

American-Made Solar Prize TECHNICAL ASSISTANCE REQUEST



infiniRel's Inverter Health Scan

infiniRel would benefit from assistance of National Laboratories and software programmers versed in the art of Big Data analytics and Machine Learning for specific data automation and validation efforts:

- a. collaboration on test and data management plan for inverter testing, including minimum sample sizes for training and challenge tests,
- b. identification and instrumentation of PV solar plants that are suitable to assess certain models of utility scale inverters with different ages and IGBT engine configurations. This requires the manufacture of infinirel's proprietary field-instrumentation equipment, as well as the development of automation scripts for data normalization, scaling and signal processing algorithms,
- c. engage scientist to collaborate on data interpretation and reliability forecasting when using the proprietary data stream provided by infinirel's inverter health scan technology. May requires application of Matlab and Python (or equivalent) scripts for automating data analysis,
- d. cost modeling assistance may be helpful as a basis to adopt a re-powering benefit analysis under various predictive scenarios.

Objective: A validated and quantified risk forecasting model

Key Results: Classify 100 inverters with different age into 3 risk classes

These risk classes are derived from a scorecard model to be further refined and quantified, which is based on predictive analytics to be performed on analog signals acquired by infiniRel’s proprietary and patented system and method for measuring the integrity of a power converter. They may be limited initially to three classes that have three different responses:

- a. **Low risk.** Follow-up with another Energy Kardio Graph within the next scheduled maintenance interval,
 - b. **Medium risk:** continuously monitor the inverter with a stationary installation, so that corrective action can be applied to avoid an imminent failure,
 - c. **High risk:** immediate throttling of the suspect inverter and re-balancing of the plant. Immediate scheduling for spare parts acquisition and maintenance.
- Similar to a flight data recorder, the continuous monitoring process with embedded, stationary instrumentation is highly valuable as it captures new symptoms that lead to a catastrophic inverter failure. A stretch goal would extend the development of control software to interface with the inverter through control center operations.

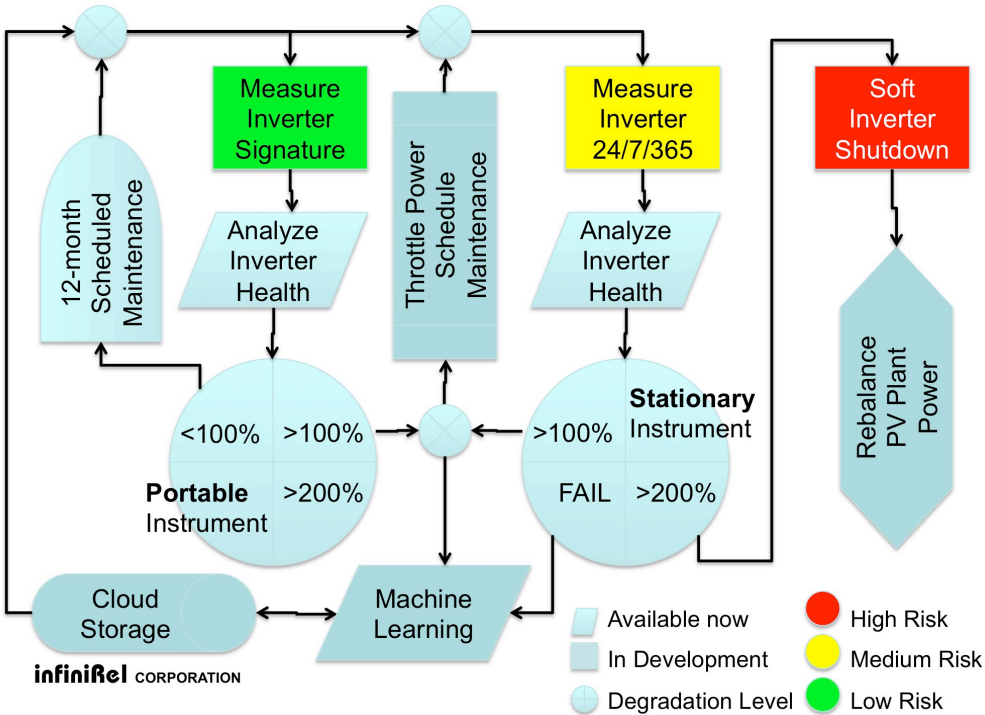


Fig 1: Flow Chart for Inverter Health Scan Process and Development Status