

Webinar Series:

# Energy Efficiency and Conservation Loan Program

With Experts from Electric Cooperatives and  
the U.S. Departments of Agriculture and Energy



U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

# Webinar #6 of 6: **Solar**

**Gerard Moore**, Acting Deputy Assistant Administrator of the Electric Program in USDA's Rural Utilities Service

**Bill Vecchio**, Business Development Director, New Hampshire Electric Co-op

**Chad Laurent**, Meister Consultants Group

**Odette Mucha**, Stakeholder Engagement, Office of Energy Efficiency and Renewable Energy, US Department of Energy



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# Webinar Series recordings available online

[www.energy.gov/rpsc](http://www.energy.gov/rpsc)

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U.S. DEPARTMENT OF  
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# **Energy Efficiency and Conservation Loan Program (EECLP)**

Rural Utilities Service  
Electric Program  
US Department of Agriculture

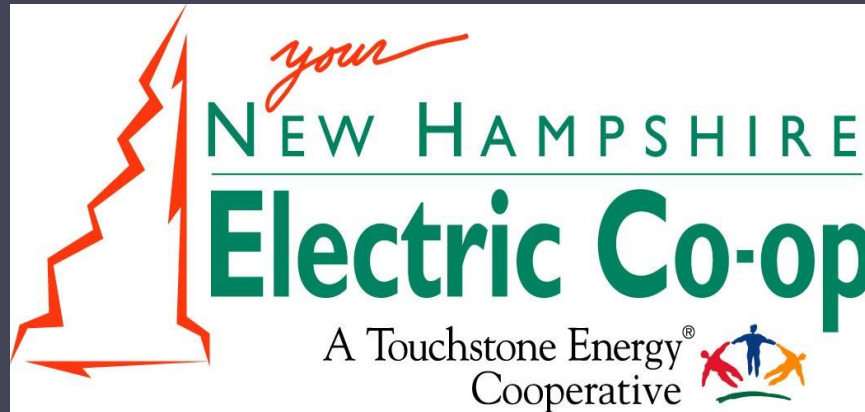
## *For Additional Information*

Please visit our website at: [http://www.rurdev.usda.gov/UEP\\_EECLP.html](http://www.rurdev.usda.gov/UEP_EECLP.html)

Or [Gerard.moore@wdc.usda.gov](mailto:Gerard.moore@wdc.usda.gov) 202-205-9692

- ▶ For more information on the Final Rule, you may download the following information here:
- ▶ [Press Release](#)
- ▶ [Final Rule](#)
- ▶ [Background PowerPoint Presentation](#)
- ▶ [Presentation](#)
- ▶ [Toolkit](#)
- ▶ Current Electric Program Borrowers should reach out to the Electric Program [General Field Representatives](#) for additional information and how to apply.

# Solar Program Overview



**Bill Vecchio**

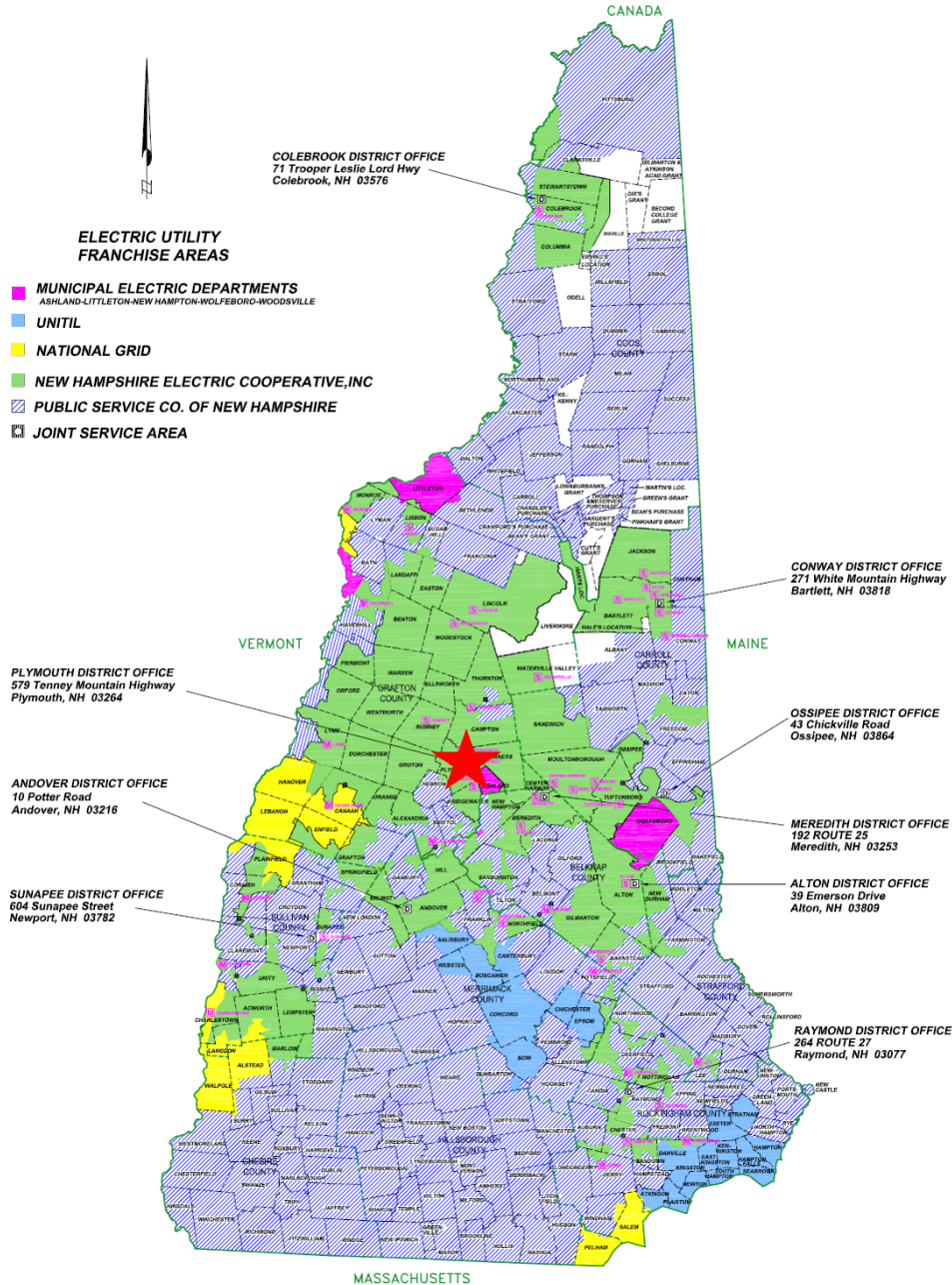
*Business Development*

**Scott McNeil**

*Program Coordinator*

**ELECTRIC UTILITY  
FRANCHISE AREAS**

- MUNICIPAL ELECTRIC DEPARTMENTS  
ASHLAND-LITTLETON-NEW HAMPTON-WOLFEBORO-WOODSVILLE
- UNITIL
- NATIONAL GRID
- NEW HAMPSHIRE ELECTRIC COOPERATIVE, INC
- PUBLIC SERVICE CO. OF NEW HAMPSHIRE
- JOINT SERVICE AREA



# Co-op Service Territory



# Organizational Demographics

- Headquartered in New Hampshire's Lakes and Mountains
- The 2nd largest electric utility in NH
- Among top 30 Co-ops nationally
- Services - 80,000+ homes (86%) & businesses (14%)
- 29% of residential members are seasonal homes
- Line Miles - 5,000 OH, 750 UG
- Offices - 9 Districts & Plymouth HQ
- Employees - 200
- Wholesale Coincident Peak ~ 180 MW
- Energy Requirements ~ 774,000 MWh

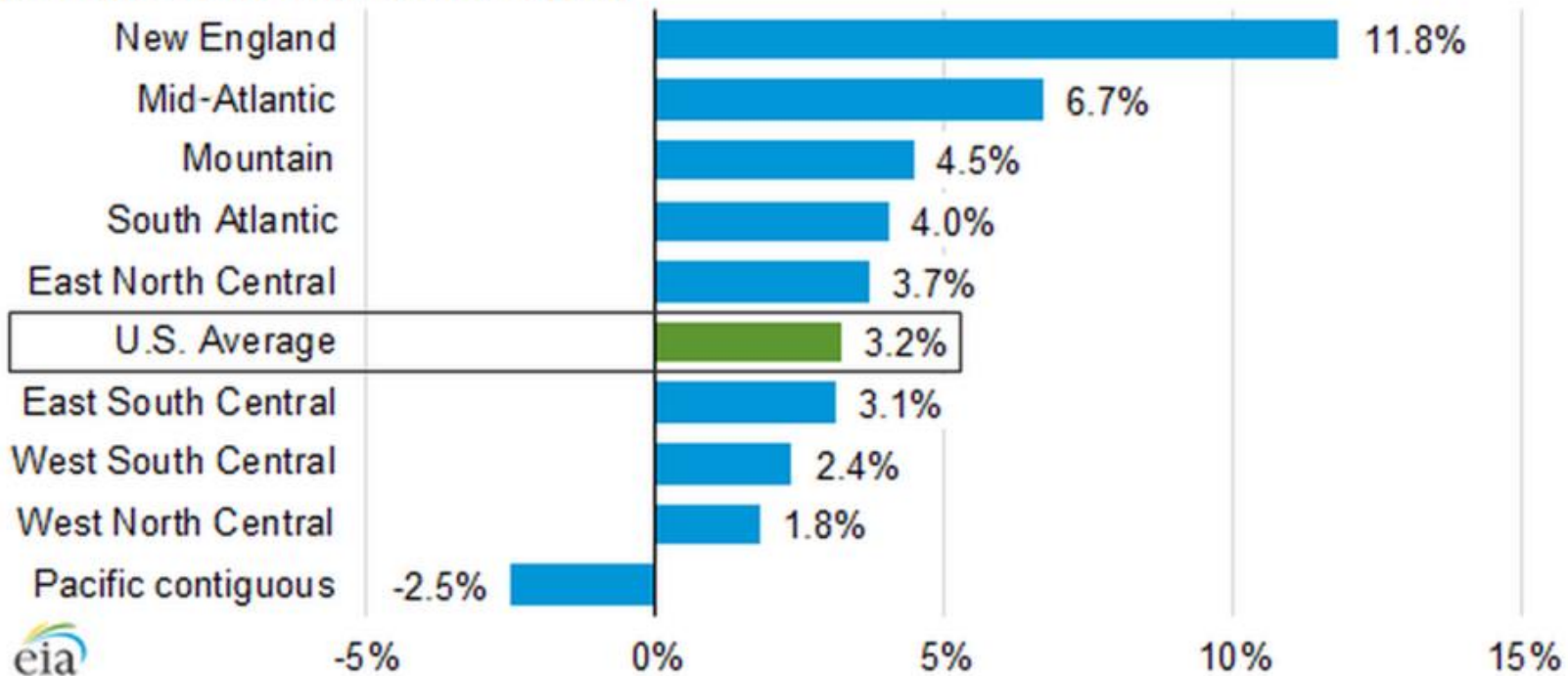


# New England's High Energy Prices

- Natural gas prices are driving up the price of wholesale electricity due to New England's reliance on natural gas for nearly half of the region's electricity.
- Although large new supplies of natural gas are being extracted nearby on New England's doorstep in states like Pennsylvania and New York, a lack of pipeline capacity into the region that is adequate to handle winter demands is causing the price of natural gas for winter delivery to climb sharply.
- This has caused a corresponding increase in the price of wholesale electricity
- The residential rate this winter is \$0.17653 per kWh
- NHEC members are seeking options to reduce costs

# Residential electricity prices are rising

Change in average residential electricity prices by Census division  
(first half 2014 versus first half 2013)



Source: Energy Information Administration,  
<http://www.eia.gov/todayinenergy/detail.cfm?id=17791>

# Energy Efficiency Programs

RESIDENTIAL  COMMERCIAL

RESIDENTIAL  COMMERCIAL



## CO-OP ENERGY SOLUTIONS

Putting the Power in Your Hands

New Hampshire Electric Cooperative provides expertise and incentives for Commercial and Industrial members looking to help their bottom line by installing energy efficiency improvements and renewable energy systems. Complete program details and applications are available online at [www.nhec.coop](http://www.nhec.coop)



## CO-OP ENERGY SOLUTIONS

Putting the Power in Your Hands

New Hampshire Electric Cooperative provides expertise and incentives for Residential members looking to invest in energy efficiency improvements and renewable energy systems. Complete program details and applications are available online at [www.nhec.coop](http://www.nhec.coop)

### LARGE BUSINESS ENERGY SOLUTIONS

Provides incentives to replace older, inefficient equipment with new technology that will save energy and money.

### SMARTSTART

(SAVINGS THROUGH AFFORDABLE RETROFIT TECHNOLOGIES)

Commercial members can utilize on-bill financing and pay nothing out of pocket for the installation of energy efficient products and equipment.

### HOME PERFORMANCE WITH ENERGY STAR®

Save money and improve the comfort of your home with a whole-house approach to energy efficiency. Incentives available for a variety of improvements, including air sealing, insulation, lighting and more.

### HOME ENERGY ASSISTANCE

Helps income-qualified members lower their energy costs by providing no-cost services and energy efficiency improvements.

### HIGH EFFICIENCY HEAT PUMPS

Incentives available for the installation of efficient heat pump systems in new or existing businesses.

### SMALL BUSINESS ENERGY SOLUTIONS

Provides incentives up to 50% for energy efficiency improvements such as lighting, HVAC and refrigeration systems to help reduce costs now and for years to come.

### ENERGY EFFICIENCY LOAN

Interest-free financing for all or a portion of your Home Performance with ENERGY STAR® co-pay.

### HEAT PUMP WATER HEATERS

Reduce your hot water heating costs by utilizing Co-op incentives toward the installation of qualified heat pump water heaters.

### RENEWABLE ENERGY

Use Co-op incentives to install qualified solar PV or thermal energy systems and reduce your exposure to fluctuating energy costs.

### COMMERCIAL & INDUSTRIAL FOSSIL FUEL

Businesses of all sizes can save fossil fuel and money with incentives on energy efficient products and equipment.

### HIGH EFFICIENCY HEAT PUMPS

Use Co-op incentives to install ultra-efficient heat pump systems in your new or existing home.

### ENERGY STAR® HOMES

Offers incentives for members who build their new homes to ENERGY STAR® efficiency standards. Incentives also available for upgrades of appliances and lighting in existing homes.

### ENERGY STAR® LIGHTING & APPLIANCES

Save with rebates when you purchase ENERGY STAR® certified products, including interior and exterior lighting, clothes washers, refrigerators, room air conditioners and more.

### RENEWABLE ENERGY

Make the clean energy choice with incentives on the installation of a variety of renewable energy systems.

For more information or to get started, visit [NHEC.COOP](http://NHEC.COOP) or call NHEC Member Solutions at 1-800-698-2007.



579 Tenney Mountain Highway  
Plymouth • NH • 03264-3154

\* Incentives and program eligibility are available on a first-come, first-served basis. Member must apply for incentives prior to starting work. Incentives are not awarded retroactively.

For more information or to get started, visit [NHEC.COOP](http://NHEC.COOP) or call NHEC Member Solutions at 1-800-698-2007.



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\* Incentives and program eligibility are available on a first-come, first-served basis. Member must apply for incentives prior to starting work. Incentives are not awarded retroactively.

# Social and Environmental Responsibility Programs

Established by NHEC's Board of Directors in 2007

Both Residential and Commercial Programs

The screenshot shows the website for New Hampshire Electric Co-op. The header includes the logo with the tagline "Serving the Granite State" and navigation links: Home, News, About NHEC, Careers, Contact Us. A search bar is present. A menu bar contains: RESIDENTIAL, BUSINESS, RATES & TARIFFS, COMMUNITY, MEMBER SERVICE, MY ACCOUNT, OUTAGE CNTR, and a Member Login button.

## RENEWABLE ENERGY

### CO-OP ENERGY SOLUTIONS

Putting the Power in Your Hands

**Use the fuel that's clean and free**

We have incentives for Residential members on the installation of qualified renewable energy systems in NHEC service territory. See links below for available incentives. Incentives are available for other renewable technologies not listed below. Contact NHEC for incentive availability.

NHEC will monitor and/or purchase Renewable Energy Certificates (RECs). [Click here for more information.](#)

- [Residential Solar Hot Water](#)
- [Residential Solar Photovoltaic \(PV\)](#)
- [Renewable Energy Certificate \(REC\) Monitoring](#)

### Downloads

#### Other Downloads

PDF Downloads require Adobe Acrobat reader. If you do not have Acrobat, you may obtain it by clicking the icon below.

[For More Information](#)

# NHEC's Solar PV Program

The screenshot shows the NHEC website's Solar PV program page. At the top, there is a navigation bar with links for Home, News, About NHEC, Careers, and Contact Us. Below this is a search bar and a menu with categories: RESIDENTIAL, BUSINESS, RATES & TARIFFS, COMMUNITY, MEMBER SERVICE, MY ACCOUNT, and OUTAGE CNTR. A Member Login button is also present.

The main content area features the heading "SOLAR PV" and the "CO-OP ENERGY SOLUTIONS" logo with the tagline "Putting the Power in Your Hands". The text reads: "Use the fuel that's clean and free. We have incentives available to help you use the sun's natural energy to generate electricity."

Three key benefits are listed:

- GOOD FOR YOU:** Protects you from future electric price increases. A typical 5KW system can produce approximately 80% of an average home's annual electricity use.
- GOOD FOR YOUR HOME OR BUSINESS:** PV systems have solid state components and require minimal maintenance. Increases the value of your home.
- GOOD FOR THE ENVIRONMENT:** Solar power is an unlimited resource that does not release carbon dioxide or other pollutants. Reduces reliance on fossil fuels.

Additional information includes: Residential incentives of \$0.50 per Watt, up to \$2,750. Funding is limited and issued on a first-come, first-served basis. Self-installations are eligible, however we strongly recommend the use of a qualified installer. Incentive applications must be pre-approved prior to installation of equipment. NHEC will monitor and/or purchase renewable energy certificates. Incentives are available for other renewable technologies.

On the right side, there is a "Downloads" section with a link to the "2015 Solar PV Incentive Application" and a note that PDF downloads require Adobe Acrobat Reader. Below this is a "For More Information" section.

# Solar PV Incentives

## ☐ Residential PV Incentives

- ✓ Available on a first come, first-served basis. There are a limited number of incentives available in 2015. The incentive is \$0.25 per DC watt up to \$1,375.

## ☐ Commercial Incentives

- ✓ Available on a first come, first-served basis. There are a limited number of incentives available in 2015. The incentive is \$0.25 per DC watt up to 15% of the system cost, capped at the lesser of 15% of the system cost or \$10,000.

# Rules & Regulations

- NHEC Terms & Conditions
- New Hampshire Public Utilities Commission Rules
  - 900 NET Metering Rules
  - 2500 REC metering rules
- National Electrical Code (system must be installed by a NH licensed electrician)

# Pre-Installation Procedures

- ✓ Telephone conference with NHEC Member
- ✓ Member submits incentive application (if applicable)
- ✓ NHEC will review
  - ✓ Existing electrical service with engineering
  - ✓ PV System Design
  - ✓ Interconnection Application
  - ✓ REC Agreement (if applicable)
- ✓ Once the application is approved, the member will be notified by mail
- ✓ Installation must be completed within 120 days of approval date



# Renewable Energy Certificates (REC's)

- By receiving an incentive, the member will be giving NHEC the rights to their REC's. (Residential – in perpetuity / Commercial – negotiated term)
- These certificates are used to help the Cooperative reach its Renewable Energy Portfolio requirements.
- In lieu of receiving an incentive, the member may sell the REC's produced by the installed renewable energy system to NHEC or to another entity.
- If the member chooses to sell the REC's to NHEC, NHEC will pay the current market value as established annually by NHEC for each REC produced.
- Each REC is equal to one megawatt-hour (1,000 kilowatt-hours) of generation.
- It is required by state regulation that the members' REC's are monitored by an approved entity.

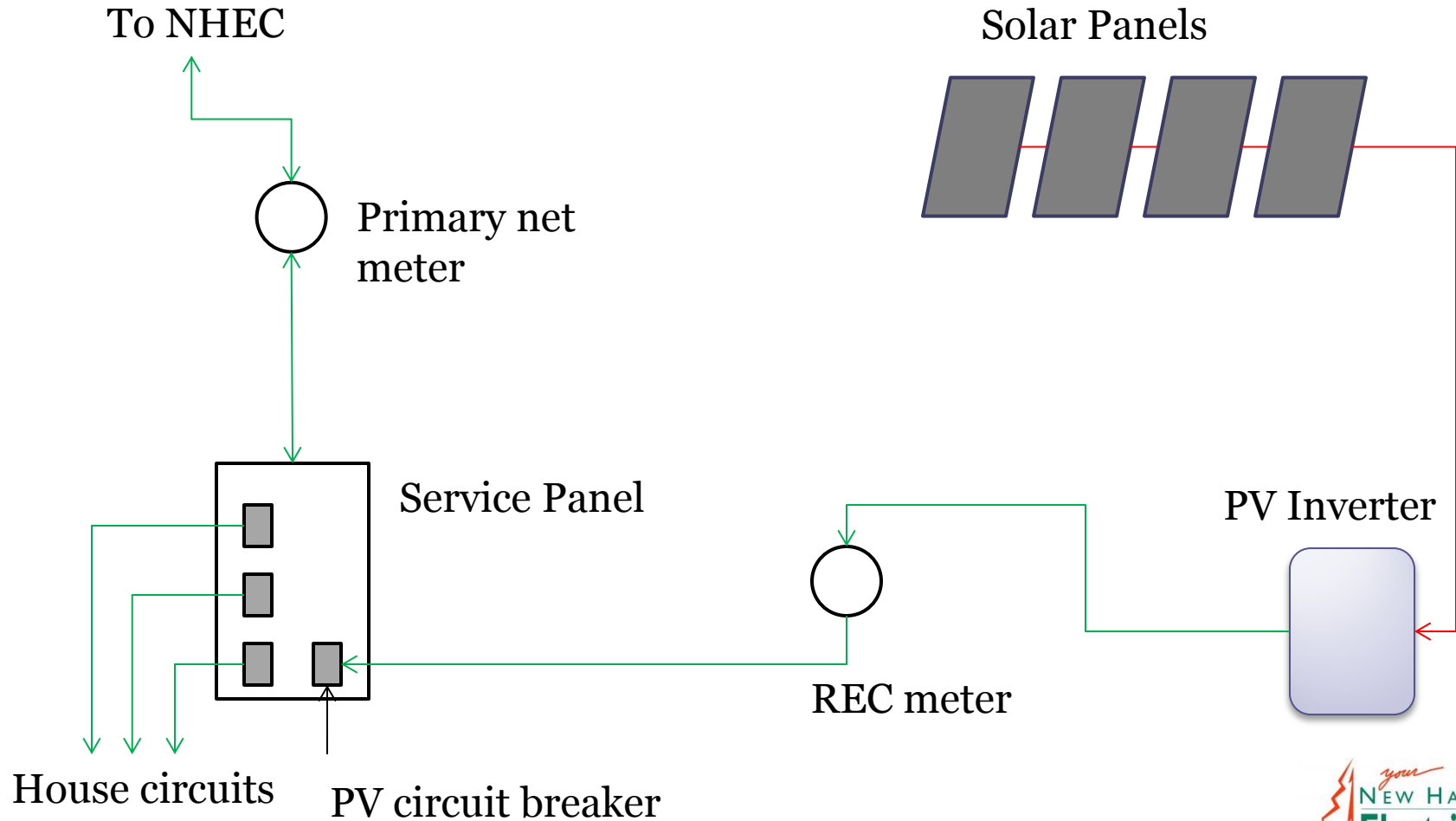
# Additional Incentives

- NHEC members may be eligible for a State of NH incentive – [www.puc.nh.gov](http://www.puc.nh.gov)
- Members may also be entitled to a federal tax credit (Members should consult their own tax advisor to determine eligibility for these credits.)

# Post Installation Site Visit

- ✓ Review applications with Member
- ✓ Verify primary meter number associated with the PV installation
- ✓ PV system hardware review:
  - ✓ PV panel location, verify panel tilt, azimuth and shading consistencies
  - ✓ inverter(s) UL 1741 listed
  - ✓ disconnects & over-current devices
  - ✓ REC meter socket location
- ✓ Replace primary meter with net meter
- ✓ Install REC meter
- ✓ Energize PV System
- ✓ Test UL 1741 operation
- ✓ Review meter displays with Member
- ✓ Member Q&A

# Single REC Metering



# Solar PV System Installations

As of 1/15/2015

## Installed

- Commercial – 36 systems (.636 MW)
- Residential – 402 systems (2.016 MW)

## In Progress

- Commercial – 2 systems (199,000kW)
- Residential – 19 systems (115,845 kW)



**Plymouth Village Water & Sewer District's 121 kw Solar Panel Array**






**CO-OP ENERGY SOLUTIONS**

Putting the Power in Your Hands



*your*  
NEW HAMPSHIRE  
**Electric Co-op**

A Touchstone Energy<sup>®</sup>  
Cooperative 

Thank you!

Questions?



**www.nhec.coop**

**SCOTT MCNEIL**

[mcneils@nhec.com](mailto:mcneils@nhec.com)

**BILL VECCHIO**


[vecchiob@nhec.com](mailto:vecchiob@nhec.com)



# Solar Powering Your Community

## Solar PV Opportunities and EECLP



 Powered by  
**SunShot**  
U.S. Department of Energy

# About the SunShot Solar Outreach Partnership



The **SunShot Solar Outreach Partnership (SolarOPs)** is a U.S. Department of Energy (DOE) program designed to increase the use and integration of solar energy in communities across the US.

# Solar Technologies



**Solar Photovoltaic (PV)**

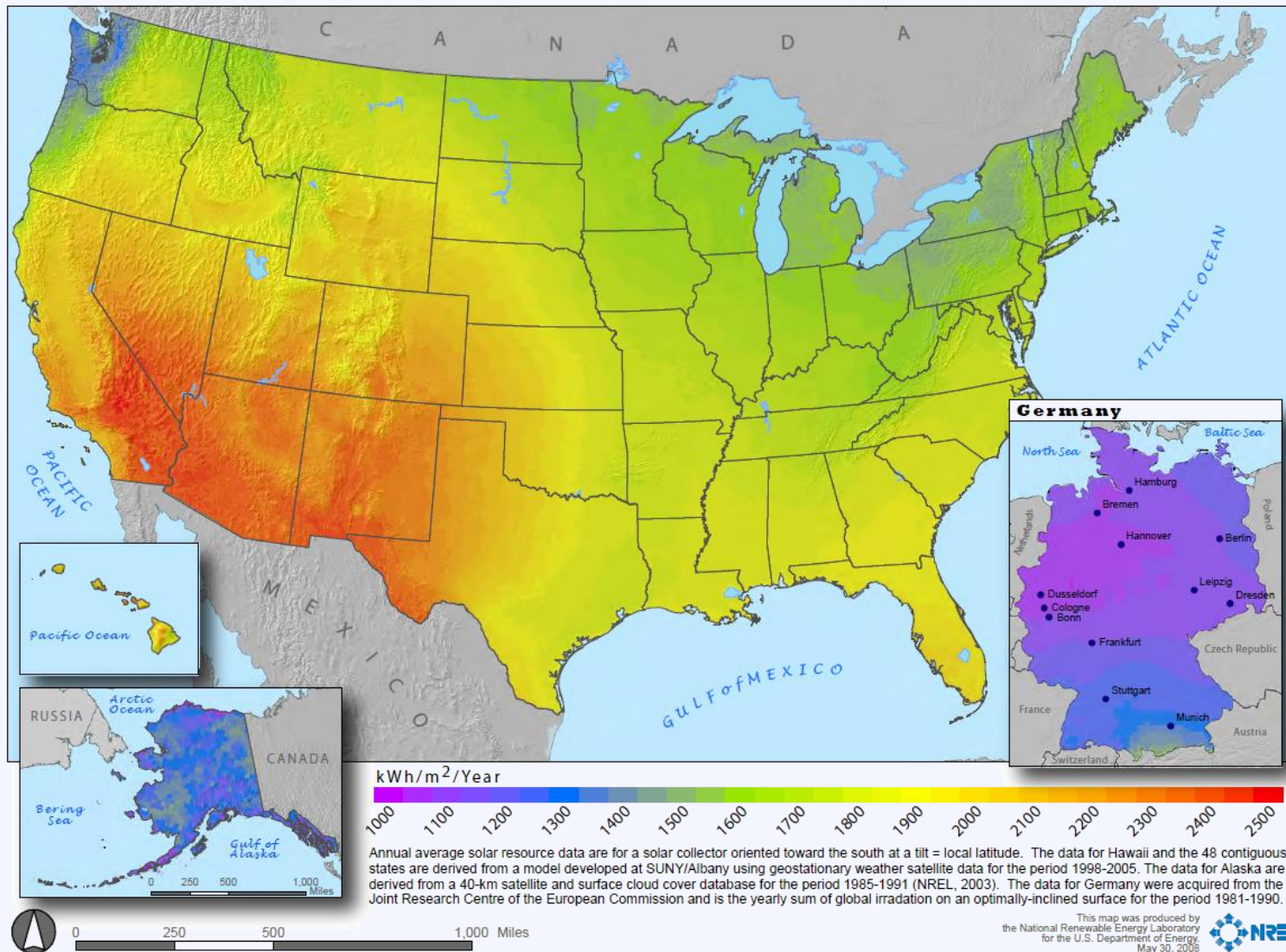


**Solar Hot Water**

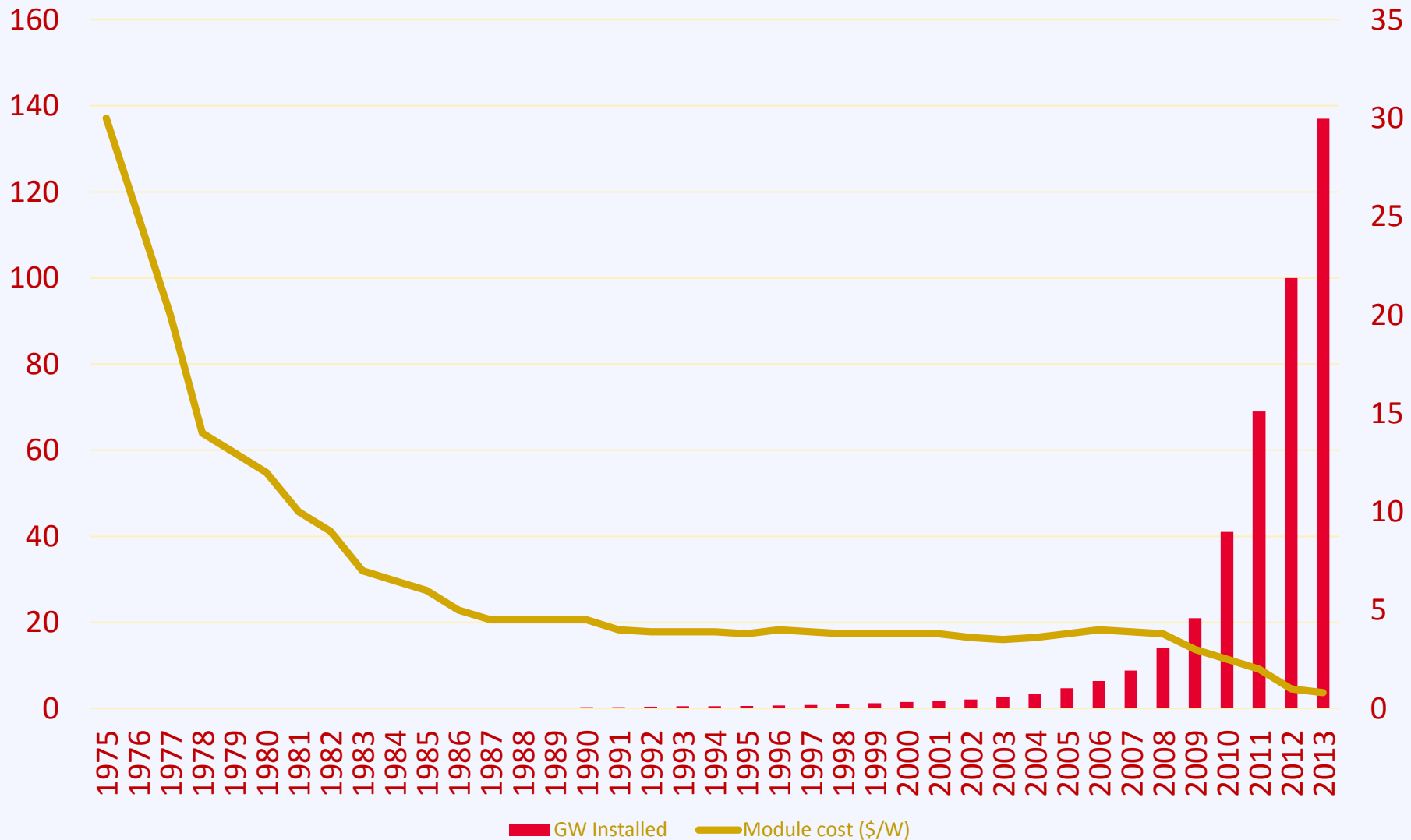


**Concentrated Solar Power**

# US Solar Resource

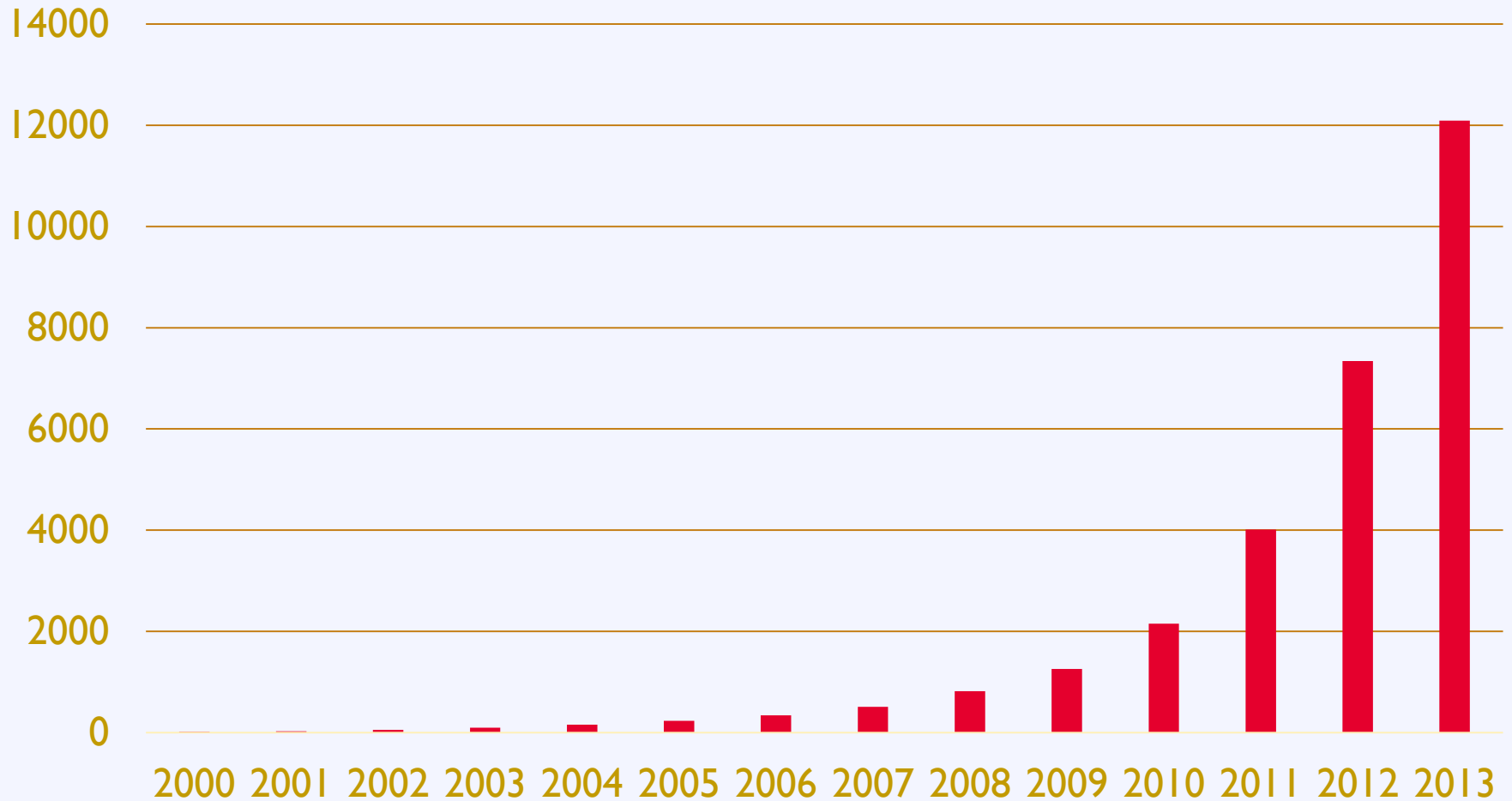


# Global Market & Module Prices



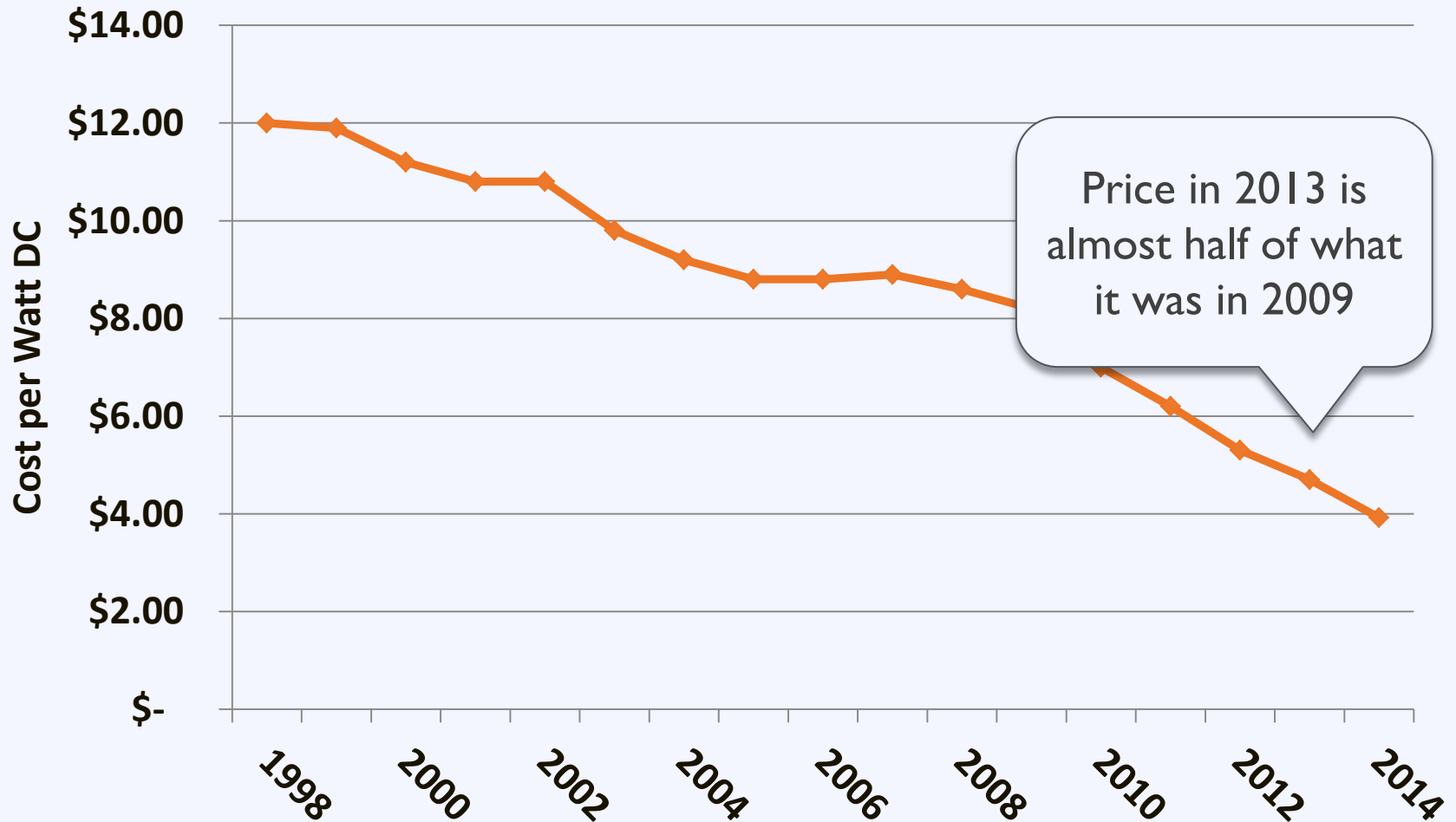
# US Solar Market

US Installed PV Capacity (MW)

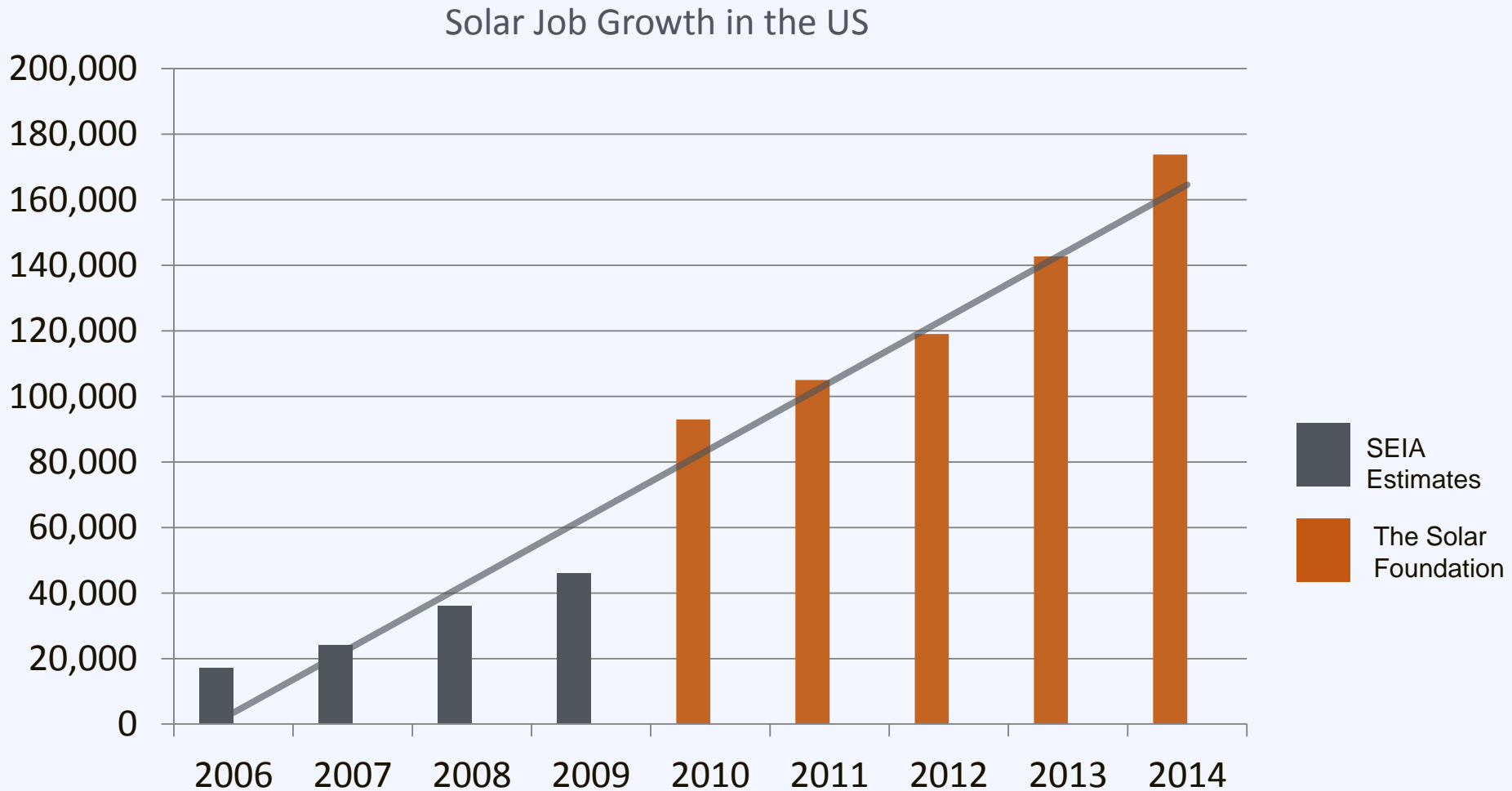


# Falling PV Prices

## US Average Installed Cost for Behind-the-Meter PV



# Solar Job Growth





# Lending Opportunity

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Fewer than **5%**

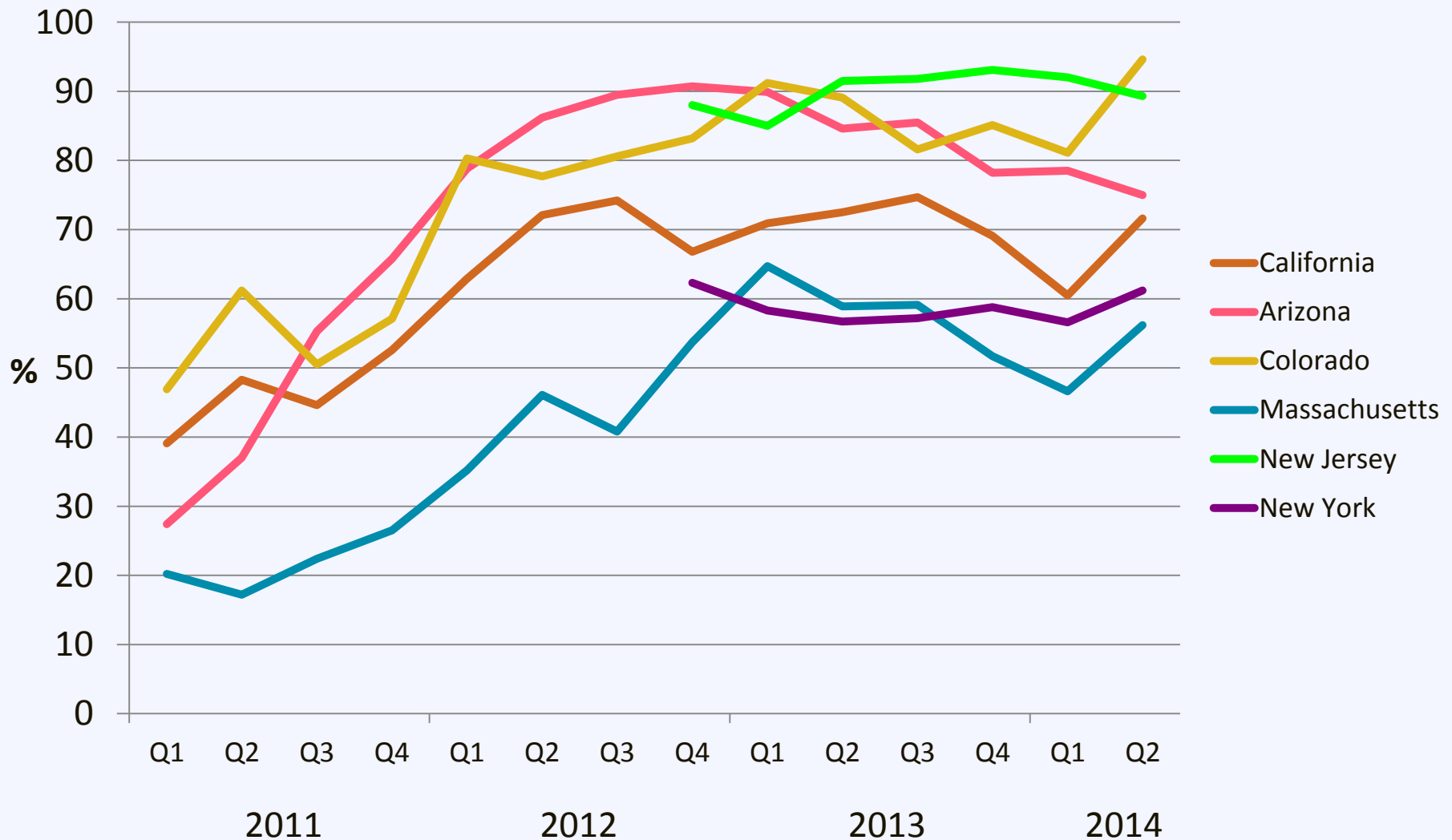
*of the*

**6,500 banks** in the US

*are*

**actively financing solar PV projects**

# Third Party Ownership



# Loans vs. PPA

## CASH PURCHASE

Pay an installer for turnkey installation, get much of it back in the first year through rebates and tax credits. Benefits generated by offsetting your electric bill and receiving incentives.

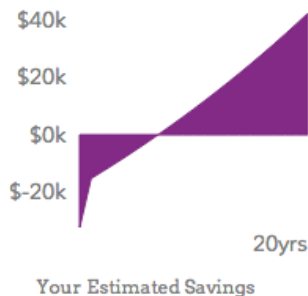
**\$0** Monthly Payment

**\$18,000** Net Cost ?

**\$2,400** First Year Savings ?

**\$42,000** 20 Year Net Savings ?

**6.9 Years** Payback



## \$0-DOWN LOAN

No money down, often a reduced monthly bill and own it outright after loan term. Get the same rebates and incentives as cash purchase without the upfront cost.

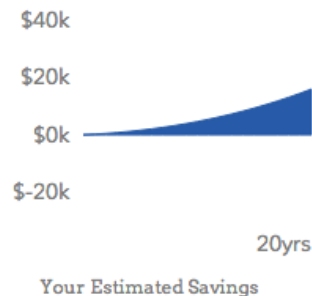
**\$180** Monthly Payment

**\$0** Out-of-Pocket Cost

**\$200** First Year Net Savings ?

**\$16,000** 20 Year Net Savings ?

**Immediate** Payback



## \$0-DOWN LEASE/PPA

Turnkey installation with no money down and immediate savings. The solar company owns and maintains the solar panel system, but you get the electricity.

**\$170** Monthly Payment

**\$0** Out-of-Pocket Cost

**\$360** First Year Net Savings ?

**\$5,800** 20 Year Net Savings ?

**Immediate** Payback



# EECLP Solar Loans

- Utility can make a consumer loan and collect payments or delegate servicing of the loan to an agent.
- Utility can pay for system without making a loan and recover its costs through an opt-in tariff for specific customer or customer class.
  - e.g. a community solar opt-in program where tariff includes both benefits of the project and loan repayment for customer's share of the project



# EECLP Solar Loans



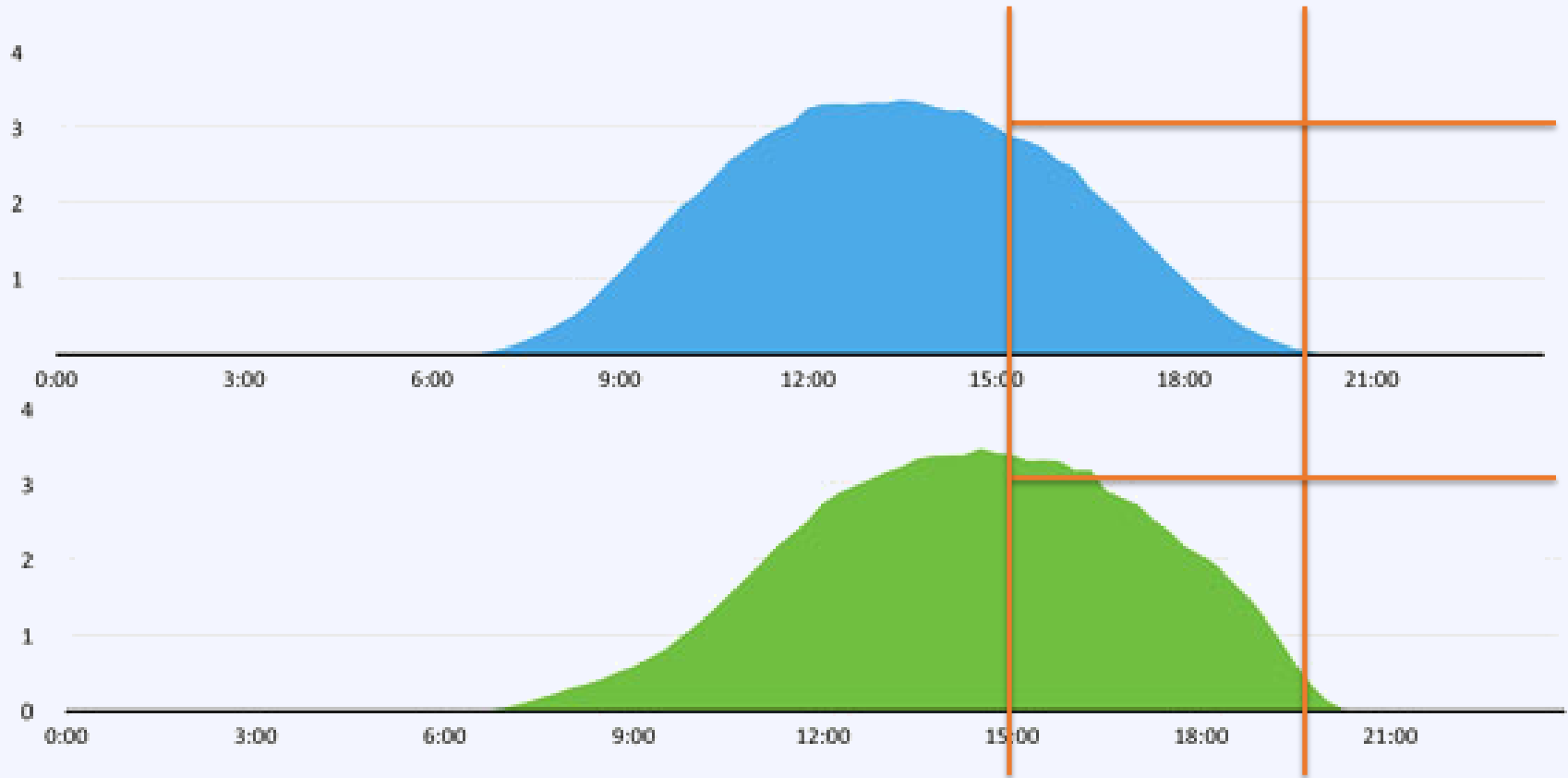
- On-bill repayment is okay
- Can recover costs through the rate-base if the project reduces peak demand.
- Other financial recoupment mechanisms may also be approved by RUS.

# Opportunities

- Opportunity to lend to residential, commercial & industrial customers, small businesses, farmers.
- Solar output matches well with electricity use for pumping, irrigation.
- Small commercial systems have often been difficult to finance—a low interest loan from the Coop could significantly help these customer PV markets

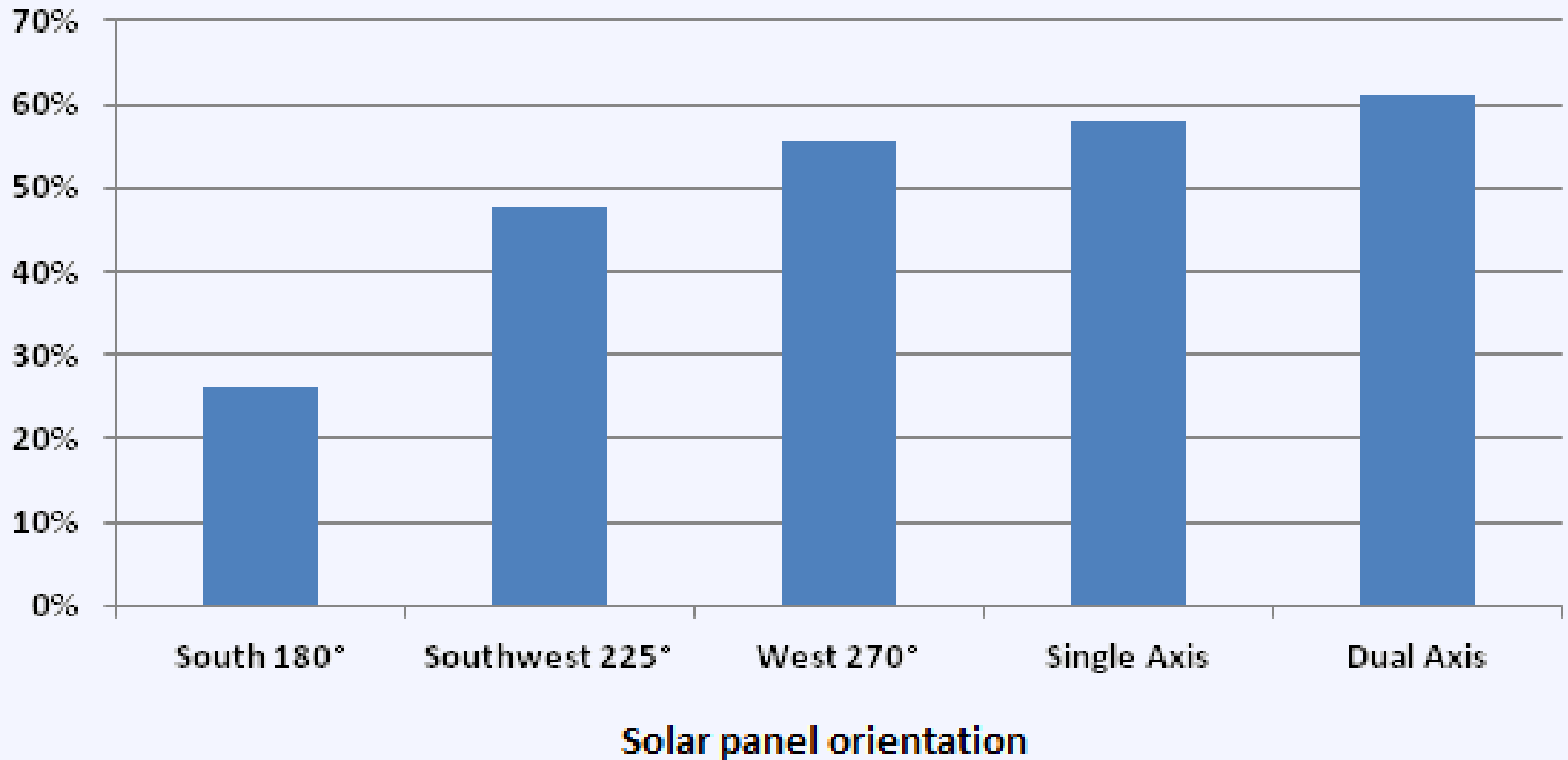


# West facing solar?



Average daily generation profile (kW) from rooftop PV systems for south and west systems. Source: Pecan Street Research Institute

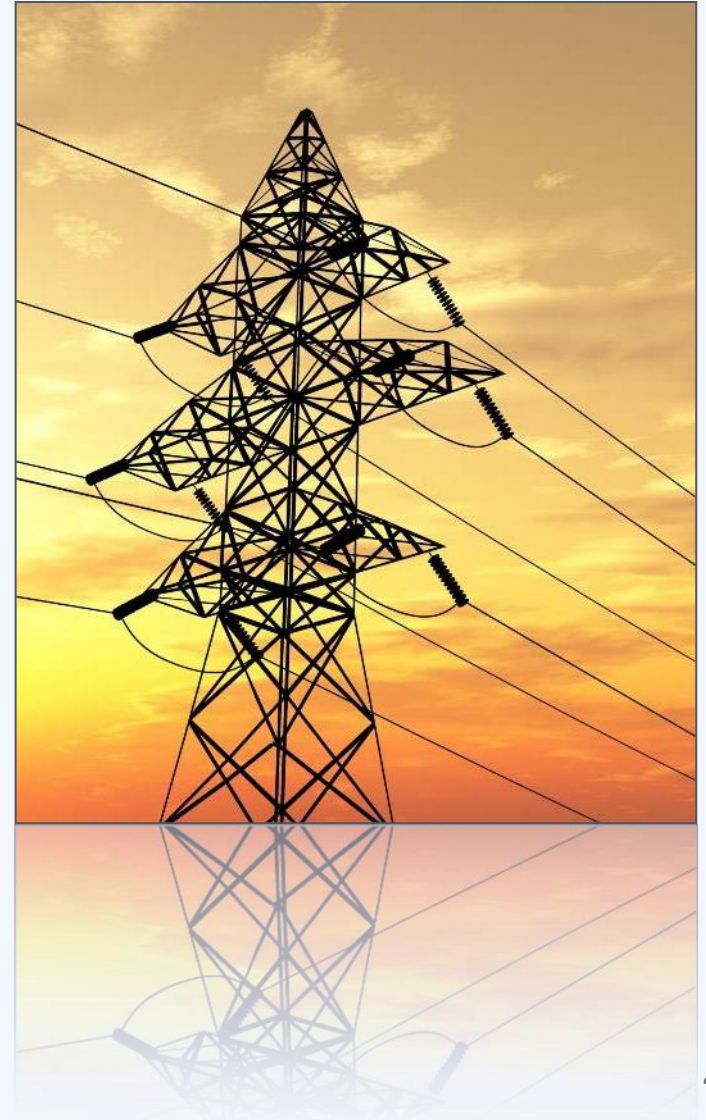
# PV Contribution to Peak





# Why Community Solar?

- More customers can participate (improve equity)
- Customer satisfaction
- Economic development
- Economies of scale with larger project
- Project can be strategically located to maximize grid benefits
- Potential for backup power

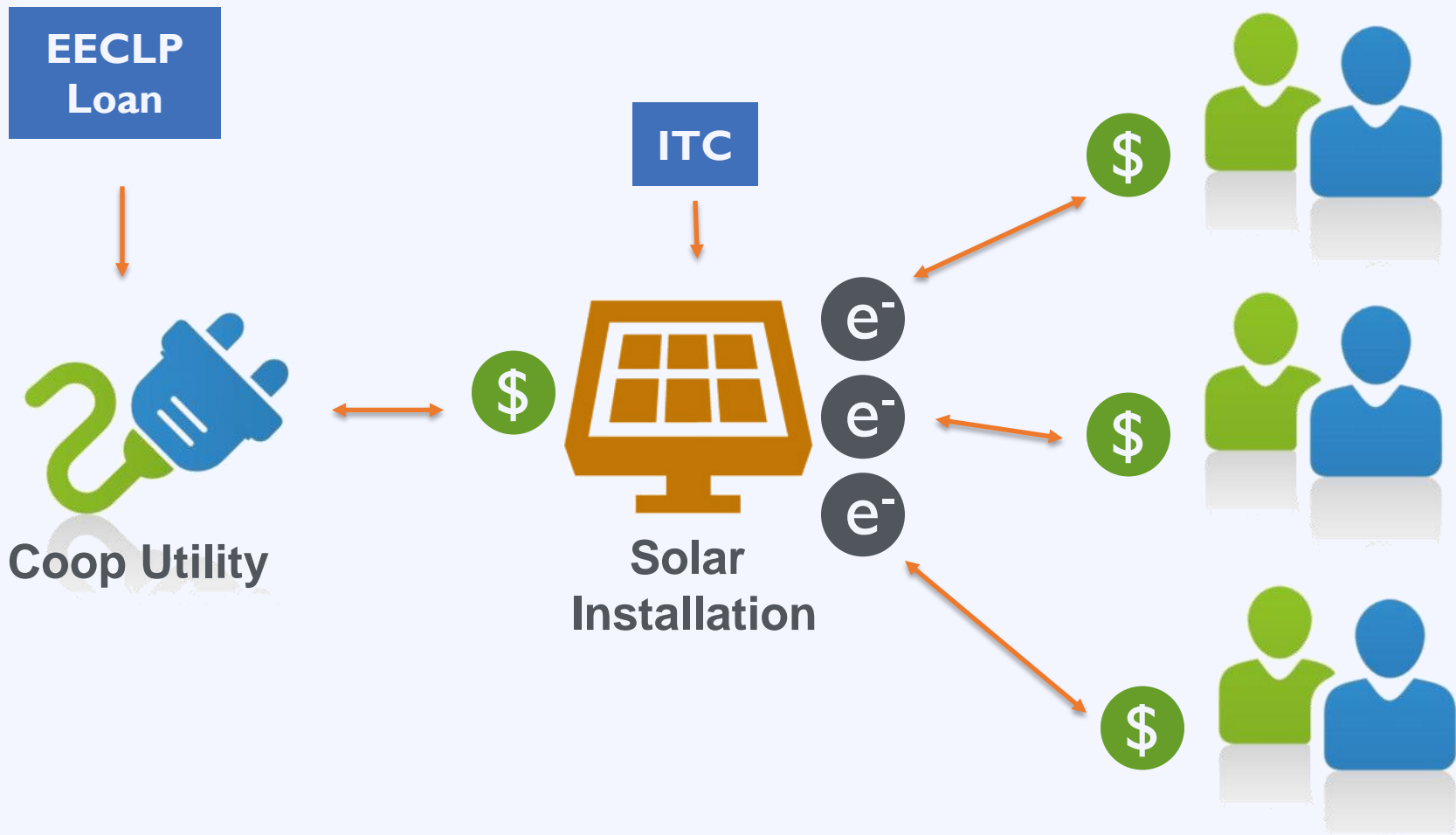


# Community Solar Variation

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- Coop Utility lends to a third party to own and manage a PV system.
- Coop Utility allows its customers to purchase a right to the benefits of that PV system.
- Loan is then repaid by customers who benefit from the PV system.
- Variation on Community Solar model currently administered by Municipal Utilities and Coops

# Community Solar: Utility Model



# Case Study: Taos, NM

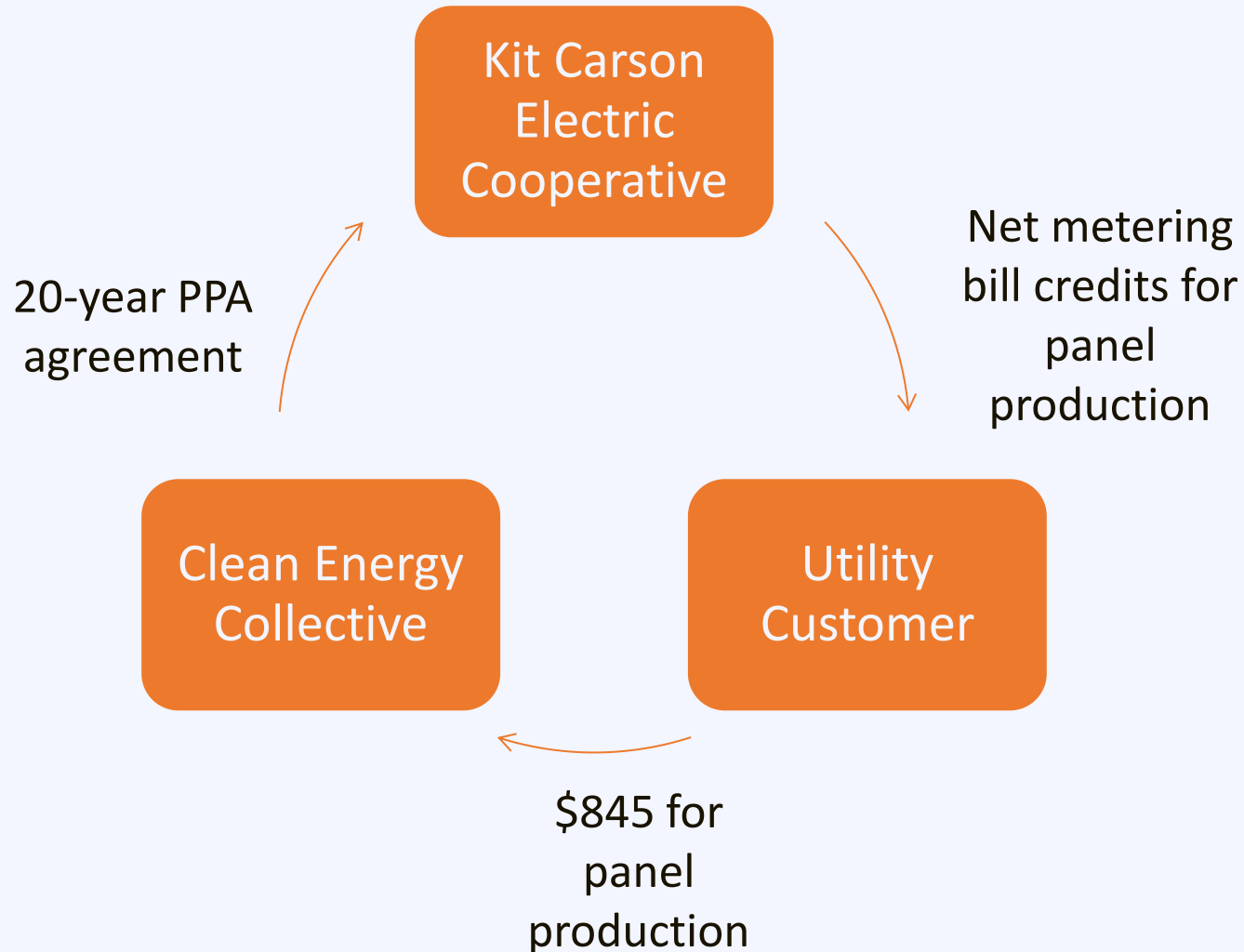
## Kit Carson Electric Cooperative



Photo credit: [Clean Energy Collective](#)

- Agreement with Clean Energy Collective
- 98.7 kW solar canopy project at Taos Charter School
- Net metering bill credits for utility customers
- Online in 2012

# Kit Carson Electric Cooperative



# Best Practices

- Engage stakeholders (ratepayers, solar installers, regulators, elected officials, etc.)
- Have a plan for over and under-subscription
- Decide who owns the RECs (if applicable)
- Make sure the value proposition to the customer is there (ability to reduce their electric bill with solar)
- Billing and IT systems



# SolarOPs Farmer's Coop Case Study



Produced as a publication resource under the Solar Outreach Partnership (SolarOPs), this case study is the first in a four-part series aimed at documenting how nonprofit utilities—both municipal and cooperative power providers—have overcome the financial challenges to solar deployment. These case studies will spotlight success stories of small utilities effectively and creatively leveraging local opportunities for solar financing and stakeholder engagement.



## Solar Success for Nonprofit Utilities

### FARMERS ELECTRIC COOPERATIVE: A SMALL RURAL COOPERATIVE BECOMES A SOLAR LEADER

**YEAR ESTABLISHED: 1916**  
**NUMBER OF MEMBERS: 650**  
**MILES OF LINE: OVER 110**

Located in the southeast corner of Iowa and in the heart of one of the largest Amish and Mennonite communities west of the Mississippi River, the Farmers Electric Cooperative has a hands-on, keep-it-simple approach to financing and building solar energy projects. The 600-member cooperative in the town of Kalona has established a varied and mostly self-financed portfolio of solar and clean energy programs since 2008.

It is also a national leader in installed solar watts per customer, with a cumulative solar capacity of more than 1,800 watts per co-op member.

Farmers' solar success can be attributed to the wide array of options for going solar offered to its members. Co-op members installing solar on their homes or farms can receive a feed-in-tariff for self-generation or opt for an up-front rebate based on the size of their systems. Those not wanting or unable to install a system can instead buy power from solar panels they own as part of a community solar "garden" that has grown from an original 13.8 kilowatts (kW) to 40 kW and is continuously oversubscribed.

Members can also help expand Farmers' use of renewable energy through the co-op's Green Power Program, paying an extra \$3 fee on their monthly bills. The co-op has set a target of reducing its use of fossil fuels 25 percent by 2025, and the money from the Green Power Program is used to buy biodiesel fuel for Farmers' back-up generators and offset some of the costs of its solar programs.

Most recently, Farmers powered up its first project privately financed through a power purchase agreement (PPA) with a local solar installer. As part of this deal, the cooperative will own the 800-kW solar farm—currently the largest in the state—after ten years.

The co-op has even won over some of the area's Amish and Mennonite farmers, who do not have electricity or telephones in their homes but often install solar-powered phone booths or individual modules on their farms so they can conduct business. About 25 local phone booths are now powered with individual solar panels, each with battery storage, which the co-op has installed as part of an off-grid program.



#### FARMER'S SOLAR GARDEN

Keeping panel purchases and installation in-house has allowed Farmers to set relatively low buy-in costs for the solar garden project. Members pay \$375 for their first panel and \$475 for any additional panels up to a maximum of 10.

- FES leads the nation in installed solar watts per customer
- Has a cumulative solar capacity of more than 1,800 watts per co-op member
- Employs innovative policy and financing mechanisms such as feed-in-tariff (fixed priced, often at or lower than electricity retail price, through long-term contracts), up-front rebate, and community solar garden

# Resources



## Utility Community Solar Handbook Understanding and Supporting Utility Program Development Version 1: December 2013

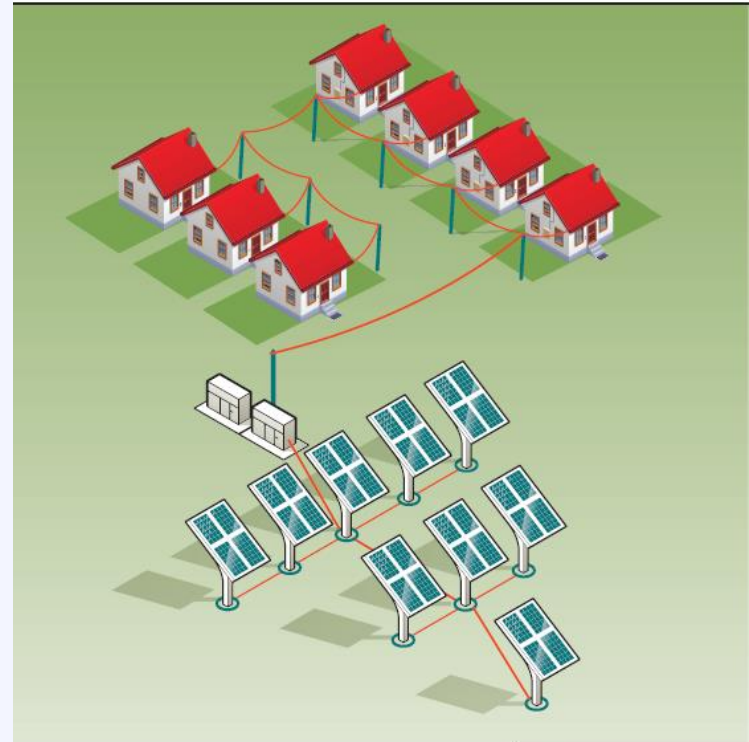
Carl R. Siegrist  
Carl Siegrist Consulting, LLC

Bianca Barth, Becky Campbell,  
Bart Krishnamoorthy, Mike Taylor  
Solar Electric Power Association

Carl Siegrist Consulting, LLC  
Carl R. Siegrist

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Bart Krishnamoorthy, Mike Taylor

## Model Rules for Shared Renewable Energy Programs



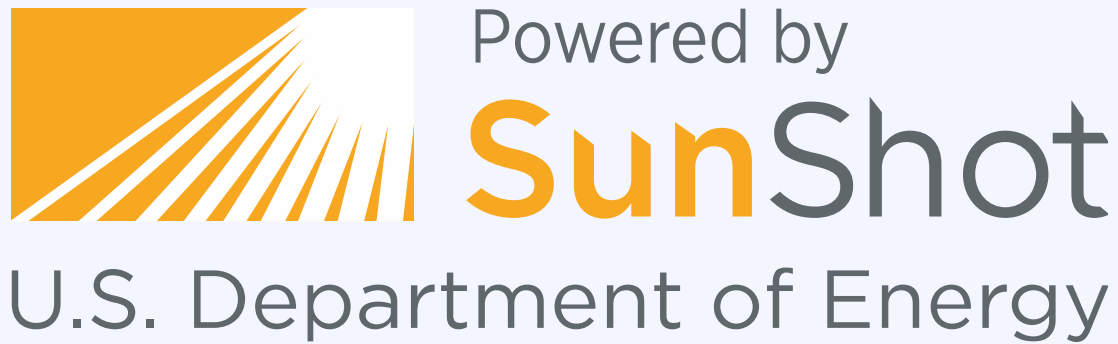
**IREC** Interstate Renewable Energy Council Inc.

THE  
**Vote Solar**  
INITIATIVE

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THE  
**Vote Solar**  
INITIATIVE





## **Chad Laurent**

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**Questions?**

# Thank you!

- Copies of the presentations may be found here [www.energy.gov/rpsc](http://www.energy.gov/rpsc)
- Recordings of the webinars are posted here:  
<https://www.youtube.com/user/USdepartmentofenergy>
- For occasional email updates on the EECLP and other types of financing, send an email to John-Michael Cross at [jmcross@eesi.org](mailto:jmcross@eesi.org)
- Email us any time at [SE@ee.doe.gov](mailto:SE@ee.doe.gov)



U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy