Your challenges

**SERVICE COST**
- PV arrays are usually installed in remote, hard-to-reach areas. This makes service calls time-consuming and expensive.
- Improper diagnoses can lead to unnecessary repairs and costs.
- Intermittent problems are difficult to track down. These problems may not always be uncovered during a service call.

**RELIABILITY**
- With annual cost of power quality related wastage in the US estimated at over $100B, utilities demand proof of clean power.
- Disturbances caused by frequent switching of inverters are cited by utilities as a main reason for limiting PV participation in the grid.
- These disturbances can include:
  - Harmonics
  - High frequency impulses
  - Voltage sags, swells, interruptions
  - Frequency variations

**EFFICIENCY**
- Due to the irregular nature of sunlight and other factors, PV power output can vary rapidly and needs to be monitored closely.
- Power disturbances can affect the inverter, causing it to operate in a less efficient derating mode or even disconnecting it from the grid.
- Miswiring and improper installations can compromise your power output, and are difficult to diagnose without the proper equipment.

The PQube® solution

**REMOTE ACCESS, PERMANENT AC/DC MONITORING**
- Ready for use with a cellular wireless modem, the PQube® allows for convenient access to your data through email and web.
- Quickly identify or rule out possible causes of failure. The PQube pays for itself with a single avoided service call.
- Small and affordable, the PQube® can be installed permanently near your inverter. No more waiting for a problem to reappear.

**USE YOUR PQUBE TO CAPTURE AND LOG ALL POWER QUALITY DISTURBANCES**
- Voltage and current harmonic reports, taken on demand or automatically at user-defined intervals.
- Receive automatic emails after grid disturbances—allowing you to react quickly to problems in the field.
- Reports contain detailed waveform and RMS graphs. Data is recorded at 256 samples per cycle on a digital camera SD card.
- Resolve conflicts with your utility. Use data from your PQube to prove that you are supplying utility-grade power into the grid.

**DETAILED REPORTS HELP YOU IDENTIFY POTENTIAL WEAKNESSES OR FAULTS IN YOUR SYSTEM**
- Your power profile is automatically reported on a daily, weekly and/or monthly basis.
- Parameters are recorded five times per second to keep up with fast-changing conditions.
- Monitor AC and DC with a single PQube® to track your inverter efficiency over time.
- Identify underperforming panels, installation errors, and faulty connections.

**NO SOFTWARE REQUIRED**
Figure 1. Typical installation for inverter monitoring includes a PQube®, a power supply module (PS2), a combined current ethernet module (CTE1), a DC monitoring module (ATT2) and a temperature/humidity probe (TH1).

Figure 2 (left). A significant voltage sag captured by the PQube®. Voltage sags can cause many problems for an inverter. Some inverters can go into “derating” mode or they can switch off altogether, as the graph shows. All this is visible through your PQube’s web server, with no software required. (Below). Automatic email reports, complete with graphs and attachments. Real time alerts allow you to quickly and efficiently resolve issues in the field. Every PQube® comes preconfigured with its own email account.

Figure 3. CO₂ avoided and Energy are among dozens of meters on the PQube’s color oLED monitor.
Your PQube at a glance

A low-cost, all-in-one power quality and energy monitor for solving PV challenges

- Single- and 3-phase lab-grade monitoring of power quality and energy
- Directly connect up to 690VAC (and 1200VDC with ATT2 option)
- Power and energy, W, VA, VAR, PF, Wh, VAh, VARh
- HF impulse detection, as fast as 1 microsecond
- Harmonics, sags, swells, frequency
- Energy and CO₂ calculations
- Two temperature-humidity channels
- Tiny—perfect for embedding inside the inverter box
- Internal UPS
- Remote communication—network via Modbus, FTP, email, web server
- NO SOFTWARE REQUIRED!

Figure 4. The PQube® Modbus Interface—remotely accessible, real-time window into all of the PQube’s meters.

Our company: www.powerstandards.com
The PQube page: www.pqube.com
Our authorized distributors: www.pqube.com/distributors

Test-drive a PQube® at map.PQube.com.