Solar Carports: Turning University Parking Facilities into Renewable Electricity Plants

September 26, 2017

Speakers & Agenda

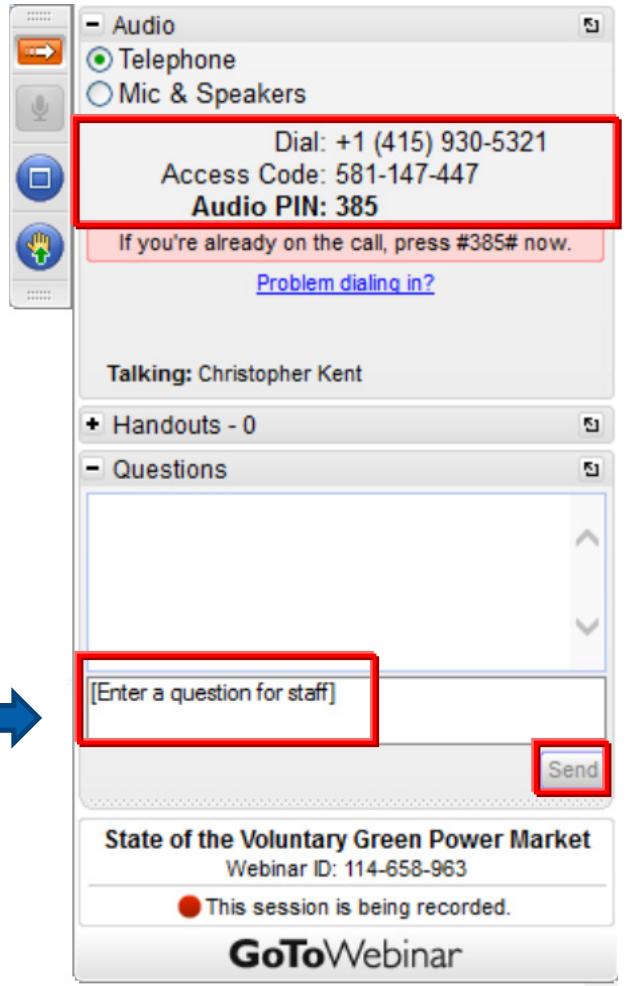
- Speakers
  - Christopher Kent, Program Manager, EPA's Green Power Partnership
  - Lynda Boomer, Director of Planning, Design and Construction, Michigan State University
  - Wolfgang Bauer, University Distinguished Professor and Senior Consultant in the Office of the Executive Vice President, Michigan State University
  - Ezra Small, Sustainability Manager, University of Massachusetts Amherst

- Agenda
  - Webinar logistics & introduction
  - Introduction to Solar Carports
  - University Case Studies
  - Question & Answer Session

EPA GREEN POWER PARTNERSHIP

Webinar Logistics

Open and close your control panel



Audio is available via your computer's microphone and speakers (VoIP) or telephone:
+1 (415) 930-5321
ID: 503-887-261

Type in your questions here

Hit "send" to submit your questions

If you experience technical difficulties, please contact Grant Strauss at: Grant.Strauss@erg.com

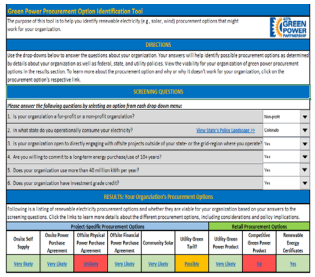
Green Power Partnership Overview

- Summary
  - The U.S. EPA's Green Power Partnership is a voluntary program that encourages organizations to use green power
- Objectives
  - Educate stakeholders on voluntary procurement options within the U.S. renewable energy market
  - Motivate stakeholders to use renewable electricity and expand the voluntary green power market
  - Standardize green power procurement as part of best practice environmental management
  - Recognize leadership in green power procurement
- Program Activities
  - Provide technical assistance and tools on procuring green power
  - Provide recognition platform for organizations using green power in the hope that others follow their lead
- 1,400+ Partners procure more than 44 billion kWh annually, equivalent to the annual electric use of more than 4 million American homes.

EPA GREEN POWER PARTNERSHIP

New Partnership Resources!

- **NEW Green Power Supply Options webpage** providing concise definitions of the various options in the renewable energy marketplace, including financial PPAs and utility green tariffs.
- **COMING SOON Green Power Procurement Options Screening Tool** allows users to determine which supply options are viable for them based on a few simple questions.
- **NEW Guide to Making Claims About Your Solar Power Use** describes best practices for appropriately explaining and characterizing solar power activities and the fundamental importance of renewable energy certificates (RECs) for solar power use claims.
- **NEW Renewable Energy Certificate (REC) Arbitrage** guidance document describes procurement strategy used by consumers installing self-financed renewable electricity projects or consumers who purchase renewables electricity directly from a project, such as through a power purchase agreement (PPA).


Green Power Procurement Option Identification Tool

The purpose of this tool is to help you identify renewable electricity (e.g., solar, wind) procurement options that might work for your organization.

DIRECTIONS

Use the drop-downs below to answer the questions about your organization. Your answers will help identify possible procurement options as determined by data is about your organization as well as federal, state, and utility policies. View the results for your organization of green power procurement options in the results section. To learn more about the procurement option and why or why it doesn't work for your organization, click on the procurement option's respective link.

SCREENING QUESTIONS

Please answer the following questions by selecting an option from each drop-down menu:

1. Is your organization a for-profit or a non-profit organization?	Non-profit
2. In what state do you operationally consume your electricity? View State's Policy Landscape >>	Colorado
3. Is your organization open to directly engaging with offsite projects outside of your state or the grid region where you operate?	Yes
4. Are you willing to commit to a long-term energy purchase/use of 10+ years?	Yes
5. Does your organization use more than 40 million kWh per year?	Yes
6. Does your organization have investment grade credit?	Yes

RESULTS: Your Organization's Procurement Options

Following is a listing of renewable electricity procurement options and whether they are viable for your organization based on your answers to the screening questions. Click the links to learn more details about the different procurement options, including considerations and policy implications.

Project-Specific Procurement Options					Retail Procurement Options	
Onsite Self Supply	Onsite Power Purchase Agreement	Offsite Physical Power Purchase Agreement	Offsite Financial Power Purchase Agreement	Community Solar	Utility Green Tariff	Utility Green Power Product	Competitive Green Power Product	Renewable Energy Certificates
Very Many	Very Likely	Unlikely	Very Likely	Very Likely	Possible	Very Likely	No	Yes

For comments or questions on the tool, please contact kent.christopher@epa.gov

This tool was last updated on: September 18, 2017

EPA GREEN POWER PARTNERSHIP

Higher Education Partners

153 Institutions

4 Billion kWh

Could power **370,000** homes

University of Washington
Drexel University
Southern New Hampshire University
Iowa State University
Syracuse University
Colby-Sawyer College
Babson
University at Buffalo
The State University of New York
American University
The University of Tennessee Knoxville
Boston Architectural College
Colby College
Bentley
www.bentley.edu
Carnegie Mellon University
Oklahoma State University
Ohio University
Georgetown University
The University of Utah
Western Washington University
Northern Arizona University
Emerson College
University of Maryland
Wellesley
University of Colorado Colorado Springs
Middlebury
Penn
University of Pennsylvania
The Ohio State University
University of Missouri
EPA Green Power Partnership
The University of Oklahoma
Northwestern University
Wisconsin
University of Wisconsin-Madison
UNT
University of North Texas
Est. 1890
Bunker Hill Community College
imagine the possibilities

Common Financing Options for Solar

- **Self-Financing**
  - **Cash purchases:** often least expensive option overall as no financing costs or solar finance company fees incurred
    - Upfront cost of PV system is significant and likely a barrier for many universities
    - University needs sufficient federal tax liability for full benefit of federal investment tax credit (ITC)
  - **Traditional self-financing:** provided by banks and credit unions and therefore likely the most available options (e.g., loans and mortgages)
    - Requires universities to have good credit and determine whether it can take full benefit of the federal ITC
- **Third-Party Financing**
  - **Power purchase agreements (PPAs):** solar array offsets university's electric bill, and developer sells power generated to university at fixed rate, typically lower than local utility
  - **Solar leases:** university signs contract with installer/developer and pays for use of solar system over specified period of time, rather than paying for generation ($/kWh)

EPA GREEN POWER PARTNERSHIP

Introduction to Solar Carports

- What is a solar carport?
  - Similar to ground-mounted solar panels, but the structure is intentionally built tall enough to house cars parked underneath
  - Many solar parking lots also incorporate electric car charging stations so that drivers of electric vehicles can recharge with solar power while parked.
- Benefits over roof-mounted solar panels?
  - Can generally produce more power because solar canopies have fewer space constraints
  - Can be built at an optimal angle for sunlight, while many roofs cannot

Arizona State University, Tempe, Arizona

Endicott College, Beverly, Massachusetts

EPA GREEN POWER PARTNERSHIP

Benefits for Your University

- Reduce university's carbon footprint (with REC ownership)
- Reduce electricity expenditures and hedge against future cost increases
  - Lower cost per kWh
  - Lock in price/kWh for next 10-20 years
  - Reduce demand surcharges
  - Certain states, like Massachusetts, have specific tax incentives for solar canopy structures.
- Increase efficiency of under-utilized space
- Improve parking experience for students, staff, and visitors
- Encourage environmentally-friendly forms of transportation
- Showcase university's commitment to sustainability to students and visitors

EPA GREEN POWER PARTNERSHIP

Benefits for Users of Parking Facilities

- Protection from the elements
  - Shade vehicles from sun to prevent overheating of interior
  - Protection from rain and snow, for both the car and its owner.
- Improved fuel economy
  - By providing shade to prevent cars from baking in the hot sun, solar carports can substantially improve car owners' fuel economy.
  - According to FuelEconomy.gov, running your car's air conditioning system can reduce a conventional vehicle's fuel economy by more than 25% under very hot conditions.
- Access to electric vehicle charging stations
  - Carports can include EV charging stations and covered bicycle parking, to encourage environmentally-friendly transportation.
- Increased school pride!

EPA GREEN POWER PARTNERSHIP

What if….

- There are an estimated 800 million parking spaces in the U.S., occupying some 4,360 square miles, or an area almost the size of Connecticut.
- If even 1/100 of those spaces were covered by solar carports, they would:
  - Produce an estimate 285 billion kWh/year of solar electricity!
  - That is enough electricity to power every home and business in California!

EPA GREEN POWER PARTNERSHIP

More Information

- Green Power Partnership: www.epa.gov/greenpower
- Renewable Energy Project Development Toolbox: www.epa.gov/repowertoolbox

- More Questions?
  - Christopher Kent, EPA, kent.christopher@epa.gov

EPA GREEN POWER PARTNERSHIP