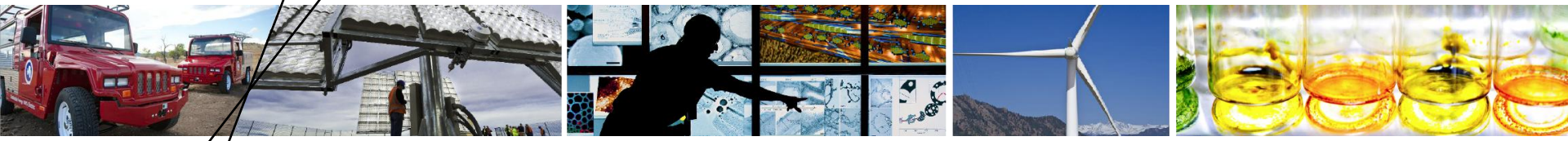
NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Steps Toward Bankability



Differentiating Quality PV

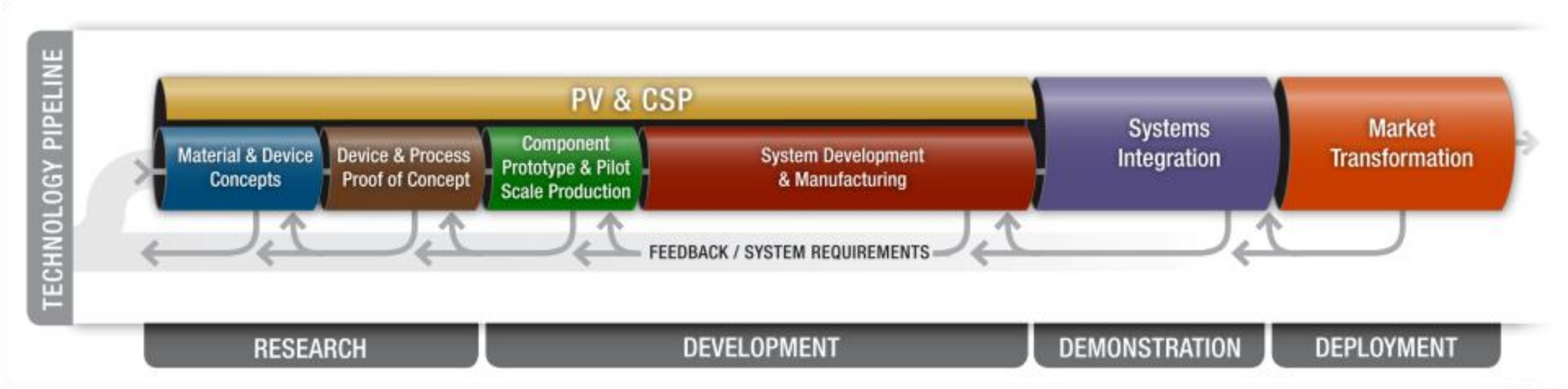
Sarah Kurtz, John Wohlgemuth

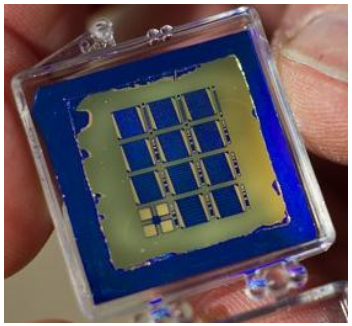
March 6, 2012

Purpose and Outline

- **Stimulate discussion about what we need in a bankability report(s)**
- **Briefly describe status and efforts currently underway; National lab roles in these**

A Bankability Report or Series of Reports?





Demonstrate Concept With Small Solar Cell

Demonstrate Module Fabrication

Demonstrate Power Plant

Product versus Project Validation

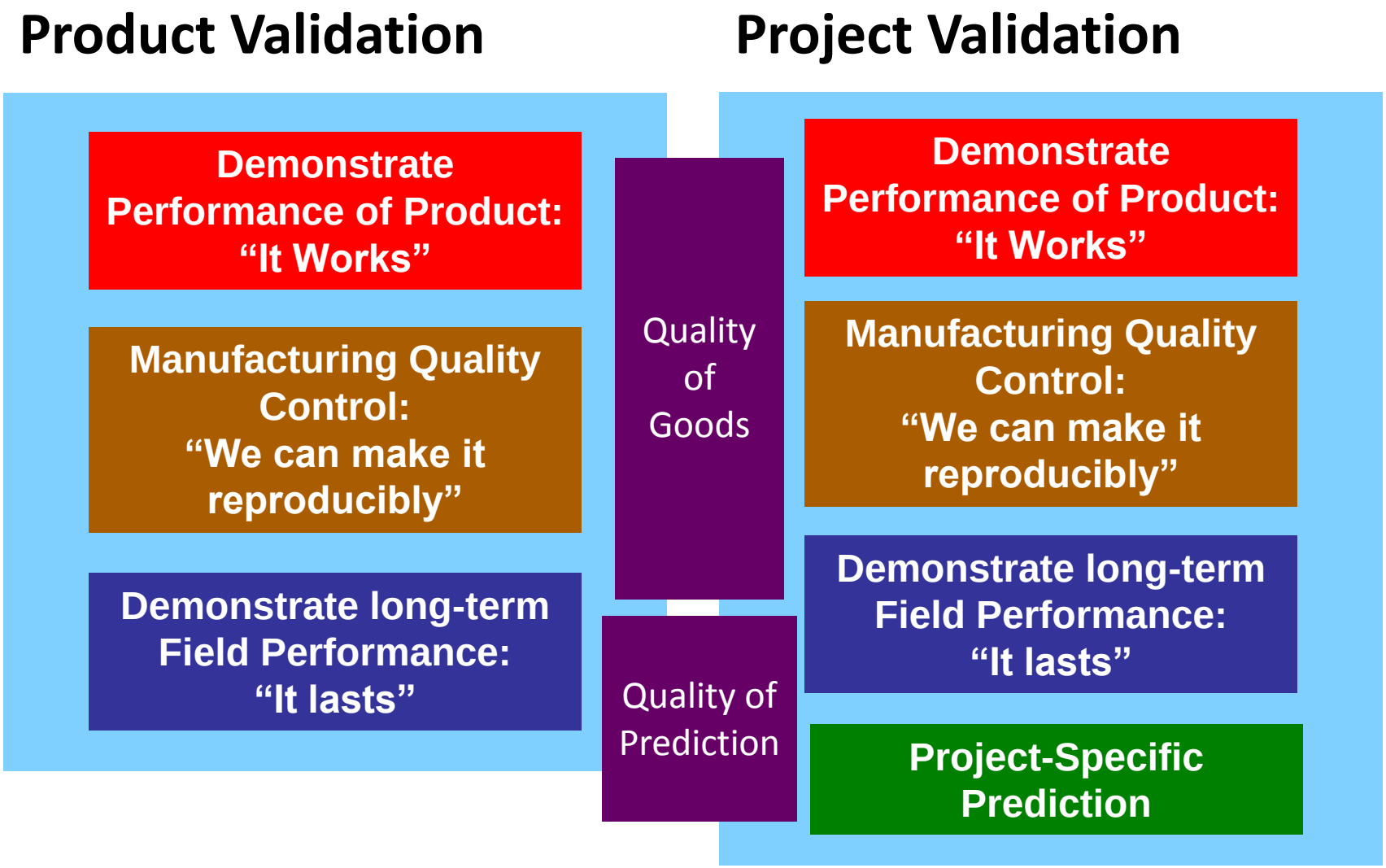
Product Validation

- Demonstrate Performance of Product: "It Works"
- Manufacturing Quality Control: "We can make it reproducibly"
- Demonstrate long-term Field Performance: "It lasts"

Project Validation

- Demonstrate Performance of Product: "It Works"
- Manufacturing Quality Control: "We can make it reproducibly"
- Demonstrate long-term Field Performance: "It lasts"
- Project-Specific Prediction

Relationship to Topics Covered Later



Status of Validation Standards

Product Validation

- Demonstrate Performance of Product: "It Works" ✓
- Manufacturing Quality Control: "We can make it reproducibly" ✗
- Demonstrate long-term Field Performance: "It lasts" ✗

Project Validation

- Demonstrate Performance of Product: "It Works" ✓
- Manufacturing Quality Control: "We can make it reproducibly" ✗
- Demonstrate long-term Field Performance: "It lasts" ✗
- Project-Specific Prediction ✗

Roles for National Labs to Address Holes

- **Facilitate Community Efforts to Develop Tools and Standards**
  - QA Task Force (talk about next)
  - Ad-hoc committee priority: 1-yr acceptance test
  - RTCs (Jennifer Granata will describe)
- **Research to Elucidate Technical Issues**
  - Target community-identified issues
  - Topic for a different day…

International PV Module Quality Assurance Forum was held in July, 2011, San Francisco

Outcome:

Formed International PV QA Task Force:

Group of volunteers/professionals (> 300) working toward a common goal

International PV Module Quality Assurance Forum

July, 2011, San Francisco

Formed International PV QA Task Force:

Goals of International PV QA Task Force:

1. ***To develop a QA rating system that provides comparative information about the relative durability of PV modules to a variety of stresses as a useful tool to PV customers and as a starting point for improving the accuracy of quantitative PV lifetime predictions.***
   1) Compare module designs
   2) Provide a basis for manufacturers' warranties
   3) Provide investors with confidence in their investments
   4) Provide data for setting insurance rates

2. **Create a guideline for factory inspections of the QA system used during manufacturing.**

The PV QA Task Force formed at the conclusion of the Forum consists of six Task Groups:

Task Group 1: PV QA Guideline for Manufacturing Consistency

Task Group 2: PV QA Testing for Thermal and mechanical fatigue including vibration

Task Group 3: PV QA Testing for Humidity, temperature, and voltage

Task Group 4: PV QA Testing for Diodes, shading and reverse bias

Task Group 5: PV QA Testing for UV, temperature and humidity

Task Group 6: Communication of PV QA ratings to the community (leader David Williams)

Make it reproducibly

"It lasts"

Today's discussion

Efforts to Develop Validation Standards

Project Validation

National Lab-Supported Efforts

Project Validation		National Lab-Supported Efforts
Demonstrate Performance of Product: "It Works"	✓	
Manufacturing Quality Control: "We can make it reproducibly"	✗	QA Task Force – Task Group 1
Demonstrate long-term Field Performance: "It lasts"	✗	QA Task Force – Task Groups 2-6 RTCs
Project-Specific Prediction	✗	RTCs