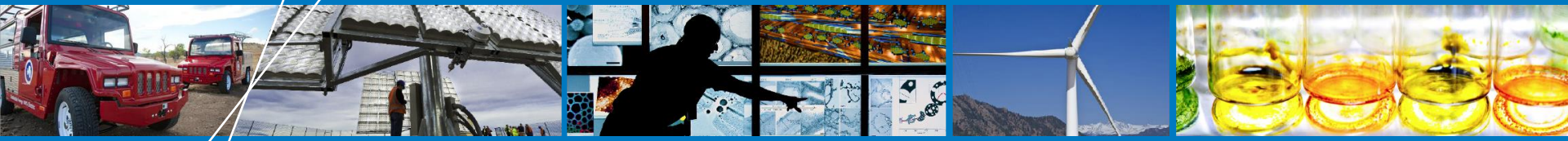
NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Beyond Demonstration Projects: How Universities Can Use Mid-Scale Solar



Webinar

December 16, 2016

Agenda

- Logistics & Speaker Introductions (5 minutes)
- Presentations (40 minutes)
- Q&A (15 minutes)

Housekeeping

- Participants are joined in listen-only mode.
- Use the Q&A panel to ask questions during the webinar. We will hold all questions until after all speakers have presented.
- Slides will be shared.

Speakers

- Angela Crooks, Lead Program Analyst, U.S. Department of Energy SunShot Initiative
- James Critchfield, Green Power Partnership Director, U.S. Environmental Protection Agency
- Jenny Heeter, Senior Energy Analyst, National Renewable Energy Laboratory

SunShot
U.S. Department of Energy

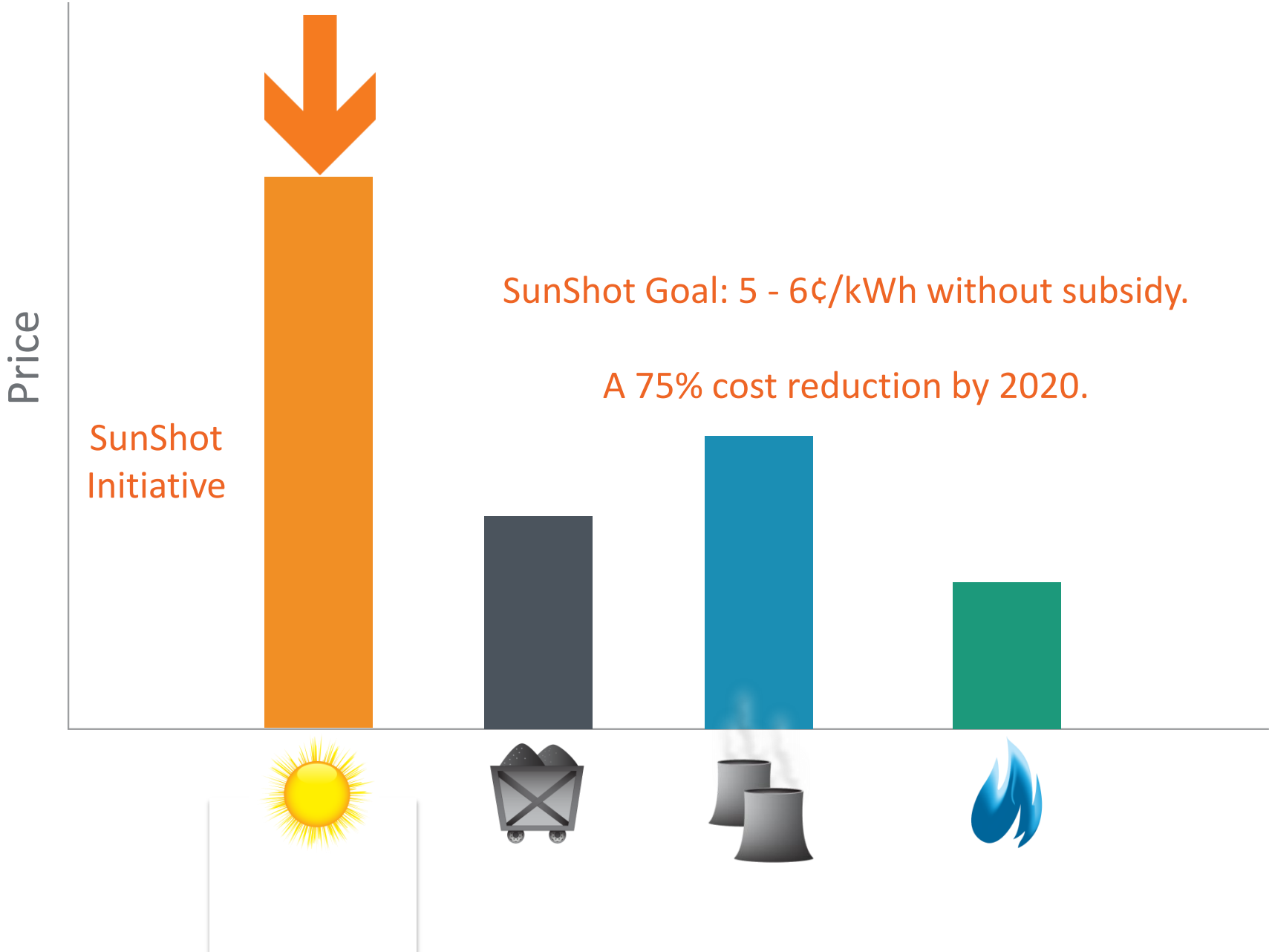
SunShot BOS Soft Costs

December 16, 2015

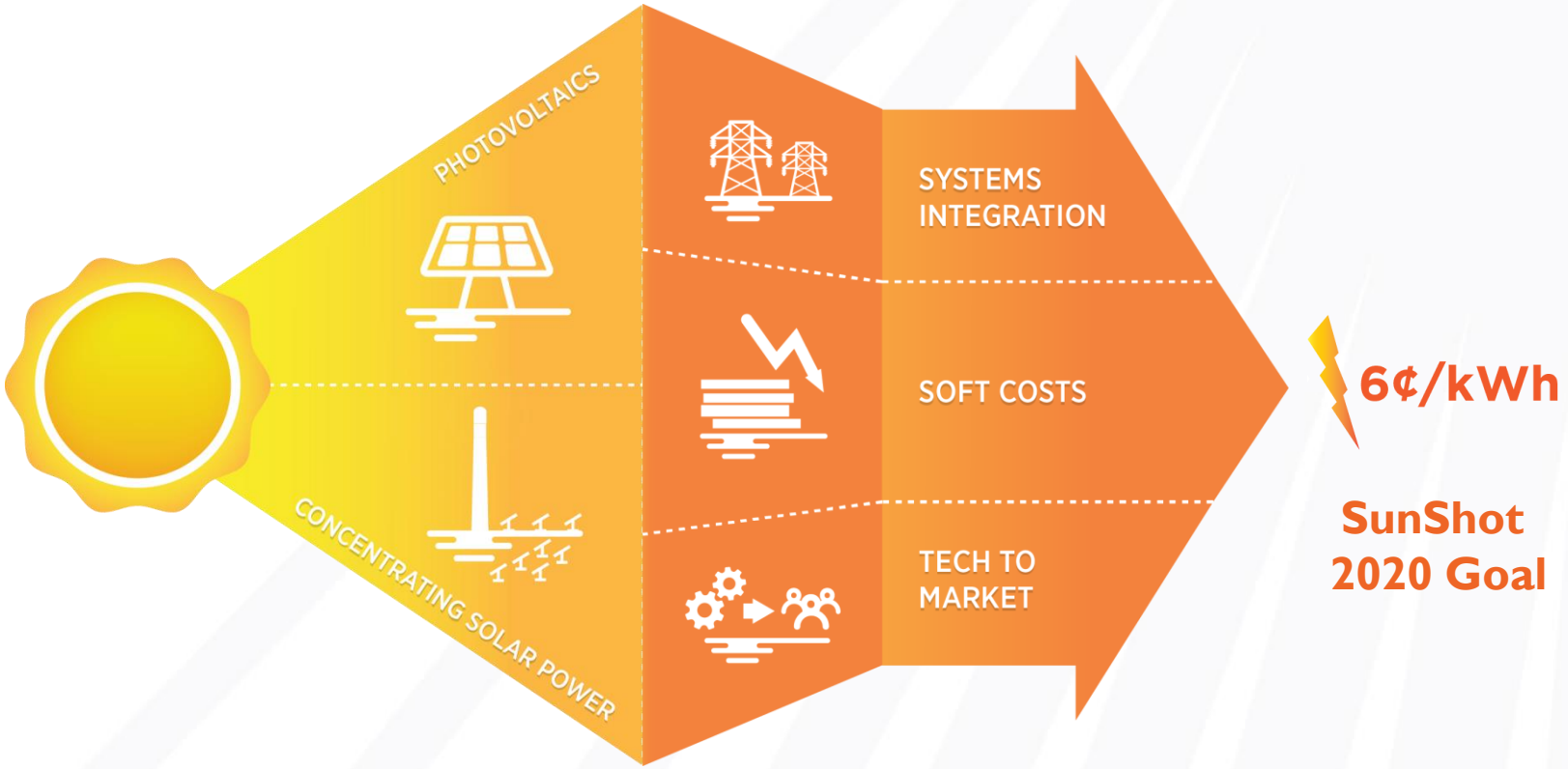
energy.gov/sunshot

Angela Crooks, ManTech International
angela.crooks@ee.doe.gov

Why SunShot?


Price
SunShot Initiative
SunShot Goal: 5 - 6¢/kWh without subsidy.
A 75% cost reduction by 2020.

SunShot Program Structure



Soft Costs Focus Areas

- Reducing non-hardware costs
  - Customer Acquisition
  - Financing and Contracting
  - Permitting, interconnection and inspection
  - Installation and performance
  - O&M
- Lowering market barriers
  - Policy and regulatory environment
  - Access to capital
- Fostering growth
  - Expanding innovation in the marketplace
  - Developing streamlined processes and data driven tools for mature businesses

Solar Market Pathways - $14.6M, 2015-2018

Pathways awardees are developing strategies and tools to increase solar deployment, including: incorporating solar into emergency planning; leveraging collective purchasing power; expanding virtual net metering and commercial property assessed clean energy financing; developing business models for community solar; and assessing solar grid impacts and interconnection processes.

Midwest Renewable Energy Association

University Partners

- Illinois State University
- Missouri University of Science and Tech
- University of Minnesota
- Purdue University

Objectives (Student-Led Program)

- Define strategies for engaging university foundations in solar deployment
- Establish and support student deployment teams
  - Created MREA PV Site Assessment Certificate Program
  - Course developed and 35 students enrolled
  - Will develop skills needed for site selection
- Develop investment proposals and seek support from university governance boards
  - Preliminary proposals reviewed by MREA and NREL; will refine and present
- Promote and showcase PV installations on partnering campuses (future)
- Develop a University Roadmap for Solar Investment, including case studies from partner universities, for national dissemination (future)

www.solarendowment.org

Council of Independent Colleges in Virginia, Inc.

College Partners

- Appalachian School of Law
- Bridgewater College
- Eastern Mennonite University
- Emory & Henry College
- Ferrum College
- Hampton University
- Hollins University
- Lynchburg College
- Mary Baldwin College
- Marymount University
- Randolph College
- Roanoke College
- Shenandoah University
- Virginia Union University
- Washington and Lee University

Objectives

- Develop multi-year 30MW deployment plan for colleges
  - Conducted planning meetings, site assessments and feasibility reports
- Implement collaborative solar procurement
  - RFP issued for over 37 MW

(http://my.solarroadmap.com/ahj/smp-icv/view)

- Stakeholder engagement (ongoing)
- Identify opportunities for utilizing existing expertise and reducing installed price (ongoing)
- Disseminate findings, lessons learned and best practices

http://www.solarroadmap.com/regional-initiatives/smp-icv/

Thank you!

SunShot
U.S. Department of Energy

Federal Initiative for the Utilization of Solar Energy in Higher Ed

James Critchfield
Manager, U.S. EPA's Green Power Partnership

EPA GREEN POWER PARTNERSHIP

NREL/EPA/DOE Technical Support Webinar
Mid-scale Solar Use in Higher Education
December 16, 2015

Green Power Partnership Overview

- Summary
  - The U.S. EPA's Green Power Partnership (GPP) is a free, voluntary program that encourages organizations to use green power as a way to reduce the environmental impacts associated with conventional electricity use.
- Objectives
  - Reduce emissions and air pollution
  - Expand the voluntary green power market
  - Standardize green power procurement as part of best practice environmental management
  - Provide recognition platform for organizations using green power in the hope that others follow their lead
- Current Status
  - 1,300 Partners using more than 28 billion kWh of green power annually, equivalent to the electricity use of more than three million average American homes.

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Higher Education Partners

Middlebury

Colby-Sawyer College

Southern New Hampshire University

UNIVERSITY OF SOUTHERN MAINE

WELLESLEY

BOSTON ARCHITECTURAL COLLEGE

THE OHIO STATE UNIVERSITY

UNIVERSITY of WASHINGTON

University at Buffalo
The State University of New York

THE UNIVERSITY of TENNESSEE KNOXVILLE

GEORGETOWN UNIVERSITY

AMERICAN UNIVERSITY
WASHINGTON, DC

THE UNIVERSITY OF UTAH

The UNIVERSITY of OKLAHOMA

NORTHWESTERN UNIVERSITY

Current Status: Green Power in Higher Education

- EPA's Green Power Partnership
  - 134 College and University Partners
    - 86 REC contracts
    - 49 Utility Market contacts
    - 92 onsite systems
    - 12 off-site PPAs
  - Green power use totaling nearly 2.6 billion kWh
    - Equates to ~5% of voluntary green power market
    - Equivalent to the electricity use of 250,000 average American homes for one year
- Second Nature's Climate Leadership Network (pka ACUPCC Network)
  - 685 Signatories committed to becoming climate neutral
    - Purchased electricity currently constitutes ~35% of their GHG emissions
  - 231 Schools committed to Tangible Action #5
    - Within one year of signing commitment, begin purchasing or producing at least 15% of institution's electricity consumption from renewable sources

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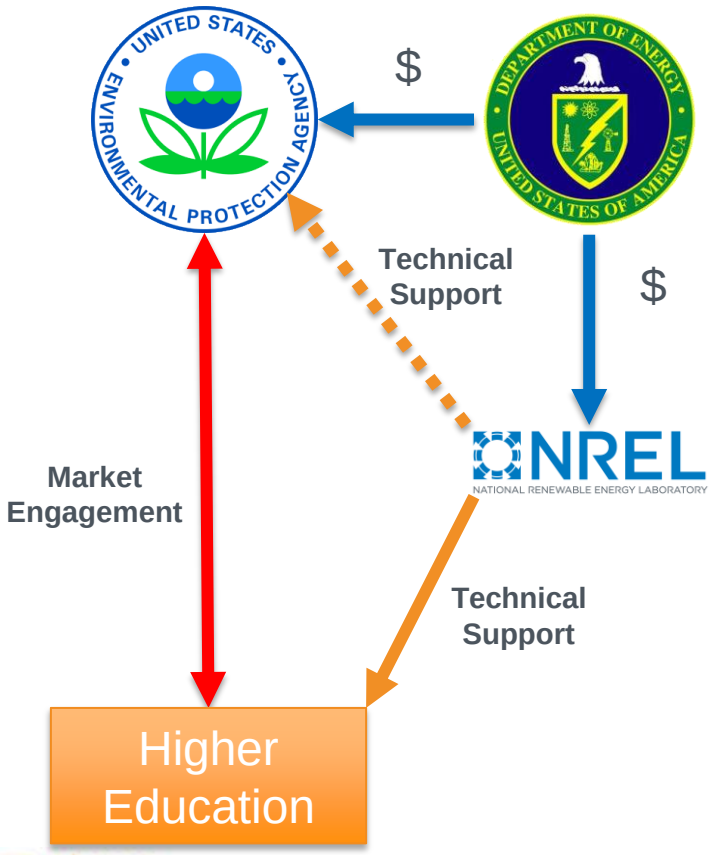
Background: New Federal Initiative

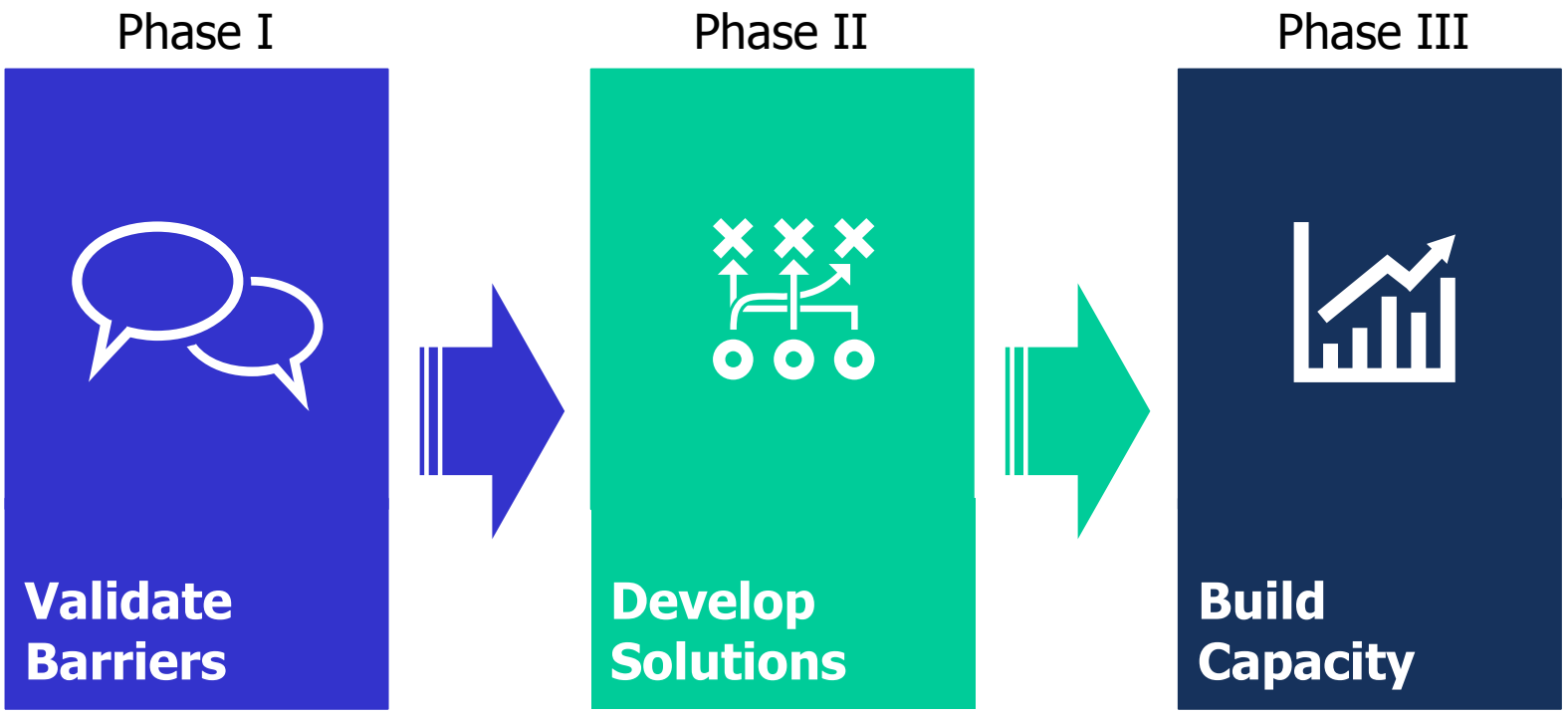
- In late 2015, the US EPA and the US DOE signed an Interagency Agreement (IAA) to focus on the mid-scale solar market
  - The initial effort will address market barriers unique to the deployment and use of solar photovoltaic energy within the U.S. Higher Education sector
- Under this IAA, EPA will leverage the Green Power Partnership's voluntary program platform and extensive network to deploy both technical and non-technical resources
  - Will focus on Public, Private, 4-year, 2-year etc..
- The National Renewable Energy Laboratory (NREL), funded through a DOE SETO SUNLAMP award, will provide technical support to EPA on tools and resources development, engagement and deployment activities undertaken through the IAA.

Federal Roles and Responsibilities



- EPA's Green Power Partnership will engage Higher Education stakeholders and deliver targeted solutions that address validated key market barriers
- The National Renewable Energy Laboratory will provide technical support to EPA as well as direct support to sector institutions
- DOE is providing the funding to EPA and NREL in an effort to advance solar utilization within the mid-scale solar market

18-month Approach



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Why Higher Education?

- Higher Education offers great potential:
  - **Homogenous cohort** of identifiable stakeholders
  - Long time and **respected pillars of local communities**
  - **Long-term view** on energy and sustainability issues
  - **Public commitments** of nearly 700 College and University Presidents to do more related to climate and RE
  - Clearly **identifiable set of financing options** including, third-party ownership, revolving loan funds, endowments, student funded initiatives etc.
  - **Tie-ins to educational mission**; training tomorrow's leaders regarding sustainability and renewable energy issues and opportunities
  - Natural **inter-institutional competitive spirit** in the areas of academia and college sports can be extended to and leveraged into solar energy use

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Near-term Opportunities

- **Higher Ed. Sector Workgroup**
  - EPA will convene a set of Higher Education institutions to identify and validate areas of need
  - Seeking Private, Public, 4-year, 2-year, and both experienced and novice institutions
  - Institutions commit to participating in regular virtual meetings, sharing insights and providing strategic direction
  - Start date: January 2016

Near-term Opportunities

- **Mini Conference Workshops**
  - EPA will be hosting three 80-minute mini-workshops
  - Attendees will learn about key issues and best practices related to solar project development within Higher Education
  - Monday April 4th at the Smart and Sustainable Campuses Conference – Baltimore MD
  - Look for potential future workshops at NACUBO (July - Montreal), ASHEE (Oct – Baltimore)

Gold Sponsors

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Silver Sponsors

OZZI

WGL Energy

Workshop and Tour Sponsors

SIEMENS

Registration: http://smartandsustainable.umd.edu/register

Additional Planned Opportunities

- Online Project Development Resource Library
- Webinar Series
- Training Series
- Best Practices Guidance, Case Studies and Tools
- Sector Recognition opportunities

Questions?

Contact:

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EPA's Green Power Partnership
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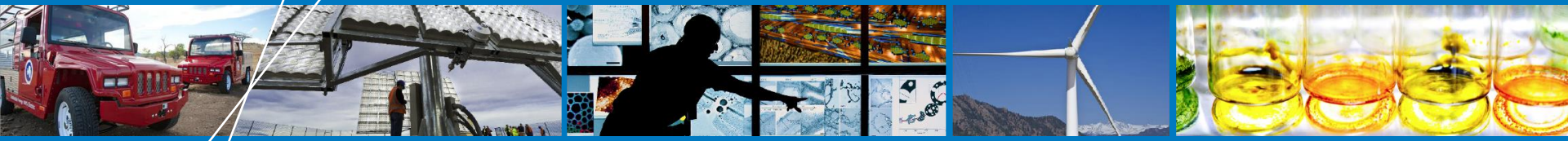
NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Technical Assistance available to Universities



Program Launch

Jenny Heeter

December 16, 2016

Solar Screenings and Implementation Assistance for Universities

- In support of the U.S. Department of Energy's SunShot initiative, NREL is offering no-cost technical assistance to universities seeking to go solar. The program is designed to increase the deployment of mid-scale solar photovoltaic (PV) systems at universities, engage stakeholders to develop deployment solutions, and empower decision makers.

http://www.nrel.gov/tech_deployment/tools_universities.html

Solar Photovoltaic Screenings

- Using the REopt model, NREL will conduct an initial techno-economic assessment of solar PV feasibility at selected universities.
- NREL will provide each university with customized results, including the cost-effectiveness of solar PV, recommended system size, estimated capital cost to implement the technology, and estimated life cycle cost savings.
- Results will be provided for two scenarios: optimizing for cost-effectiveness and optimizing for carbon reduction
- NREL can also offer a more detailed analysis under a strategic partnership projects agreement.

http://www.nrel.gov/tech_deployment/tools_universities.html

Solar Photovoltaic Implementation Assistance

- NREL will provide short-term solar PV implementation assistance to decision-makers in the higher education sector through one-on-one consultations.
- Successful applicants will be partnered with expert NREL staff to determine the most effective use of assistance in deploying mid-scale solar PV.
- NREL will inform the university of existing resources and provide additional information specific to the organization's needs.
- Assistance per university is anticipated to be approximately 40 hours of staff time.

http://www.nrel.gov/tech_deployment/tools_universities.html

Potential Topics

- Financing a solar project
- Procuring a solar project through a power purchase agreement (PPA) or other arrangement
- Developing a collaborative procurement with other institutions
- Hosting a community shared solar array
- Understanding renewable energy certificate (REC) claims and the EPA's Green Power Partnership
- Other (you tell us!)

Eligibility & Selection Criteria

- Any U.S. higher education institution is eligible to apply.
- The following criteria will inform the selection process. Scoring low on one component will not automatically disqualify the university.
  - Plans for future solar projects & solar deployment capacity (MW)
  - Specificity of technical assistance request
  - Innovativeness of solar proposal (e.g. includes a solar+storage, microgrid component, partnerships with businesses, collaborative university purchases, leveraging endowments, etc.)
  - Appropriateness for NREL's areas of expertise
  - Regional diversity
  - Campus solar and sustainability goals
  - Existing partnership (e.g. EPA Green Power Partner)

http://www.nrel.gov/tech_deployment/tools_universities.html

Application materials and deadlines

- First round deadline: January 15, 2016
- Separate applications for each program
- 1-2 page application
- Application forms:
  http://www.nrel.gov/tech_deployment/tools_universities.html

http://www.nrel.gov/tech_deployment/tools_universities.html

Contact information

- **Solar Screening**
  - Kate Anderson, kate.anderson@nrel.gov, 303-384-7453
- **Implementation Assistance**
  - Jenny Heeter, jenny.heeter@nrel.gov, 303-275-4366

http://www.nrel.gov/tech_deployment/tools_universities.html

Potential Q&A

- **Can universities under SMP be funded?**
  - Yes, as long as the request does not duplicate the SMP funded work
- **How many universities will be selected?**
  - Solar Screening: 15 over 2 years
  - Implementation Assistance: 20 over 2 years
- **Can you be apply to both programs?**
  - Apply to one that is most useful to you.