IECRE PV System Certification Survey Results

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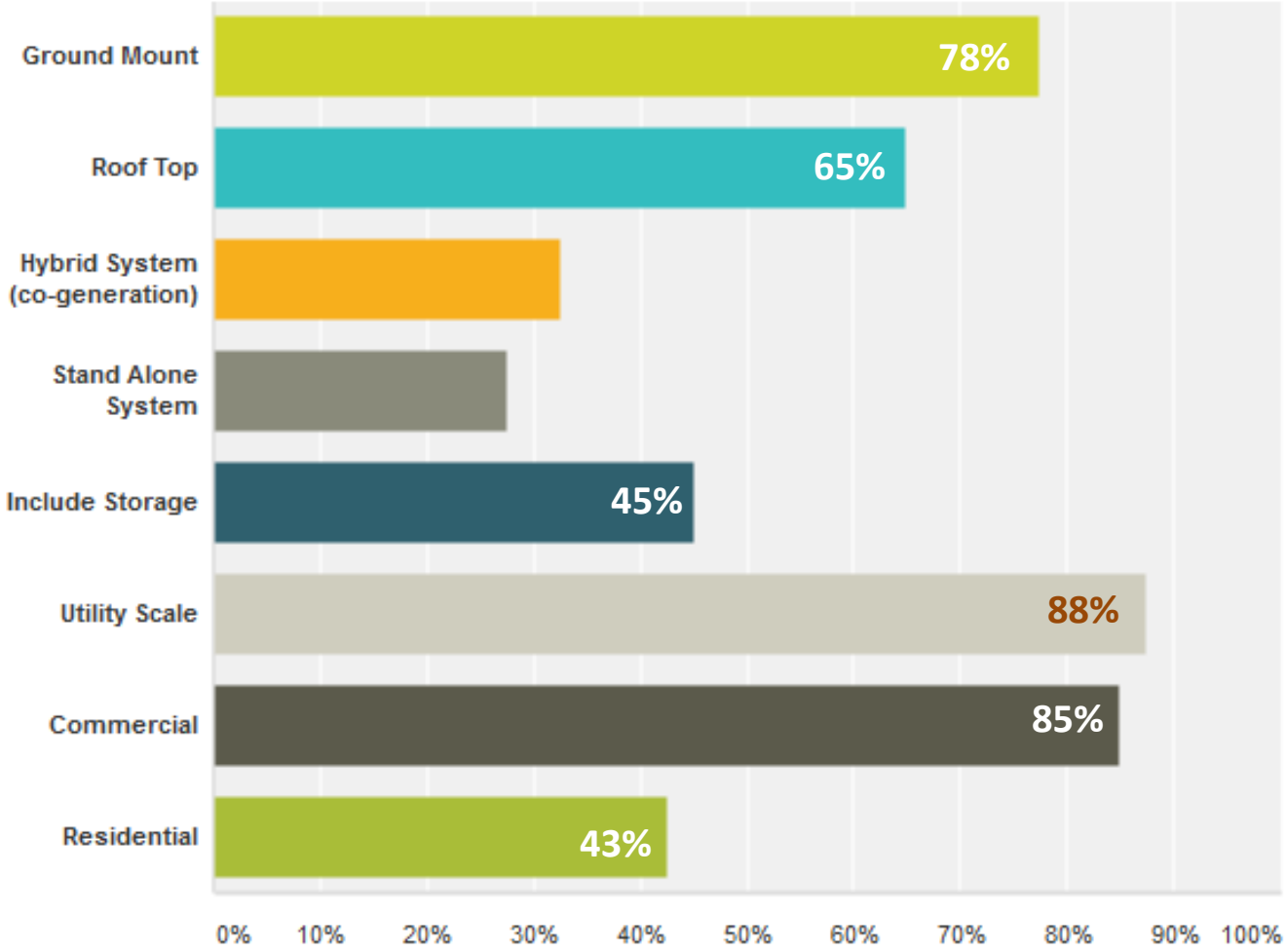
IECRE Systems Certification Workshop – Survey Results

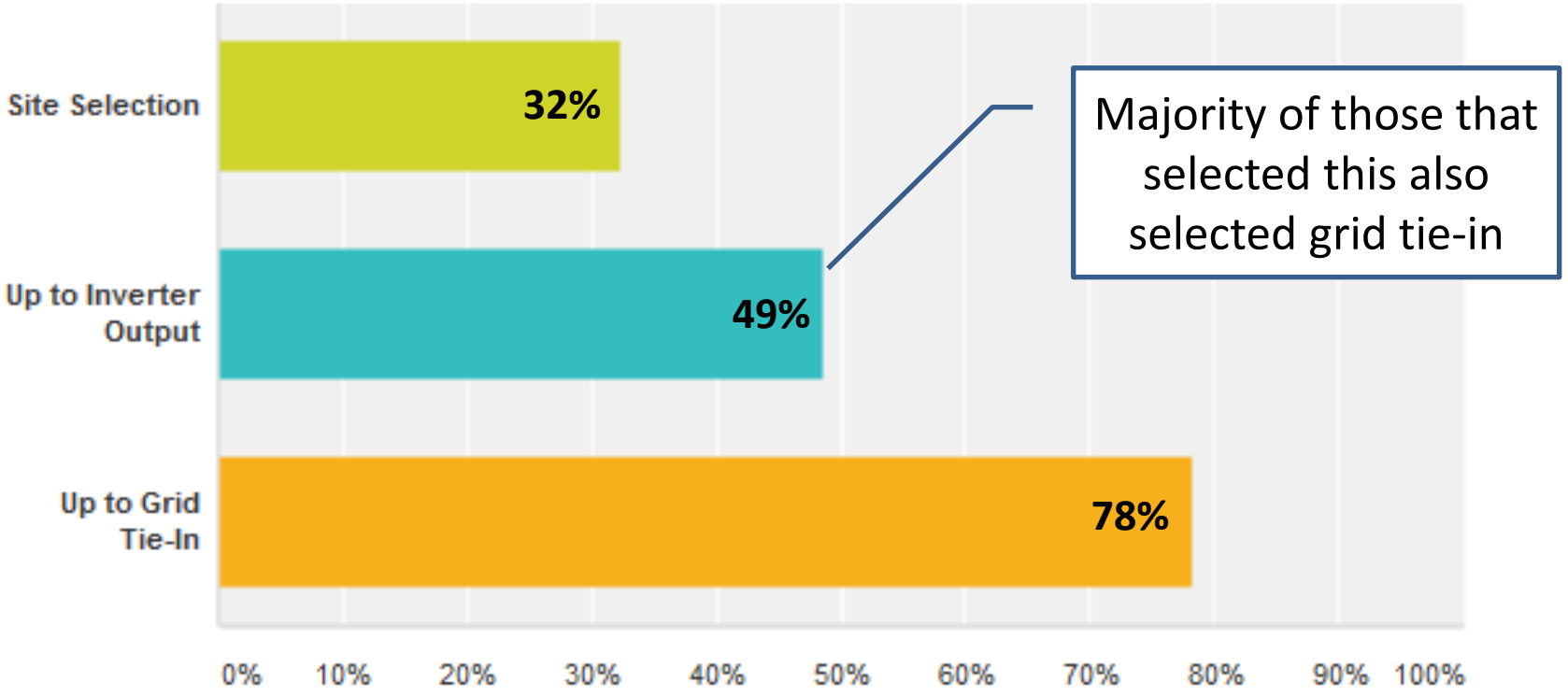
PV Power Plant Application - What types of plants would you include in a IECRE PV Plant certification standard?



PV Power Plant Application - What types of plants would you include in a IECRE PV Plant certification standard?

- Ground mount seems to be a given – whether commercial or utility scale
- Commercial and rooftop score high – are there size or project cost (financing) thresholds?
- How do we structure the scope (and cost) of a certification for large plants vs. small commercial or even residential systems?
  - Minimum certification cost may be too much for single residence
  - Could however apply to residential portfolio
- Need additional expertise and reference standards to address storage

PV Power Plant Installation Scope - What do you think the IECRE PV Plant certification standard should cover?



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Site Selection (Project Development)	• Site assessment – soils or other structural evaluation • Utility interconnect and access hurdles • Energy prediction – preliminary design
Component Certifications	• Module standards IEC 61730, 61215, etc. • Inverter standards 62109, **62093**.. • **Miscellaneous BOS safety standards**
Project Execution	• Design – IEC 62548, **62738** • Performance and Monitoring - 61724 series • Commissioning and **maintenance** – 62446 series
Additional to include Interconnection	• Basic local code and utility requirements • **MV transformer, MV installation** • **Substation design, installation** • **SC 8A, State or ISO, NESC requirements, for example**

What is the wind energy group in IECRE doing for this?

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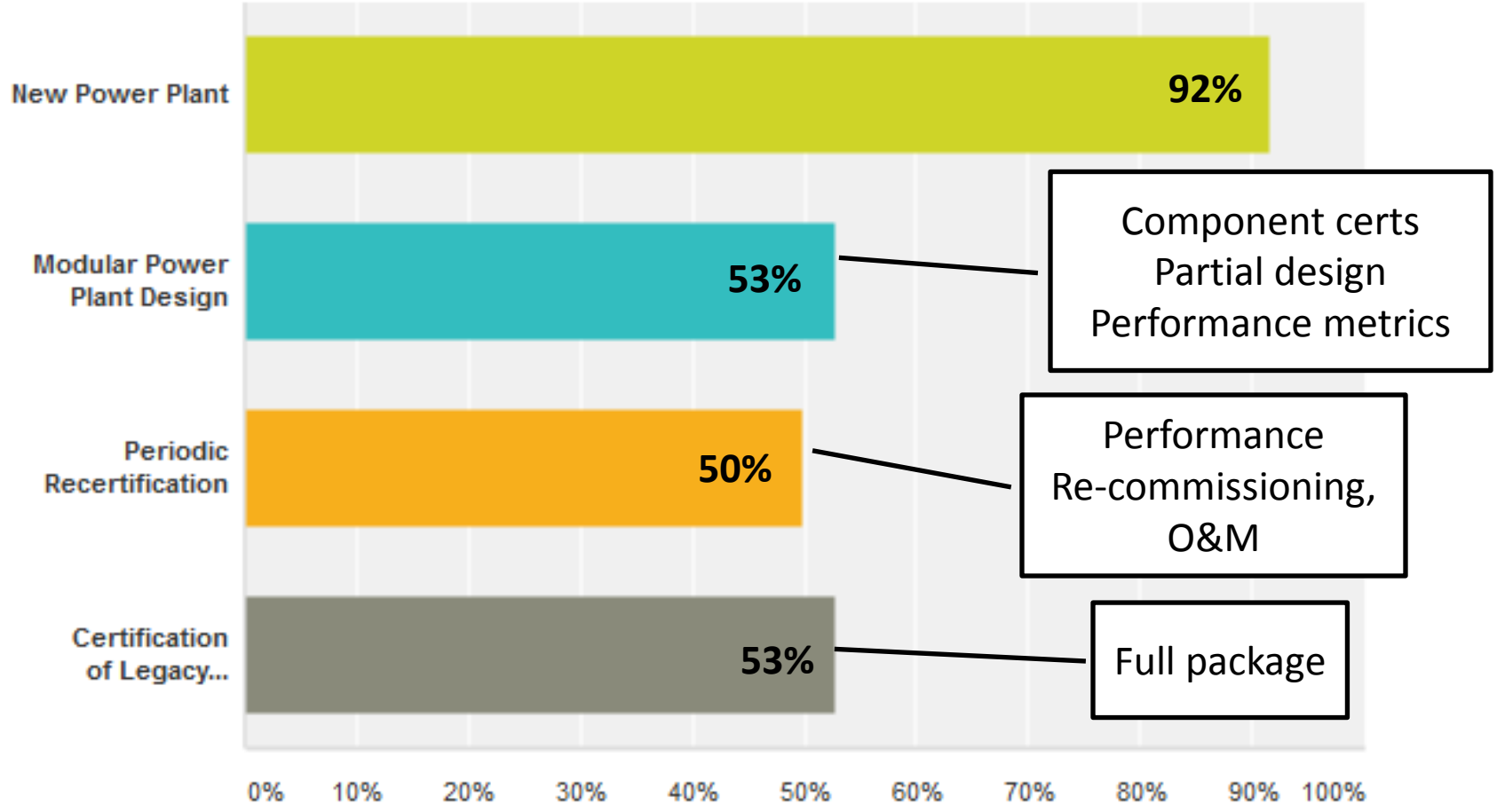
PV Plant Certification - What types of certification should be governed by the IECRE standard?



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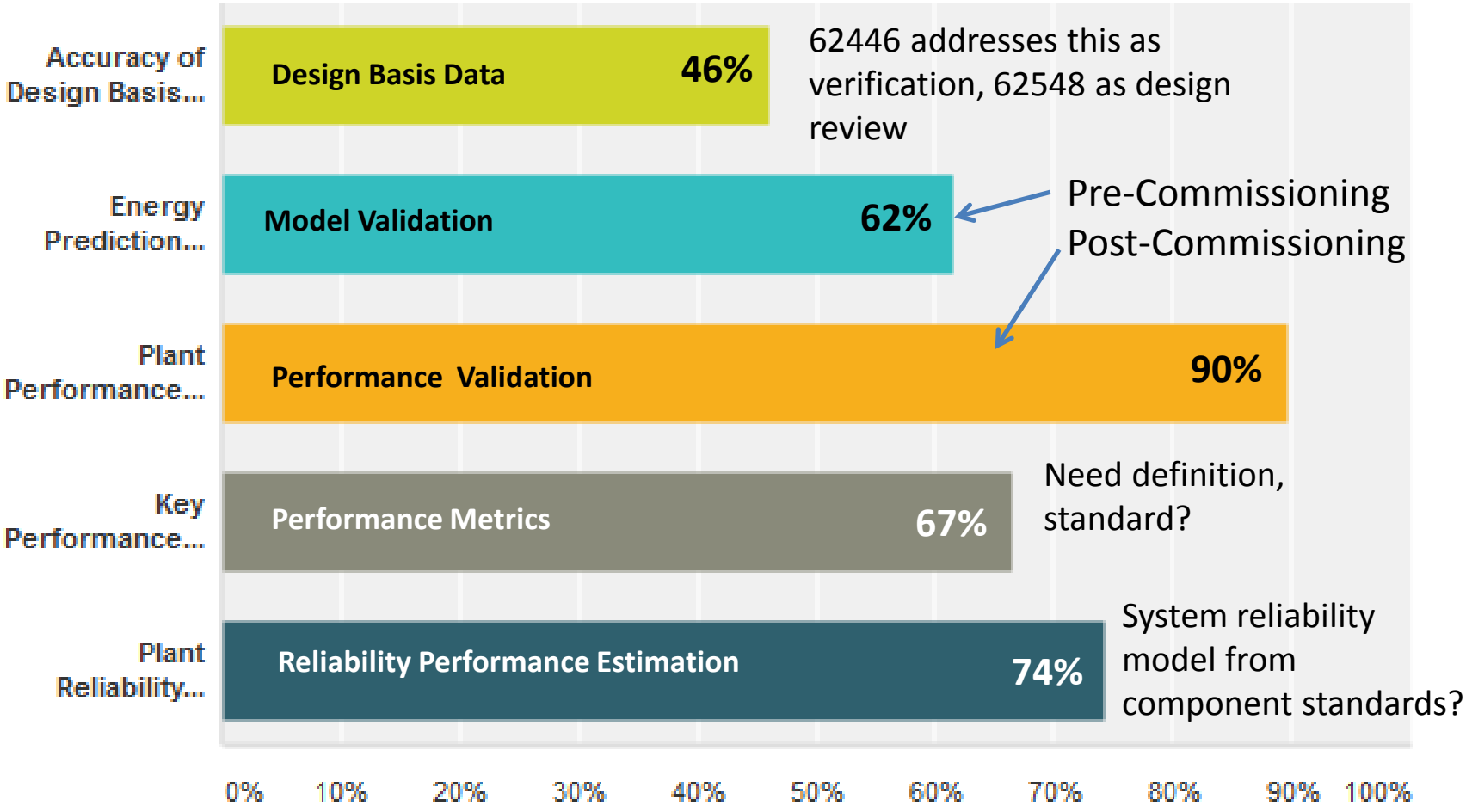
Performance Verification and Validation- What aspects are important to you to assure performance of the power plant?



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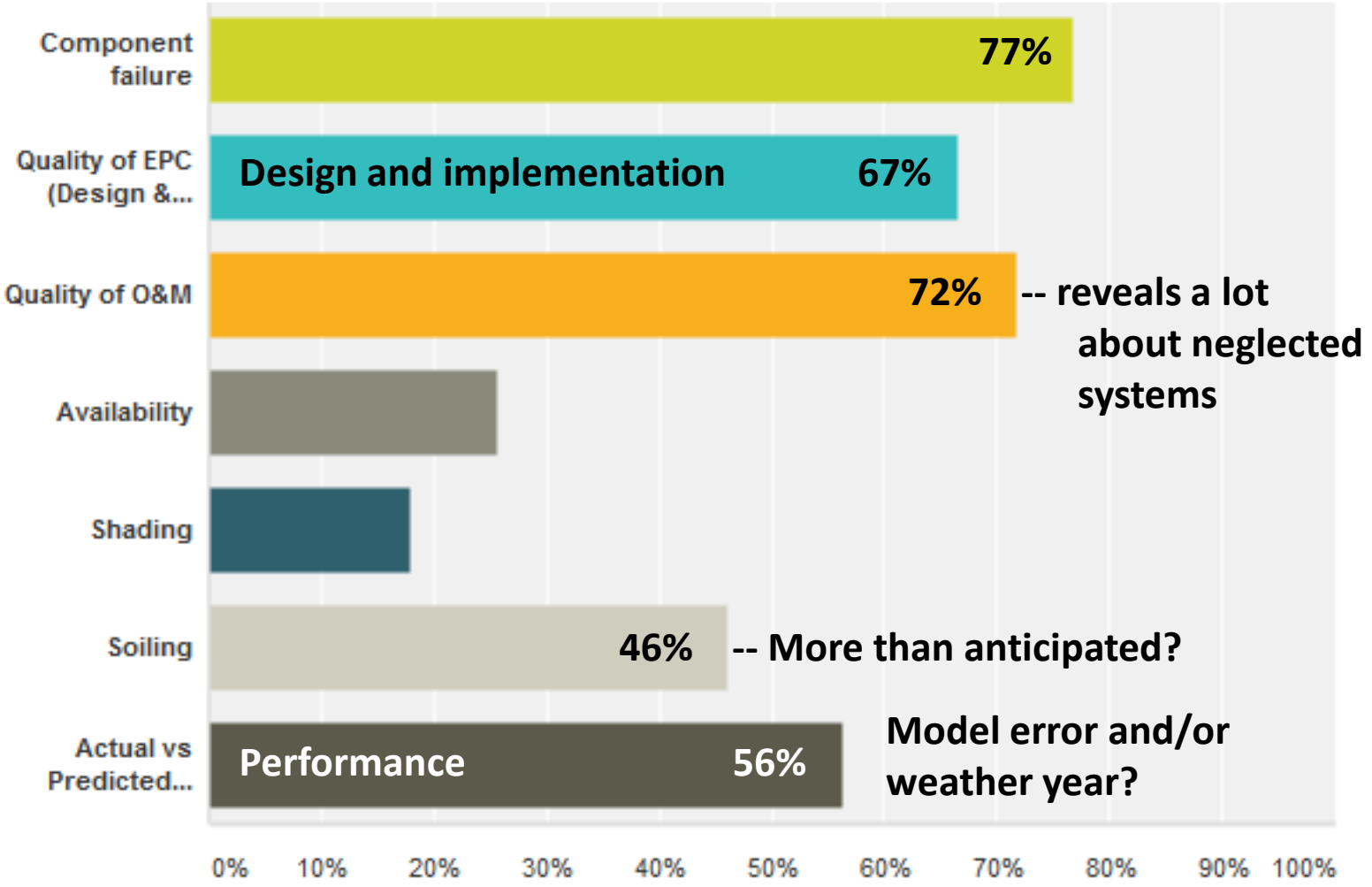
Based on your experience, which of the following have a large effect on the financial performance of the asset?



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What are you most concerned about or what is it that you have the least confidence in?

Module Issues

- Module degradation
- Module design faults not well covered by standards, like cell cracks
- High accuracy models for long-term product durability or accelerated testing methods.
- Direct replacements for older failing modules
- Polymers, reliability due to extreme weather & earthquakes.

BOS Durability and Reliability

- BOS suppliers' quality, reliability and maturity. Lack of standardization, accountability of performance measures across industry.
- High accuracy models for long-term product durability or accelerated testing methods.
- I have the least confidence in the long term reliability of the plant
- Good standard development is hampered by the fact that manufacturers and distributors/dealers would likely prefer to deal with quality and reliability as a proprietary matter rather than helping less-experienced competitors gain more market share.

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What are you most concerned about or what is it that you have the least confidence in?

System Level Design and Engineering

- While there are individual standards for each component, the optimal interaction between system components at the prevailing environmental conditions on site is often enough not fully understood by system integrators.

Project Execution and Commissioning

- Much damage can be done during transport and installation that will not show up for years after commissioning. Not therefore caught by "certification."
- Quality of workmanship.
- Skill of field techs
- Current commissioning standards do not go deep enough into the most critical items which affect PV system performance at the time of commissioning and in the future.

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What are you most concerned about or what is it that you have the least confidence in?

Performance

- Predictability of yield
- Inaccuracy of the system
- The definition and use of PV performance metrics have not been standardized.
- Grading of installed power plants for state-of-health based on numerically obtained results through field evaluation.

O&M

- Inverter parts availability;
- High quality O&M tech skill;
- Enough money in the O&M and asset management budgets.
- Bankruptcy of solar companies, not supporting warranties - need independent, inexpensive, means to validate

Additional Insights from Survey Taken at IEC Workshop at 2014 IEEE PVSC

- Nearly identical results on:
  - Types of plants included
  - Scope of certification
- Less emphasis on certification of legacy plants
- Less variation on aspects of performance validation
- Quality of EPC ranked 1st in financial impact

NEXT STEPS

- Good responses and direction from survey
- Additional discussions on the priorities and their practical implications
- Draft detailed framework for certification of different kinds of plants:
  - Content and sequence of certification steps
  - Develop thresholds for defining the rigor of assessments
  - Define core assessment with optional add-ins (e.g. project development stage
- Emphasis on core competency aspects of assessment (TC82 specific standards) to get things rolling sooner.