implementing automatic methods to storage energy in different ways depending on the weather forecast.

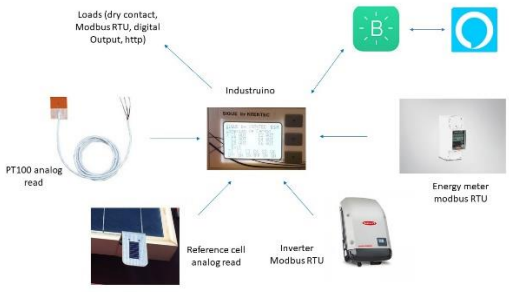

Figure 1. SIGUE components and communication flows