

Hot Issues in PV Performance and Solar Project Finance

***Webinar Series, Session #1:
“Strategies for Ensuring Module Quality Prior to Installation”***



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OUTLINE OF WEBINAR

THIS WEBINAR – Strategies for ensuring PV Module Quality *Prior* to Installation:

- Importance of determining Module quality early on a macro-level
- General Considerations
- Contractual provisions for ensuring quality prior to shipment
- Contractual provisions for ensuring quality, limiting defects, and reducing risk of loss during shipment
- Inspection post-delivery
- Rejection and Acceptance

FUTURE WEBINAR(S) – Strategies for ensuring PV module quality and project performance *post-installation*.

- Performance testing (capacity, output/yield, performance ratio, etc.) post-installation and performance liquidated damages
- Acceptance of the project
- Deep dive on warranties (Equipment – materials, workmanship, design, etc.), Linear Degradation, Serial/Systemic Defects)

THE IMPORTANCE OF DETERMINING QUALITY EARLY

- **Cost of Performance**

- Increased overhead for both parties due to added logistics
- Costs associated with re-shipping (carriage/freight, insurance, duties, demurrage, storage, etc.) are borne by at least one of the parties
- Purchaser costs for reasonably protecting the defective Modules following rejection

- **Schedule Issues and Insufficient Remedies**

- **Warranty Issues**

- *The best warranty a manufacturer can provide is one that the Purchaser never has to use...*
- Increased O&M Costs
- Serial/Epidemic Defects

- **Bankruptcy/Insolvency/Restructuring**

- Balance Sheet/Parent Guaranty
- Monitor credit
- Insurance products
- Contractual provisions to ensure quality

greentech solar:

First Solar's \$215 Million "Manufacturing Excursion"



A process control issue involving its CdTe thin-film solar panels is being put right.

HERMAN K. TRABISH: MARCH 2, 2012

In the early part of First Solar's rise to the top as a U.S. solar module maker, the firm encountered a glitch in its manufacturing process that compromised the performance of a small portion of its modules.

An estimated four percent to eight percent of the cadmium telluride (CdTe) thin-film

SOLYNDRA®

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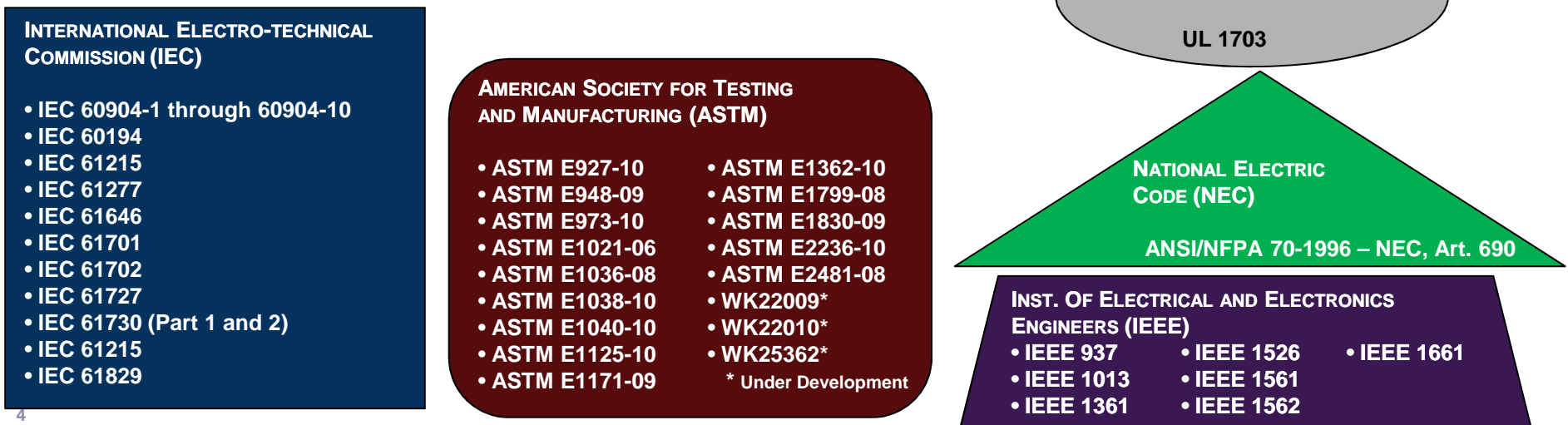
UNI-SOLAR. SOLON

evergreensolar
Think Beyond.

GENERAL CONSIDERATIONS

- **Choice of Law**
 - Domestic – Article 2 of Uniform Commercial Code
 - International Agreements – U.N. Convention on the International Sale of Goods

- **Compliance with all Applicable Laws, Standards and Codes**
 - Applicable Law
 - Standards and Codes – Design, manufacturing and testing requirements (dozens of potential standards)



GENERAL CONSIDERATIONS

- **The PV Modules and the Supplier should be obligated to comply with:**
 - All “Applicable Laws”
 - All “Standards and Codes”
 - The Specifications
 - Industry Practices
 - Manuals
 - Warranties
- **Defining “Defects”**
 - Advantages
 - What’s market?

TERMS FOR ENSURING QUALITY – PRE-SHIPMENT

- **Quality Assurance and Quality Control (QA/QC Plan)**
 - Does the manufacturer have a QA/QC Plan? Consider requiring.
 - Attach as an exhibit; include a Supplier covenant to follow the plan.
 - ISO 9001:2008

- **Supplier Inspection and Testing**
 - Inspect Modules at appropriate stage of fabrication to confirm compliance with Requirements
 - Notify Purchaser of discovery of Defects
 - Conduct tests (e.g., flash test) in accordance with procedures (e.g., IEC 60904-1 through 60904-10) and at STC
 - Other tests



INTERNATIONAL ELECTRO-TECHNICAL COMMISSION (IEC)

- IEC 60904-1: Measurement of PV current-voltage characteristics
- IEC 60904-2: Requirements for reference solar devices
- IEC 60904-3: Measurement principles for terrestrial PV devices with refer. spectral irradiance data
- IEC 60904-4: Reference solar devices – Procedures for establishing calibration traceability
- IEC 60904-5: Determination of equivalent cell temp. of PV devices by the open-circuit voltage method
- IEC 60904-7: Computation of spectral mismatch correction for measurements of PV devices
- IEC 60904-8: PV Devices – Measurement of spectral response of PV device
- IEC 60604-9: Solar simulator performance requirements
- IEC 60904-10: Methods of linearity measurement

TERMS FOR ENSURING QUALITY – PRE-SHIPMENT (Cont.)

- **Purchaser and Financing Party Inspections – Issues**

- Timing of notice prior to inspection
- Interference with business operations
- Confidentiality
- Safety requirements
- Scope of inspection
- Permanent presence of Purchaser personnel

- **Independent Third-Party Inspections and Testing**

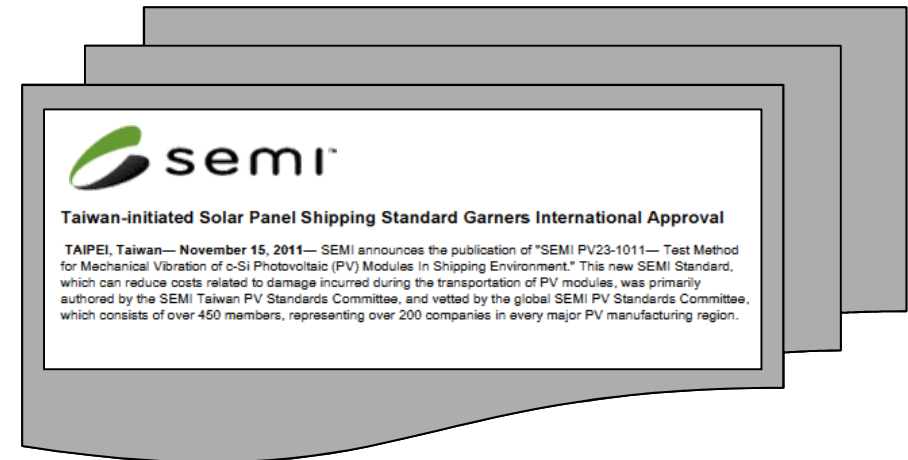
- Who will conduct the test? ISO/IEC 17025:2005 certified?
- What are the specific tests that will be conducted and the testing protocols?
- Who is responsible for the cost (including shipment of the Modules), and does this shift if a Defect is discovered in the course of such tests?



TERMS FOR ENSURING QUALITY – SHIPMENT

- **Risk of Loss**
 - INCOTERMS
 - Contractual efficiency

- **Packaging Requirements**
 - General provisions
 - Specific provisions
 - SEMI PV23-1011 Test Method for Mechanical Vibration of c-Si PV Modules in Shipping Environment



TERMS FOR ENSURING QUALITY – POST-DELIVERY

- **Purchaser (or Contractor) Inspection Post-Delivery**
 - Visual Inspections
 - Additional Third-Party Inspections

- **Rejection and Acceptance**
 - Purchaser's right of rejection under U.C.C. Art. 2
 - Perfect Tender
 - Acceptance
 - Under U.C.C. Art. 2
 - Benefits of delayed acceptance
 - Commencement of Warranty
 - Purchaser's Right of Rejection vs. Warranty Rights

CLOSING THOUGHTS

- **Quality in Supply Contracts for Utility Scale Projects vs. Non-Utility Scale Purchases – What’s Market?**
- **Relative bargaining power shifting in certain circumstances**
 - Increased competition
 - Rapidly declining module prices
 - No looming artificial deadlines forcing quick negotiations and concessions
 - Increasing leverage of well-financed Purchasers
- **Opportunity for quality-related provisions and additional testing requirements (e.g. latent defect and accelerated life testing) to become standard**
 - Reduces technical risk
 - Increases the likelihood that long-term performance meets or exceeds both expected performance and warranted performance
 - Increases confidence in long-term cash flows and the ability to meet downstream energy obligations to the offtaker
 - Reduces cost of capital to finance projects or large purchases
 - Increases the number of bankable projects – benefits Purchasers and Suppliers.

QUESTIONS

Please use the Q&A or Chat feature of the webinar software



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Andrew T. Braff, Associate – Energy & Clean Technology

Andrew Braff is an associate in the Seattle office at Wilson Sonsini Goodrich & Rosati, where his practice focuses on energy project development, structuring and finance primarily in the solar, biomass, biofuels, landfill gas, geothermal, and wind industries. His experience includes advising on, negotiating, and drafting principle project-related documentation, including joint development/colocation agreements, engineering, procurement and construction (EPC) agreements, material and feedstock supply agreements, project offtake agreements (including power purchase agreements (PPAs) and fuel sales agreements), equipment procurement agreements, operation and maintenance agreements, and real property sale and lease agreements. Andrew's practice also includes advising on federal and state legislative and regulatory process and government incentives, including the Title XVII and Section 9003 Loan Guarantee Programs.

Andrew previously served as an extern for Justice Mary E. Fairhurst of the Washington State Supreme Court and as director for policy and public affairs for California State Assemblyman, now State Senator, Mark Wyland. In addition, he was a legislative assistant to Congressman George R. Nethercutt, Jr. where he advised on numerous federal policy and appropriations issues.

REPRESENTATIVE SOLAR ENGAGEMENTS:

- *Amonix, Inc.:* Represented venture-backed developer of concentrated solar photovoltaic technology in negotiating an equipment supply contract with NextEra Energy for the Hatch Solar Energy Center in New Mexico.
- *Solar Projects Solutions:* Drafted and negotiated an engineering, procurement and construction agreement for development of a switching station associated with a photovoltaic generating facility in California.
- *NorthLight Power:* Represent joint venture developing a 90 MW DC photovoltaic generating facility, including drafting and negotiating both EPC and O&M Agreements and Module Supply and Warranty Agreements.
- *SunRun Generation:* Negotiated photovoltaic module supply agreements with multiple vendors, along with bailee and warehouse logistics agreements.
- *Client Name Withheld:* Drafted and negotiated the principal project documents for the financing and construction of a manufacturing facility receiving a Title XVII Loan Guarantee issued pursuant to the Energy Policy Act.
- *CleanPath Ventures:* Negotiated and advised on PV module procurement contracts with both domestic and foreign suppliers.
- *Phoenix Rising Development, Inc.:* Drafted, negotiated and advised a California-based solar developer in the sale of certain joint venture-held project-related assets in connection with a 50 MW photovoltaic project.
- *Lockheed Martin Corporation:* Advised Lockheed Martin on engineering, procurement and construction contract matters relating to a proposed solar thermal facility in Arizona.

REPRESENTATIVE SOLAR ENGAGEMENTS (Cont.):

- *Client Name Withheld:* Advising purchaser and lessee of commercial building in connection with an engineering, procurement and construction agreement for a 750kW photovoltaic system .
- *GreenVolts, Inc.:* Advised GreenVolts on the development of domestic and international equipment sales agreements and a construction contract for its first utility scale HCPV project with PG&E to prove technology.
- *SolarCity Corporation:* Advised SolarCity in the purchase of substantially all of the assets of Clean Currents Solar of the Mid-Atlantic.
- *Client Name Withheld:* Represented client in a successful Part I application for 1705 loan guarantee with the DOE for a \$392m CIGS solar fabrication facility, including corporate reorganization incident to the application.

EDUCATION:

- J.D., University of Washington School of Law, 2006
Shidler Journal for Law, Commerce & Technology; Berman Environmental Law Clinic
- B.A., Whitman College, 2000
With Honors; Magna Cum Laude; Phi Beta Kappa
- State Bar of Washington

ADMISSIONS:

- State Bar of Washington

SELECT SPEAKING ENGAGEMENTS:

- "Geothermal Leasing Essentials and the Anatomy of a Geothermal Lease," Presentation at Geothermal Resource Council's 33rd Annual Meeting, October 2, 2009, Reno, NV
- "Geothermal Site Acquisition and Early Development: Key Legal Issues and Emerging Strategies," Geothermal Energy 2008 Conference and Expo, Reno, Nevada, 2008 (Co-Author with Peter Mostow)
- "Algae: The Next Biofuel? Recent Developments and the Financial Landscape," Presentation at the Renewable Energy Finance and Investment Summit, May 20, 2008, Scottsdale, AZ
- "Biofuels from Algae," Testimony Before a Joint Session of the House Technology, Energy and Communications Committee and the Senate Water, Energy and Telecommunications Committee, February 21, 2008, Olympia, WA
- "The Federal Renewable Fuel Standard ("RFS") Program: Operational Highlights and Outlook," Presentation at 2007 Biofuels Workshop and Trade Show, October 10, 2007, Portland, OR

