Overview of SETO Soft Costs Programming

Introduction to the Soft Costs Track

Garrett Nilsen
Summary of Solar Soft Costs (Residential)

- Sales Tax: 3%
- Permitting, Inspection, Interconnection: 8%
- Supply Chain Costs: 8%
- Installation Labor: 10%
- Sales and Marketing (Customer Acquisition): 16%
- Overhead (General and Administrative) and Profit: 21%

New Markets: Defining and Addressing Soft Costs

**Utility-scale PV**

- Soft Costs = $0.39/watt

**Residential/Commercial PV**

- Soft Costs = $1.86/watt

**More Complex Applications (e.g., Agricultural PV)**

- Costs are unknown
- Land Acquisition
  - Siting restrictions
  - Land use concerns
- Install Labor
  - New installation practices
- Structural BOS
  - Need new structures

- Existing benchmarks don’t work

**COMPLEXITY**

2020 SETO Peer Review
Concentrating Solar-Thermal Power Soft Costs

- Location!
  - Location!
  - Location!

» .....the costs to control land and get approvals
  - Environmental Permitting
  - Land acquisition
  - Interconnection
  - And More!

Image By Craig Butz - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=34568236
Soft Costs Strategic Areas

**NETWORKING AND TECHNICAL ASSISTANCE**
Empowering state and local decision-makers through timely and actionable resources, peer networks, and technical assistance.

**BUSINESS INNOVATION**
Developing solar finance and business solutions to expand access to capital and accelerate market growth.

**DATA ANALYSIS**
Harnessing big data analysis and technical solutions to support the many stakeholders involved in solar deployment.

**TRAINING**
Training an innovative solar workforce to enable the solar industry to meet growing demand.
Soft Costs Topic Area Scopes

PV Markets and Regulation

• Collecting data, developing tools and conducting analysis to help solar stakeholders navigate the U.S. solar energy markets and reduce soft costs

Solar Energy Access

• Increase access for solar to individuals, particularly individuals that do not have regular access to onsite solar, including low- and moderate-income individuals, businesses, nonprofit organizations, and states and local and tribal governments.

Workforce

• Providing solar energy and grid technology stakeholders with a trained and properly skilled workforce (installation, grid, cyber)
Impacting Solar Soft Costs

- Identification of who plays a role
- Delivery of accurate and actionable information
- Drive agreement on what is needed: where and when
Workforce
2020 US Energy and Employment Report

The Electric Power Generation sector employed 896,800* and grew by almost 2 and a half percent, gaining over 21,200 jobs. Job losses in nuclear and coal generation were offset by increases in natural gas, solar, wind, CHP, hydro, and geothermal.

**Fasting Growing Sectors**

Advanced/low emissions natural gas, solar, and wind generation were the fastest growing new sources, increasing employment by more than:

- **Advanced Natural Gas**: 6,500 +9.4%
- **Wind**: 3,600 +3.2%
- **Solar**: 5,700 +2.3%

**SOLAR**

Solar energy firms employed 248,000 employees who spent the majority of their time on solar.

An additional 97,400 employees spent less than half their time on solar-related work. The number of employees who spend the majority of their time on solar increased by 2.3 percent or nearly 5,700 jobs in 2019.

**ZERO EMISSIONS**

509,697 worked in zero emissions' generation technologies, including solar, wind, hydro, geothermal, and nuclear.

Source: [https://www.usenergyjobs.org/](https://www.usenergyjobs.org/)
Further Information from USEER

Source: https://www.usenergyjobs.org/
## Diversity in the Solar Industry

**Table 19. Solar Electric Power Generation – Demographics, Q4 2019**

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Solar Photovoltaic</th>
<th>Concentrating Solar Power</th>
<th>National Workforce Averages</th>
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<tr>
<td>Male</td>
<td>70%</td>
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<tr>
<td>Union</td>
<td>4%</td>
<td>6%</td>
<td>6%</td>
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</table>

Source: [https://www.usenergyjobs.org/](https://www.usenergyjobs.org/)
Workforce Themes

• Installer capacity building
• Expansion of worker pools
• Upgrading curriculum
• Developing new capacity
• Diversifying skill sets of the future
Future Themes in Workforce

1. How to help the industry during and after COVID-19

2. Leaving no profession related to soft costs behind

3. Solar energy jobs vs careers

4. Proactive roles on the way to mass electrification
Future Themes in Workforce

1. How to help the industry during and after COVID-19

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4. Proactive roles on the way to mass electrification
Soft costs related to installation do not stop at installers... 

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Educational Materials for Professional Organizations Working on Efficiency and Renewable Energy Developments (EMPOWERED) FOA

Federal Funds: $4.5M

- Collaborative Opportunity between Solar, Building and Vehicle Technologies Offices
- Goal: provide training materials for professionals whose jobs are not primarily working with solar, building efficiency or vehicle energy technologies, but who have significant involvement and authority over these technologies’ implementation. (First Responders, Building, Fire and Safety Officials)
Permitting, Inspection and Interconnection
Permitting Work Themes

• Local vs Federal jurisdiction
• Converge on best and uniform practices
  • Develop tools and resources to ease local implementation
• Expand and update resources on solar and other energy technologies (EMPOWERED)
  • Identify the right audience, right dissemination method
  • Speak with a single voice
• Need to address storage in tandem!
Why addressing permitting/interconnection are important

- Area of bipartisan interest
- Business environment
- Opportunity to impact other soft costs
Investing in time and tools - Permitting

Permitting Operational Efficiencies and Reduced Costs
Interconnection Work Themes

• Converge on best and uniform practices
  • Develop tools to ease local implementation

• Identify, quantify and dissemination information on efforts to increase hosting capacity

• Need to address storage in tandem!
Investing in time and tools - Interconnection

Interconnection Operational Efficiencies and Reduced Costs
Future Themes in Permitting and Interconnection

• Continued focus on quantification of challenges and value in solutions

• Fund the time, space and analysis to identify, disseminate and implement process improvements

• Storage, Storage, Storage
Solar and the Environment
Impact of Environmental Considerations

- Drive soft costs to infinity

Open up new value streams to developers/system owners

https://fresh-energy.org/solarama-crush/
Investing in Data, Research Community, Tools

Bringing together communities, developing data sets and making tools for decision makers

Images courtesy of the National Renewable Energy Lab and Sandia National Lab
Future Themes in Solar and the Environment

• Quantification of costs and benefits of solar co-location

• Quantification of the true impacts on water resources, flora and fauna

• Dissemination of analysis to provide factual information for decision makers at all levels
Analysis and Planning for Institutions
Value of Empowering Institutions

Institutions include, but are not limited to, state/local gov’t, non-profits, for-profits

- Intimate knowledge of constituents needs
  - Can meet people where they are (physically and informationally)
- Ability to work across or with similar stakeholders
Developing Resources, Convening and Assisting (examples)

- **Resource Development**
  - World Resources Institute
  - Solar Smart
  - Solar Energy Innovation Network
  - Solar Energy Technologies Office

- **Assistance**
  - ICMA

- **Convening**
  - National Community Solar Partnership

- **All of the Above**
Future Themes in Analysis and Planning

• Engagement across industries and DOE offices

• Nationwide Community Solar

• Packaging and dissemination of materials for use at all levels of sophistication

• Continue to expand population for which resources and assistance are available
Solar Energy Access
Value of Increasing Access to Solar Energy

• Allow financial benefits from solar to flow to everyone and every community

• Increase the demand for solar energy

• Drive innovation
  • More actors + More familiarity = More ideas
Multiple Approaches to Increasing Access (examples)

• Financing and business models

• Empowering local strategies
The National Community Solar Partnership is a coalition of community solar stakeholders working to expand access to affordable community solar to every American household by 2025.
Future Themes in Solar Energy Access

• Identification and capacity building of proper messengers

• Continued experimentation with new approaches

• Quantification of baseline knowledge and challenges for all stakeholders

• Deepen understanding of human behavior in technology adoption
Additional areas of relevance to soft costs reduction

• Hardware development, testing and validation
  • PV, SI, CSP, M&C teams

• Performance data aggregation and analysis
  • PV, SI, CSP teams

• Supply chain development
  • Private Sector
2025 Goals: Soft Costs

LCOE for PV is <0.05 USD/kWh on new houses and existing commercial roofs and <0.10 USD/kWh for residential retrofit systems

100% of US energy consumers have access to solar electricity that does not increase their energy costs

In 95% of cases, between permit application and permission to operate, no more than 30 days elapse for residential PV systems and no more than 100 days elapse for utility PV systems

MECHANISMS

• Providing tools and training to make permitting and interconnection fast and easy

• Performing analysis to support the scalable and equitable integration of solar technology into the energy system

• Supporting new processes and mechanisms for efficient solar integration and deployment

• Providing objective information and analysis to inform decision-makers in business and government

• Offering workforce development for solar workers
Tools we have at our disposal, timeframes to impact

- Funding Opportunity Announcements (FOA)
- National Lab Solicitations
  - National Lab Core Research
- Convening Power
- Analysis Products
- Technical Assistance
- Information Aggregation and Dissemination
- Introductions
Soft Costs Track- Award Breakdown

**Soft Costs Projects by Topic Area**
- Workforce: 12
- Solar Energy Access: 22
- PV Markets and Regulation: 29

**Soft Costs Funding by Topic Area**
- Workforce: $20,007,976
- Solar Energy Access: $32,988,821
- PV Markets and Regulation: $55,946,742
QUESTIONS?
Thank You

Garrett Nilsen, Program Manager
Garrett.Nilsen@ee.doe.gov