



U.S. Department of Energy
Energy Efficiency and Renewable Energy

The President's Solar America Initiative



Technology Acceptance:
Codes and Standards
Solar Energy Technologies Program
U.S. Department of Energy



- Your verbal comments today will be used to inform our strategic planning process and our solicitation drafting process.
- SENTECH, Inc. is capturing your comments to the greatest extent possible, although their job is to note important points and general discussion trends, not capture every comment by every participant.
- If you wish to provide further comments on any Technology Acceptance topic, please feel free to respond in writing to the Solar America Initiative Technology Acceptance Request for Information (RFI). **COMMENT PERIOD CLOSES JUNE 30, 2006.**
- A link to the RFI is provided on this website:
<http://www.sentech.org/SolarTATEM2006/>



SAI Mission

Reduce cost of solar power to grid parity across all U.S. markets by 2015.

SAI Technology Acceptance Mission

Reduce market barriers and promote market expansion of solar energy technologies through non-R&D activities.

Codes and Standards Mission (Personnel)

Examine and improve codes and standards related to installation and acceptance of PV.



Codes and Standards Topics for Discussion



- **National Electrical Code (NFPA70)**
- **International Building Code (Several Uniform Building Codes)**
- **Safety Standards**
 - Underwriters Laboratories (UL)
 - American National Standards Institute (ANSI)
 - American Society for Testing and Materials (ASTM)
- **Acceptance Standards**
 - Institute for Electrical and Electronics Engineers (IEEE)
 - International Electrotechnical Commission (IEC)
 - Underwriters Laboratories (UL)
- **Performance Standards**
 - IEEE
 - IEC
 - PowerMark Certification
- **Net Metering Regulations and Tariff Issues**
- **Energy Policy Act – 2005 (EPAct2005)**



Tech Acceptance Pathways for Codes and Standards



Infrastructure Development

Identify barriers
to market
penetration

Identify methods
to minimize or
eliminate barriers

Barriers

Methods

Market Expansion

Opportunities

Methods

Identify
opportunities for
market expansion

Identify methods
to capitalize on
opportunities

Technology
Acceptance
Strategic Plan

Technology
Acceptance
Implementation Plan

Prioritization

Implementation

Prioritize activities &
return on investment

Identify tasks,
performers,
metrics, budgets
and timelines



Infrastructure Development

Provide technical, regulatory, institutional, and practical solutions to codes and standards technology acceptance barriers.

1. Promote codes and standards development, reviews, sanity checks, net metering
 - Installation & Building Codes
 - Safety and Communications Stds
 - Interconnection Standards
 - International Reciprocity
2. Encourage beneficial industry and utility interactions.
3. Develop and promote standard national performance assurance for solar systems.

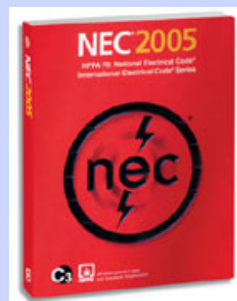




Status of Codes and Standards



- The NEC is scheduled on a 3-year cycle (2008 is under way)
 - SNL Industry Forum
 - Public Comments
 - DOE supported CMP members
- UL standards for safety are in place but undergoing changes
 - UL 1741– Inverters/Controllers
 - UL1703- PV modules
 - UL????- Solar systems??
- International Uniform Building and Safety Codes (No Activity)
- IEC standards (International Work)
 - Modules and BOS
 - Inverters/controllers
 - Performance/acceptance
- ASTM/ANSI standards are in place and evolving for PV





Potential DOE Partners: Codes and Standards

GOVERNMENT

- Federal Agencies
- Regional Entities
- States
- City / Local
- Tribal

COMMERCIAL

- PV Industry
- Commercial Users
- Industrial Users
- Building Community
- Finance/Insurance Community

UTILITY

- Investor-Owned
- Federal
- Municipal
- Rural Cooperatives

INSTITUTIONAL

- Educational Community
- Unions
- Standard-Development Organizations
- Independent Labs
- NGOs

PARTNERS



Most frequently identified non-technical barriers to solar energy implementation, listed in order of frequency.

High cost (*being addressed by all SAI activities, including R&D effort*)

Lack of trained technical personnel, lack of reliable installation and maintenance services

Lack of communication, information dissemination, and consumer awareness

Inadequate financing options

Lack of appropriate, consistent interconnection standards

Inadequate government incentives (*not covered in this session*)

Lack of equitable and effective net-metering guidelines

Inadequate codes and standards

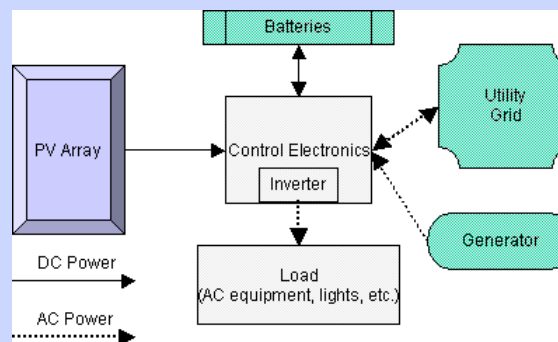
Liability issues / insurance requirements

Poor public perception of solar system aesthetics



Broad participation is needed in order to promote quality and accurate codes and standards for all PV/Solar installations.

- Long time delays for codes and standards development, changes and additions.
- States, utilities, and trade unions have been relatively absent in the development of consistent codes and standards.
- Work with international community/organizations to promote solar system compatibility and to prevent trade barriers is costly and time consuming.
- National consistency for codes and standards for PV components/systems needs immediate improvement.
- Synergism for “best in class” model codes and standards for other technologies is generally absent.





Main Challenges Codes/Standards



- Timely and accurate “Codes and Standards” updates to mirror newly developed technology and its applications
- Infrastructure
 - *Independent* Representations
 - Industry/Utility Involvement
 - Program integration
 - Industry
 - Unions
 - Academia
 - Quality/accurate documentation
 - Self sufficiency
 - Consistency and compatibility!

CONSISTENCY



QUALITY



Likely SAI Activity Topics: Codes and Standards



- **Examine current codes and standards for compatibility with modern PV components, applications or installations.**
- **Determine appropriate organizations to coordinate and provide accurate inputs for development or updating codes/standards**
- **Work with industry to promote uniform codes and standards for domestic and international installations**



End product: A consistent and reliable national set of codes and standards for Solar PV installations.



Codes/Standards Issues (Starting Points)



- **Electrical Codes/Standards development has been going forth with some coordination. (More coordination needed)**
- **Multiple levels and types of codes and standards are emerging. (Often without coordination)**
- **Federal and State funding for cost-shared support of standards development has been insufficient.**
- **The recent code/standard dilemma has been a small domestic market. NOW we have highly anticipated exponential domestic growth. (Is it too late to be proactive?)**
- **Codes/standards infrastructure can often take more than 5-years for development while some are on strict schedules.**
- **Codes/standards development should generally involve industry, utilities as well as other participants. (But needs third-party equalization)**



Codes and Standards Starting Questions



- 1. Where is the USA most deficient in supporting codes and standards development?**
- 2. What new codes and standards goals are needed? What changes are critical?**
- 3. How would SAI teams best function to prepare national codes and standards that satisfy the goals of the Solar America Initiative?**
- 4. How can the SAI accelerate the formulation, adoption and acceptance of codes and standards for domestic and international use?**
- 5. What level of funding/priorities from the US Solar Technologies Program is needed to spur adequate involvement from industry, states, critical trade organizations and academia?**



- RFI Release (April 2006)
- Tech Acceptance Strategic Planning Group (April-June)
- Technical Exchange Meetings (San Francisco, Washington) – (June 2006)
- RFI Close (June 2006)
- Issuance of Tech Acceptance Strategic Plan (July 2006)
- FOA Issuance (July 2006)
- FOA Close (September 2006)
- Announcement of Winners (November 2006)
- Awards completed (January/February 2007)
- Release of Tech Acceptance Implementation Plan (part of SAI Implementation Plan) (February 2007)