American-Made Solar Prize
TECHNICAL ASSISTANCE REQUEST

U.S. DEPARTMENT OF ENERGY

infiniRel's Inverter Health Scan

infiniRel would benefit from assistance of National Laboratories and actuarial scientists, who are versed in the art of Big Data analytics and Machine Learning for the elimination of false positives, false negatives and accelerated life testing:

a. Manufacturing support
    a. Rogowski coil
       Objective: cost reduction
    b. Power management board
       Objective: simplification for improving ease-of-use
b. IT support
    a. design of a global scalable database, queries, scripts, and
    b. interface to embedded local databases contained in our field instruments,
       Objective: data collection and formatting for Machine Learning
c. Analysis support
    a. engage actuarial and/or data scientist to collaborate on a reliability model
       Objective: quantify health score, credibility/confidence level
    b. cost modeling assistance for re-powering strategy under various scenarios based on a combination of field data and assumptions.
       Objective: automate benefit analysis with independent validation

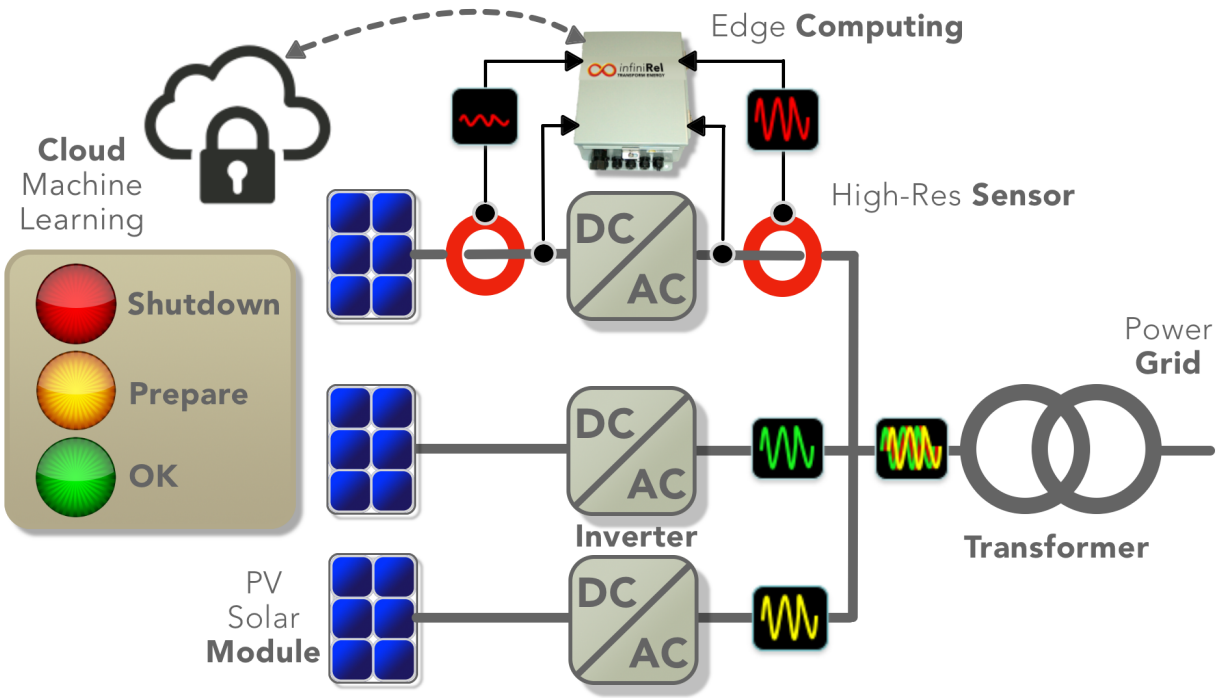

Fig. 1 Technical system diagram

The challenges to be overcome:

a. Training data must include data for good (healthy) examples and data for bad (high risk) examples that prove to fail in short order. This requires to perform destructive testing on units, which may have internal controls implemented to shutdown before failure, or may take longer than the allotted test period to fail.

b. The test design must be on field equipment and real world environment, not emulators, so that the health scanner captures the device under test, not the health of the emulators or equipment.

c. In order to derive a statistically relevant sample base for forecasting, a minimum number of failures must be produced. See comparable forecasting of O-ring failures at low temperatures for the retrospective outcome of the space shuttle Challenger disaster of 1986.

d. The complexity of failure methods and large set of environmental parameters requires the development of a neural network and large data sets for training and identification and reduction of parameters to those most relevant to the failure.