Motivation

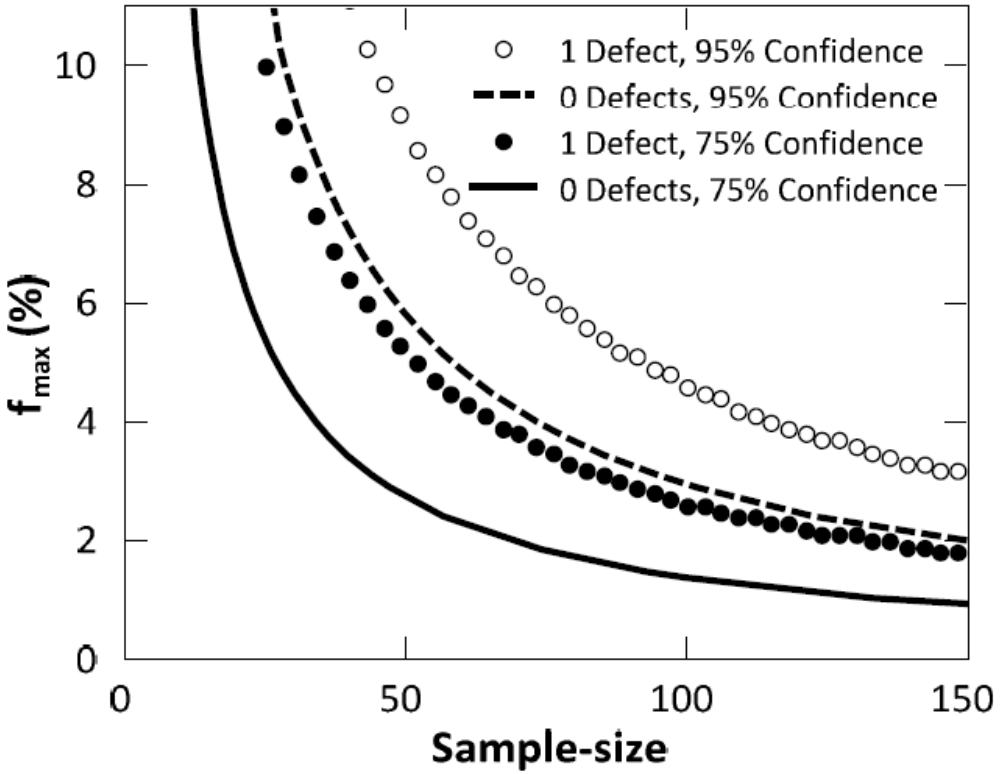
$$\text{Cost of Capital} \propto \text{Risk} \propto \frac{1}{\text{knowledge}}$$

- The more one knows about something, the lower the risk, the cheaper the project.
- PV projects consist of tens or hundreds of thousands of panels
  - Over 500 suppliers of PV modules globally
  - Extremely volatile equipment supply space
  - Perception of quality varies greatly

- How can we improve the quality of knowledge about the products being installed at a PV power plant?

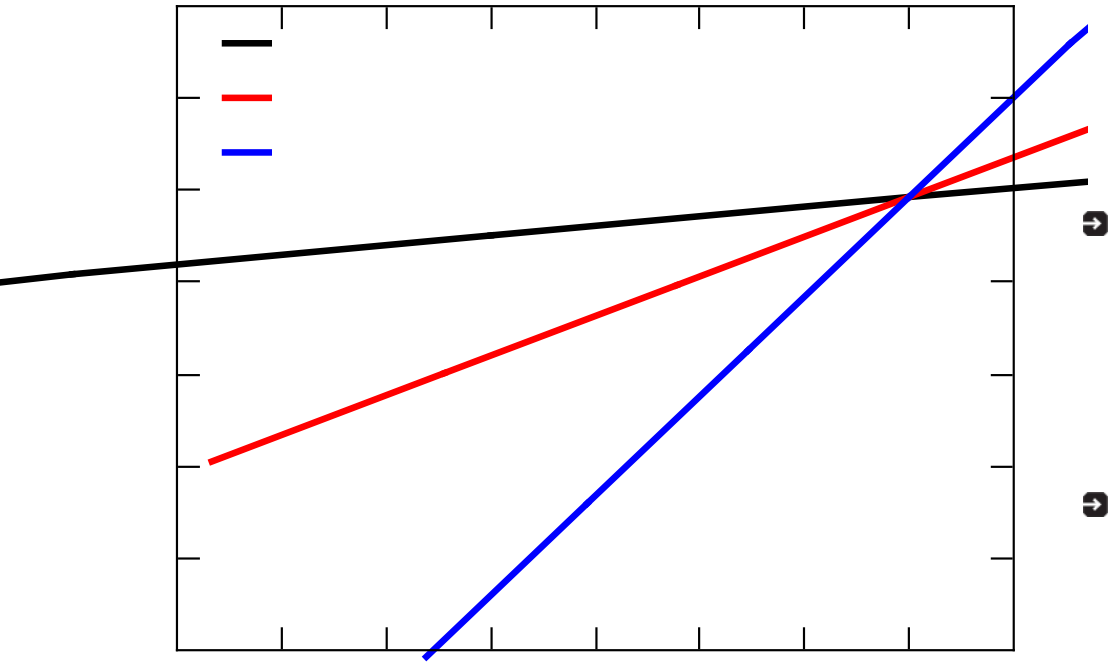
Latent Defect Screening Program

- Today there is no certification that protects against manufacturing deviations
- Latent defects are the leading driver of underperforming PV modules in the field
- Affected modules typically perform per expectations out of the box but suffer accelerated degradation



	Evaluates	Timing	Sample Size
Certification	Design	Pre-production	About 10 panels
Latent Defect Screening	Manufacturing Stability	Per Project	Statistically Significant

LCOE Sensitivity



- Simple SAM modeling suggests that financing costs have the greatest impact on LCOE
- Increasing cost of quality can disproportionately decrease installed project cost
- At a 20MW project for under 1 □/watt we can be 75% confident that less than 4% of the modules may exhibit a latent defect

FACILITIES

PV-USA

SERVICES

PVEL PROJECT QUALITY

- Solar Reference Cells
- Latent Defect Screening
- Ongoing Degradation Testing
- Ongoing Reliability Testing
- Warranty Support

PVEL BANKABILITY

- Reliability Demonstration Testing
- PID Certification
- PAN files – *with Black & Veatch*
- PV-EPI – *with Black & Veatch*
- PV-USA outdoor test center