Solar Powering Your Community Addressing Soft Costs and Barriers







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.



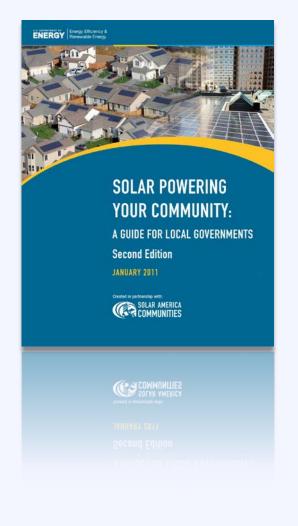
- Increase installed capacity of solar electricity in U.S. communities
- Streamline and standardize permitting and interconnection processes
- Improve planning and zoning codes/regulations for solar electric technologies
- Increase access to solar financing options



Resource Solar Powering Your Community Guide

A comprehensive resource to assist local governments and stakeholders in building local solar markets.

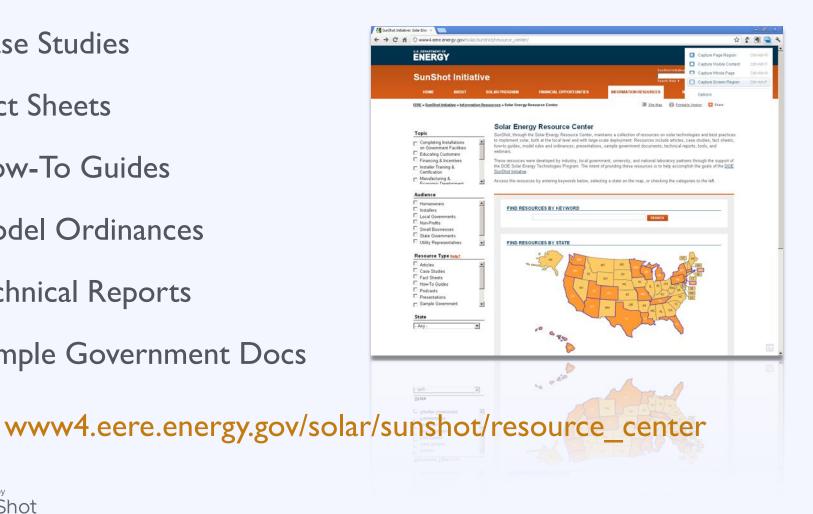
www.energy.gov





Sunshot Resource Center Resource

- Case Studies
- Fact Sheets
- How-To Guides
- Model Ordinances
- Technical Reports
- Sample Government Docs







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Meister Consultants Group

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Agenda

08:40 - 09:00

|0:30 - ||:00

||:30 - ||:40

Introductions & Discussion

- 09:00 09:50 Creating a Regulatory Landscape for Solar 09:50 – 10:00 Break
- 10:00 10:30 Understanding Utility Regulations
 - Understanding Solar Financing
- 11:00 11:30 Installing Solar on Municipal Facilities
 - Break
- ||:40 |2:|0 Lo
 - Local Speaker
- 12:10 12:30
- Next Steps for Solar in Region



Agenda

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09:00 – 09:50	Creating a Regulatory Landscape for Solar
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:40 - 2:10	Local Speaker
12:10 - 12:30	Next Steps for Solar in Region





Poll Who's in the room?





Poll What is your experience with solar?



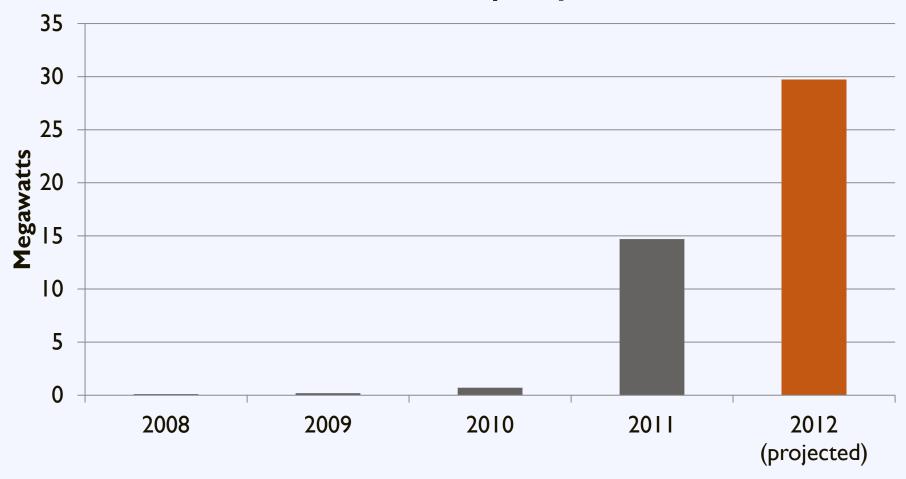


Workshop Goal Enable local governments to replicate successful solar practices and expand local adoption of solar energy



Missouri Solar PV Market

Cumulative Installed Capacity of Solar PV

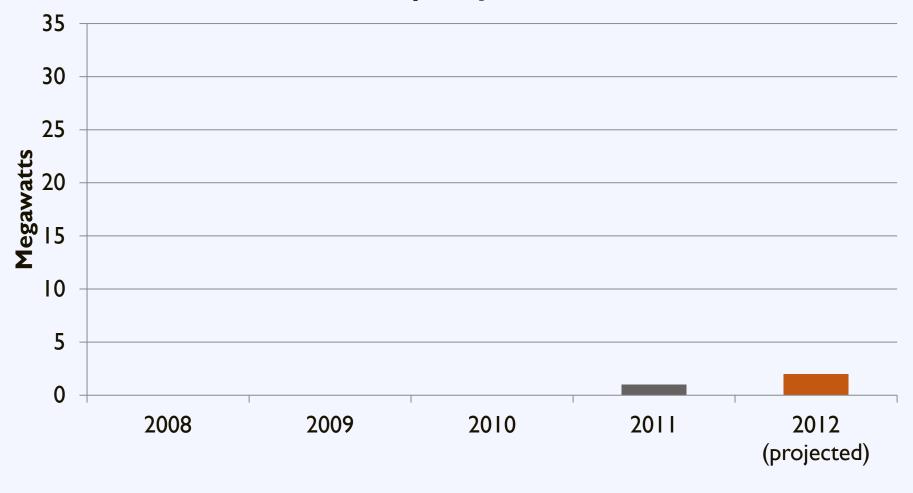


Powered by SunShot U.S. Department of Energy

Source: IREC, Photon Magazine

Kansas Solar PV Market

Installed Capacity of Solar PV



Powered by SunShot U.S. Department of Energy

Source: IREC, Photon Magazine



Explore benefits

and

Overcome barriers





Activity: Identifying Benefits

What is the greatest benefit solar can bring to your community? [Blue Card]

Right Now

During Session

After Break











Activity: Addressing Barriers

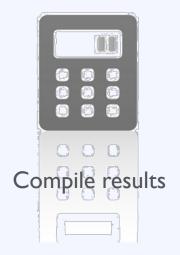
What is the greatest barrier to solar adoption in your community? [Green Card]

Right Now

During Session

After Break











Installed Capacity

Top 5 Countries Solar Operating Capacity Germany Germany Italy 35.6% Japan USA 5.7% Spain **USA** Rest of World



http://www.map.ren21.net/GSR/GSR2012.pdf



Installed Capacity

Total installed solar capacity in the US

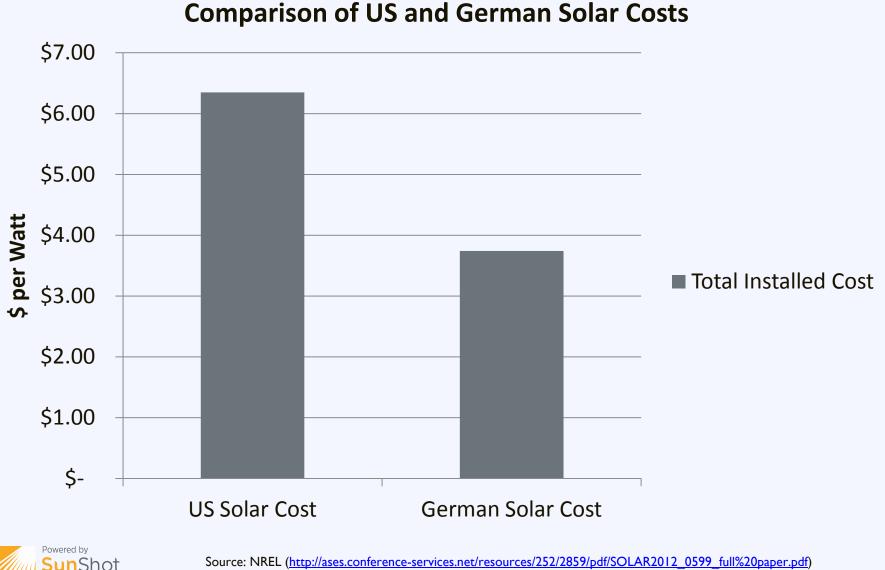
4 GW

Capacity installed in Germany in Dec 2011

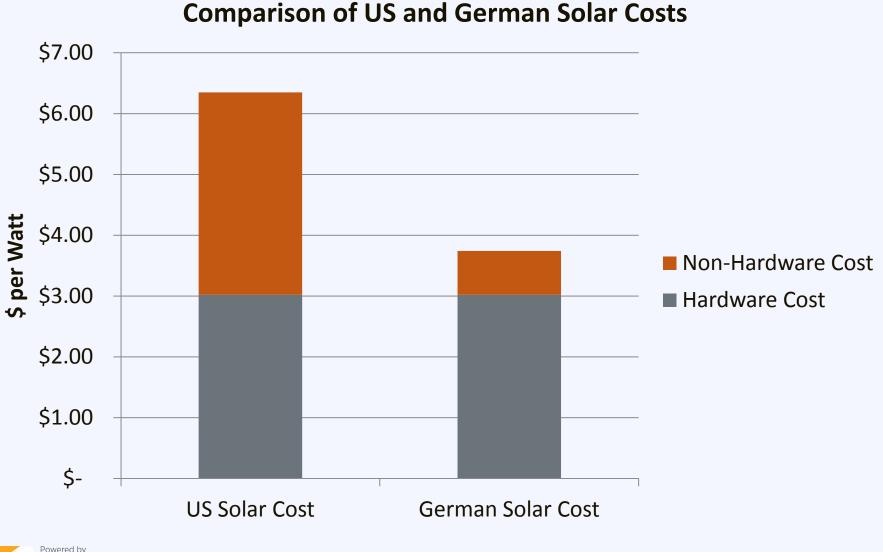


http://www.map.ren21.net/GSR/GSR2012.pdf

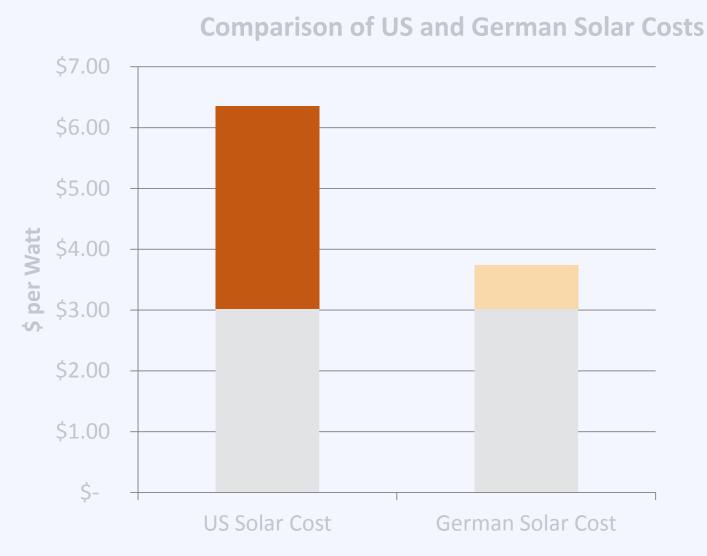
U.S. Department of Energy



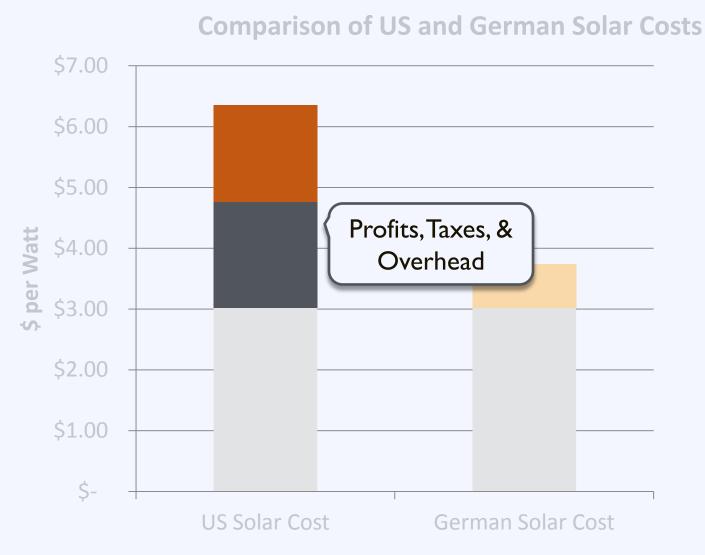
⁽http://www.nrel.gov/docs/fy12osti/53347.pdf) (http://www.nrel.gov/docs/fy12osti/54689.pdf)



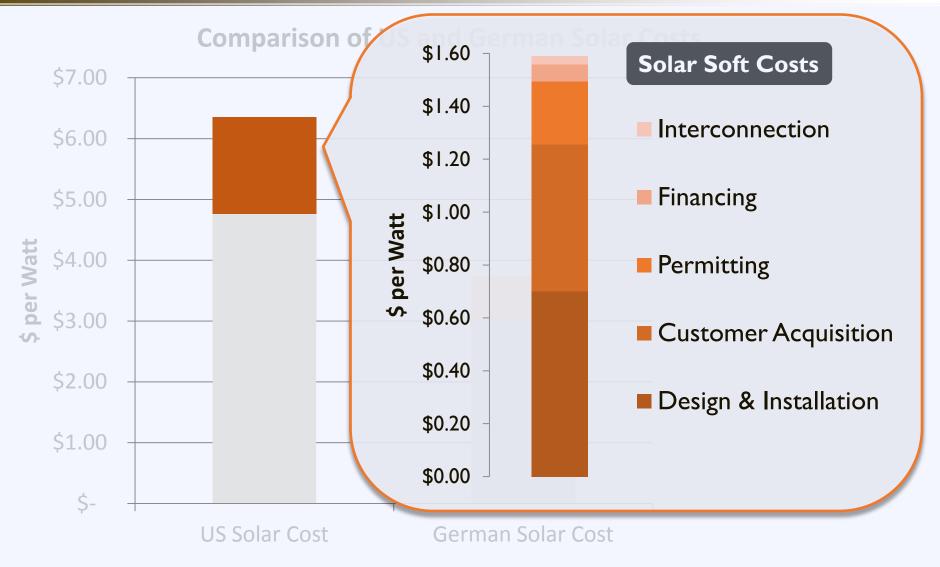
Powered by SunShot U.S. Department of Energy















Time to Installation





Photon Magazine



Germany's Success

Consistency and Transparency

through a

Standardized Processes





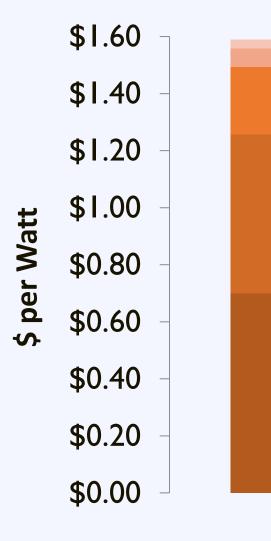
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Mitigate Soft Costs



Interconnection

Financing

Permitting

Customer Acquisition

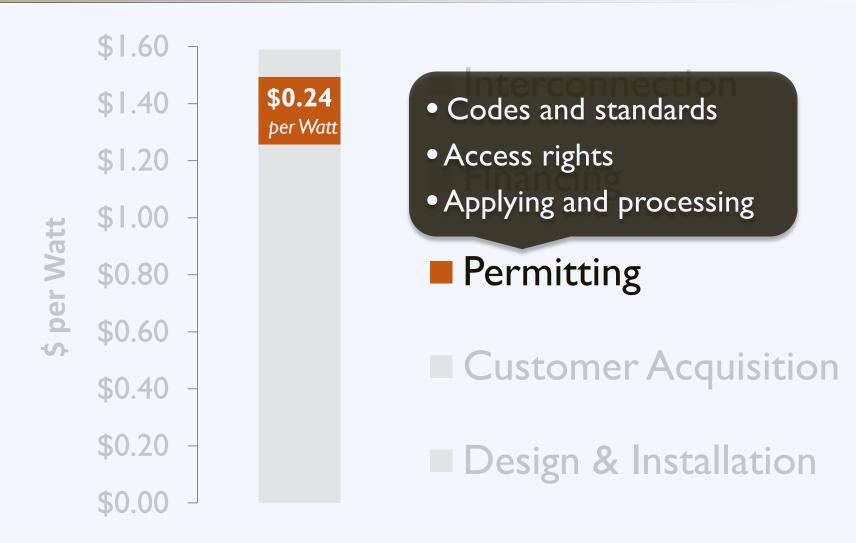
Design & Installation



Source: NREL (http://www.nrel.gov/docs/fy12osti/54689.pdf)



Mitigate Soft Costs





Source: NREL (http://www.nrel.gov/docs/fy12osti/54689.pdf)



Zoning Codes: Regulations

Section	Topics to Address
Permitted Uses	Primary vs. accessory
Dimensional Standards	HeightSetbacksLot coverage
Development Standards	ScreeningSite PlanningPlacement
Definitions	Types of solar systems



Zoning Codes: Small Scale Solar

- **Typical Requirements:**
- Permitted as accessory use
- Minimize visibility if possible
- Requirements:
 - District height
 - Lot coverage
 - Setback



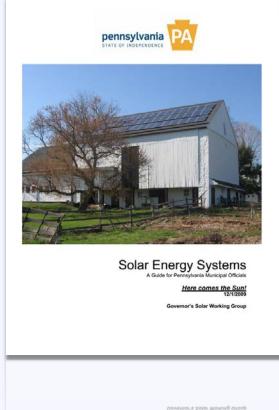


Zoning Code: Small Scale Solar

Resource Pennsylvania Model Ordinance

Prepared to assist local governments in establishing reasonable standards to facilitate the development of small-scale solar

state.pa.us



Governor's Solar Working Grou

Here comes the Su

Solar Energy Systems



Zoning Codes: Large Scale Solar

Typical Requirements:

- Allowed for primary use in limited locations
- Requirements:
 - Height limits
 - Lot coverage
 - Setback
 - Fencing and Enclosure





Zoning Code: Large Scale Solar

Resource Massachusetts Model Ordinance

Prepared to assist local governments in establishing reasonable standards to facilitate the development of large-scale solar installations

www.mass.gov



standards to facilitate development of large-scale ground-mounted solar photonolatic installations. The basis was ad eveloped as a model and is not intended for adoption without steetife review be municipal counsel. A Purpose The purpose of this bylaw is to promote the creation of new large-scale ground-mounted solar notovoltaic installations by providing standards for the placement, design, construction, personal construction and the placement, design, construction, personal construction and removal of such installations that address public safety, imitize impacts on section, stantal and historie resources and to provide adequate financial surance for the eventual decommissioning of such installations. The provisions set forth in this section shall apply to the construction, operation, and/or repair of gescale ground-mounted solar photovoltaic installations. This section application modified that matterially alter the type, configuration, or size of this section application modified that matterially alter the type, configuration, or size of the installations or related equipment. Qualifying as a Greec Community: In order to satisfy the Green Communities Act avs-of- right noning requirement a community: For some most adjust on solar photovoltaic installations for WOCC or more. Star VICC or complex and systems which individually hare a rated name plate capacity of 20 WV (CC) cocapies agreensimately one care of land. Starlies tool starge star Matellations: A solar photovoltatic array with a rated name plate capacity of 20 WV (CC) cocapies agreensimately one eaver of land. Starlies tools and solar botovoltatics on a Green Community: in oiteneed bot discourage construction of solar photovoltations that a wondier than 20 WK, but care the courser that in discignated locations that and collect regulatory.	Allowing Use of Large-Scale Ground-Mounted Solar Photovoltaic	
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Solar Access

Solar Access Laws:

- I. Increase the likelihood that properties will receive sunlight
- 2. Protect the rights of property owners to install solar
- 3. Reduce the risk that systems will be shaded after installation





Fontainebleau V. Eden Roc (1959)



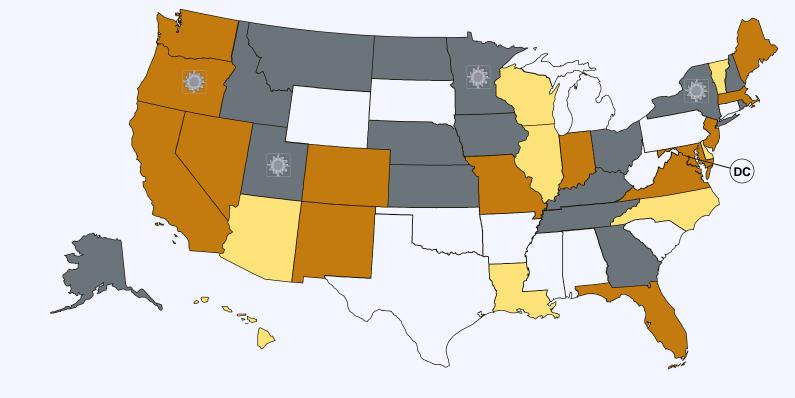
A landowner does not have any legal right to the free flow of light and air across the adjoining land of his neighbor



Source: Solar ABCs (Image: Google Earth)



Solar Access



Solar Easements Provision



Solar Easements and Solar Rights Provisions

U.S. Virgin Islands









Solar Easements: Kansas & Missouri

Allows parties to voluntarily enter into solar easement contracts for the purpose of ensuring adequate exposure of a solar energy system





Solar Rights: Missouri

Missouri Statue 442.012:

The right to utilize solar energy is a property right but eminent domain may not be used to obtain such property right.





Solar Rights: Missouri

James Babb V. City of Clarkson Valley





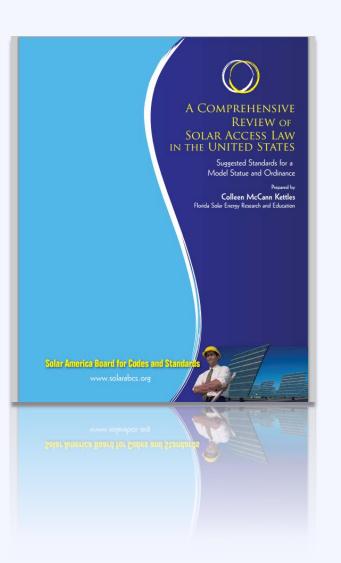
Solar Access

Resource Solar ABCs

A comprehensive review of solar access law in the US – Suggested standards for a model ordinance

www.solarabcs.org







The Permitting Process: Challenges

18,000+ local jurisdictions

with unique permitting requirements



Source: http://www.nrel.gov/docs/fy12osti/54689.pdf

The Permitting Process: Challenges

Local permitting processes add on average



to the installation cost of residential PV



Source: SunRun

The Permitting Process: Challenges





Source: Forbes



Solar Permitting Best Practices:

- \checkmark Fair flat fees
- ✓ Electronic or over-the-counter issuance
- Standardized permit requirements

\checkmark Electronic materials





Solar Permitting Best Practices:

- \checkmark Training for permitting staff in solar
- \checkmark Removal of excessive reviews
- \checkmark Reduction of inspection appointment windows
- ✓ Utilization of standard certifications



Resource Solar ABCs

Expedited Permitting:

- Simplifies requirements for PV applications
- Facilitates efficient review of content
- Minimize need for detailed studies and unnecessary delays

ASTM International IADMO International Code Council Int'i Electrotechnical Comm. EEEE NFPA – National Elec. Code SEMI	Codes & Standards The Solar America Board for Codes and Standards (Solar ABCS) collaborates and enhances the practice of developing, implementing, and disseminating solar codes and standards. The Solar ABCS provides formal coordination in the planning and revision of separate, though interrelated, solar codes and standards. We also provide access for stakeholders to participate with members of standards making bodies through working groups and research activities to set national priorities on technical issues. The Solar ABCS is a contralized repositorin for collection and
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IEEE NFPA - National Elec. Code SEMI	bodies through working groups and research activities to set national priorities on technical issues. The Solar ABCs is a centralized repository for collection and
NFPA - National Elec. Code (SEMI	
SEMI	dissemination of documents, regulations, and technical materials related to solar
Indeputters Laboratories	codes and standards.
	The Solar ABCs creates a centralized home to facilitate
	photovoltaic (PV) market transformation by:
	Creating a forum that fosters generating consensus 'best practices' materials.
	Disseminating such materials
	to utilities, state and other regulating agencies.
	Answering code-related questions (technical or statutory in nature).
	Providing feedback on important related issues to DOE and government agencie
	Learn more about solar codes and standards development:
1	The below organizations all publish codes and standards for PV products and each organization has its own process to develop and publish standards.
	ASTM
	IAPMO Standards
	International Code Council
	 International Electrotechnical Commission
	• IEEE
	 National Fire Protection Association
	• <u>SEMI</u>
	Underwriters Laboratories
	Underwriters Laboratories
	 National Fire Protection Association SEMI
	IEEE National Fire Protection Association
	International Electrotechnical Commission International Electrotechnical Commission



Resource Interstate Renewable Energy Council

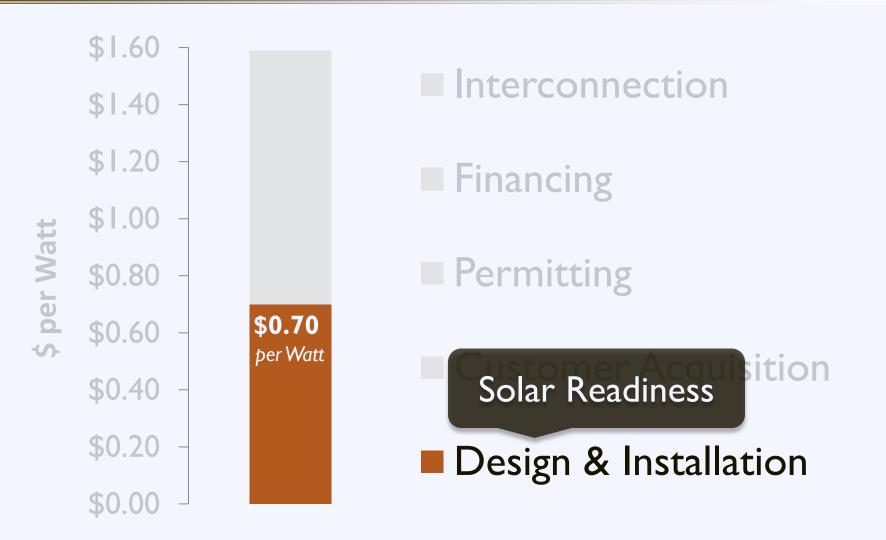
Outlines emerging approaches to efficient rooftop solar permitting

www.irecusa.org



Emerging Approact to Efficient Roo Solar Permitting	ftop
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www.irecusa.org	May 2012
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Mitigate Soft Costs



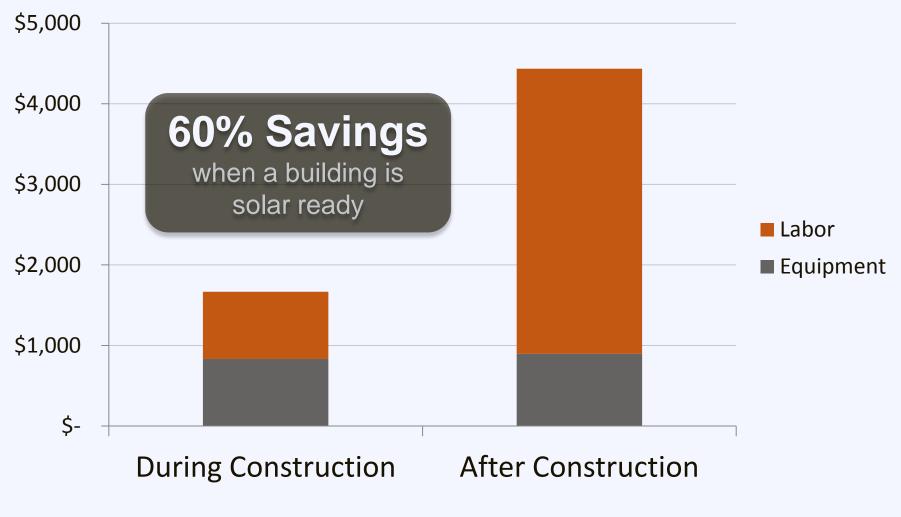


Source: NREL (http://www.nrel.gov/docs/fy12osti/54689.pdf)

Creating solar-ready guidelines and promoting energy efficiency at the outset can help make future solar installations easier and more cost effective.



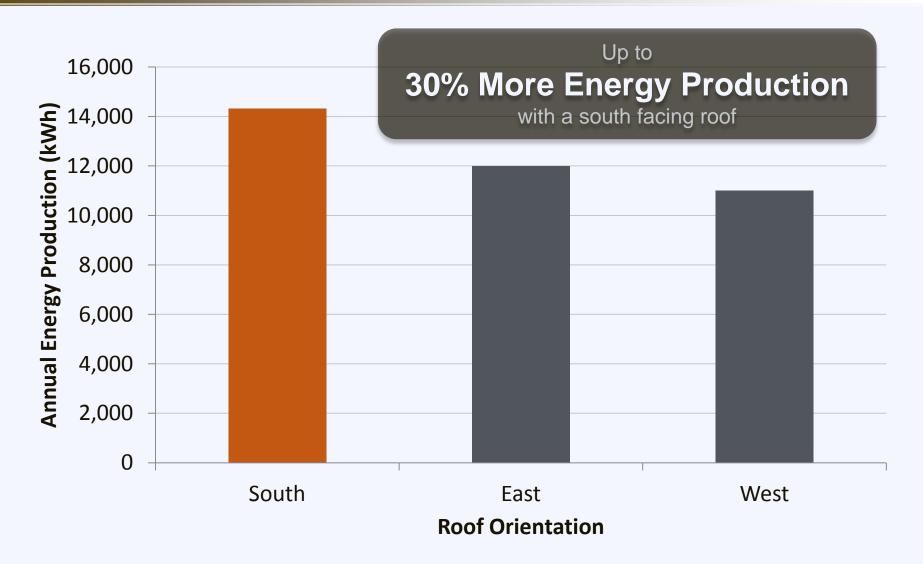






Source: Solar Ready: An Overview of Implementation Practices [Draft]. NREL, Feb. 18, 2011.







Source: Solar Ready: An Overview of Implementation Practices [Draft]. NREL, Feb. 18, 2011.



Require builders to:

- \checkmark Minimize rooftop equipment
- \checkmark Plan for structure orientation to avoid shading
- \checkmark Install a roof that will support the load of a solar array
- \checkmark Record roof specifications on drawings
- \checkmark Plan for wiring and inverter placement



Solar Readiness: Case Study



Oro Valley, Arizona Population: 40, 195



Source:Wikipedia



Solar Readiness: Case Study

Oro Valley Requirements:

- Installation of conduit or sleeve for wiring
- A space near the service equipment to mount additional PV equipment
- Installation of a circuit breaker that can be back-fed from a PV system



Source: http://cms3.tucsonaz.gov/files/dsd/PV_Prep.pdf

Resource NREL

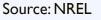
Creating a solar ready guide for buildings:

- Legislation
- Certification programs
- Stakeholder Education

www.nrel.gov







Mitigate Soft Costs



Interconnection

Financing

Permitting

Customer Acquisition

Design & Installation



Source: NREL (http://www.nrel.gov/docs/fy12osti/54689.pdf)

Customer Acquisition

SOLARIZE MASS

Solarize Group Purchasing







Solarize: Advantages

Barriers Solutions

High upfront cost 🛛 → Group purchase

Complexity — Community outreach

Customer inertia 💛 Limited-time offer



Solarize: Advantages

Benefits to Local Government:

Low implementation cost: \$5,000 - \$10,000

Quick turn-around: 9 Months

Long-term impact: Sustainable ecosystem



Solarize: Process







Harvard, Massachusetts Population: 6,520



Source:Wikipedia

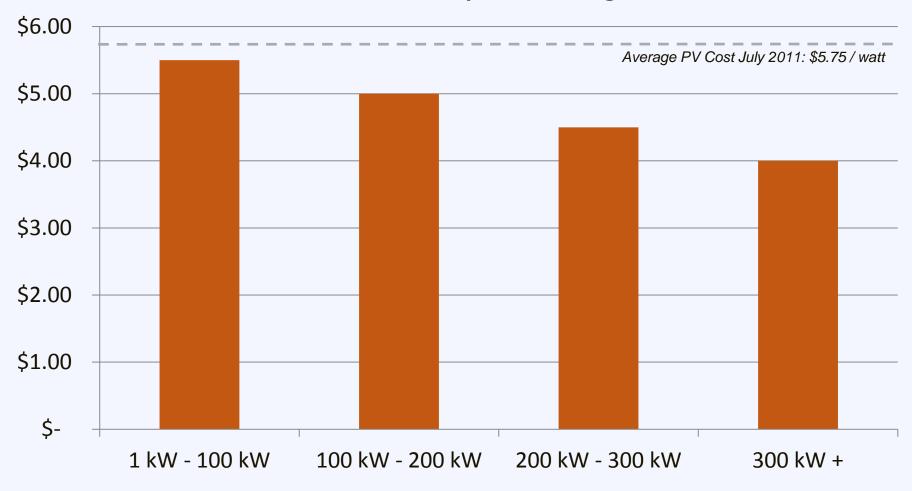
Solarize: Case Study





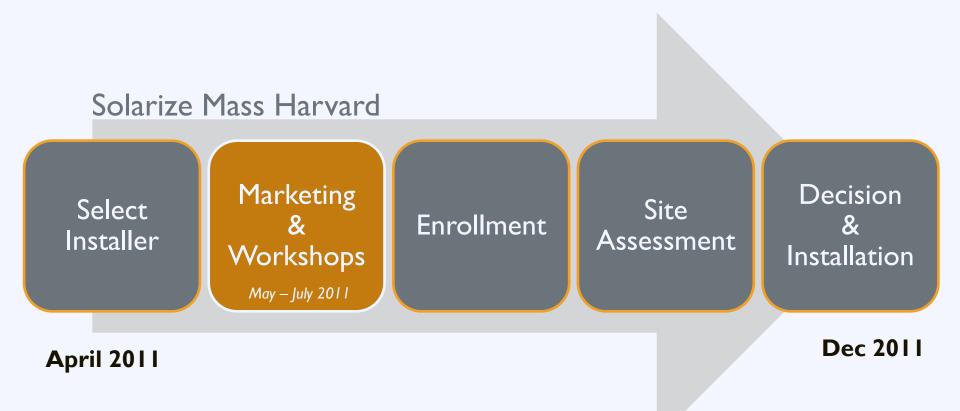
Group Purchasing

Harvard Mass Group Purchasing Tiers





Solarize: Case Study

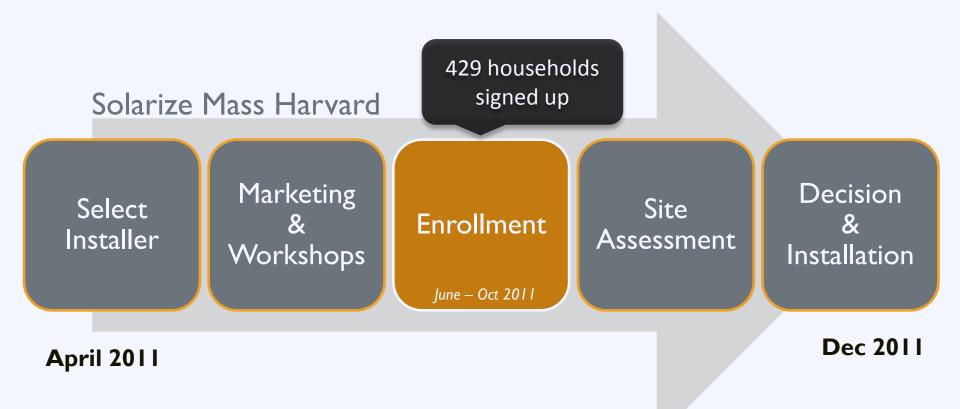




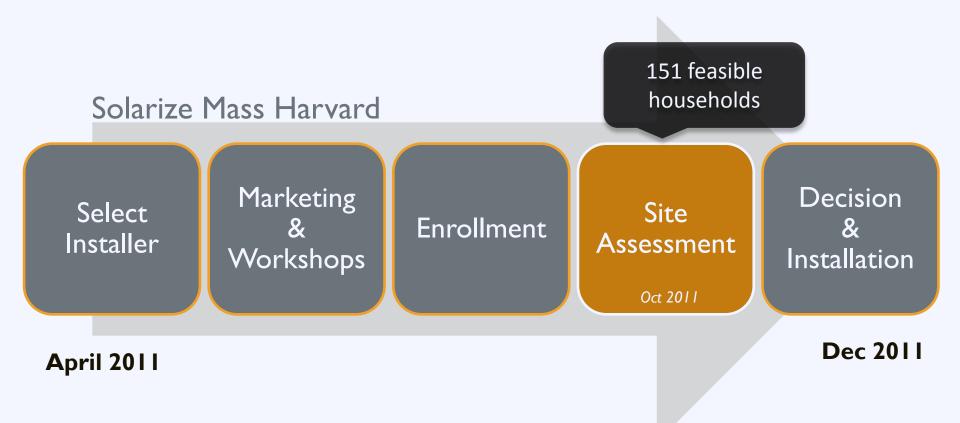
Marketing Strategy:

- Electronic survey of 1,100 households
- Email newsletters and direct mailings
- Float in July 4 parade
- Articles and advertisements in local newspaper
- Facebook page and online discussion board



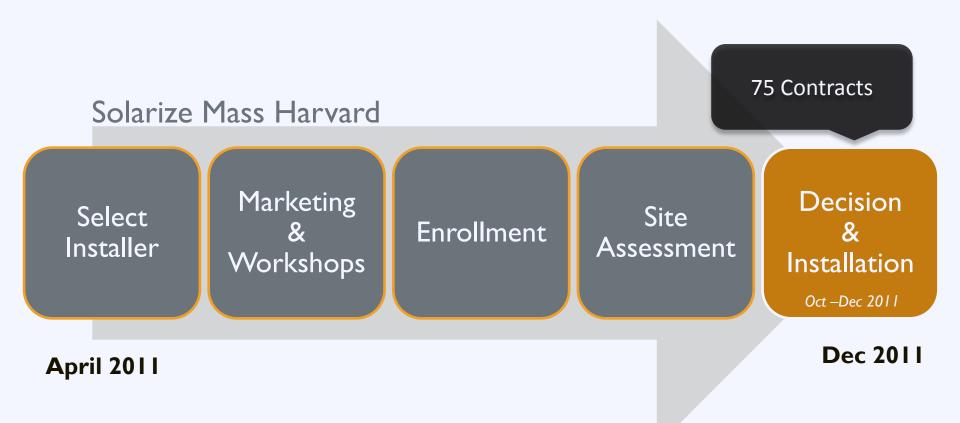








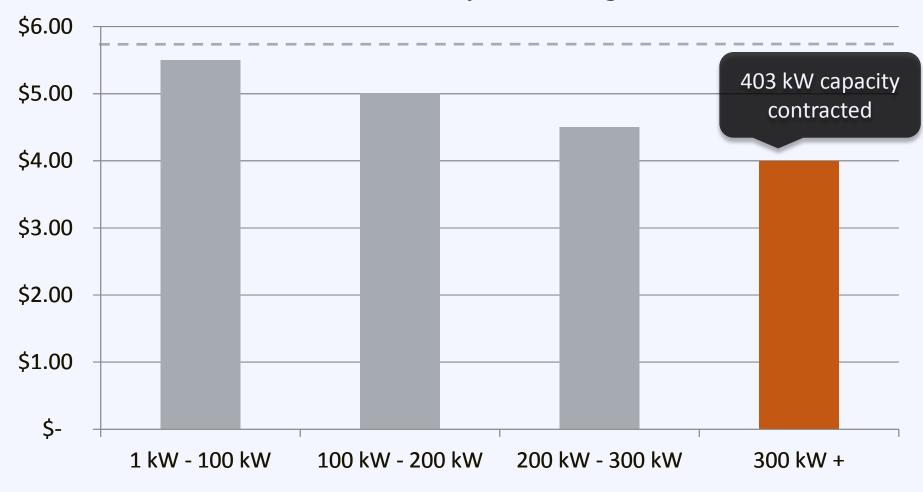
Solarize: Case Study





Group Purchasing

Harvard Mass Group Purchasing Tiers





Solarize: Case Study

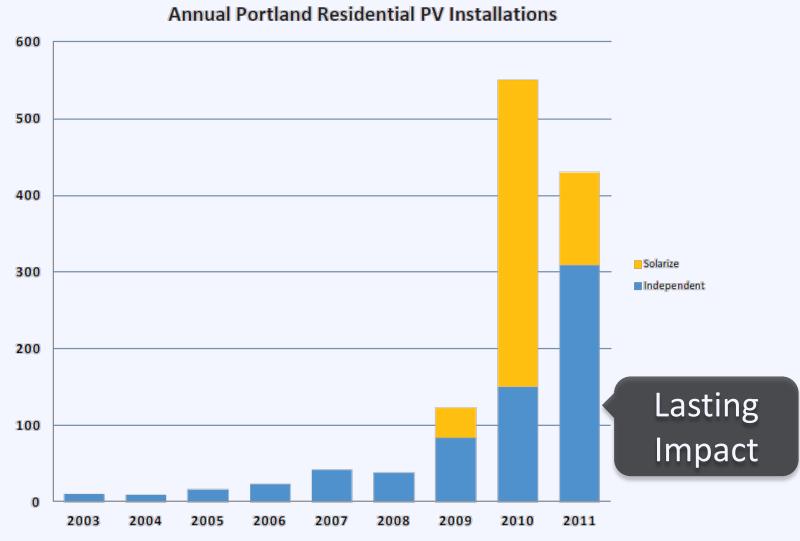
75 new installations totaling 403 kW

30% reduction in installation costs

575% increase in residential installations



Solarize: Lasting Impact





Source: NREL

Solarize: Resources

Resource The Solarize Guidebook

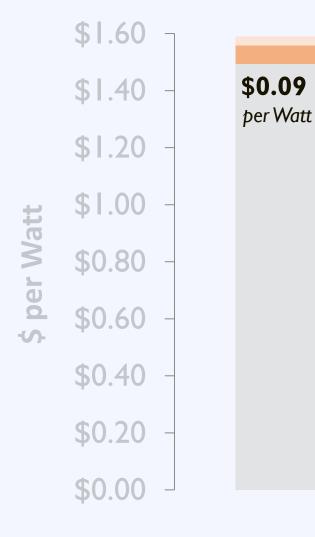
A roadmap for project planners and solar advocates who want to create their own successful Solarize campaigns.

www.nrel.gov





Mitigate Soft Costs



Interconnection

Financing

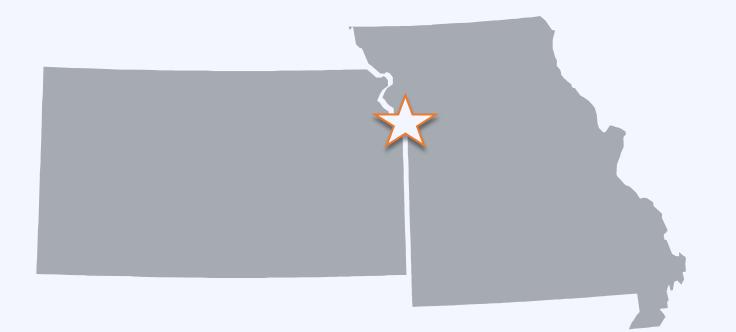
Permitting

Customer Acquisition

Design & Installation



Source: NREL (http://www.nrel.gov/docs/fy12osti/54689.pdf)



Best Management Practices for Solar Installation Policy



PlanningProcessImprovementsImprovements

Best Management Practices for Solar Installation Policy



Planning Improvements

Process Improvements

Best Management Practices for Solar Installation Policy





Planning Improvements

Step I: Solar Access and Education

✓ Adopt a solar access ordinance

 \checkmark Provide tools to developers

✓ Educate homeowners



Planning Improvements

Step 2: Solar Readiness

✓ Develop a solar ready building checklist

✓ Adopt solar ready ordinance





Planning Improvements

Step 3: Engage Homeowner's Association

Create incentives for adopting best practices



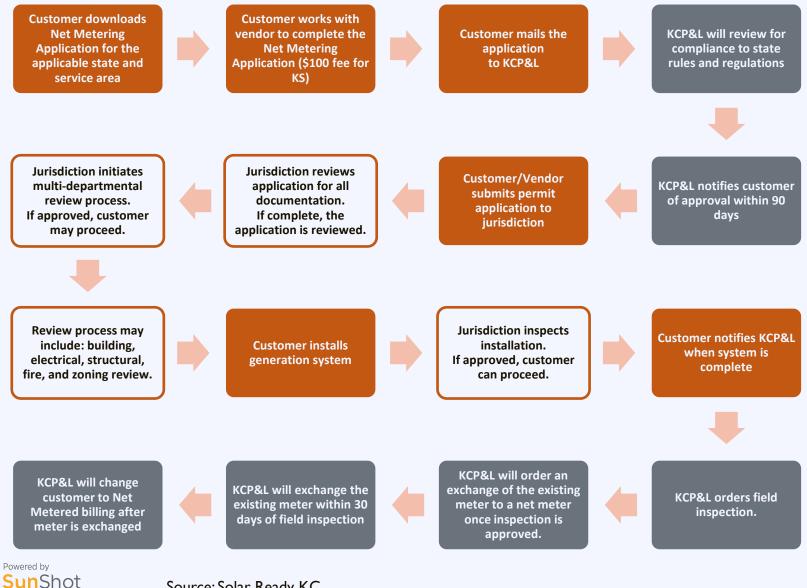
Planning Improvements

Process Improvements

Best Management Practices for Solar Installation Policy



Current Process



Source: Solar Ready KC

U.S. Department of Energy



Process Improvements

Step I: Streamline permits

 \checkmark Provide central information source

✓ Create permit checklist

 \checkmark Develop criteria for standard installation





Process Improvements

Step 2: Permit fees & utility coordination

Establish a fixed fee for residential applications

✓ Adopt permit fee calculator for larger projects

✓ Conduct joint inspections with local utility





Process Improvements

Step 3: Pre-qualify plans and installers

✓ Pre-qualify standard plans

 \checkmark Pre-qualify installers







Agenda

08:40 – 09:00 Introductions & Discussion

09:00 – 09:50 Creating a Regulatory Landscape for Solar

09:50 – 10:00 Break

10:00 – 10:30 Understanding Utility Regulations

10:30 – 11:00 Understanding Solar Financing

II:00 – II:30 Installing Solar on Municipal Facilities

11:30 – 11:40 Break

11:40 – 12:10 Local Speaker

12:10 - 12:30

Next Steps for Solar in Region



Activity: Identifying Benefits

What is the greatest benefit solar can bring to your community? [Blue Card]

Right Now

During Session

After Break









[Results from Survey]



Agenda

08:40 – 09:10 Introductions & Discussion

- 09:10 09:50 Creating a Regulatory Landscape for Solar
- 09:50 10:00 Break
- 10:00 10:20

|0:20 - ||:00

Understanding Utility Regulations

- Understanding Solar Financing
- II:00 II:30 Installing Solar on Municipal Facilities
- 11:30 11:40 Break
- 11:40 12:10 Local Speaker
- 12:10 12:30
- Next Steps for Solar in Region



Electric Market Status (2010)

Retail Sales	Investor- Owned	Municipal	Rural Coops	TOTAL
Missouri	69.6%	13.0%	17.4%	86.1 M MWh
Kansas	66.5%	17.3%	16.2%	40.4 M MWh

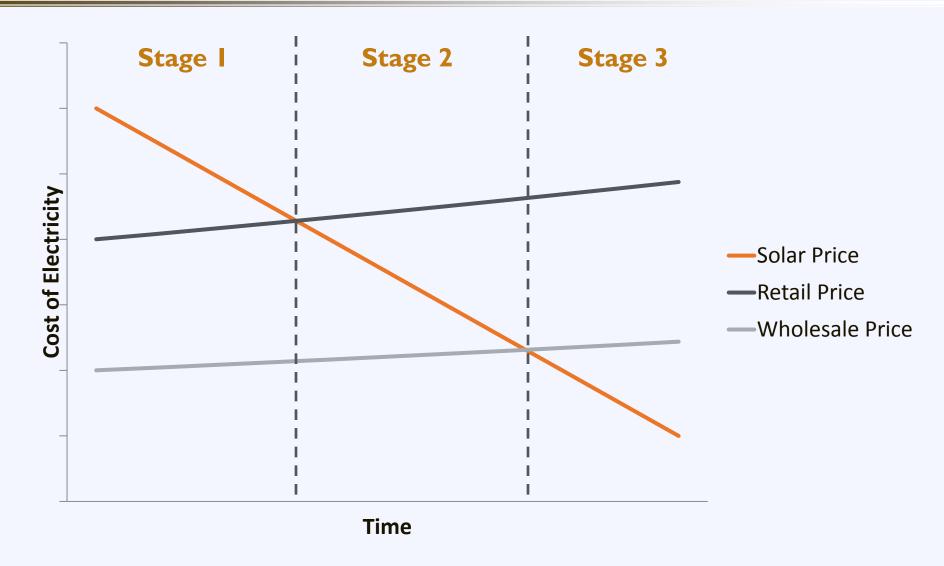
# Customers	Investor- Owned	Municipal	Rural Coops	TOTAL
Missouri	62.6%	13.8%	23.6%	3,075,664
Kansas	64.2%	16.1%	19.7%	1,456,431

Prices	Investor- Owned	Municipal	Rural Coops	Average
Missouri	7.39¢/kWh	8.32¢/kWh	8.94¢/kWh	7.78¢/kWh
Kansas	8.04¢/kWh	7.97¢/kWh	10.04¢/kWh	8.35¢/kWh



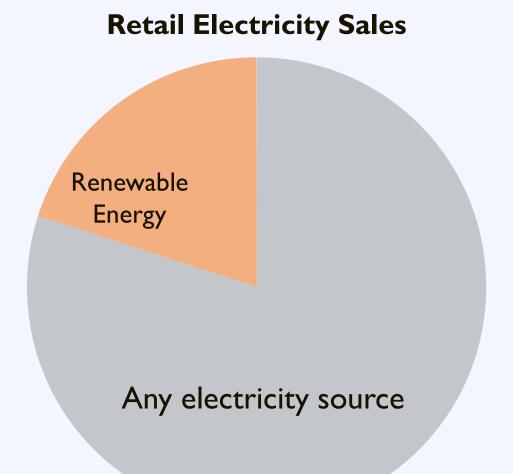
Source: US Energy Information Administration

Utility Market Stages

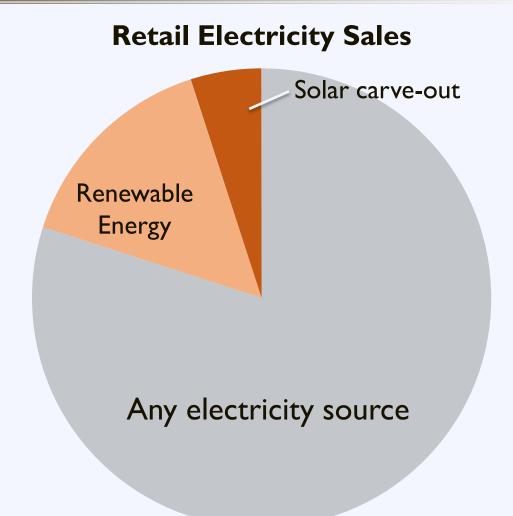




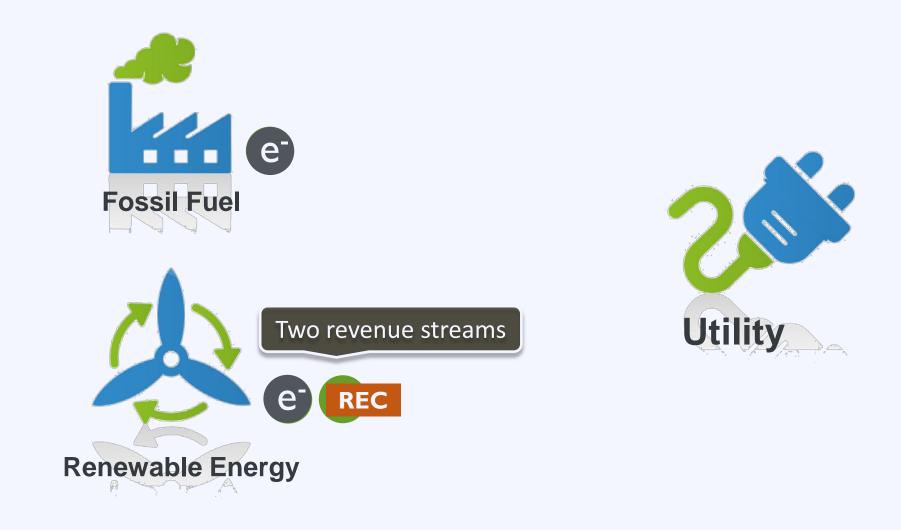
Source: Solar Electric Power Association





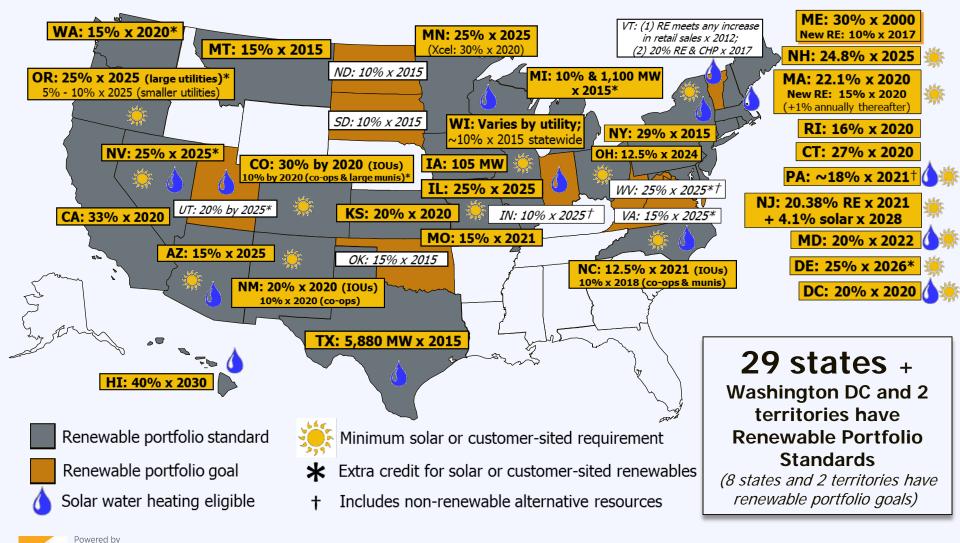








www.dsireusa.org / August 2012



SunShot

U.S. Department of Energy



Net Metering

Net metering allows customers to export power to the grid during times of excess generation, and receive credits that can be applied to later electricity usage





Net Metering: Overview

Morning









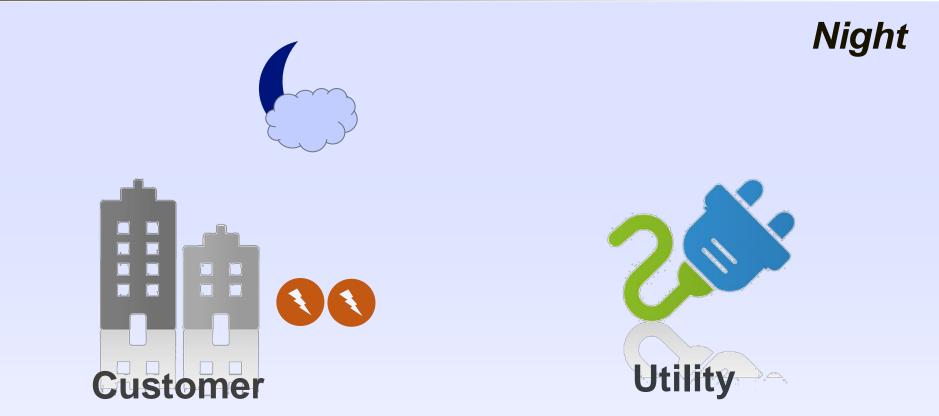
Net Metering: Overview







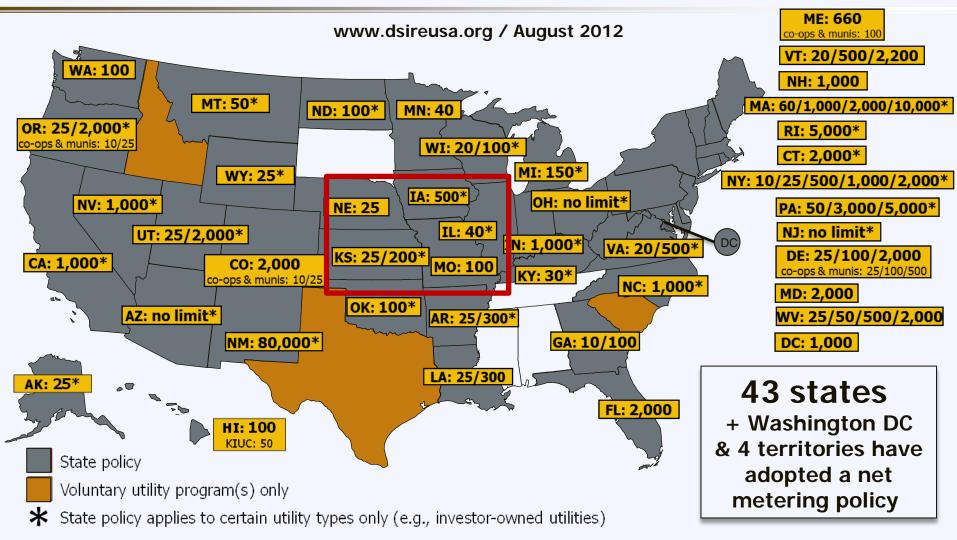
Net Metering: Overview



Solar covers 100% of the customer's load, even at night!



Net Metering: State Policies



Note: Numbers indicate individual system capacity limit in kilowatts. Some limits vary by customer type, technology and/or application. Other limits might also apply. This map generally does not address statutory changes until administrative rules have been adopted to implement such changes.





Net Metering: Market Share

More than 93% of distributed PV Installations are net-metered



Source: IREC (http://www.irecusa.org/wp-content/uploads/IRECSolarMarketTrends-2012-web.pdf)

Net Metering: Resources

Resource Freeing the Grid

Provides a "report card" for state policy on net metering and interconnection

http://freeingthegrid.org/





Net Metering: Missouri

Net Metering				
C	C	C	C	C
2007	2008	2009	2010	2011

Eligible Renewable/ Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities
System Capacity Limit:	100 kW
Aggregate Capacity Limit:	5% of utility's single-hour peak load during previous year
Net Excess Generation:	Credited to customer's next bill at avoided- cost rate; granted to utility at end of 12-month period
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed



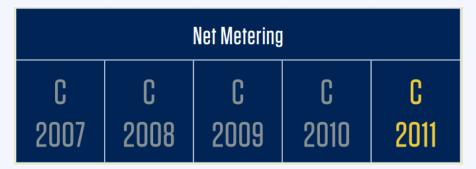
Net Metering: Missouri

Net Metering				
C	C	C	C	C
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Net Metering: Missouri



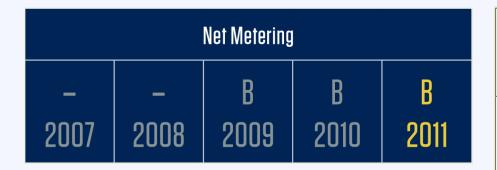
Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Credit net excess generation at the retail rate

Eligible Renewable/ Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities
System Capacity Limit:	100 kW
Aggregate Capacity Limit:	5% of utility's single-hour peak load during previous year
Net Excess Generation:	Credited to customer's next bill at avoided- cost rate; granted to utility at end of 12-month period
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed



Net Metering: Kansas



Eligible Renewable/ Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	200 kW for non-residential; 25 kW for residential
Aggregate Capacity Limit:	1% of utility's peak demand during previous year
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Utility owns RECs
Meter Aggregation:	Not addressed



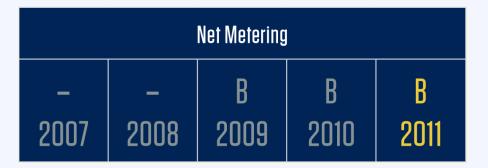
Net Metering: Kansas

Net Metering				
_	_	В	В	В
2007	2008	2009	2010	2011

Eligible Renewable/ Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels
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Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Utility owns RECs
Meter Aggregation:	Not addressed



Net Metering: Kansas



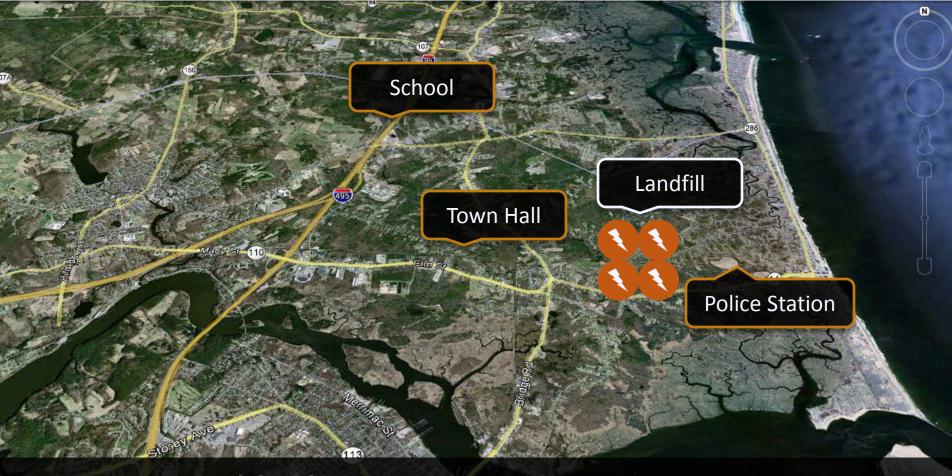
Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Expand net-metering to all utilities

Eligible Renewable/ Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	200 kW for non-residential; 25 kW for residential
Aggregate Capacity Limit:	1% of utility's peak demand during previous year
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Utility owns RECs
Meter Aggregation:	Not addressed



Net Metering: Virtual



No direct connection necessary



Net Metering: Meter Aggregation



Aggregation of some from authorized by state

But...It's complicated

- Ownership requirements
- Contiguous vs. non-contiguous properties
- Multiple customers
- Multiple generators
- Modified system/aggregate system size limits

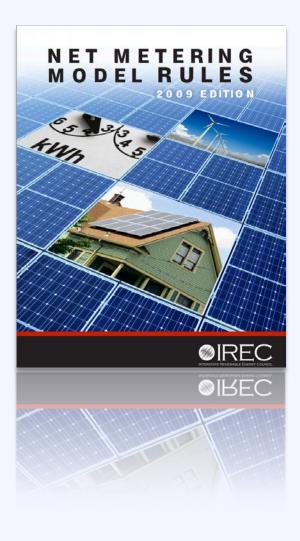
- Rollover rates
- Distance limitations
- Number of accounts
- How to address accounts on different tariffs

Net Metering: Resources

Resource Interstate Renewable Energy Council

IREC developed its model rules in an effort to capture best practices in state net metering policies.

www.irecusa.org





Interconnection

5,000+ utilities

with unique interconnection procedures



Source: NREL (http://www.nrel.gov/docs/fy12osti/54689.pdf

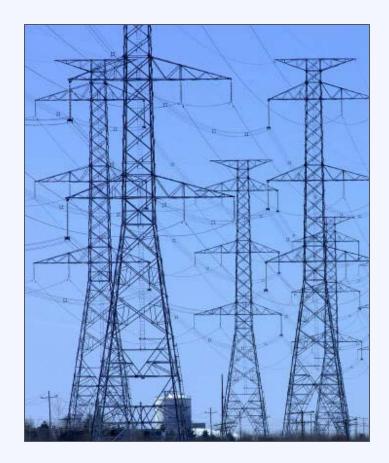
Interconnection: Background

- **2000:** NREL finds that interconnection is a significant barrier to customer sited DG
- **2005:** Congress requires state regulator authorities to consider an interconnection standard (IEEE 1547)
- 2012: 43 States & DC have adopted interconnection standards
 - CA Rule 21 MADRI Procedures
 - FERC SGIP IREC Procedures



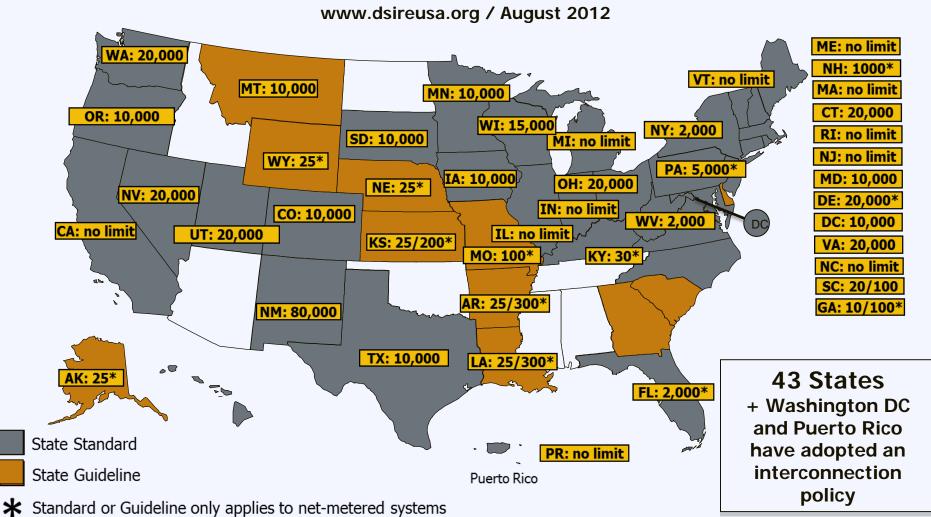
Interconnection: Best Practices

- I. Use standard forms and agreements
- 2. Implement expedited process
- Implement simplified procedure for small solar arrays





Interconnection: State Policies



<u>Notes</u>: Numbers indicate system capacity limit in kW. Some state limits vary by customer type (e.g., residential versus non-residential). "No limit" means that there is no stated maximum size for individual systems. Other limits may apply. Generally, state interconnection standards apply only to investor-owned utilities.



Interconnection: Missouri



Recommendations:

 Adopt IREC's model interconnection procedures

Eligible Renewable/Other Technologies:	_
Applicable Sectors:	_
Applicable Utilities:	-
System Capacity Limit:	_
Standard Agreement:	_
Insurance Requirements:	_
External Disconnect Switch:	_
Net Metering Required:	_



Interconnection: Kansas



Recommendations:

 Adopt IREC's model interconnection procedures

Eligible Renewable/Other Technologies:	_
Applicable Sectors:	_
Applicable Utilities:	-
System Capacity Limit:	_
Standard Agreement:	_
Insurance Requirements:	_
External Disconnect Switch:	_
Net Metering Required:	_

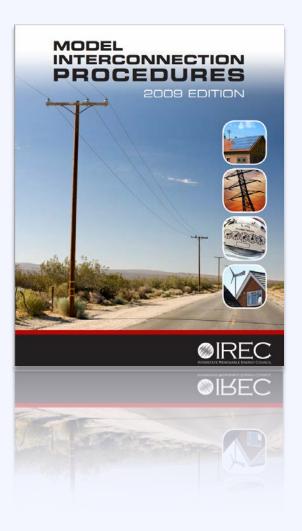


Interconnection: Resources

Resource Interstate Renewable Energy Council

IREC developed model interconnection procedures in an effort to capture emerging best practices in this vital area.

www.irecusa.org









Agenda

08:40 – 09:00 Intr	oductions	& Disc	ussion
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- 09:00 09:50 Creating a Regulatory Landscape for Solar
- 09:50 10:00 Break
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- 10:30 11:00 Understanding Solar Financing
- II:00 II:30 Installing Solar on Municipal Facilities
- 11:30 11:40 Break
- II:40 I2:10 Local Speaker
- 12:10 12:30
- Next Steps for Solar in Region





Understanding Solar Financing





Understanding Solar Financing

Direct Cash Incentives	RPS/SRECs	Rebates	PBIs/FITs



Comparison: PV Financial Incentives

Kansas		
-	State Rebates	-
-	State Grants	-
1	State Loans	≤ \$30,000 (R, C)
-	PACE Financing	-
-	Prod. Incentives	-
-	Corp.Tax Credits	-
-	Pers.Tax Credits	-
1	Prop.Tax Incentives	All sectors , on-site use

Missouri		
1	State Rebates	\$2.00 /W
-	State Grants	-
1	State Loans	Competitive (govt, schools)
1	PACE Financing	Local Option
1	Prod. Incentives	Utilities
-	Corp.Tax Credits	-
-	Pers.Tax Credits	-
1	Prop.Tax Incentives	Optional abatement, utility scale

Missouri Solar Rebates

- \$2.00 per W
- \$50,000 Max.
- Up to 100 kW
- KCP&L: \$1.3M in 2011
- Ameren: \$2.96M for 2011





RPS: Missouri Overview

- I 5% renewables by 2021
- Solar carve-out of 0.3% by 2021
- Some opportunities for SREC sales



- No defined alternative compliance payment (2X REC market value)
- No geographic/eligibility limitations





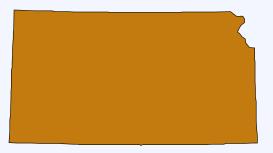
SRECs in Missouri

Ameren Standard Offer: \$50 (2012) for 5 or 10 years; limited to 100 kW or less; lump sum for 10 kW or less; \$2M annually (fully committed for 2012) **KCP&L** Standard Offer: Coming Soon?



RPS: Kansas Overview

- 20% peak-demand capacity by 2020
- No solar carve-out

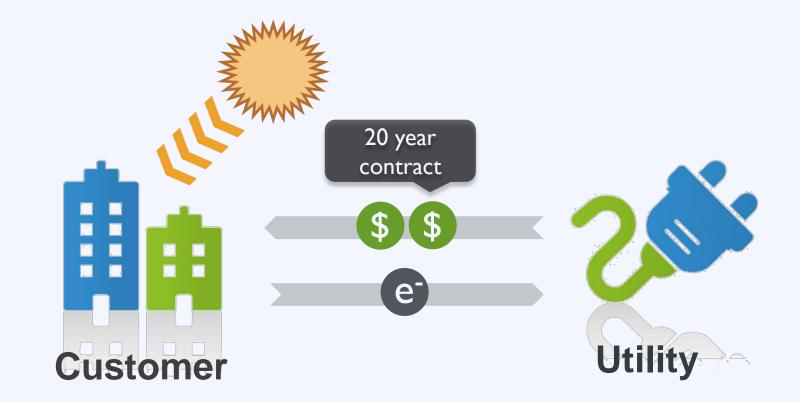


- No defined alternative compliance payment or penalties
- No geographic/eligibility limitations
- Formulaic approach to translate RECs (MWh) into capacity (MW)





What is a Feed in Tariff?





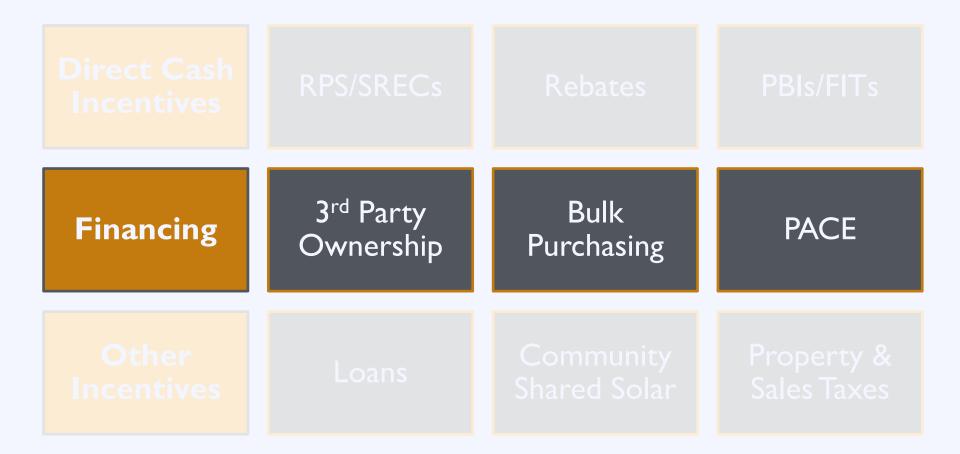
Components of a Feed in Tariff

- Fixed price payment
- Long term contract
- Guaranteed power purchase
- Price based on generation cost





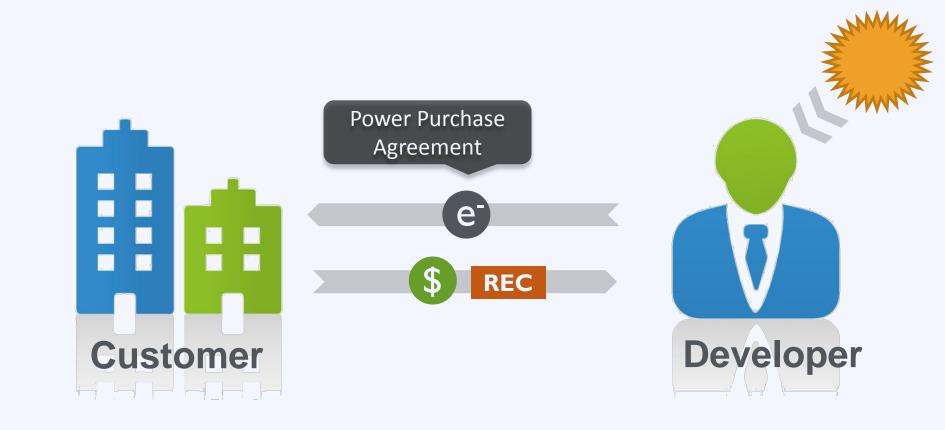
Understanding Solar Financing





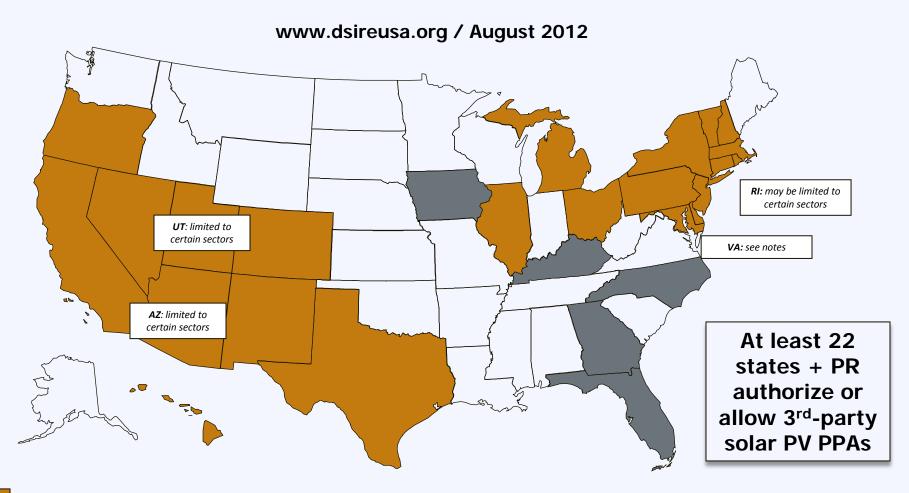


Third Party Ownership





3rd-Party Solar PV Power Purchase Agreements (PPAs)



Authorized by state or otherwise currently in use, at least in certain jurisdictions within in the state Apparently disallowed by state or otherwise restricted by legal barriers

Status unclear or unknown

Note: This map is intended to serve as an unofficial guide; it does not constitute legal advice. Seek qualified legal expertise before making binding financial decisions related to a 3rd-party PPA. See following slides for additional important information and authority references.

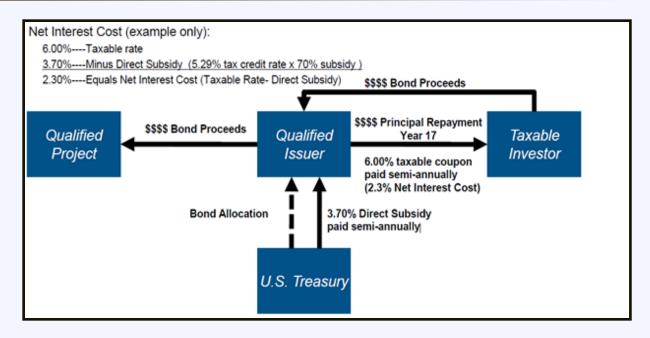
Qualified Energy Conservation Bonds

- What?
 - Tax credit or direct payment subsidy
- Why?
 - Subsidy lowers the effective cost of capital
- Relevance for Solar?
 - Financing public facilities (numerous)
 - "Green Community" programs (a few)
- How?

- State allocation or automatic allocation



Qualified Energy Conservation Bonds



Local Examples:

- St. Louis County, MO \$10.3 million residential energy efficiency loan program
- City of Lawrence, KS \$8.7 million hydro project, bundled with other bonds



Group Purchasing

- Many people come together to purchase solar equipment and installation services in bulk
- Economies of scale = lower price per watt





Property Assessed Clean Energy

City creates type of land-secured financing district or similar legal mechanism (a special assessment district)

Property owners voluntarily signup for financing and make energy improvements Proceeds from revenue bond or other financing provided to property owner to pay for energy project Property owner pays assessment through property tax bill (up to 20 years)

Local Examples: Jefferson City, Cole County, others coming soon? (see http://www.mocefllc.com/)



Understanding Solar Financing





Financing: Attractive Loan Options

- Limited options in both Missouri and Kansas
- Local governments and utilities can develop loan programs:
 - direct loans (e.g., revolving loan fund)
 - loans through private lenders (e.g., credit enhancement)
- Benefits and drawbacks exist for both approaches
- The goal is to increase access to financing or induce additional improvements
- Various funding options exist



Community Shared Solar





Seattle City Light's Jefferson Park Project

Property & Sales Tax Exemptions

- Property tax exemption in Kansas for customer-sited facilities
- Limited information available in Missouri on property tax assessment
- "Renewable Energy Generation Zones" authorized in Missouri (abatement of at least 50% for 10 years if adopted)
- 4.225% state sales tax in Missouri, plus local
- 6.3% state sales in Kansas, plus local







Agenda

08:40 – 09:00 Introdu	actions & Discussion
-----------------------	----------------------

- 09:00 09:50Creating a Regulatory Landscape for Solar
- 09:50 10:00Break
- |0:00 |0:30|Understanding Utility Regulations
- |0:30 ||:00Understanding Solar Financing
- ||:00 ||:30
- 11:30 11:40
- 1:40 12:10
- |2:|0 |2:30

- Installing Solar on Municipal Facilities
- Break
- Local Speaker
- Next Steps for Solar in Region





Option 1: Direct Ownership

Decide on Ownership Structure

Option 2: Third Party Ownership

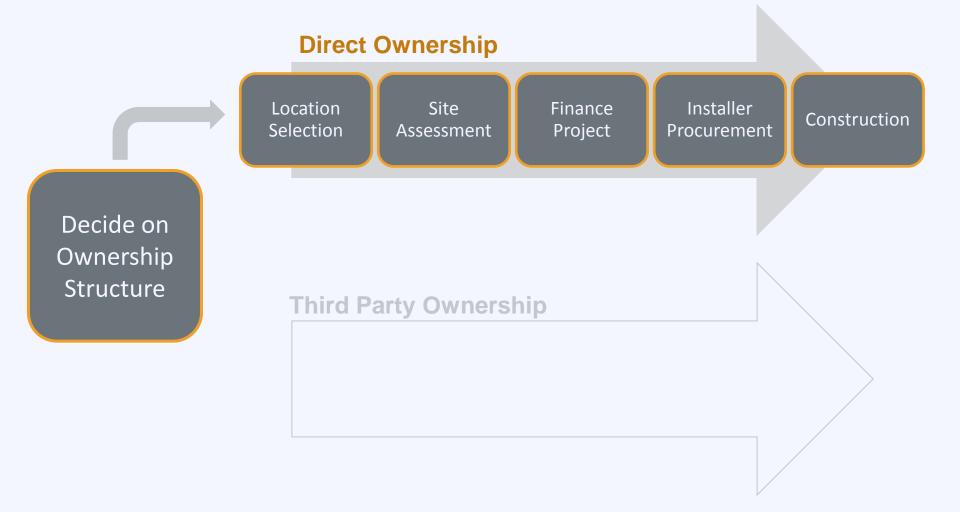


Ownership Structure Decision

- Are you a taxpaying entity?
- Do you have access to financing or available cash?
- How does this compare to other opportunities?
- Can you enter into long-term contracts?
- Do you want to own the system?
- Do you have a municipal utility?
- Do you need the RECs for compliance?

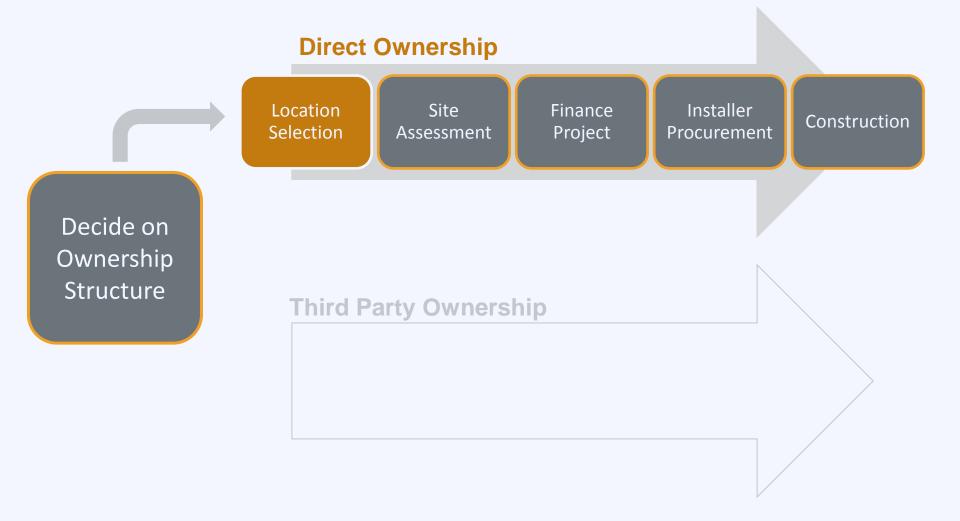














Step I: Location Selection

- Who is using the energy?
- Where is the energy being used?
- What is the user's energy load?
- What is the user's energy cost?



Step I: Location Selection





Rooftop











Step 2: Site Assessment

- Solar Access Rights
- Interconnection
- Wind loading
- Roof age, type, & warranty
- Electrical configuration
- Slope, Shading and orientation





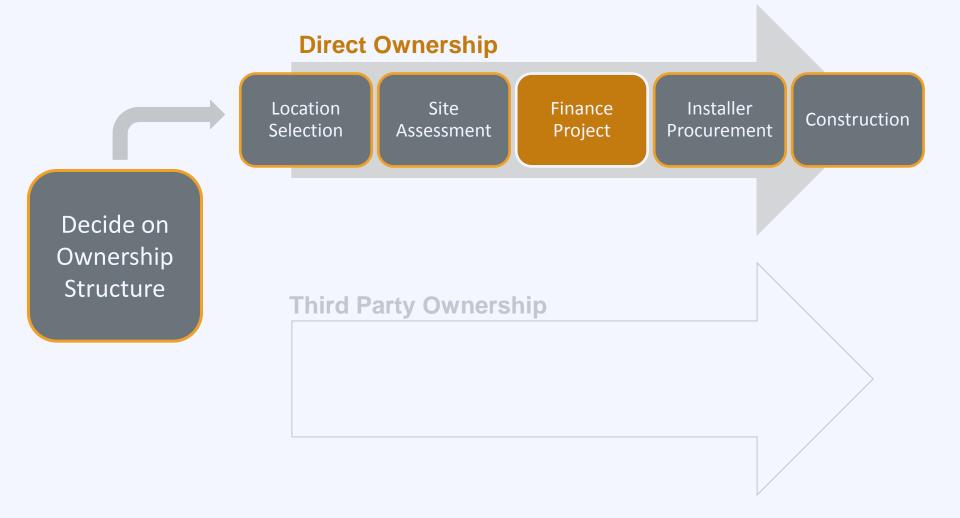
Step 2: Site Assessment

- Usable acreage
- Slope
- Distance to transmission lines
- Distance to graded roads
- Conservation areas











Step 3: Finance Project

- Direct purchase
- Grant financed
- ESCO/performance contracting
- Loans
- Bonds









Step 4: Installer Procurement

EPC = Engineer, Procure, Construct

- Designs the project
- Completes necessary permitting requirements
- Works with the utility to file for interconnection
- Assists in procuring components
- Applies for incentives
- Manages project construction









Direct Ownership

Pros

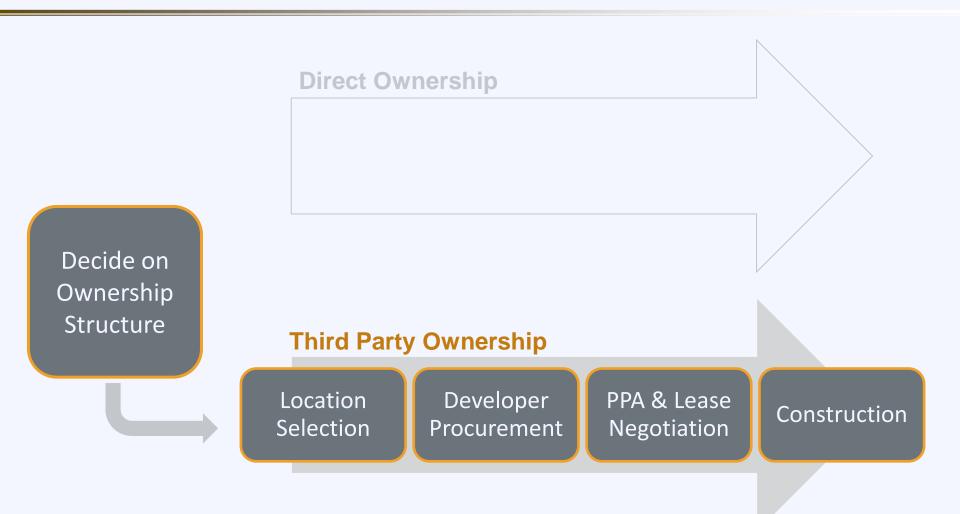
- Low cost electricity
- REC revenue
- Maximize underutilized spaces

Cons

- Large upfront cost
- Long term management
- Can't take all incentives
- Development risk
- Performance risk

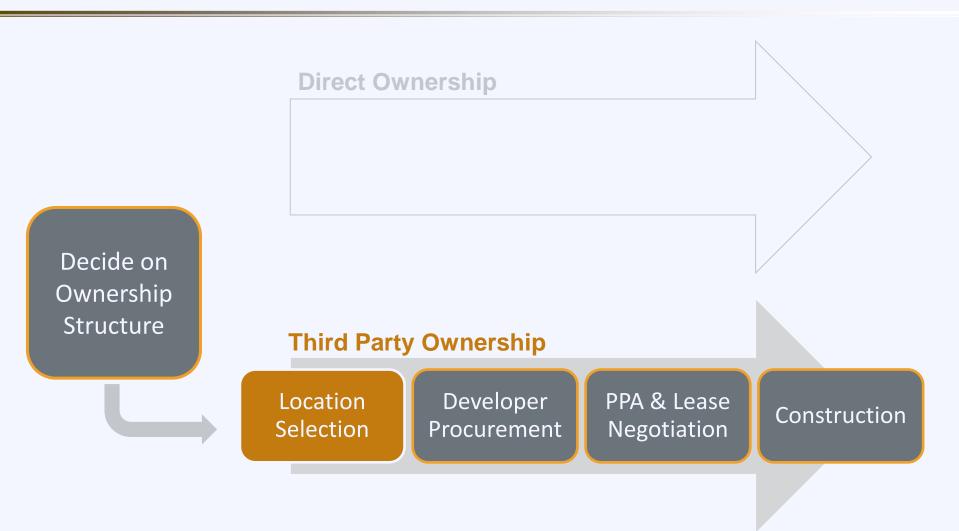




















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Step 2: Developer Procurement

Avoid Five Common Pitfalls:

- RFP/RFQ specifications are too restrictive or too unstructured
- Competing measures of system efficiency
- Finding sufficient number of qualified bidders
- Lack of effective O&M program
- Lack of strong monitoring program





Step 2: Developer Procurement

In Santa Clara County, CA, nine municipalities collaboratively bid out 47 sites. Benefits include:

50% savings in administrative costs

0-5% reduction in energy cost



Source: NREL Webinar "Procuring and Implementing Solar Projects on Public Buildings: How to Avoid Common Pitfalls" December 8, 2010







Step 3: Contract Negotiation

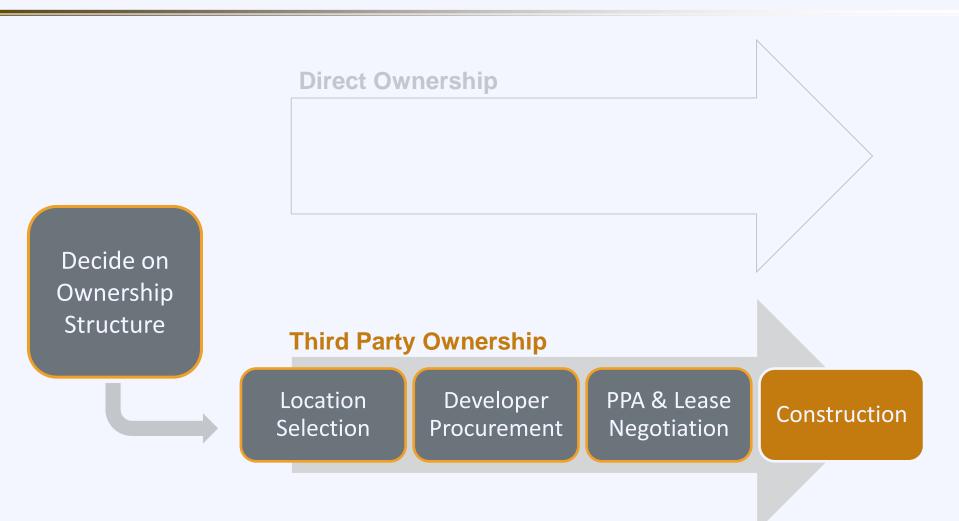
Negotiation points:

- Fixed or floating electricity price
- Price escalator
- Contract term length
- Property taxes
- Liability
- Performance guarantee
- Regulatory risk











Third Party Ownership

Pros

- No upfront cost
- No O&M costs
- Low risk
- Predictable payments

Cons

- Market electricity price risk
- Limited opportunity in PA
- Don't keep RECs

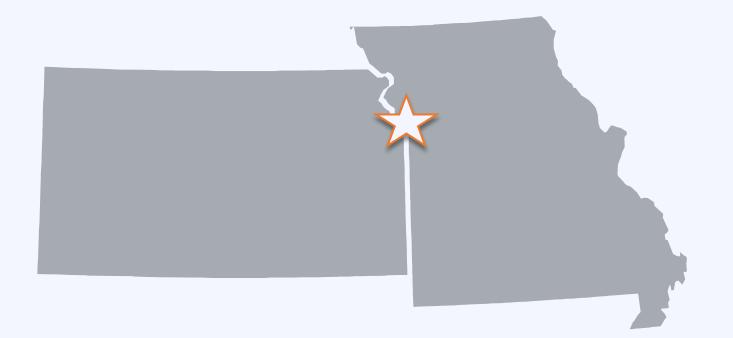


Factors PPA Providers Look For

- States that allow PPA providers to operate without being regulated as utility
- State financial incentives tax credit or rebate
- REC market
- Good net metering and interconnection
- PPA providers allowed to net meter



Case Study: Kansas City



The City will lease 40 – 80 rooftop grid connected 25 kW solar PV installations



Case Study: Kansas City



U.S. Department of Energy





Agenda

08:40 – 09:00 Introductions & Discus	sion
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- 09:00 09:50 Creating a Regulatory Landscape for Solar
- 09:50 10:00 Break
- 10:00 10:30 Understanding Utility Regulations
- 10:30 11:00 Understanding Solar Financing
- II:00 II:30 Installing Solar on Municipal Facilities
 - Break
 - Local Speaker
- 12:10 12:30

||:30 - ||:40

1:40 - 12:10

Next Steps for Solar in Region



Activity: Addressing Barriers

What is the greatest barrier to solar adoption in your community? [Green Card]

Right Now

During Session

After Break









[Results from Survey]



Agenda

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12:10 - 12:30

Local Speaker

Next Steps for Solar in Region



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- 12:10 12:30
- Next Steps for Solar in Region



Activity: Next Steps

What do you pledge to do when you leave today's workshop? [Orange Card]









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