

# Ensuring Quality of PV Modules

26<sup>th</sup> PVSEC

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# Outline

- Motivation – Customers want to be able to assure quality of PV modules
- Two parts of quality assurance (QA)
  - During design phase
  - During manufacturing phase

# **Motivation: the question on the street**

## **“How do I predict lifetime of PV modules?”**

- Reliability engineer: How do I test to determine the number of years for the warranty?
- PV customer: How do I choose the PV module that will last longer?
- PV investor: How do I know that I’m making a safe investment of \$1 billion (if the modules fail after 10 yr, the warranty will be worthless because the company will be gone)?
- Insurance company: How do I determine rates for insuring PV installations?

# Two parts of Quality Assurance

1. Is the *design* durable for the intended application?
  - Depends on location (hot & humid; hot & dry, temperate, etc.)
  - Depends on mounting (close-roof mount runs hotter; partially shaded modules undergo different types of stress)
  - Depends on application (a customer may plan to resurface the roof 10 years from now and only cares about the modules lasting that long)
2. Are the modules *consistently manufactured*?
  - Could variations in the material composition or manufacturing processes result in premature failure of some fraction of the modules?

# Current Status

1. Is the design durable for the intended application?
  - IEC qualification tests (61215, 61646, 62108) give pass-fail indication, but do not address the variability of the stresses
  - The relationship between passing the test and the expected service life is not well documented (maybe 10 years in some locations; less in others?)
  - Each test lab is suggesting a testing protocol
2. Are the modules consistently manufactured?
  - The certification to IEC 61215 may or may not indicate that there is an ongoing QA program

*No way to look at a module and quickly assess its quality/durability*

# PV QA Task Force

The PV QA Task Force has been formed to address these needs

Today's meeting will describe this opportunity in more detail

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