Standards and Technical Considerations for Small Scale Energy Projects into the Grid

APEC EGNRET Workshop
Hanoi, Viet Nam
April 4, 2013

Agenda

1. Update on Standards Development Activity
2. Technical Considerations for Small Scale Projects
   A. Systems Approach to Safety and Performance (Local vs. International)
   B. Installation
   C. PID, Inspection, and Maintenance
3. Energy Storage and Integration Policy
4. Recommendations for Engagement of International Standards Development and Private Sector
5. SCSC Project Proposal – PV Integration into the Smart Grid
6. Questions and Feedback

Standards Development: UL and IEC

- **UL is active in IEC Harmonization Efforts in key renewable energy technologies:**
  - **IEC/UL 61730, IEC/UL 61215, IEC/UL 61646, IEC/UL 62108 for PV**
  - **IEC/UL 62109 for inverters**
  - **UL also active in IEC committees with an eye toward future harmonization in areas like batteries, wind power, and electric vehicle equipment**

- **Call for more APEC economy and regional representation and involvement**
- **Key considerations for future standards development will include safety, performance, reliability, bankability, grid connectivity, interoperability, and security**
- **System level standards development will be an increasing priority to address safe and reliable operation of renewable energy systems**

Systems Level Approach – International Considerations and Local Application

- **Coordinating the balance of global product deployment and local compatibility is an ongoing challenge**

- **For example, inverters may be expected to comply with:**
  - **Product standards for safety (e.g. IEC 62109, UL 1741, etc.)**
  - **Code requirements for installation (e.g. NEC)**
  - **General Utility interconnection requirements (e.g. IEEE 1547)**
  - **Special Utility performance requirements (e.g. low-voltage ride-through), depending on the specific distributed resource & grid characteristics**

- **UL is achieving efficiency through a systems level approach, where basic aspects are addressed and optional aspects are clearly defined to support proper selection, approval and use in the system**

Installation Considerations

- **Safe and suitable installation is essential to support appropriate deployment; this is accomplished through:**
  - **Suitably qualified installers, verified by means such as Certification or other credentialing to promote workmanship and code compliance**
  - **Approval by regulators for safety, energy performance, etc.**
  - **Approval by utilities for suitability of grid connectivity & performance**

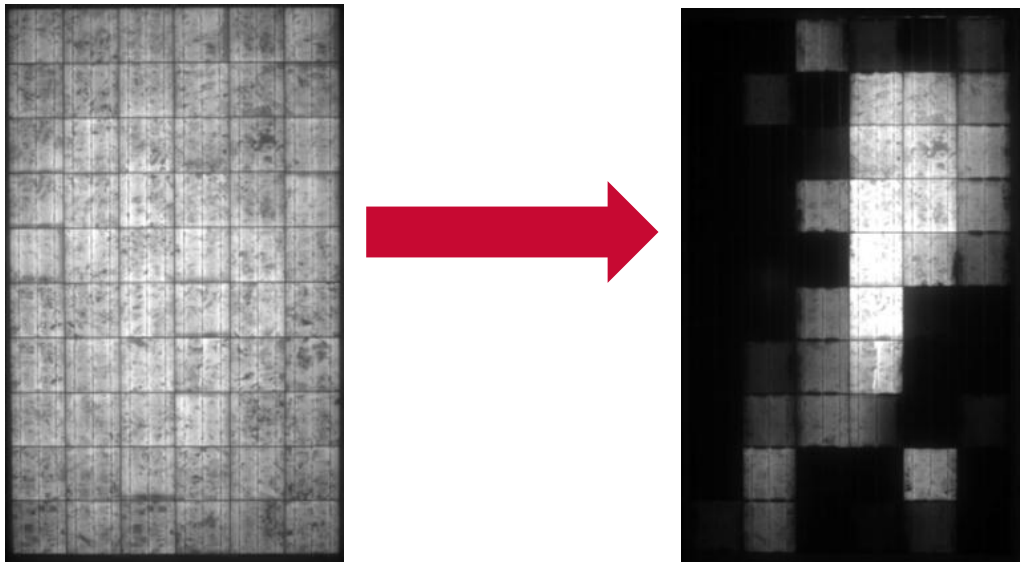
- **Various documents and programs have been developed or initiated to address these issues – for example UL's PV installer certification and installation guidebook development through IEC**

- **Residential safety implications – UL/Solar ABCs research on flammability of roofing materials under installed PV panels indicated that consideration is needed to coordinate safety**

Technology In-Use

Assessing safety and performance attributes of the systems in use are critical – for example:

- **Potential Induced Degradation (PID) is a phenomenon that can greatly reduce operation of PV modules, especially in damp environments; UL's test method identifies PID susceptibility**



- **Ongoing performance and safety are addressed in PV Park programs to promote assurance of proper operation**

PV Safety Research

Research in 3 general areas of PV fire safety

1. **Effect of a PV installation on roof fire classification ratings:**
   - **Changes to fire test procedure have been proposed to the UL 1703 Standards Technical Panel**
   - **Reports of the work can be accessed at http://www.solarabcs.org/current-issues/fire_class_rating.html**
2. **Use of screens to prevent ignition of debris under a PV installation:**
   - **Screen found to be ineffective in prevention of debris ignition**
   - **Caused an increase in module operating temperature**

PV Safety Research (continued)

Research in 3 general areas of PV fire safety

3. Fire Fighter Safety and Installation

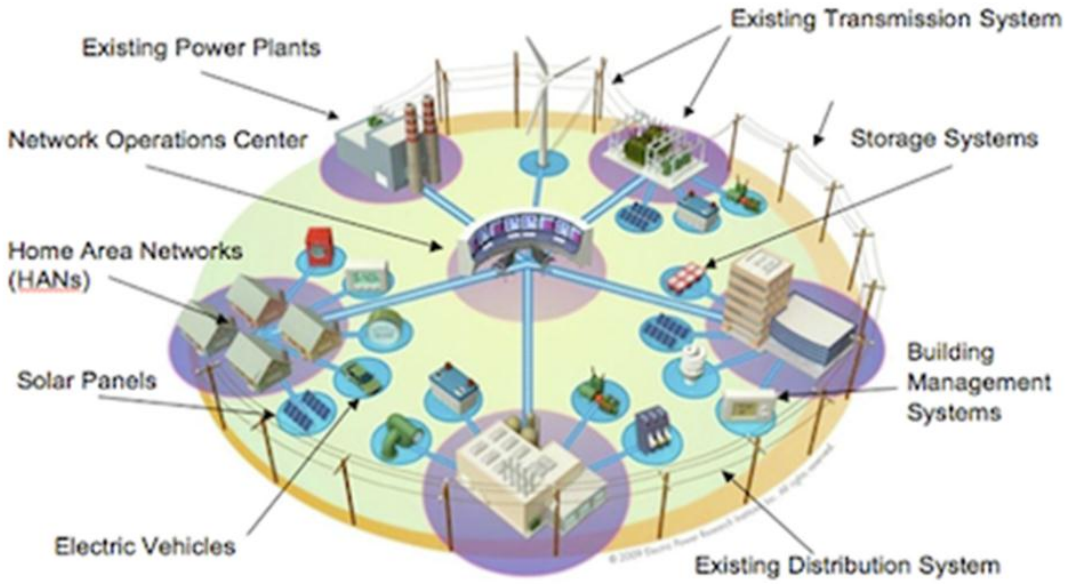
- **Shock hazard due to presence of water and PV power during suppression activities**
- **Shock hazard due to direct contact with energized components during firefighting operations**
- **Emergency disconnect and disruption techniques**
- **Severing of conductors**
- **Assessment of PV power during low light ambient light,, artificial light and illumination from fire**
- **Assessment of potential shock hazard from damaged PV modules and systems.**
- **Reports of the work can be accessed at http://www.ul.com/global/eng/pages/offerings/industries/buildingmaterials/fire/fireservice/pvsystems/**

Energy Storage and Smart Grid

- **Energy storage standards and balancing systems will be increasingly critical to assure safety and establish realistic expectations about performance and reliability**

- **How will different economies handle energy storage policy and when power can feed back into the grid will become increasingly important**

- **Transition to Smart Grid systems leads to new implications for safety, performance, interoperability, and security**



Considerations for APEC and ASEAN Economies

- **Engagement in standards development**
- **Climate and Environment Implications**
- **Small-Scale Projects and Residential Application – safety and efficiency**
- **Engaging Private Sector in projects and services**

APEC Project Proposal:
PV Integration into the Smart Grid

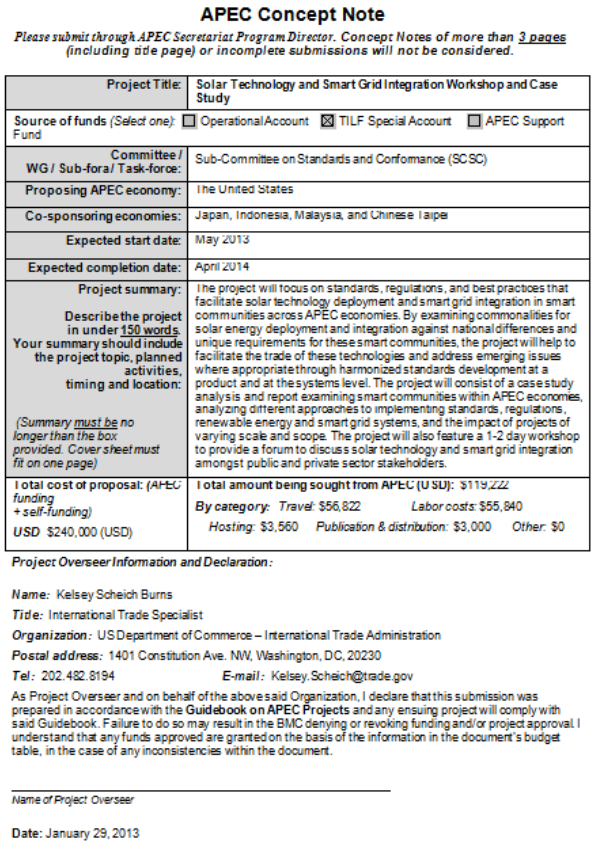
"The project will focus on standards, regulations, and best practices that facilitate solar technology deployment and smart grid integration in smart communities across APEC economies."

Study of different Smart Communities across APEC and workshop around SOM 1 2014 in China

Submitted through Subcommittee on Standards and Conformance (SCSC) under the Committee on Trade and Investment (CTI)

Co-sponsoring Economies: Indonesia, Japan, Malaysia, Chinese Taipei, and expressed support for hosting in 2014 by China

Build up collaborative work in SCSC, EGNRET, and EWG



APEC Concept Note

Please submit through APEC Secretariat Program Director. Concept Notes of more than 3 pages (including title page) or incomplete submissions will not be considered.

Project Title:	Solar Technology and Smart Grid Integration Workshop and Case Study
Source of funds *(Select one)*:	☐ Operational Account ☒ TILF Special Account ☐ APEC Support Fund
Committee / WG / Sub-fora / Task-force:	Sub-Committee on Standards and Conformance (SCSC)
Proposing APEC economy:	The United States
Co-sponsoring economies:	Japan, Indonesia, Malaysia, and Chinese Taipei
Expected start date:	May 2013
Expected completion date:	April 2014
Project summary: Describe the project in under 150 words. Your summary should include the project topic, planned activities, timing and location: *(Summary must be no longer than the box provided. Cover sheet must fit on one page)*	The project will focus on standards, regulations, and best practices that facilitate solar technology deployment and smart grid integration in smart communities across APEC economies. By examining commonalities for solar energy deployment and integration against national differences and unique requirements for these smart communities, the project will help to facilitate the trade of these technologies and address emerging issues where appropriate through harmonized standards development at a product and at the systems level. The project will consist of a case study analysis and report examining smart communities within APEC economies, analyzing different approaches to implementing standards, regulations, renewable energy and smart grid systems, and the impact of projects of varying scale and scope. The project will also feature a 1-2 day workshop to provide a forum to discuss solar technology and smart grid integration amongst public and private sector stakeholders.
Total cost of proposal: *(APEC funding + self-funding)* **USD** $240,000 (USD)	**Total amount being sought from APEC (USD):** $119,222 **By category:** *Travel:* $56,822 *Labor costs:* $55,840 *Hosting:* $3,560 *Publication & distribution:* $3,000 *Other:* $0

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As Project Overseer and on behalf of the above said Organization, I declare that this submission was prepared in accordance with the **Guidebook on APEC Projects** and any ensuing project will comply with said Guidebook. Failure to do so may result in the BMC denying or revoking funding and/or project approval. I understand that any funds approved are granted on the basis of the information in the document's budget table, in the case of any inconsistencies within the document.

Name of Project Overseer

Date: January 29, 2013

Questions and Answers

Thank You

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