Solar Powering Your Community

Addressing Soft Costs and Barriers

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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.

About the SunShot Solar Outreach Partnership

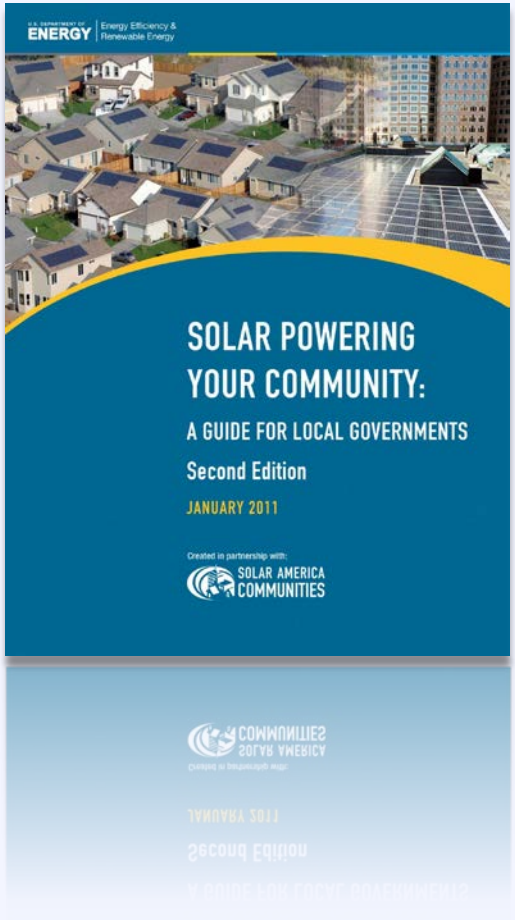
- Increase installed capacity of solar electricity in U.S. communities
- Streamline and standardize permitting and interconnection processes
- Improve planning and zoning codes/regulations for solar electric technologies
- Increase access to solar financing options

About the SunShot Solar Outreach Partnership

Resource **Solar Powering Your Community Guide**

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

www.energy.gov



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About the SunShot Solar Outreach Partnership

Resource SunShot Resource Center

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

www4.eere.energy.gov/solar/sunshot/resource_center

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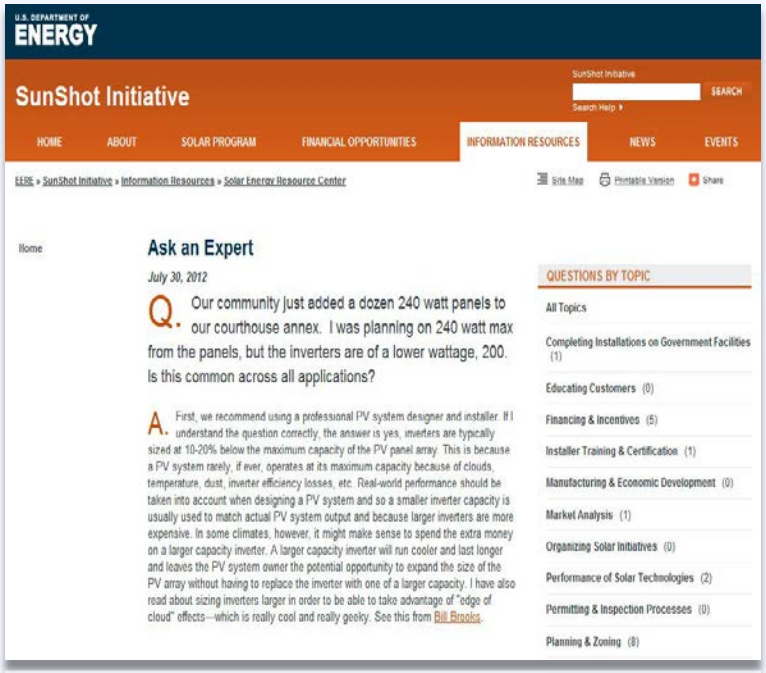
About the SunShot Solar Outreach Partnership

Technical Support

- 'Ask an Expert' Live Web Forums
- 'Ask an Expert' Web Portal
- Peer Exchange Facilitation
- In-Depth Consultations
- Customized Trainings



www4.eere.energy.gov/solar/sunshot/resource_center

For more information email: solar-usa@iclei.org

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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 the North Carolina Market
10:30 – 11:00	Understanding Solar Financing
11:00 – 11:30	Installing Solar on Municipal Facilities
11:30 – 11:40	*Break*
11:40 – 12:10	Local Speaker – Julian Prosser
12:10 – 12:30	Next Steps for Solar in Region

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Poll

Who's in the room?

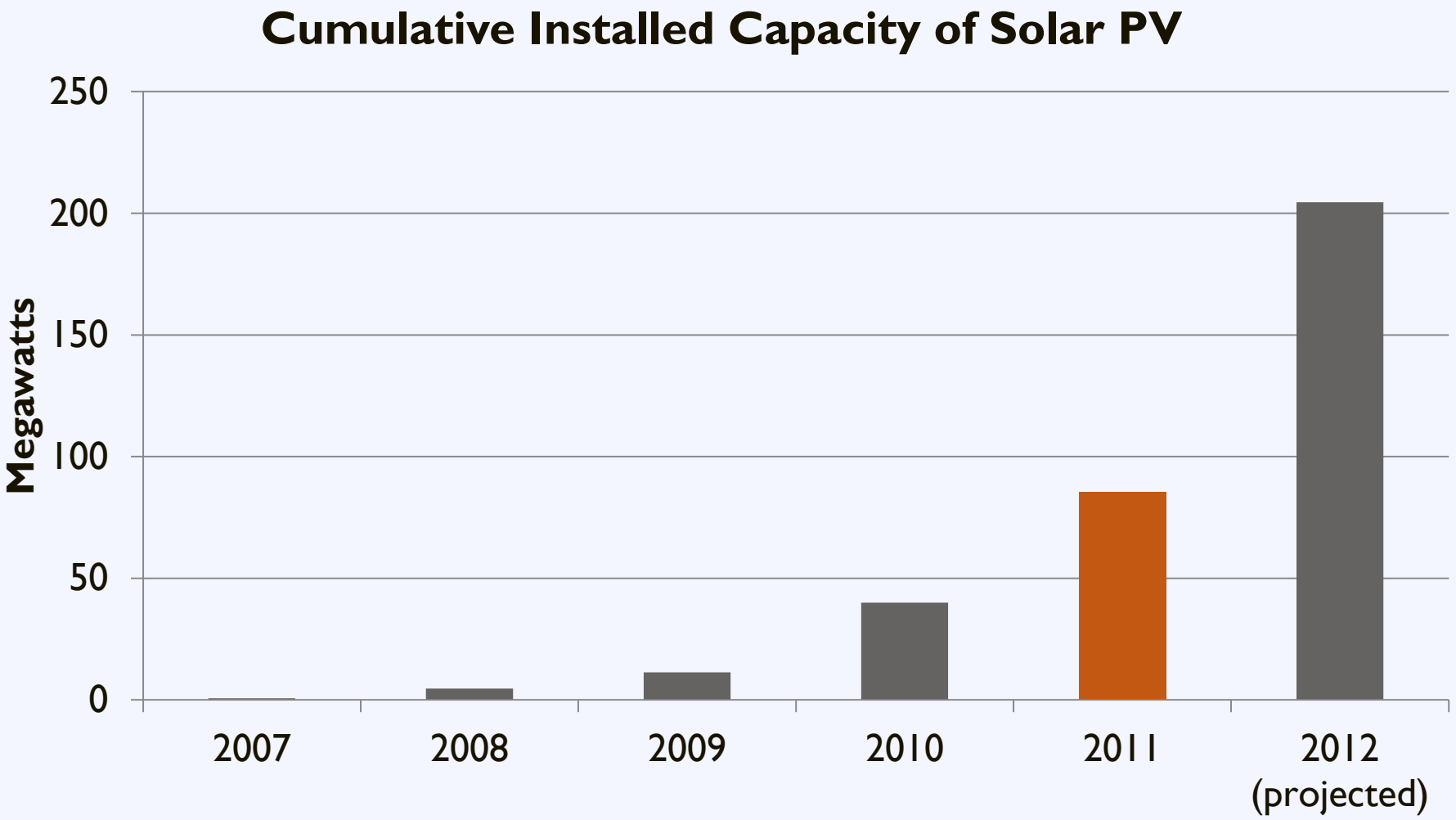
Poll

What is your experience with solar?

Workshop Goal

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

North Carolina Solar PV Market



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Source: IREC, Photon Magazine

Quick Facts

85.5 MW of solar has been installed in NC, enough to power 9,500 homes and create 2,400 solar jobs

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Source: PennFuture

Explore benefits

and

Overcome barriers

Activity: Identifying Benefits

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

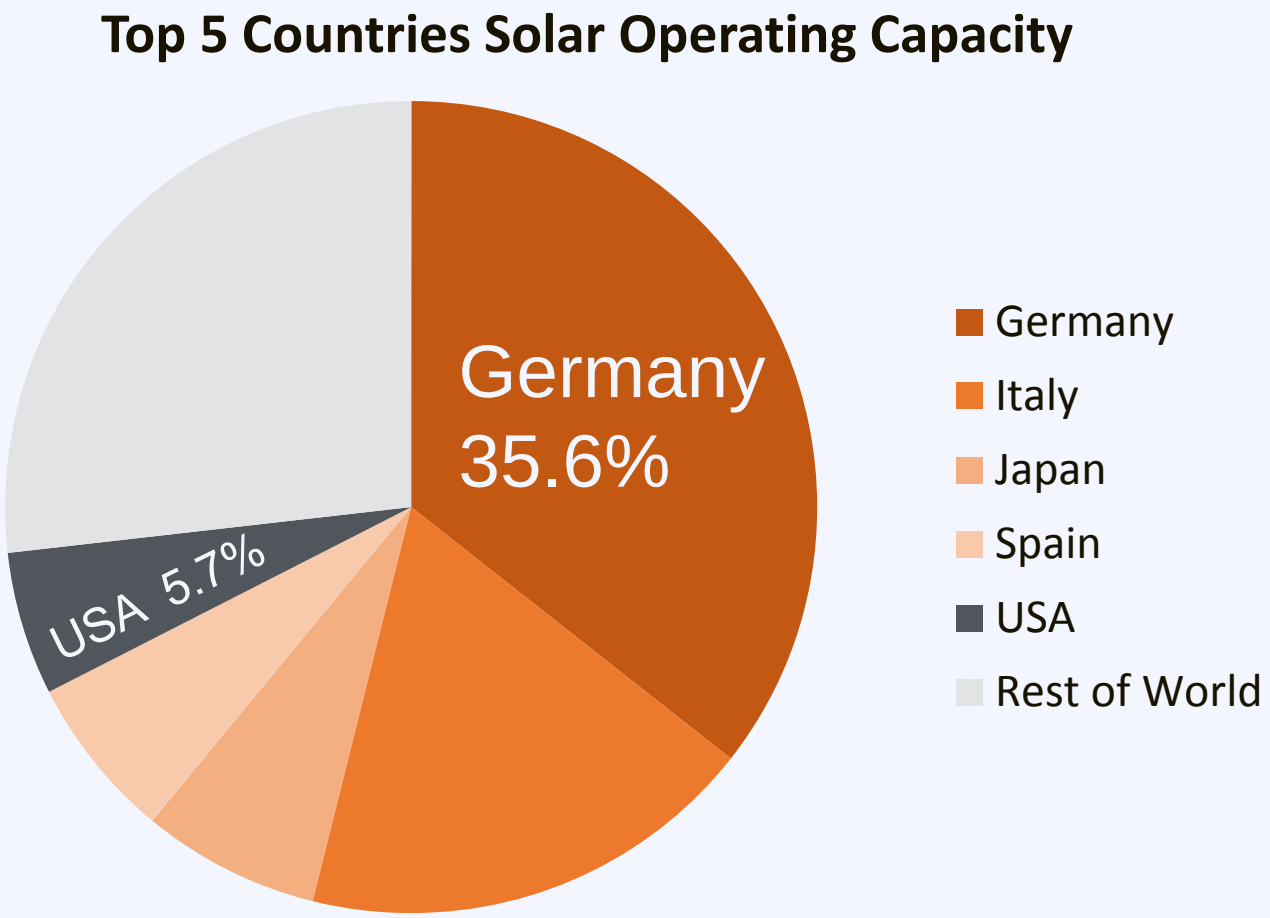
Right Now	During Session	After Break
		
Write answer on card	Compile results	Group discussion

Activity: Addressing Barriers

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

Right Now	During Session	After Break
		
Write answer on card	Compile results	Group discussion

Installed Capacity



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

Installed Capacity

Total installed solar capacity in the US

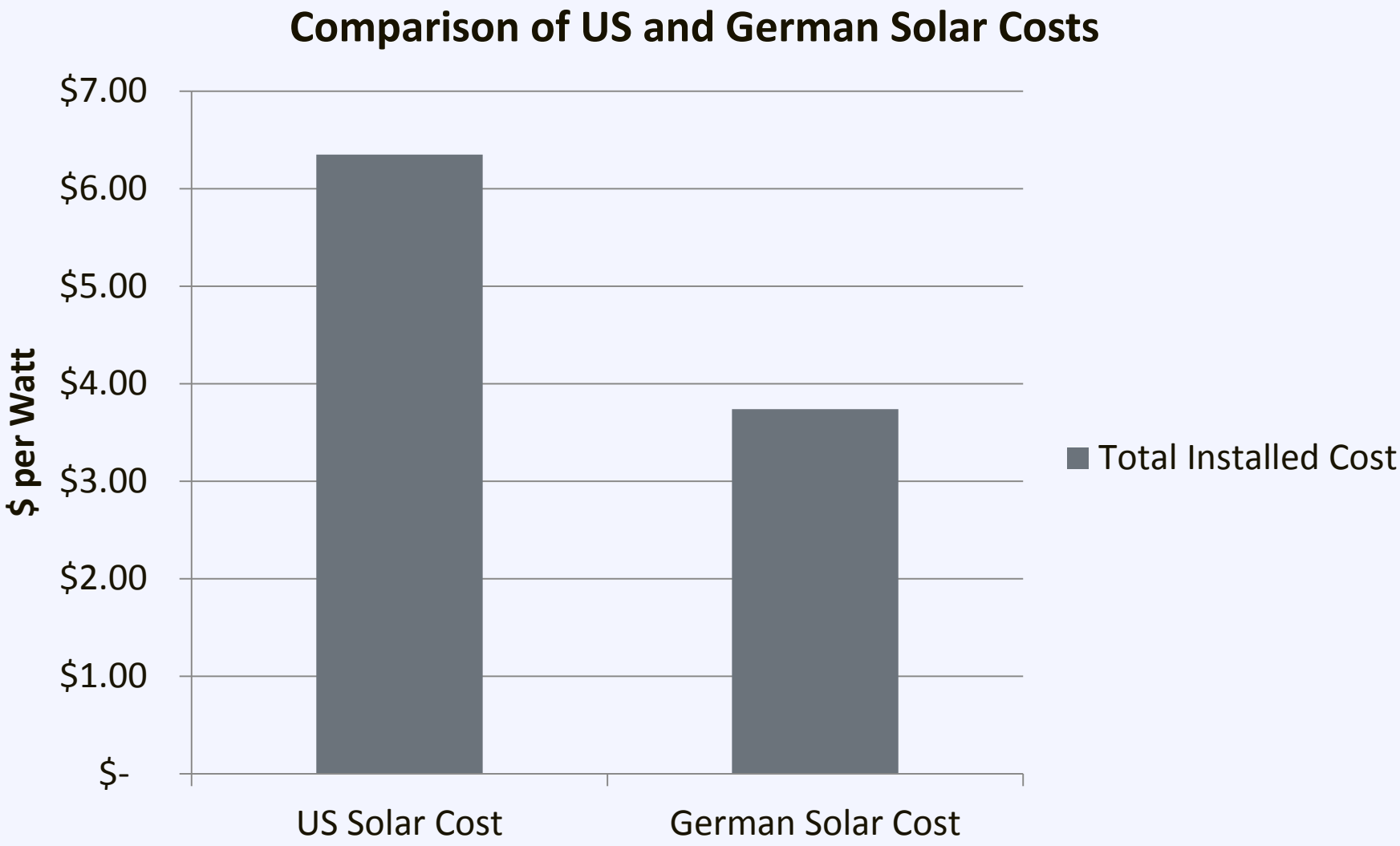
4 GW

Capacity installed in Germany in Dec 2011

4 GW

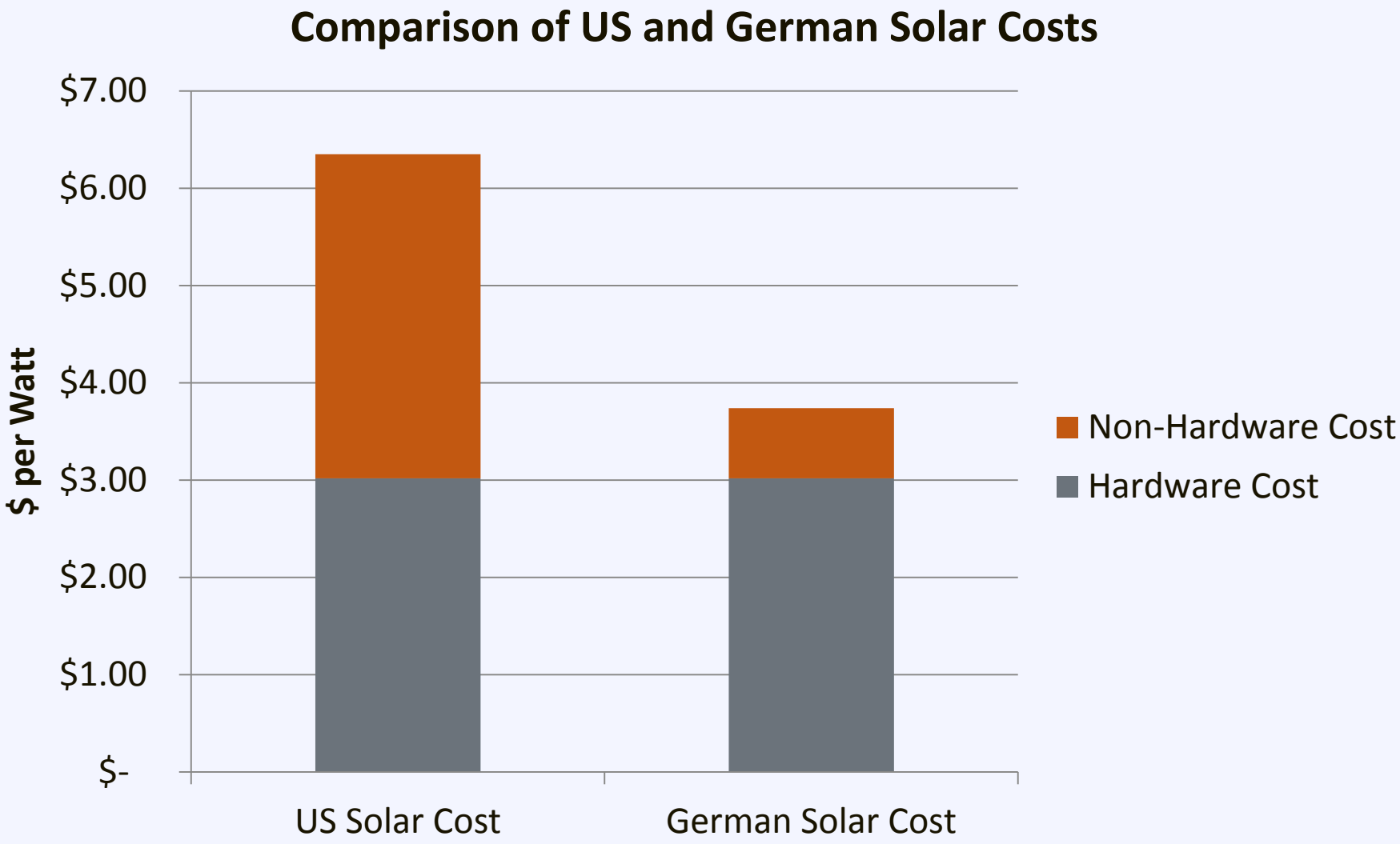
http://www.map.ren21.net/GSR/GSR2012.pdf

The Cost of Solar in the US



Source: NREL (http://ases.conference-services.net/resources/252/2859/pdf/SOLAR2012_0599_full%20paper.pdf) (http://www.nrel.gov/docs/fy12osti/53347.pdf) (http://www.nrel.gov/docs/fy12osti/54689.pdf)

The Cost of Solar in the US



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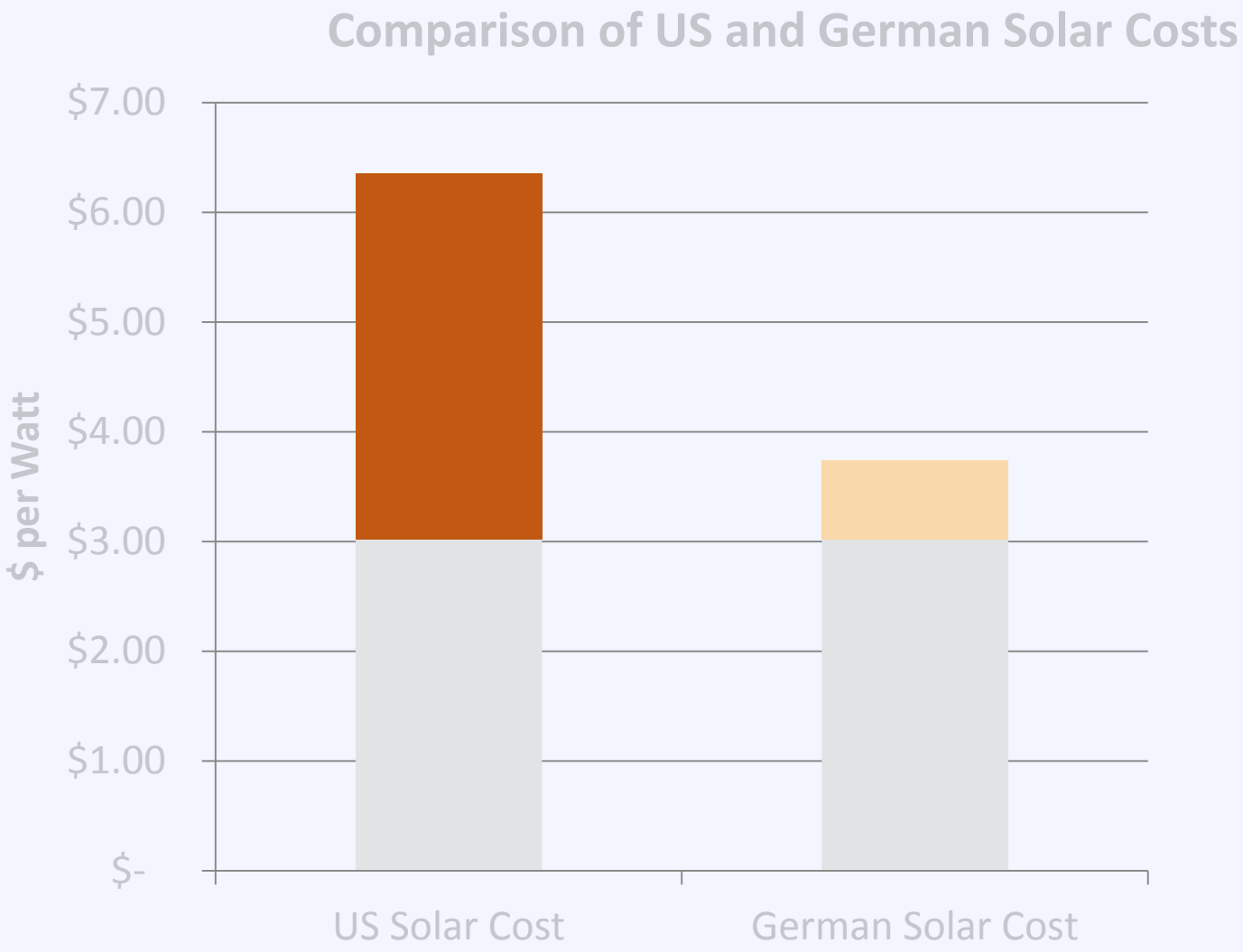

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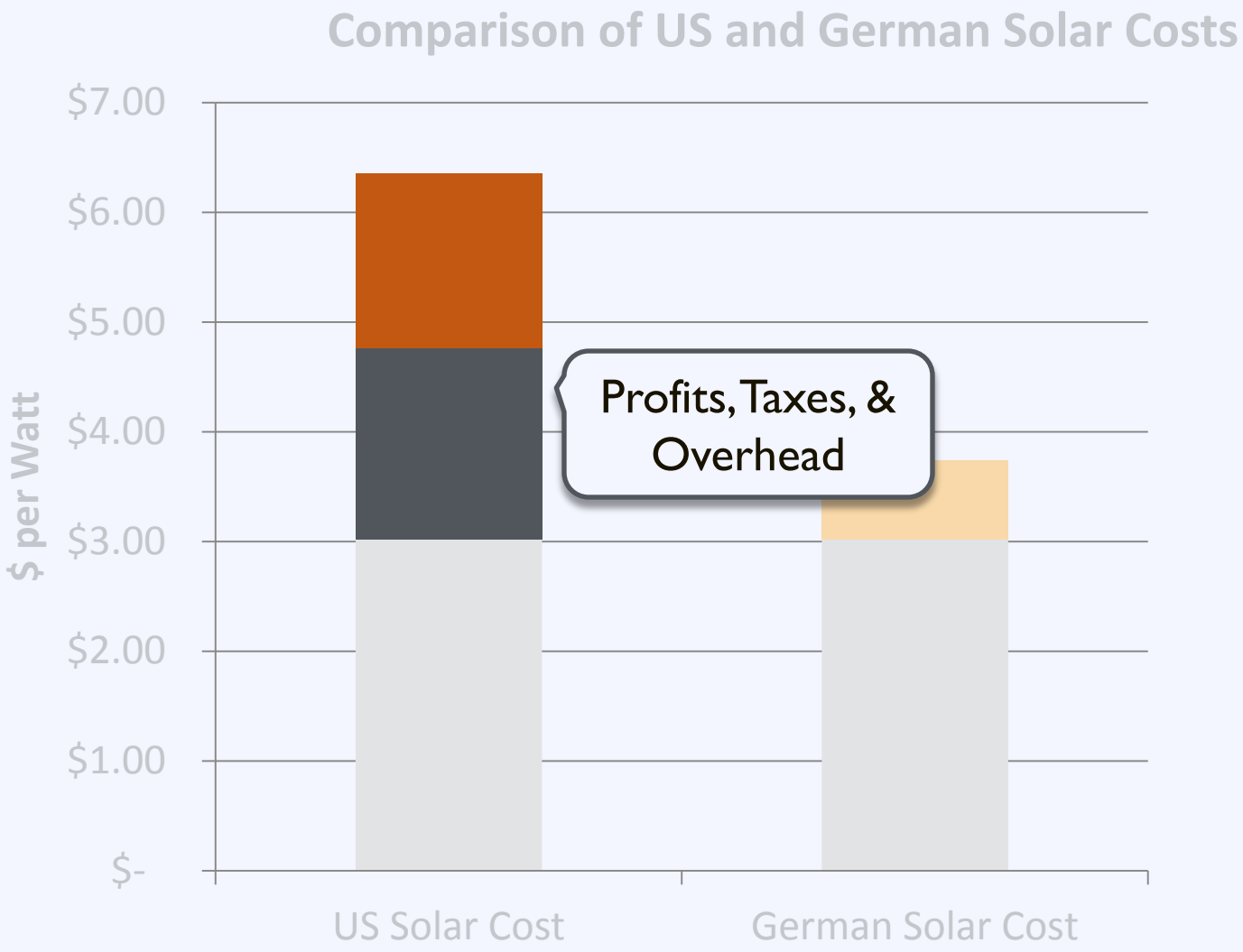

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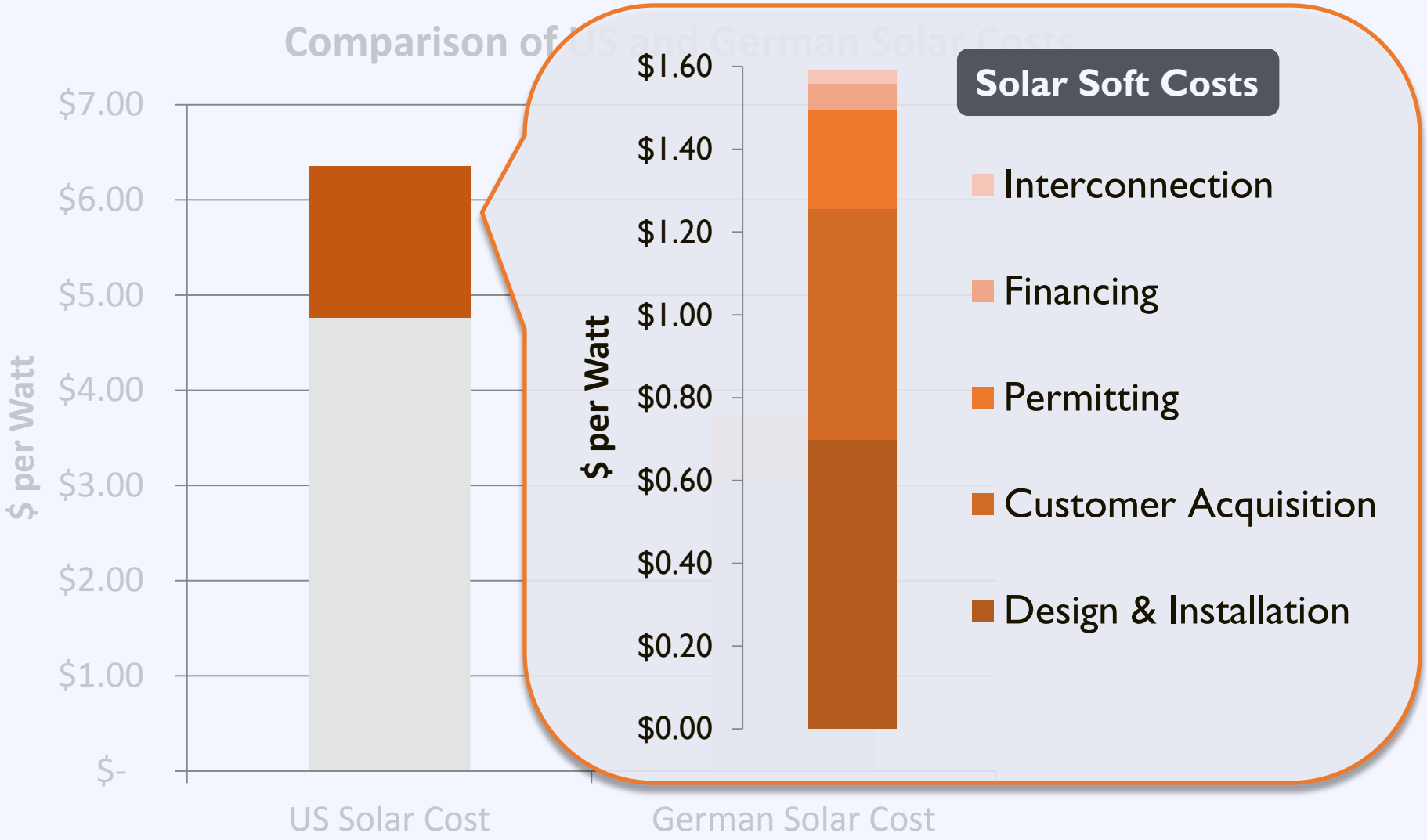

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Time to Installation

New York City's Goal

100 days

from inception to completion

Germany Today

8 days

from inception to completion

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Photon Magazine

Germany's Success

Consistency and Transparency

through a

Standardized Process

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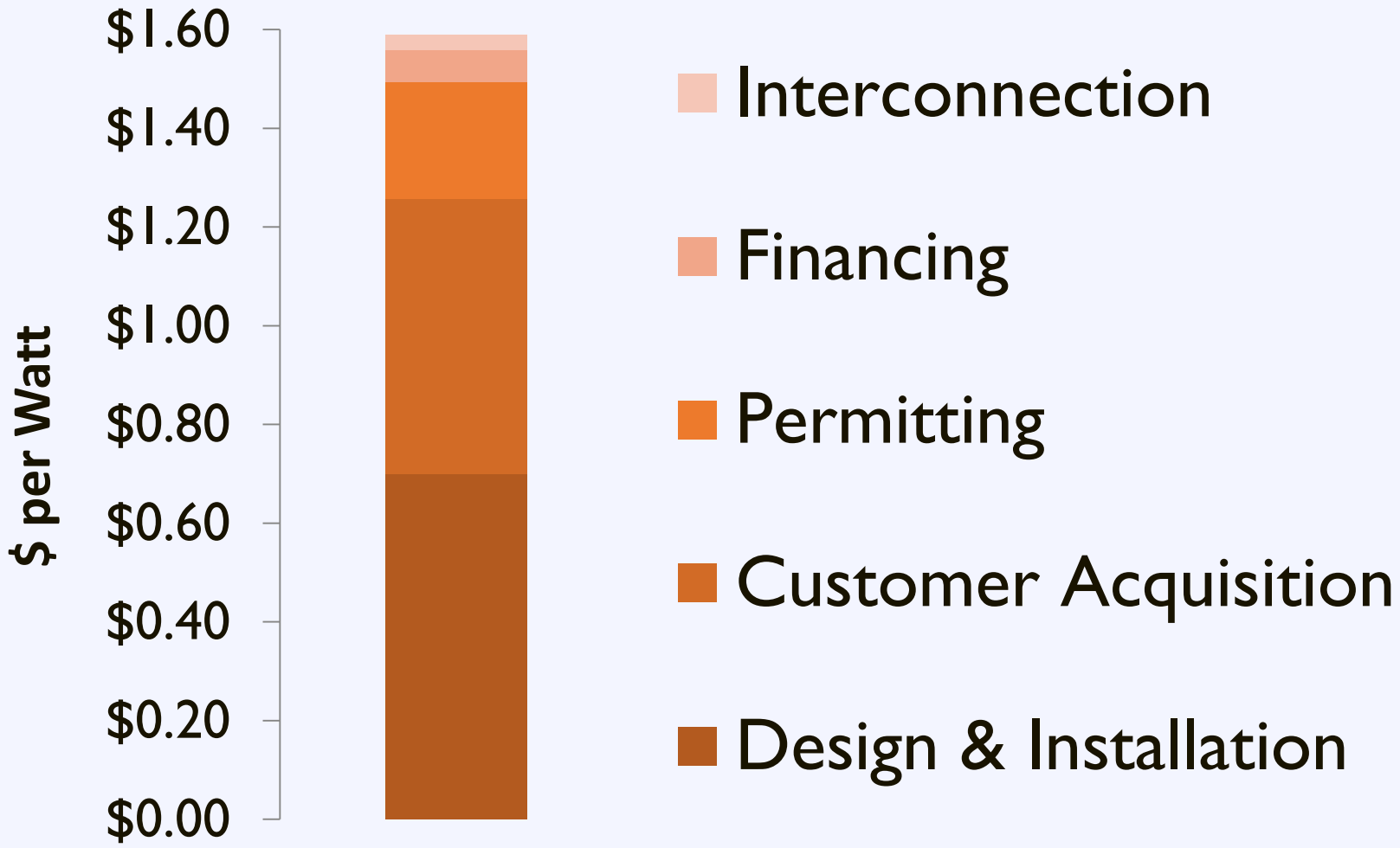
Mitigate Soft Costs



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

Mitigate Soft Costs

- Interconnection
- Financing
- Codes and standards
- Access rights
- Applying and processing
- Permitting
- Customer Acquisition
- Design & Installation

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U.S. Department of Energy

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

Zoning Codes: Regulations

Section	Topics to Address
Permitted Uses	Primary vs. accessory
Dimensional Standards	• Height • Lot coverage • Setbacks
Development Standards	• Screening • Placement • Site Planning
Definitions	Types of solar systems

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U.S. Department of Energy

Source: American Planning Association

Zoning Codes: Small Scale Solar

Typical Requirements:

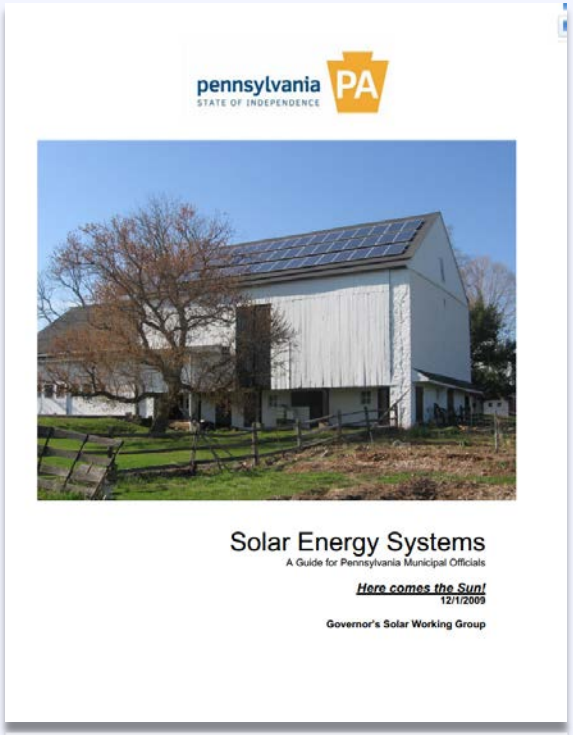
- Permitted as accessory use
- Minimize visibility if possible
- Requirements:
  - District height
  - Lot coverage
  - Setback

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



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Zoning Codes: Large Scale Solar

Typical Requirements:

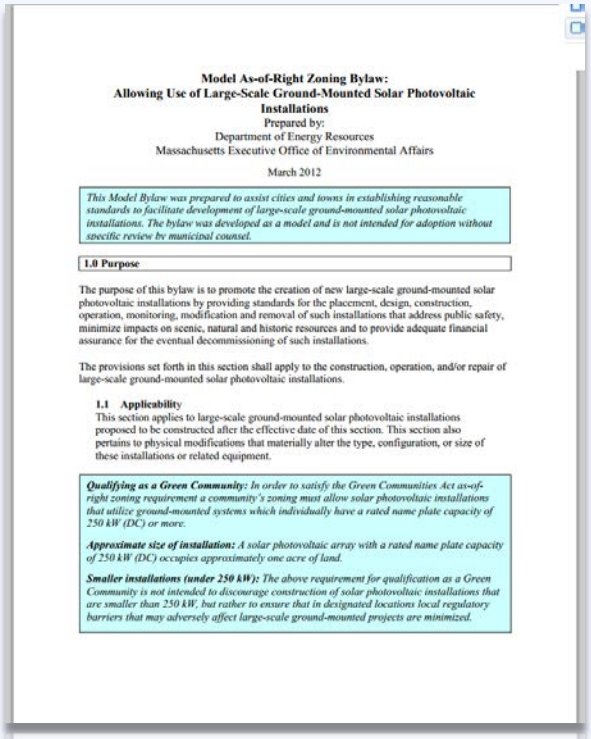
- Allowed for primary use in limited locations
- Requirements:
  - Height limits
  - Lot coverage
  - Setback
  - Fencing and Enclosure

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



Model As-of-Right Zoning Bylaw:
Allowing Use of Large-Scale Ground-Mounted Solar Photovoltaic Installations
Prepared by:
Department of Energy Resources
Massachusetts Executive Office of Environmental Affairs

March 2012

This Model Bylaw was prepared to assist cities and towns in establishing reasonable standards to facilitate development of large-scale ground-mounted solar photovoltaic installations. The bylaw was developed as a model and is not intended for adoption without specific review by municipal counsel.

1.0 Purpose

The purpose of this bylaw is to promote the creation of new large-scale ground-mounted solar photovoltaic installations by providing standards for the placement, design, construction, operation, monitoring, modification and removal of such installations that address public safety, minimize impacts on scenic, natural and historic resources and to provide adequate financial assurance for the eventual decommissioning of such installations.

The provisions set forth in this section shall apply to the construction, operation, and/or repair of large-scale ground-mounted solar photovoltaic installations.

1.1 Applicability
This section applies to large-scale ground-mounted solar photovoltaic installations proposed to be constructed after the effective date of this section. This section also pertains to physical modifications that materially alter the type, configuration, or size of these installations or related equipment.

Qualifying as a Green Community: *In order to satisfy the Green Communities Act as-of-right zoning requirement a community's zoning must allow solar photovoltaic installations that utilize ground-mounted systems which individually have a rated name plate capacity of 250 kW (DC) or more.*

Approximate size of installation: *A solar photovoltaic array with a rated name plate capacity of 250 kW (DC) occupies approximately one acre of land.*

Smaller installations (under 250 kW): *The above requirement for qualification as a Green Community is not intended to discourage construction of solar photovoltaic installations that are smaller than 250 kW, but rather to ensure that in designated locations local regulatory barriers that may adversely affect large-scale ground-mounted projects are minimized.*

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Solar Access

Solar Access Laws:

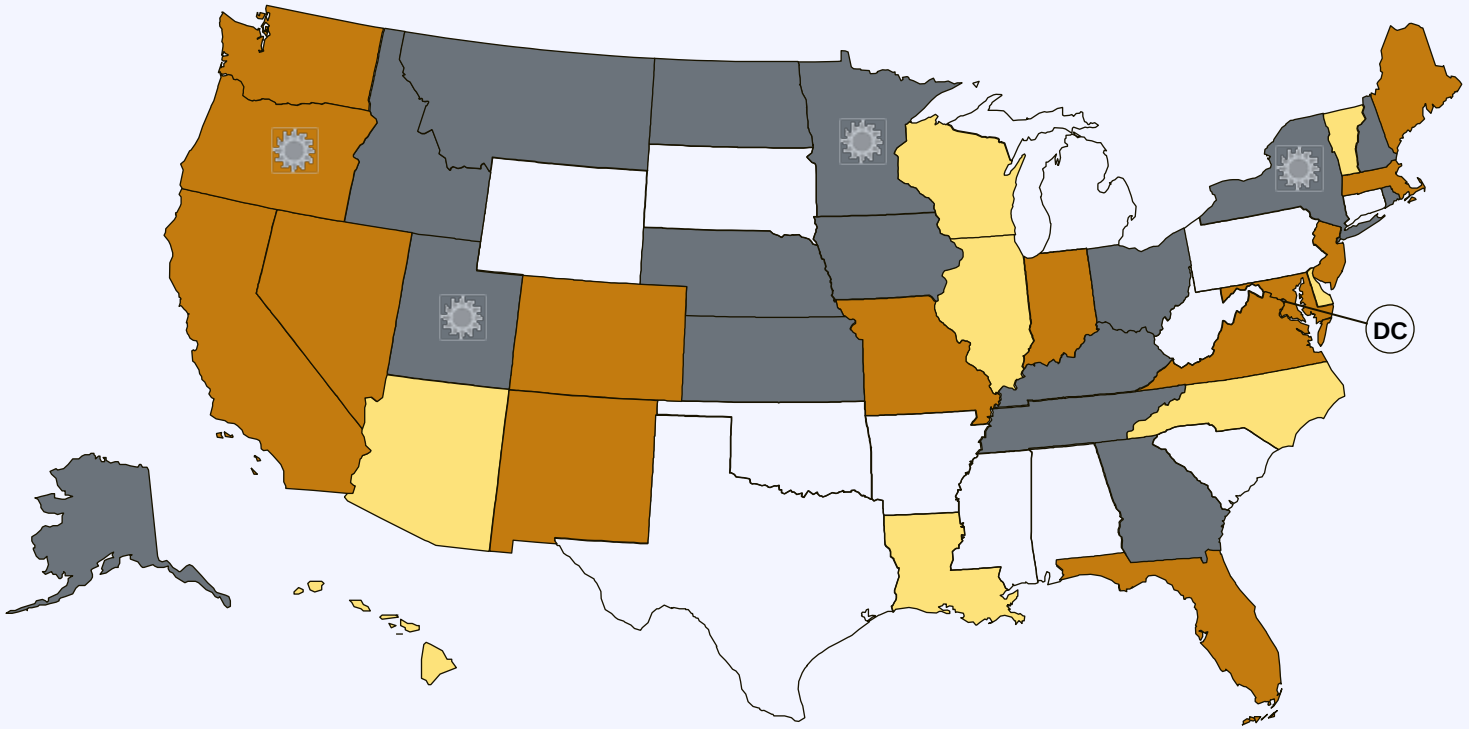
1. Increase the likelihood that properties will receive sunlight
2. Protect the rights of property owners to install solar
3. Reduce the risk that systems will be shaded after installation

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 Rights Provision

Solar Easements and Solar Rights Provisions

U.S. Virgin Islands

Local option to create solar rights provision

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Source: DSIRE

Solar Rights: North Carolina

Cities and counties cannot adopt ordinances prohibiting solar, but can place limitation on location of systems. Private covenants from Oct. 1, 2007 onwards cannot prohibit solar. Again, location of system can be limited.

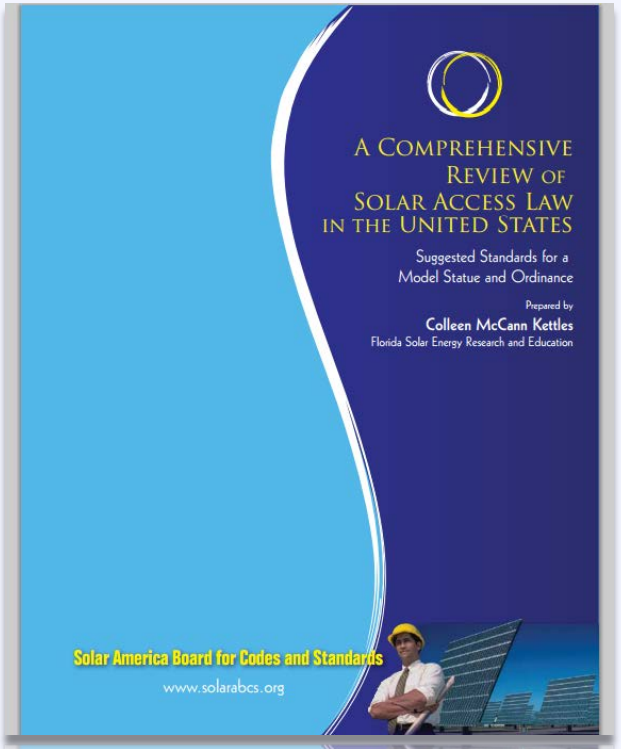
Source: Solar ABCs

Solar Access

Resource **Solar ABCs**

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

www.solarabcs.org



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The Permitting Process: Challenges

18,000+ local jurisdictions

with unique permitting requirements

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

The Permitting Process: Challenges

Local permitting processes add on average

$2,516

to the installation cost of residential PV

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Source: SunRun

The Permitting Process: Challenges

Source: Forbes

Expedited Permitting

Solar Permitting Best Practices:

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

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U.S. Department of Energy

Source: Vote Solar

Expedited Permitting

Solar Permitting Best Practices:

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

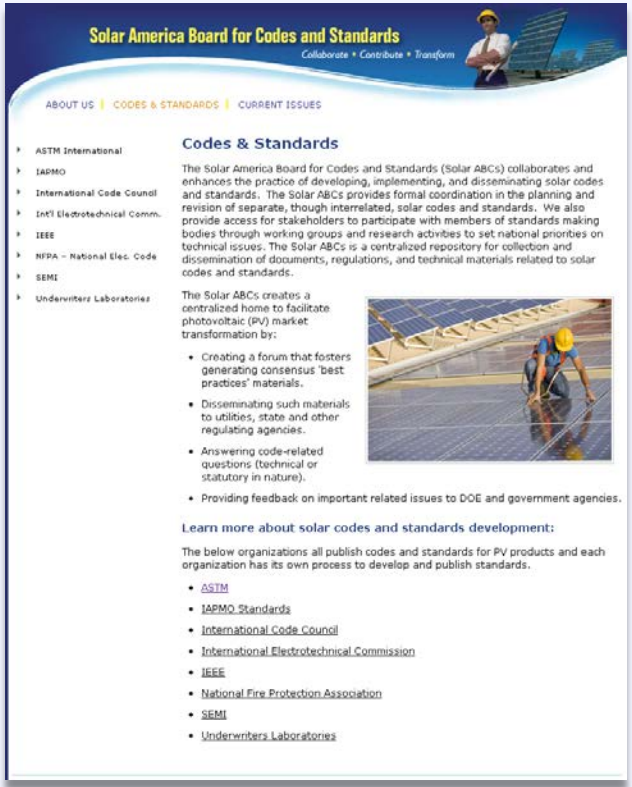
Source: Vote Solar

Expedited Permitting

Resource **Solar ABCs**

Expedited Permitting:

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



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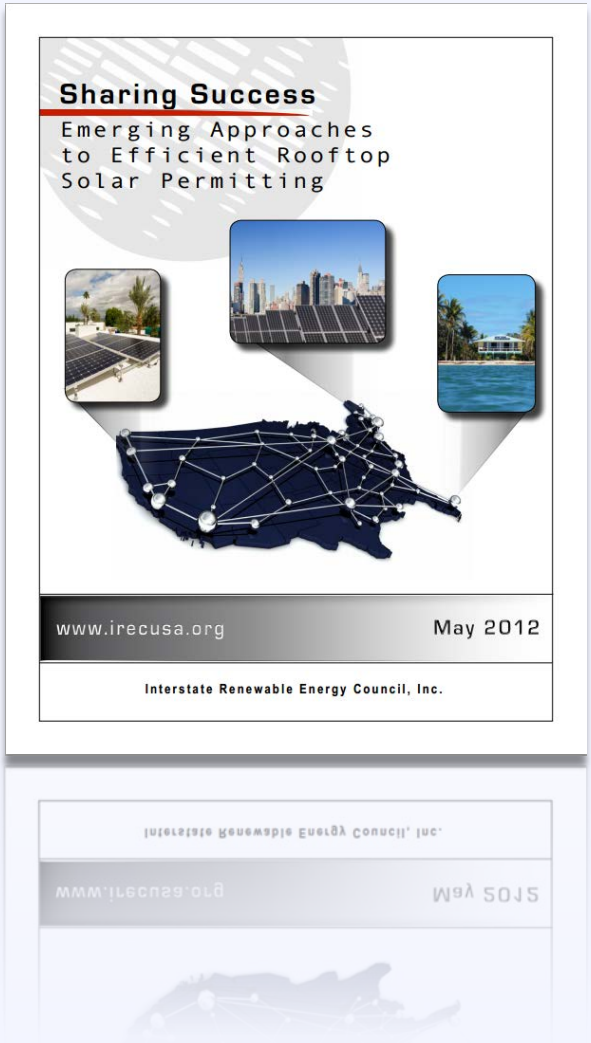
Expedited Permitting

Resource **Interstate Renewable Energy Council**

Outlines emerging approaches to efficient rooftop solar permitting

www.irecusa.org



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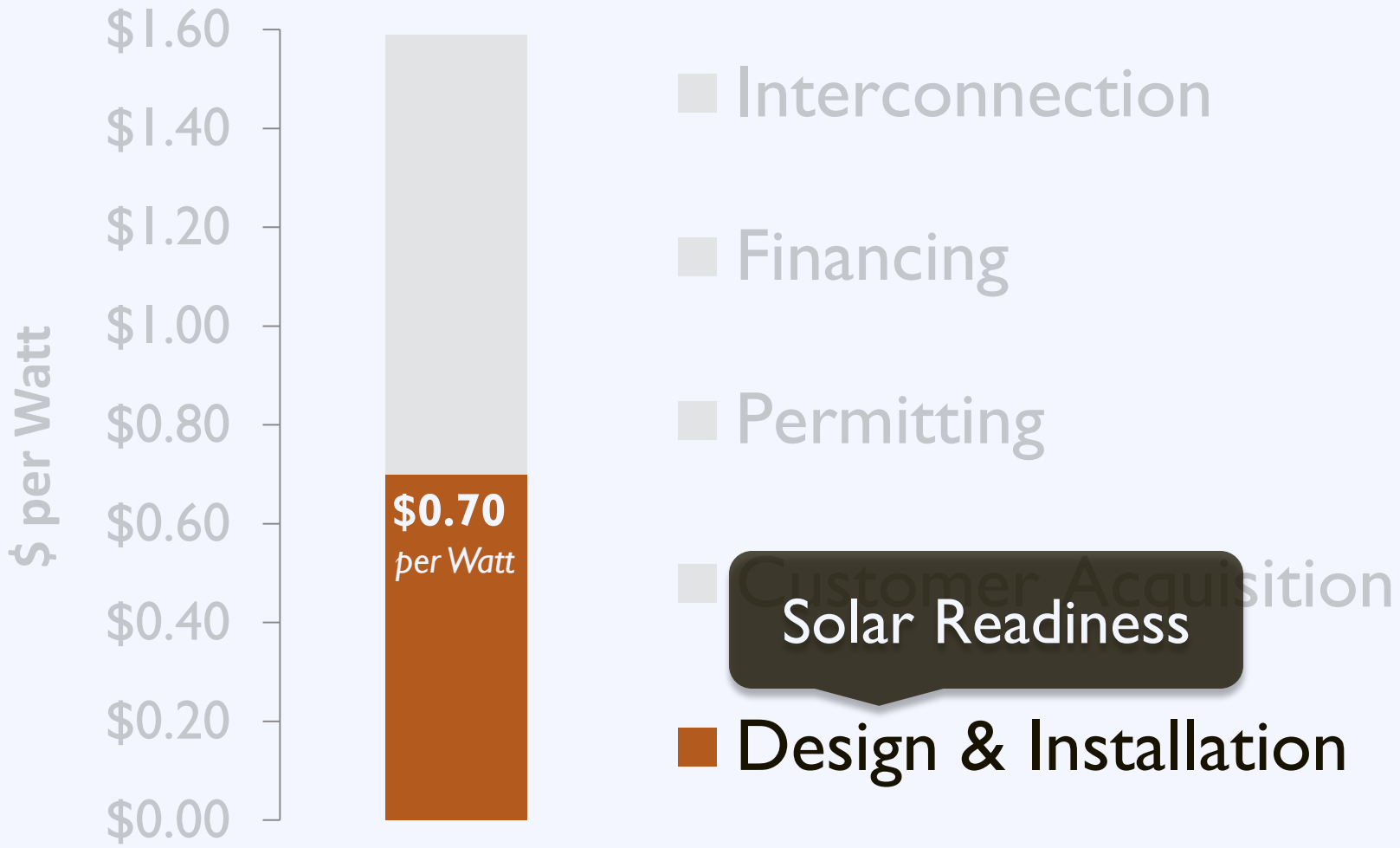
Mitigate Soft Costs



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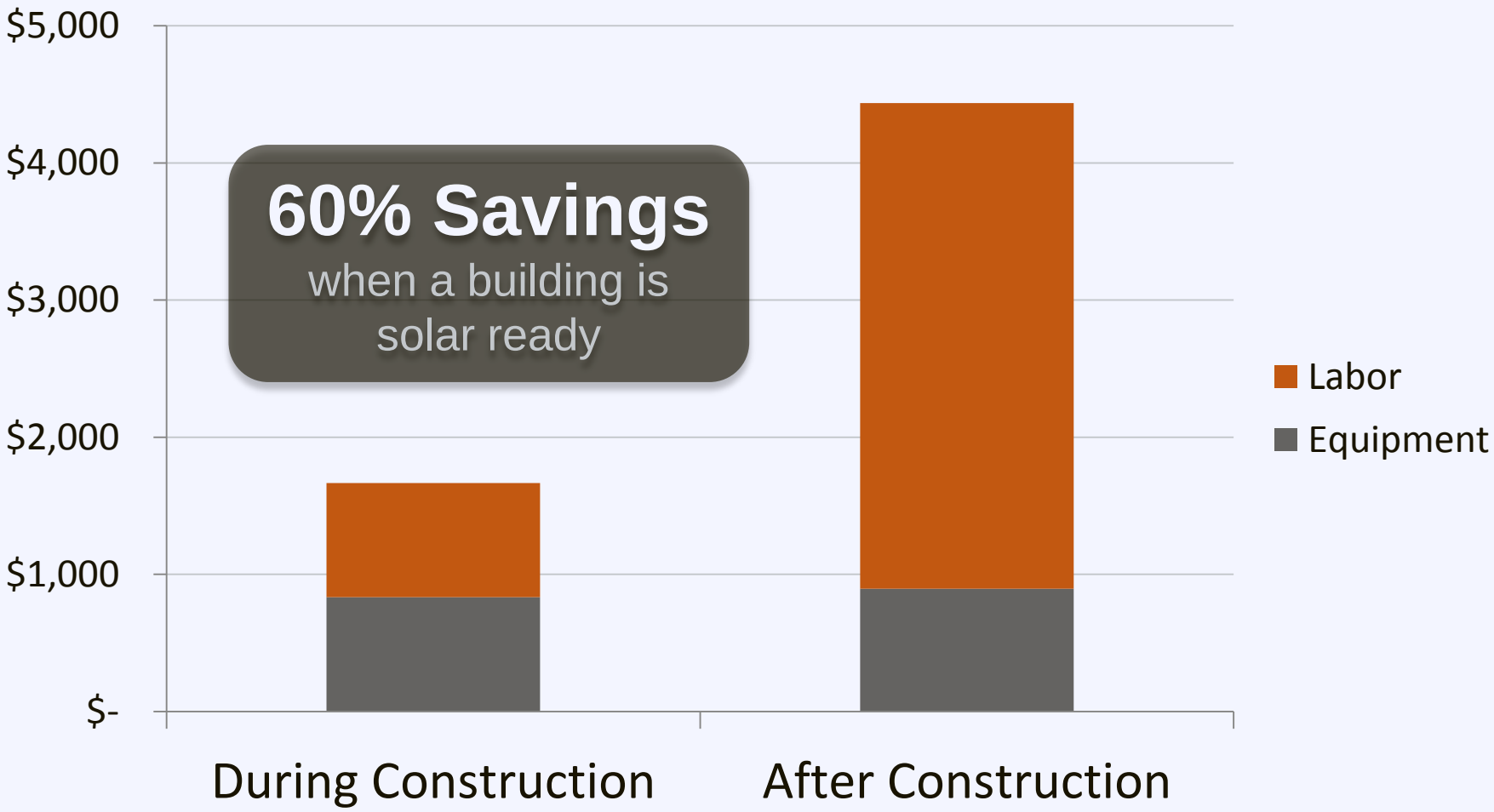
Source: NREL (http://www.nrel.gov/docs/fy12osti/54689.pdf)

Solar Readiness

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

Solar Readiness



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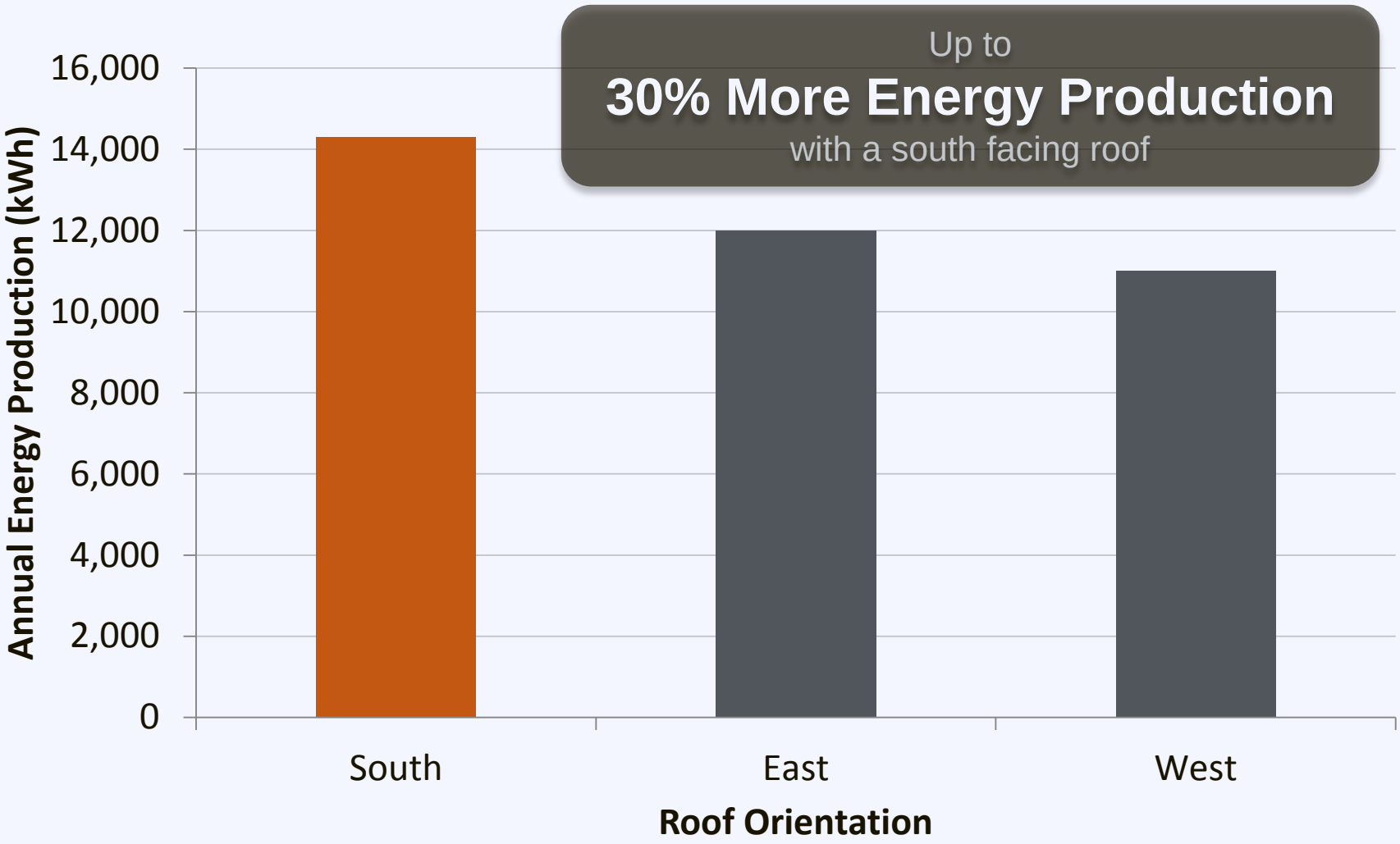
Source: Solar Ready: An Overview of Implementation Practices [Draft]. NREL, Feb. 18, 2011.

Solar Readiness



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

Solar Readiness

Require builders to:

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

Solar Readiness: Case Study

Oro Valley, Arizona

Population: 40,195

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U.S. Department of Energy

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

Solar Readiness

Resource **NREL**

Creating a solar ready guide for buildings:

- Legislation
- Certification programs
- Stakeholder Education

www.nrel.gov

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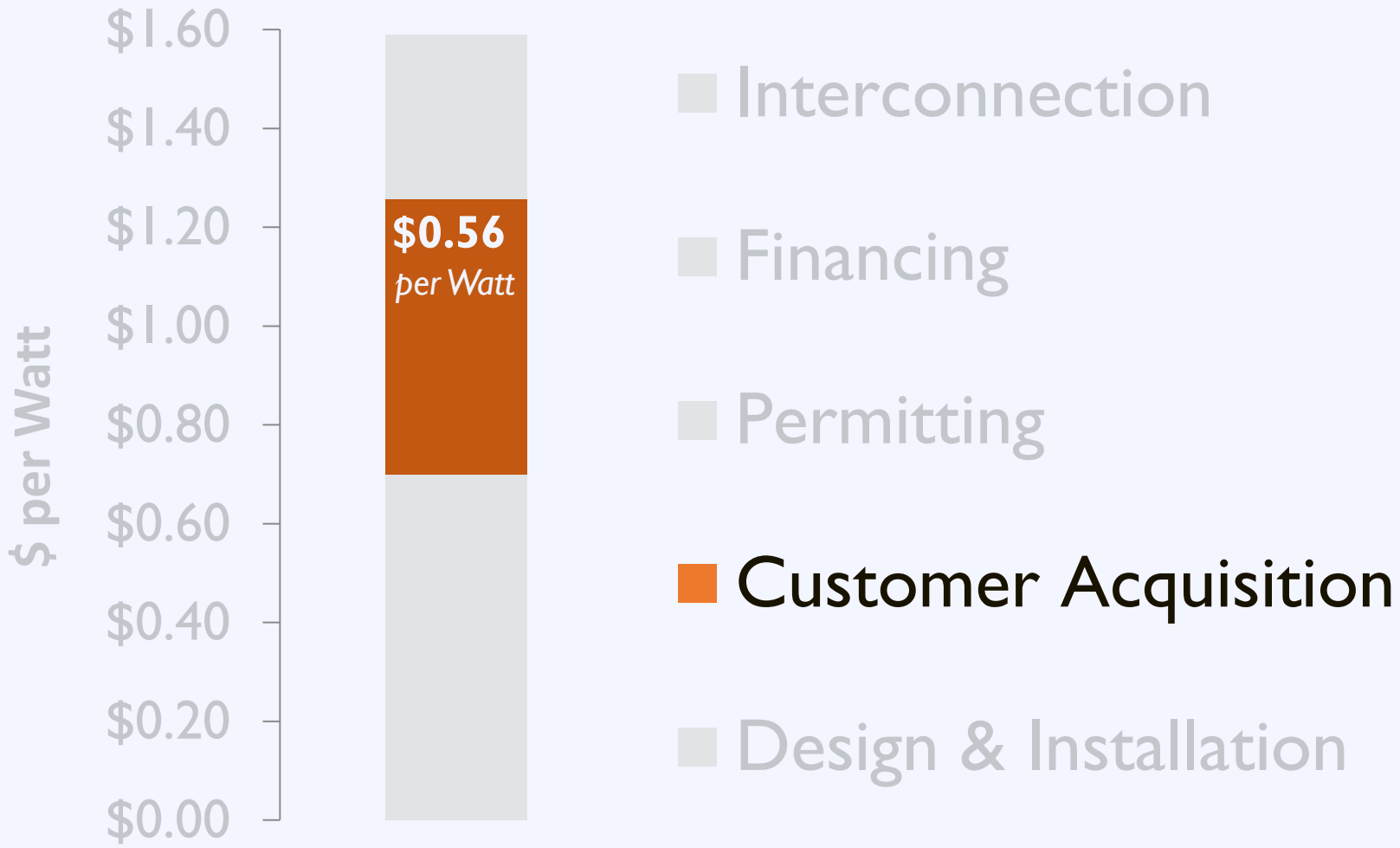
Source: NREL

Mitigate Soft Costs



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

Customer Acquisition

Solarize

Group Purchasing

Solarize: Advantages

Barriers		Solutions
High upfront cost	→	Group purchase
Complexity	→	Community outreach
Customer inertia	→	Limited-time offer

Solarize: Advantages

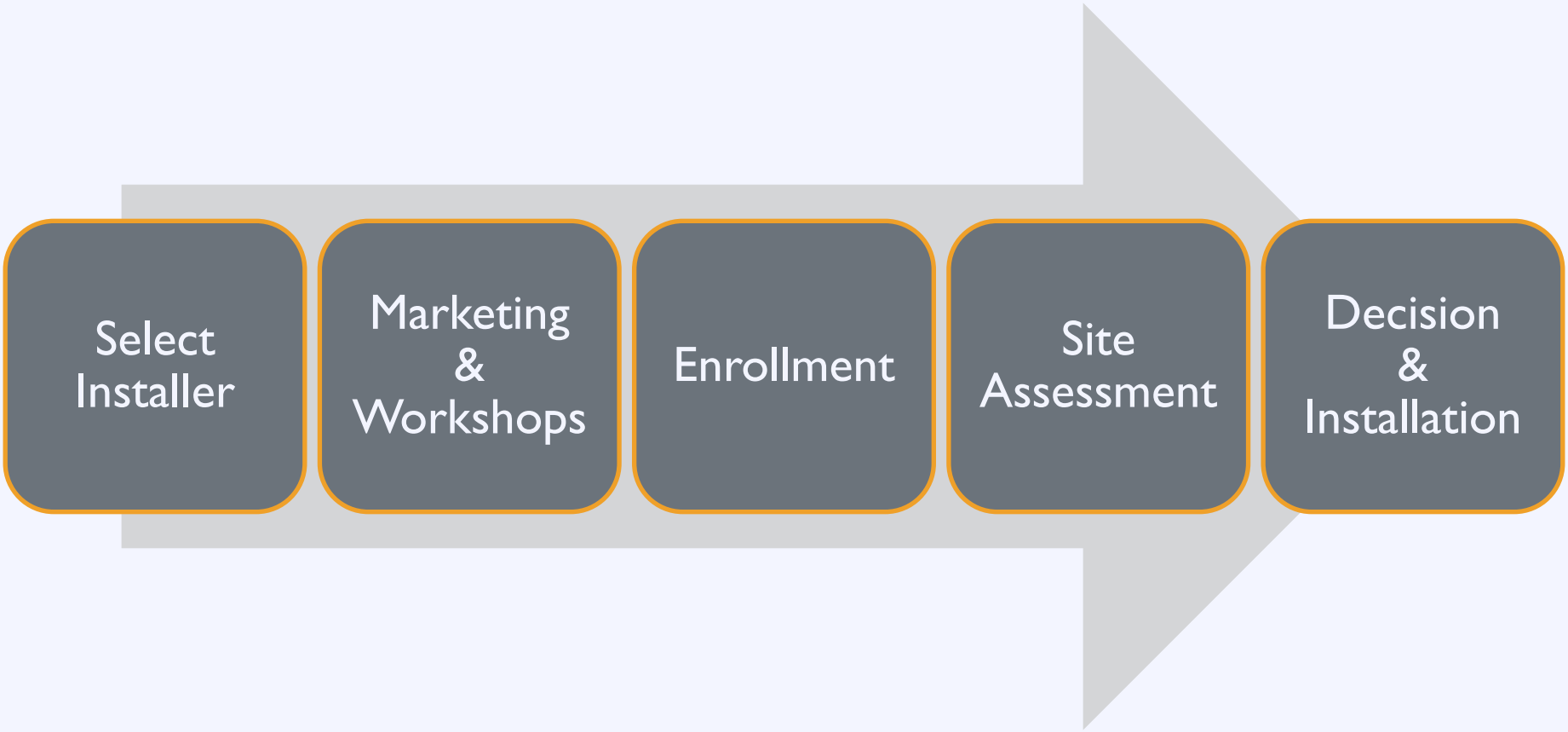
Benefits to Local Government:

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

Quick turn-around: 9 Months

Long-term impact: Sustainable ecosystem

Solarize: Process



Solarize: Case Study

Harvard, Massachusetts

Population: 6,520

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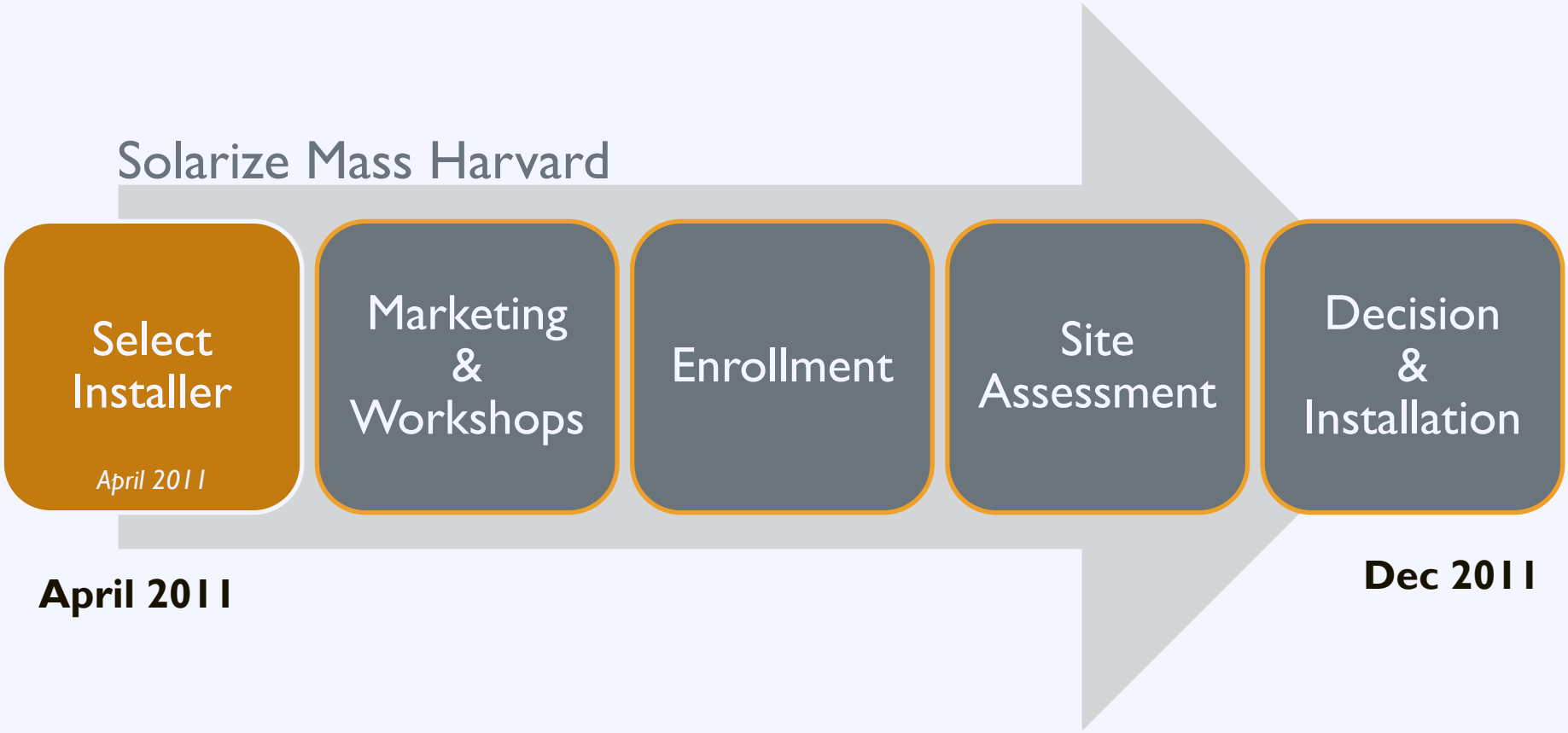
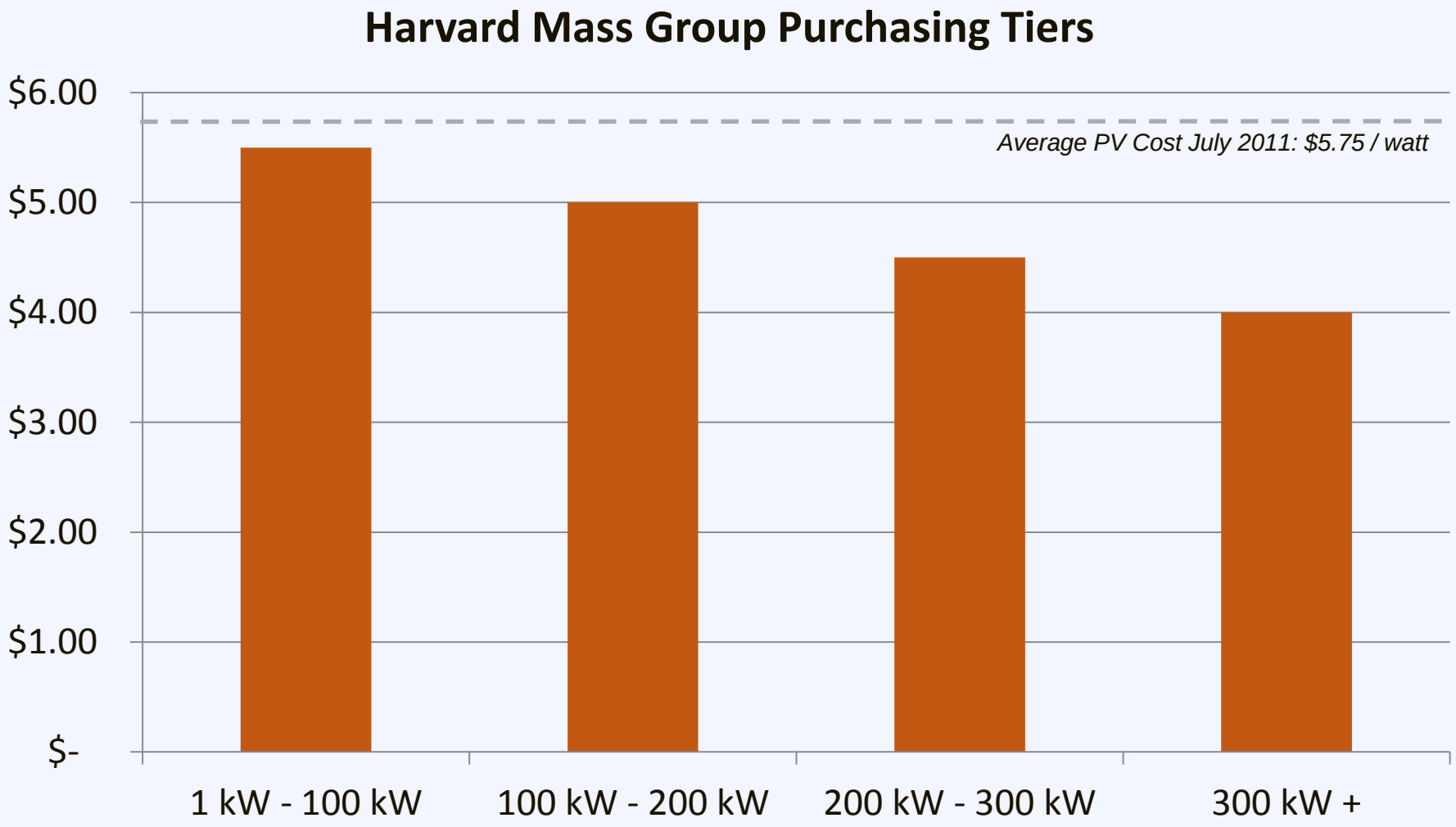
U.S. Department of Energy

Source: Wikipedia

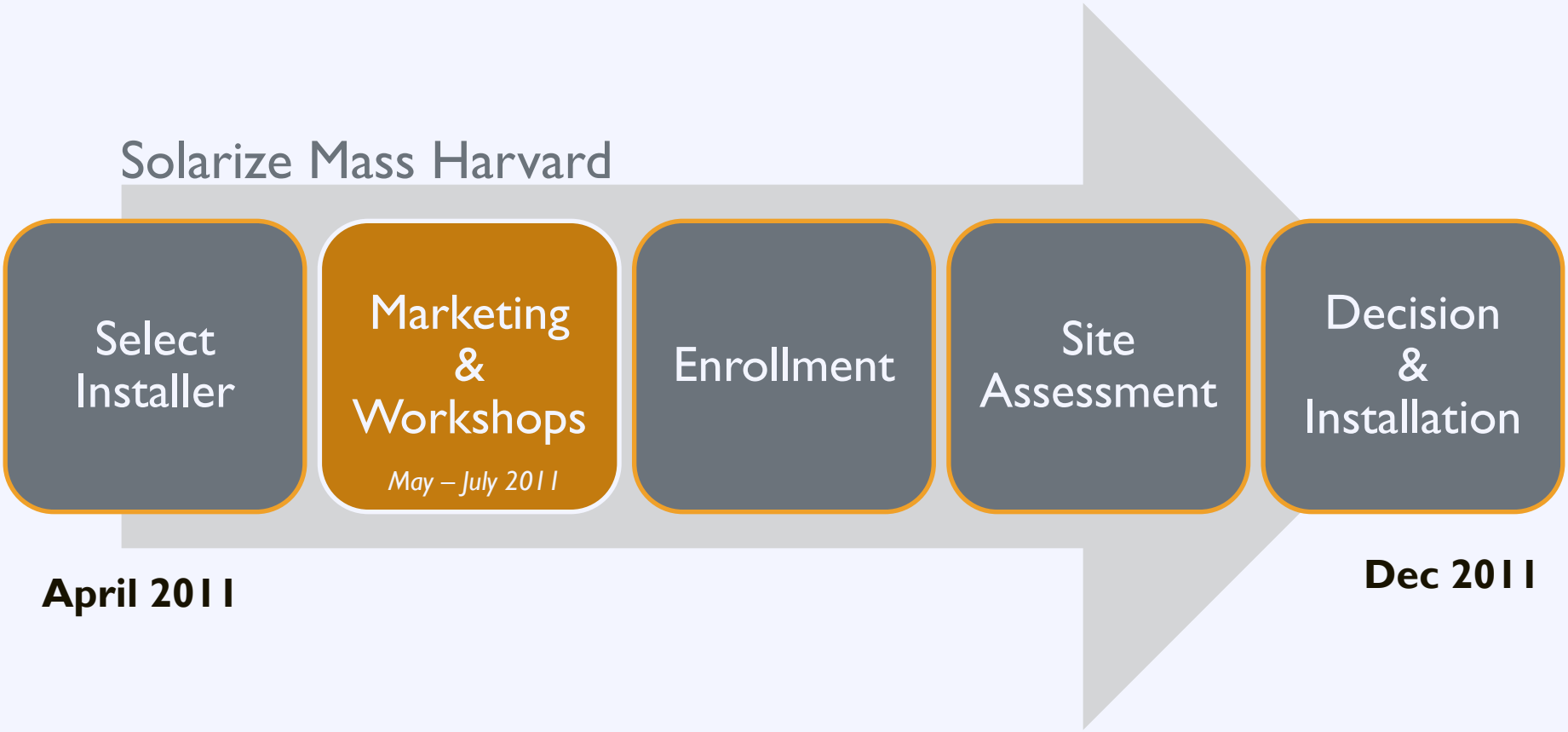
Solarize: Case Study



Group Purchasing



Solarize: Case Study



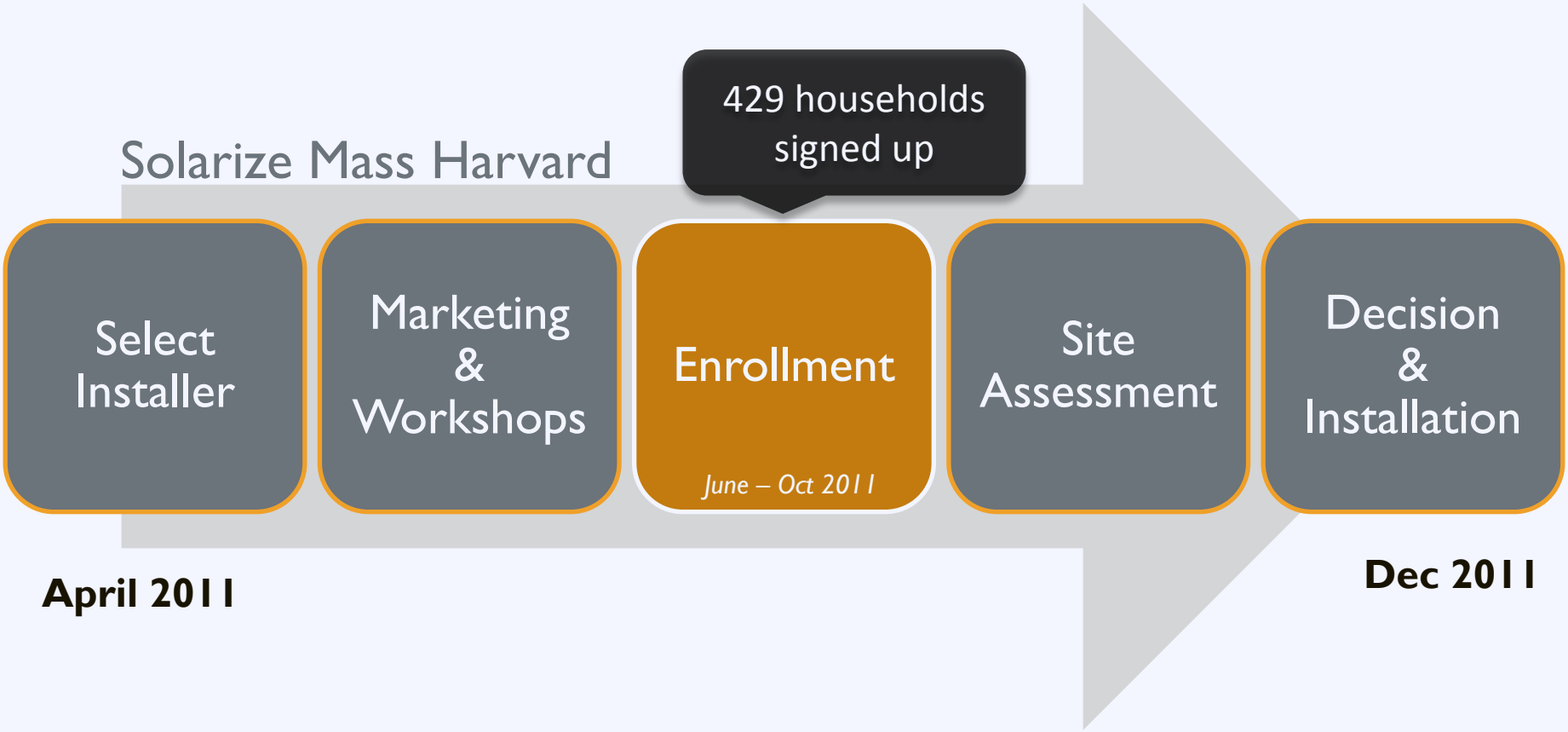
Solarize: Case Study

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

Source: Vote Solar

Solarize: Case Study



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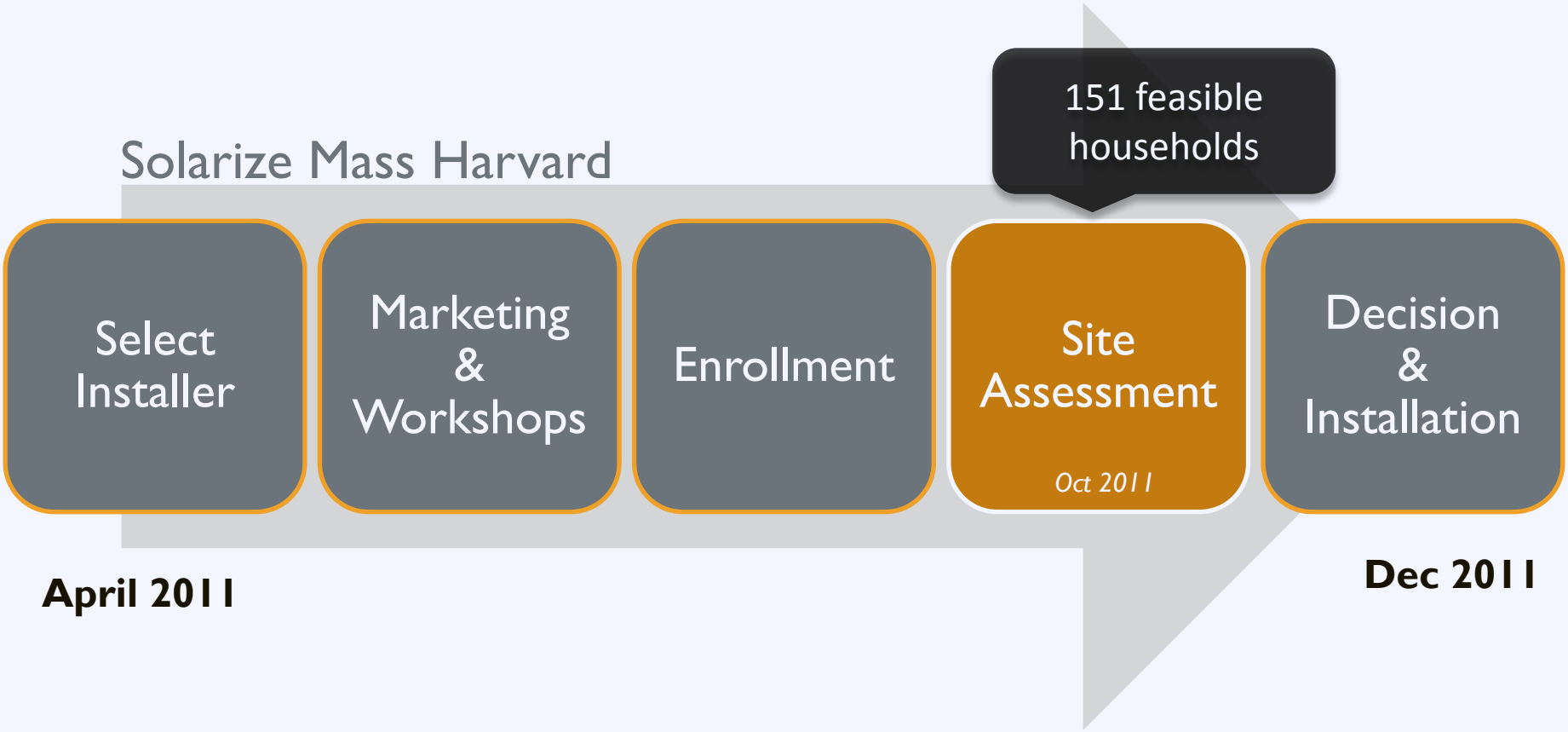

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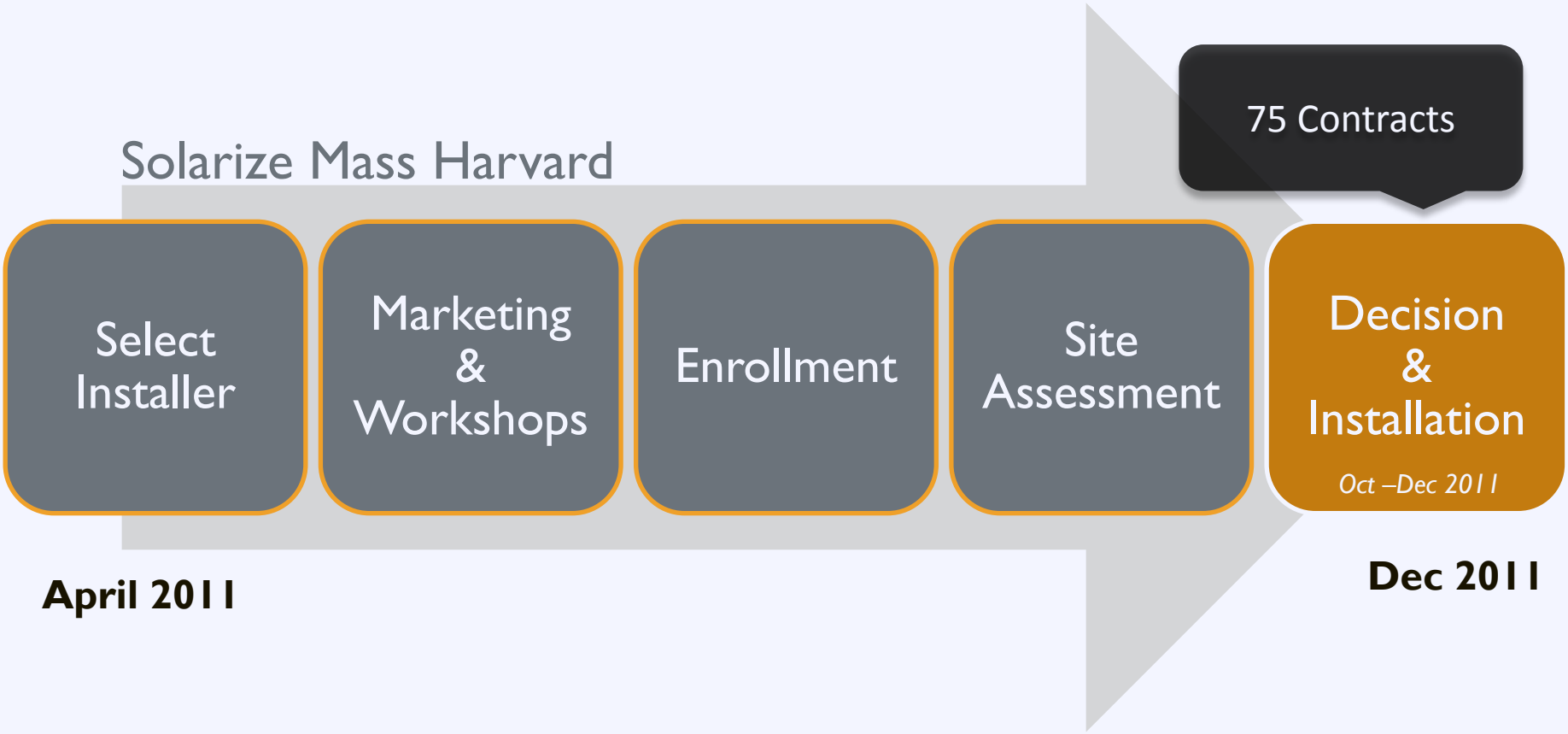

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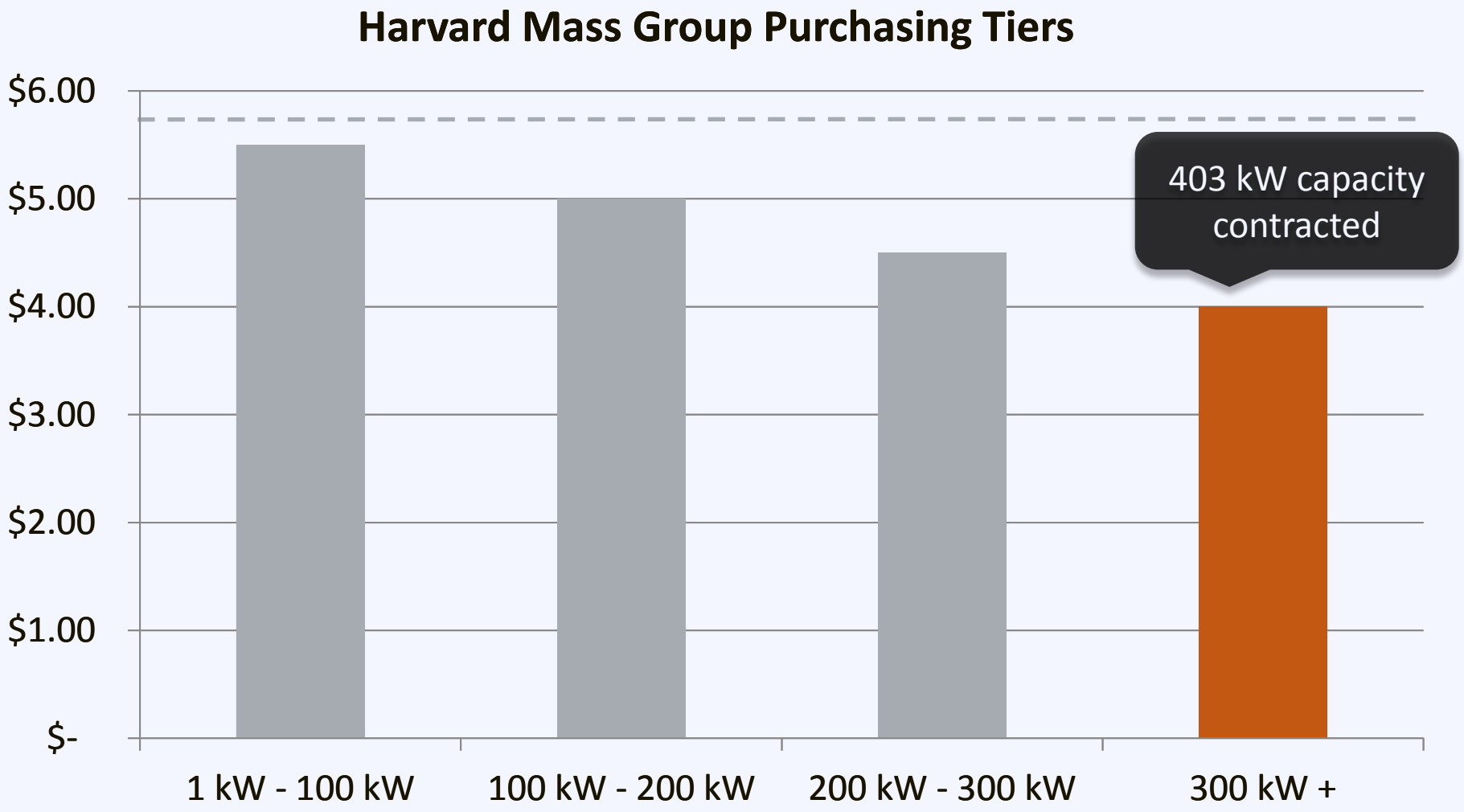


Solarize: Case Study

75 new installations totaling 403 kW

30% reduction in installation costs

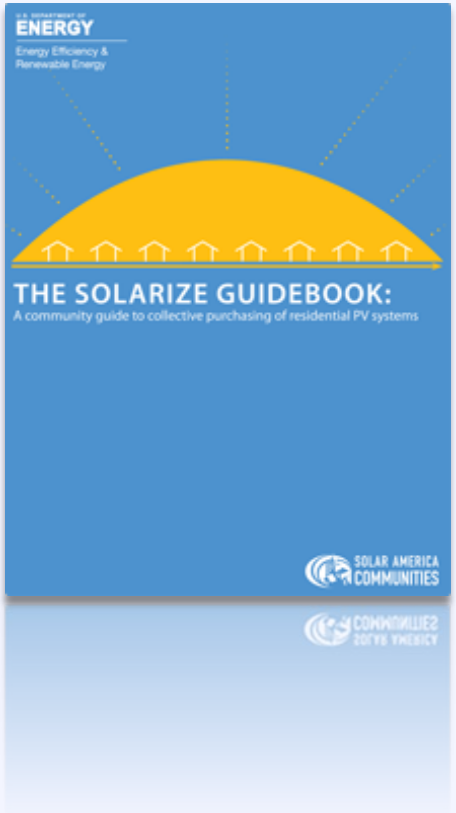
575% increase in residential installations

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



Q & A

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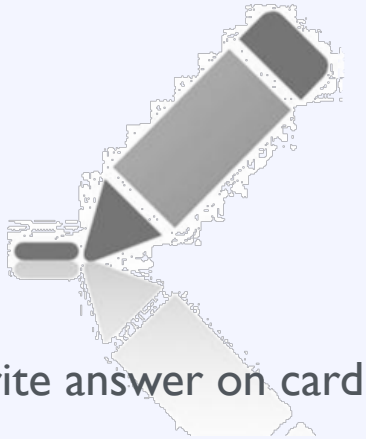
11:30 – 11:40	*Break*
11:40 – 12:10	Local Speaker – Julian Prosser
12:10 – 12:30	Next Steps for Solar in Region

Activity: Identifying Benefits

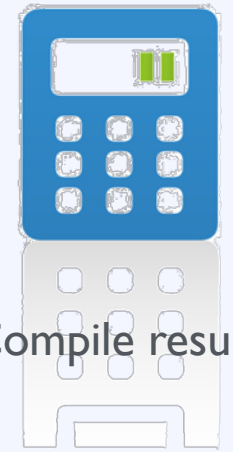
What is the greatest benefit solar can bring to your community? [Blue Card]

Right Now



Write answer on card

During Session

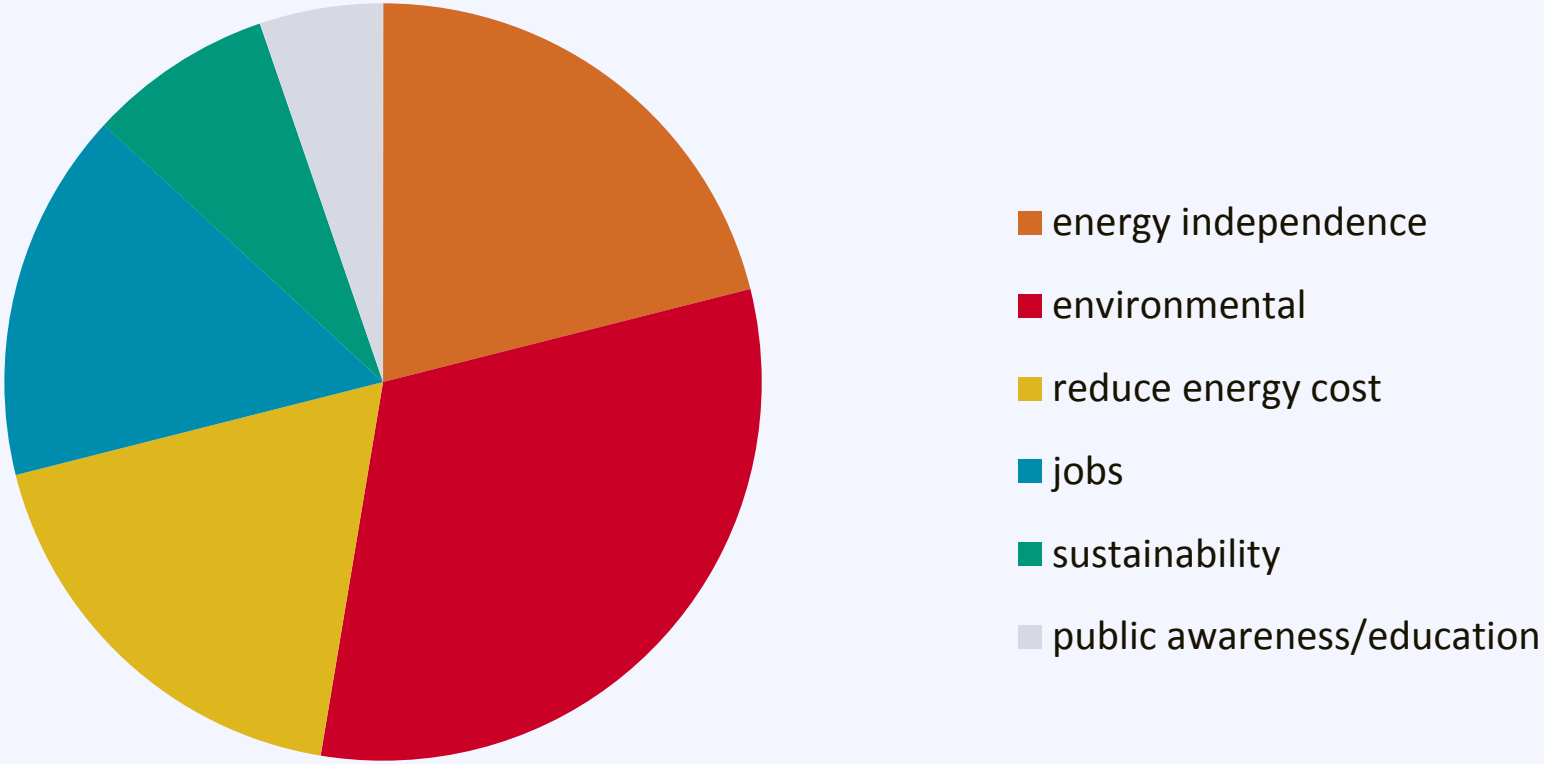


Compile results

After Break

Group discussion

[Results from Survey]



Agenda

08:40 – 09:10	Introductions & Discussion
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Electric Market Status (2010)

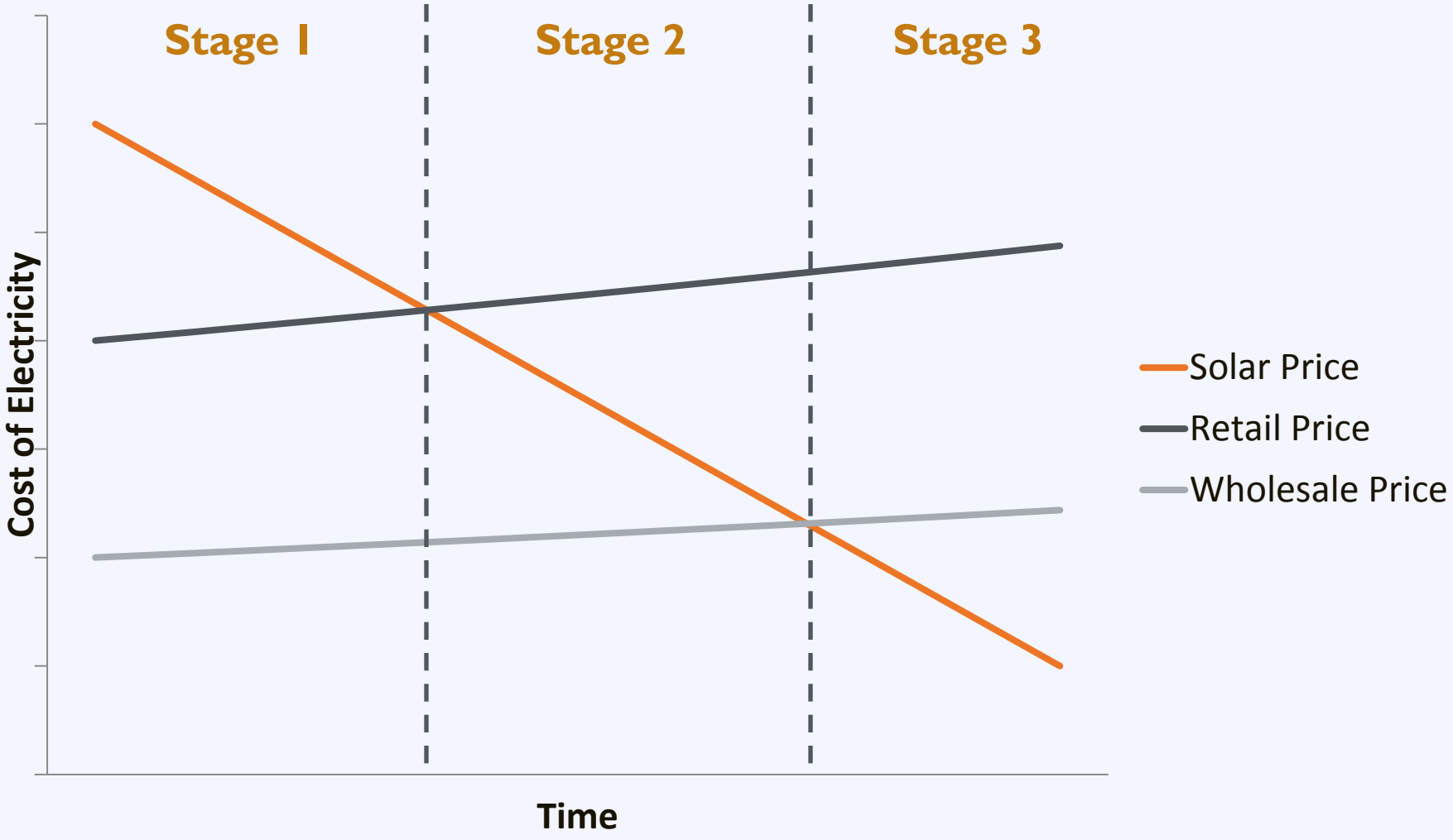
Retail Sales	Investor-Owned	Municipal	Rural Coops	TOTAL
South Carolina	62.4%	18.5%	19.2%	82.5 M MWh
North Carolina	74.2%	12.1%	13.7%	136.4 M MWh
Georgia	62.0%	8.6%	29.5%	140.7 M MWh

# Customers	Investor-Owned	Municipal	Rural Coops	TOTAL
South Carolina	56.4%	13.9%	29.7%	2,434,144
North Carolina	66.9%	12.1%	21.0%	4,841,173
Georgia	51.1%	7.3%	41.5%	4,615,805

Prices	Investor-Owned	Municipal	Rural Coops	Average
South Carolina	8.13¢/kWh	7.40¢/kWh	10.71¢/kWh	8.49¢/kWh
North Carolina	8.10¢/kWh	10.20¢/kWh	10.40¢/kWh	8.67¢/kWh
Georgia	8.61¢/kWh	8.41¢/kWh	9.55¢/kWh	8.87¢/kWh

Source: US Energy Information Administration

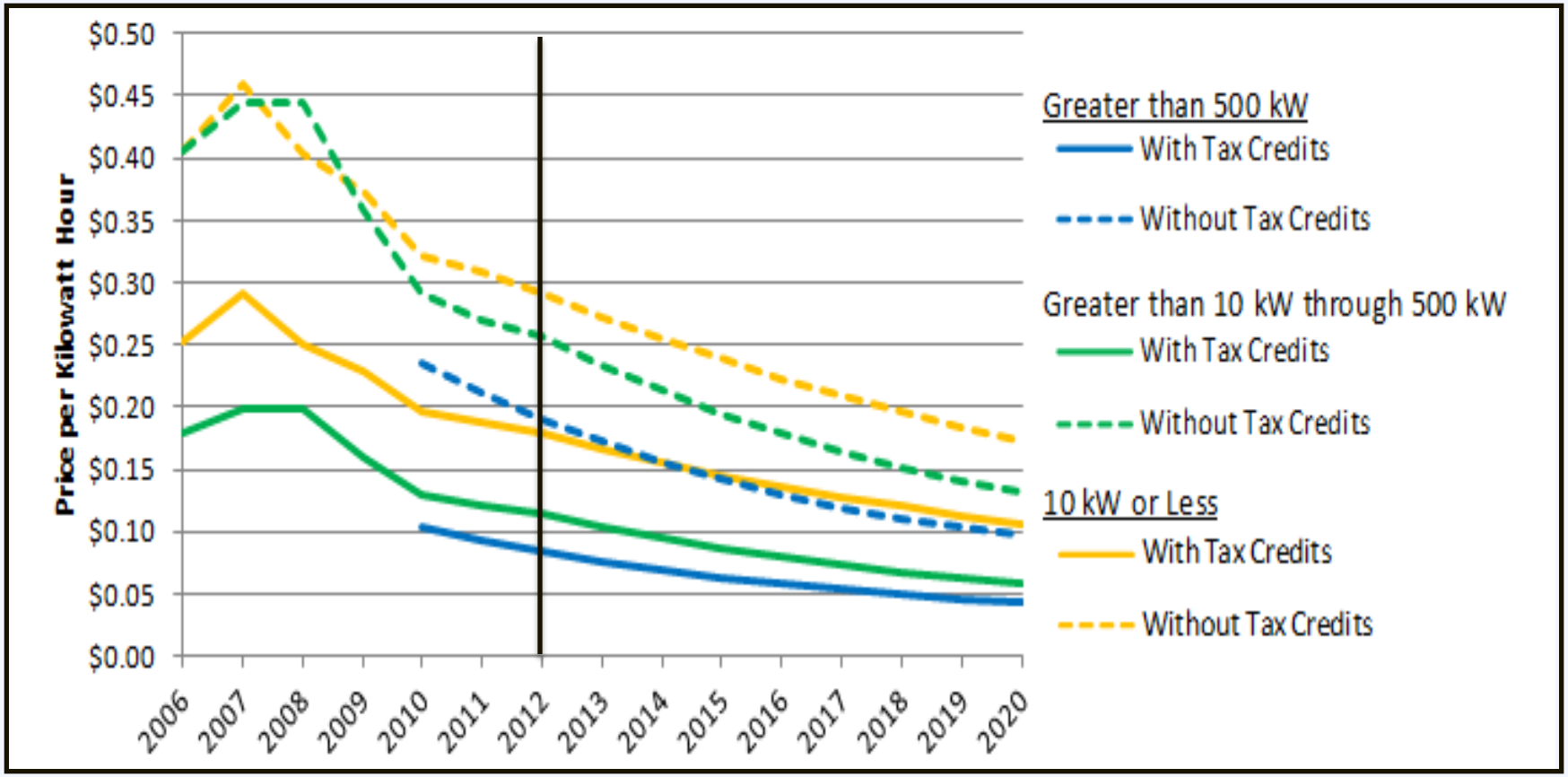
Utility Market Stages



Source: Solar Electric Power Association

Illustration: Where Are We?

Levelized Cost of Solar in North Carolina (20 Yr)



Source: NC Sustainable Energy Association

Comparison: North Carolina PV Incentives

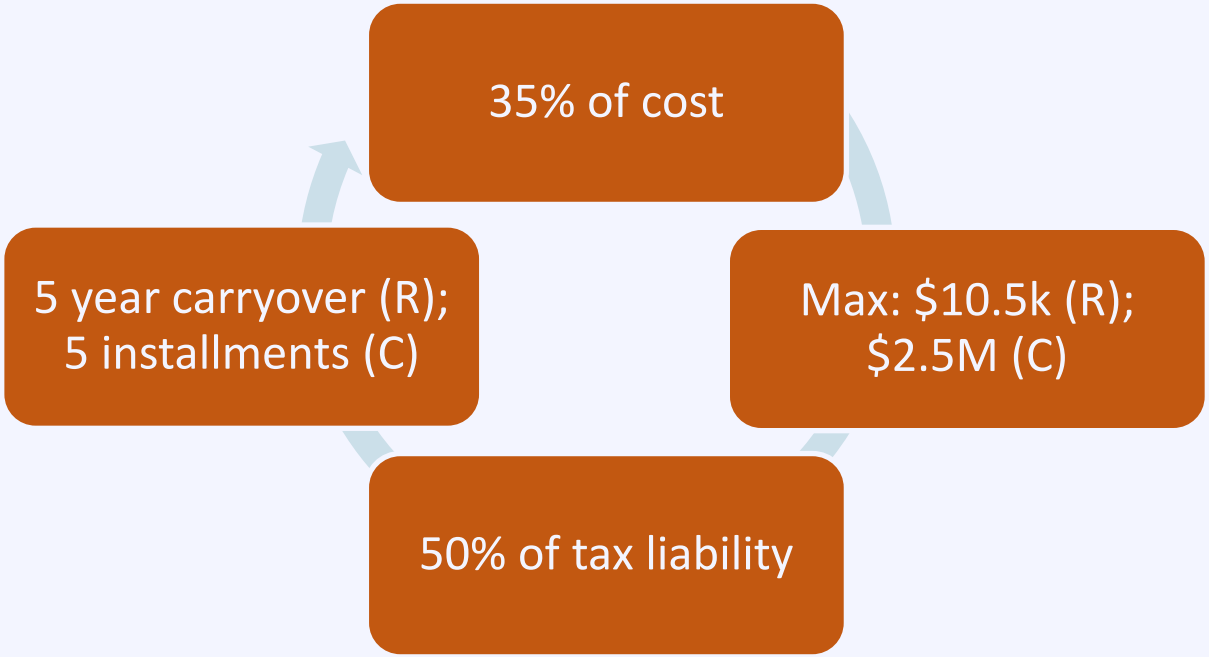
Financial		
✓	Rebates	Progress (R); $1,000 per kW
-	State Grants	-
-	State Loans	-
-	PACE Financing	-
✓	Prod. Incentives	Duke, Progress, TVA, NC Greenpower
✓	Corp. Tax Credits	35% up to $2.5 million
✓	Pers. Tax Credits	35% up to $10,500
✓	Prop. Tax Incentives	80% abatement, R basically exempt

Regulatory		
✓	RPS	12.5% by 2021
✓	Solar Carve-Out	0.2% by 2018
✓	Interconnection Standards	IOUs only; Freeing the Grid Grade: B
✓	Net Metering	IOUs only: Freeing the Grid Grade: D
✓	Solar Rights	Public and Private Restrictions but w/caveats

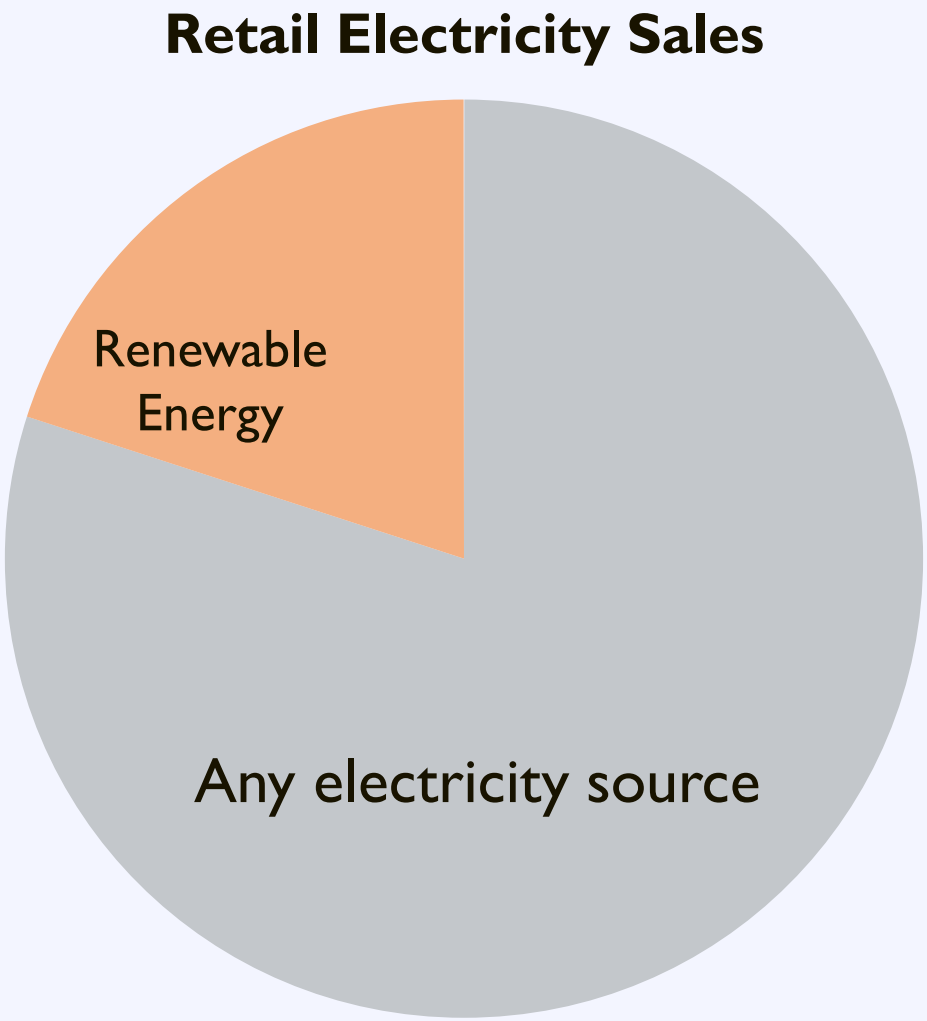
NC Renewable Energy Tax Credit

Federal Tax Credits: 30% of cost for businesses and personal income tax payers, through 2016.

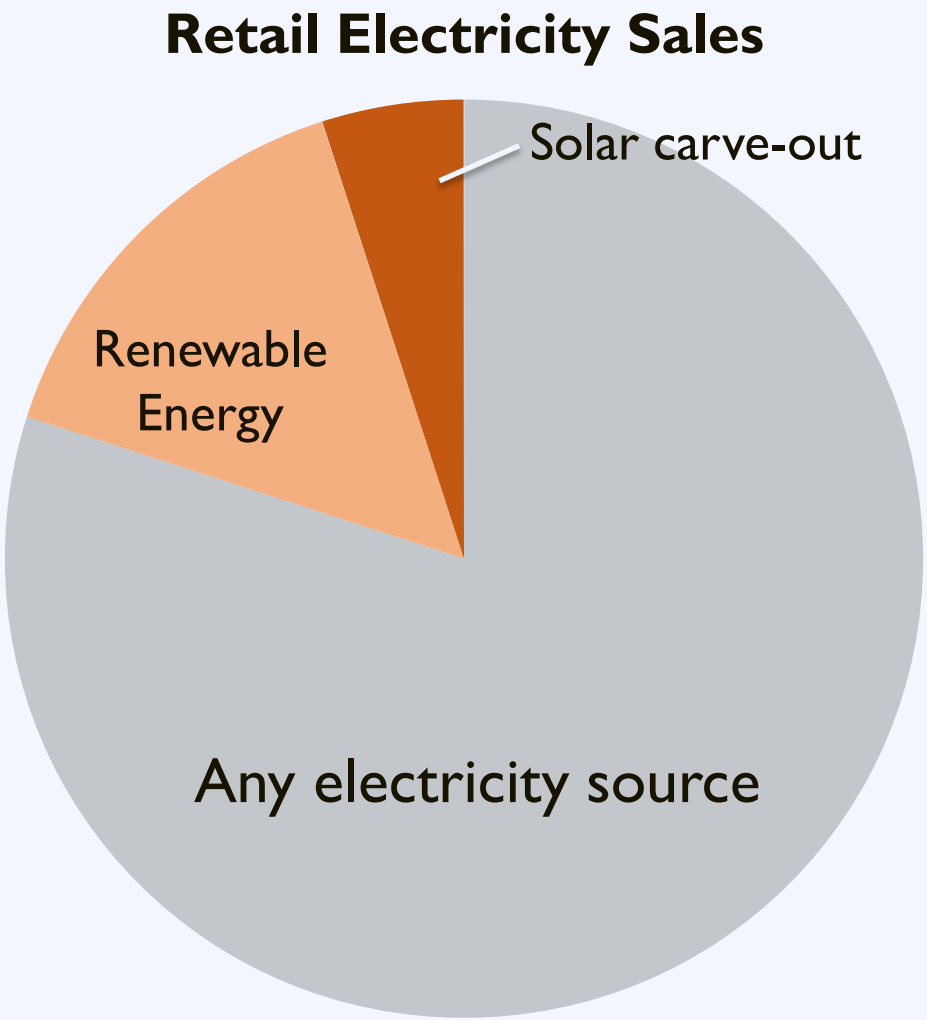
State Tax Credits (Personal and Corporate)



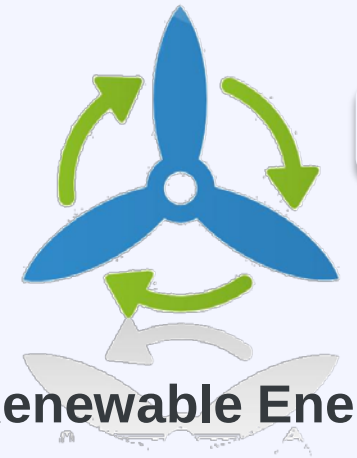
Renewable Portfolio Standard



Renewable Portfolio Standard



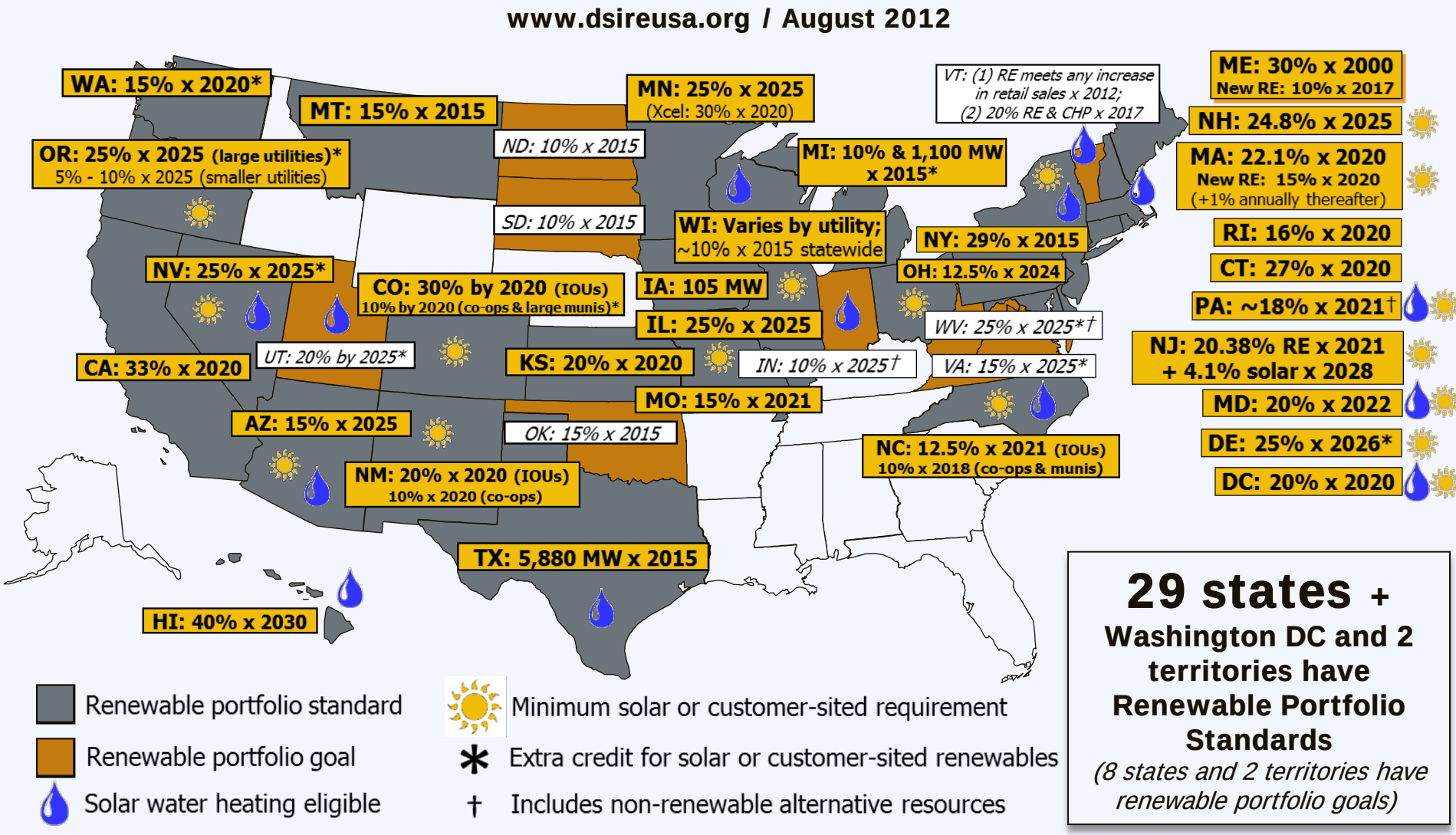
Renewable Portfolio Standard



Two revenue streams

e- REC

Renewable Portfolio Standard



29 states +
Washington DC and 2 territories have Renewable Portfolio Standards
(8 states and 2 territories have renewable portfolio goals)

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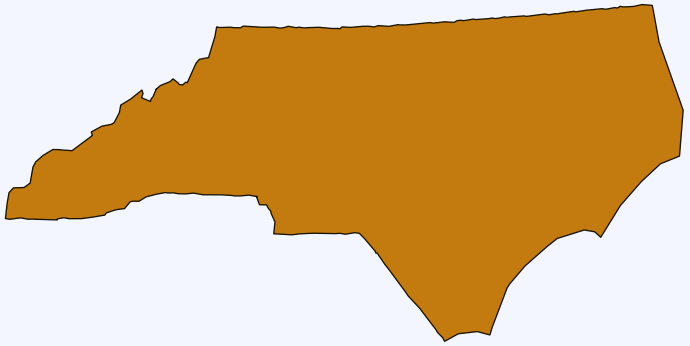
RPS: North Carolina Overview

- 12.5% renewables by 2021 for IOUs
- 10% by 2018 for coops and munis
- Solar carve-out of 0.2% by 2018
- Some opportunities for SREC sales
- No defined alternative compliance payment or penalties
- Up to 25% w/unbundled out-of-state RECs



Progress: Solar Rebates

- Residential only
- $1.00 per W (AC)
- Systems from 2 – 10 kW
- monthly credit $4.50/kW (5 yrs)
- Net metering only
- Surrender RECs (5 yrs)

Performance Incentives

Duke REC Standard Offer:

$0.005/kWh; 35 – 10,000 RECs annually; 5 – 15 Yr. contracts; rate subject to change; RECs only (power sales separate)

Progress Commercial SunSense:

$0.15/kWh (energy + RECs); 20-Yr. contracts.; 11 – 500 kW; Guaranteed! (Expected to re-open December 2012)

NC Greenpower:

Currently $0.08/kWh for 5 kW or less; competitive for larger systems; 5-Yr. agreement but not guaranteed; power sold to utility (~$0.04/kWh)

Performance Incentives

TVA Generation Partners:

Up to 50 kW; $1,000 + $0.12/kWh above retail; 10-yr. contract; 3 participating coops

TVA Mid-Size Program Standard Offer:

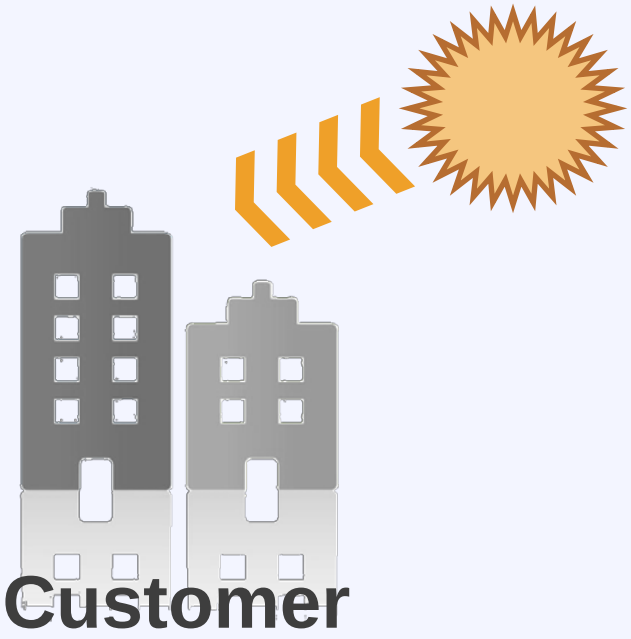
50 kW – 20 MW; variable seasonal/TOD rates from $0.038/kWh - $0.16/kWh (3% escalation); 10 to 20-yr. contract

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

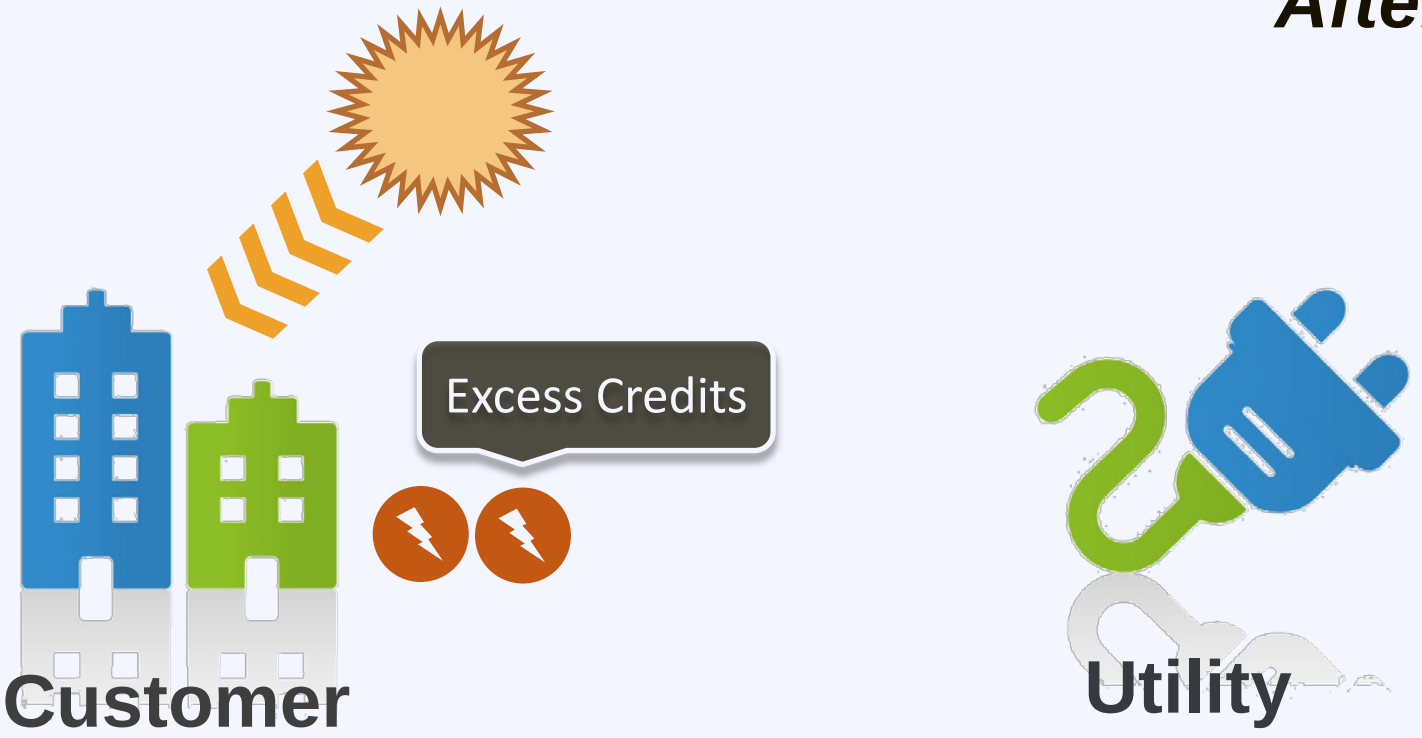
Net Metering: Overview

Morning



Net Metering: Overview

Afternoon



Net Metering: Overview

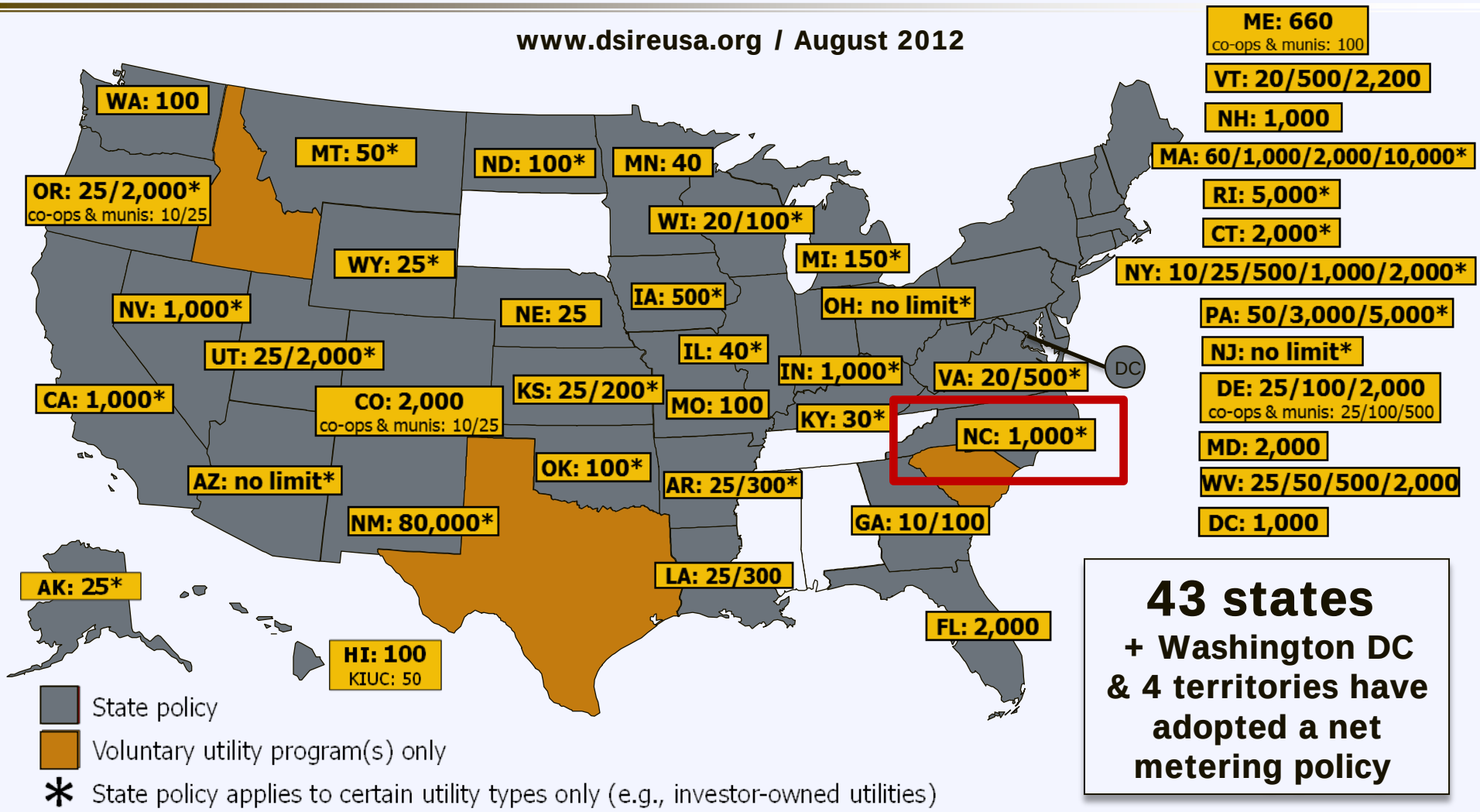
Night

Customer

Utility

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

Net Metering: State Policies



43 states
+ Washington DC & 4 territories have adopted a net metering policy

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.

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U.S. Department of Energy

Net Metering: Market Share

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

Powered by SunShot U.S. Department of Energy

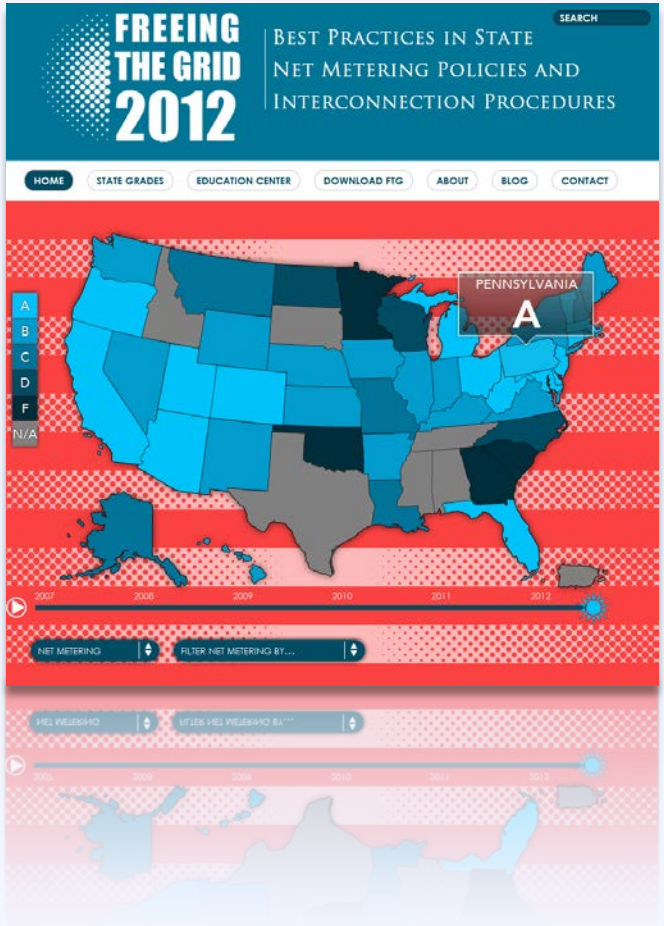
Source: IREC (http://www.irecusa.org/wp-content/uploads/IRECSolarMarketTrends-2012-web.pdf)

Net Metering: Resources

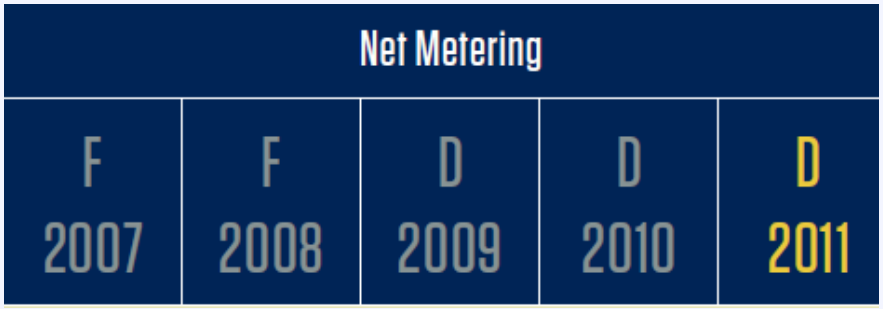
Resource **Freeing the Grid**

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

http://freeingthegrid.org/



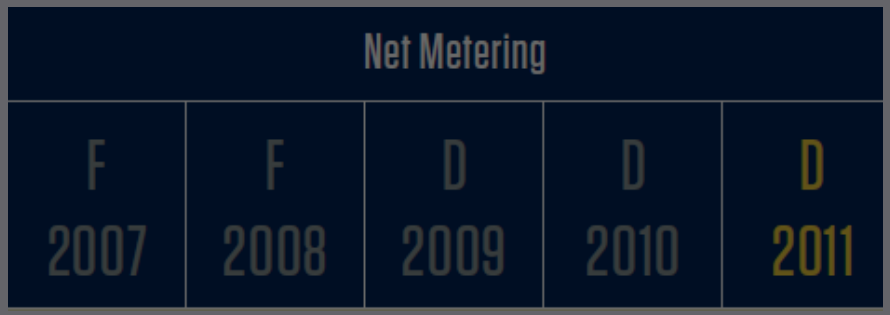
Net Metering: North Carolina



Eligible Renewable/ Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, CHP/Cogeneration, Hydrogen, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	1 MW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at beginning of summer billing season
REC Ownership:	Utility owns RECs (unless customer chooses to net meter under a time-of-use tariff)
Meter Aggregation:	Not addressed

Source: Freeing the Grid

Net Metering: North Carolina



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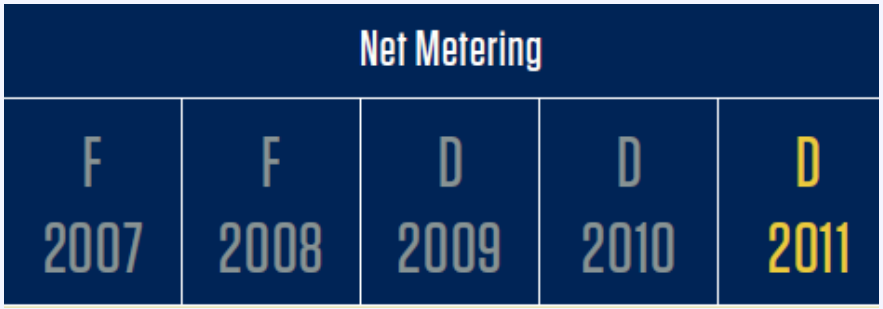
Net Metering: North Carolina



Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees
- Extend net metering to all utilities
- Remove limitations on REC ownership

Eligible Renewable/ Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, CHP/Cogeneration, Hydrogen, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Fuel Cells using Renewable Fuels
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Meter Aggregation:	Not addressed

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U.S. Department of Energy

Source: Freeing the Grid

Net Metering: Virtual

No direct connection necessary

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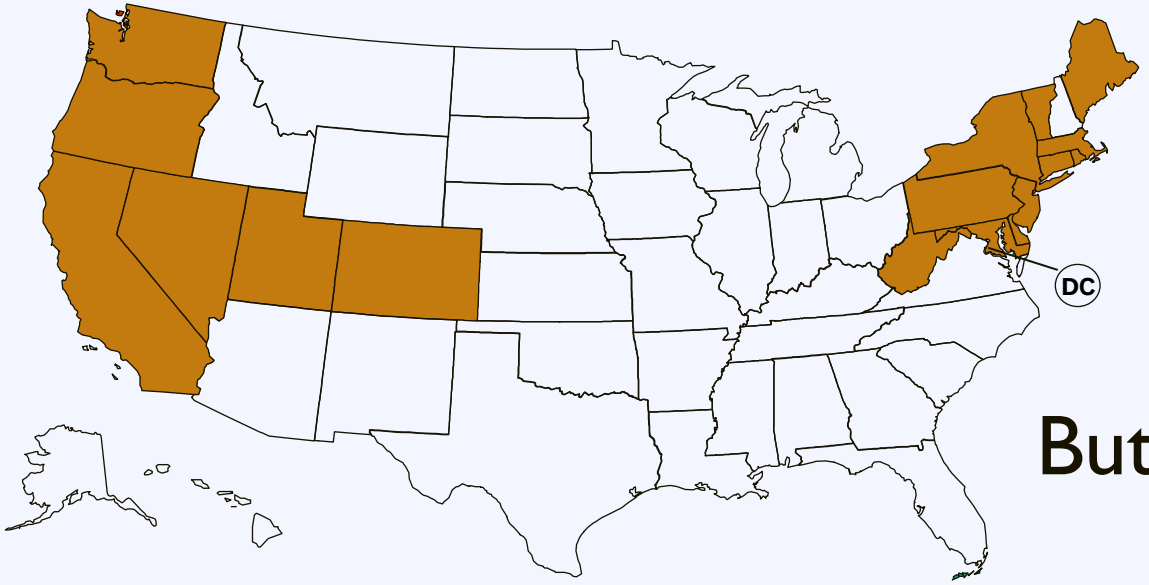
Net Metering: Meter Aggregation



But…It's complicated

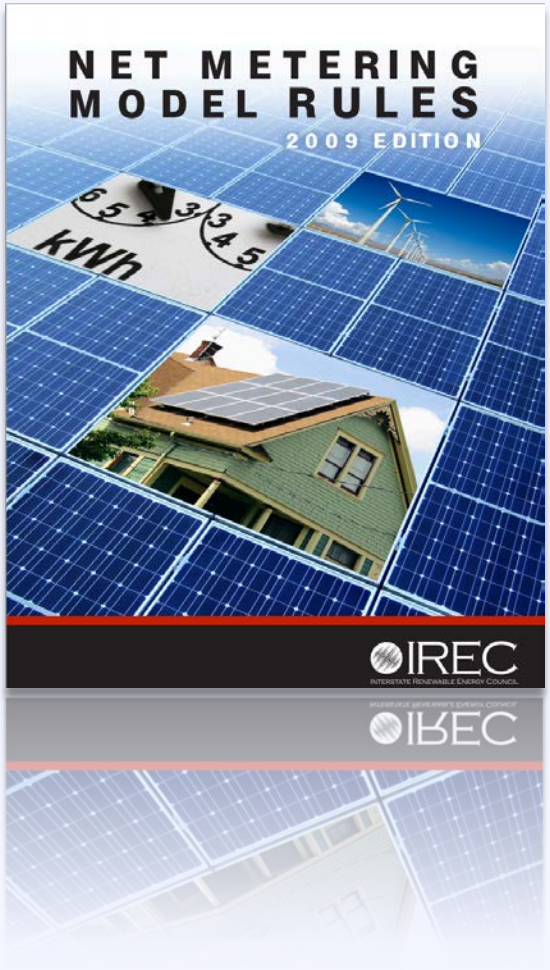
- Ownership requirements
- Contiguous vs. non-contiguous properties
- Multiple customers
- Multiple generators
- Modified system/aggregate system size limits
- Rollover rates
- Distance limitations
- Number of accounts
- How to address accounts on different tariffs

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

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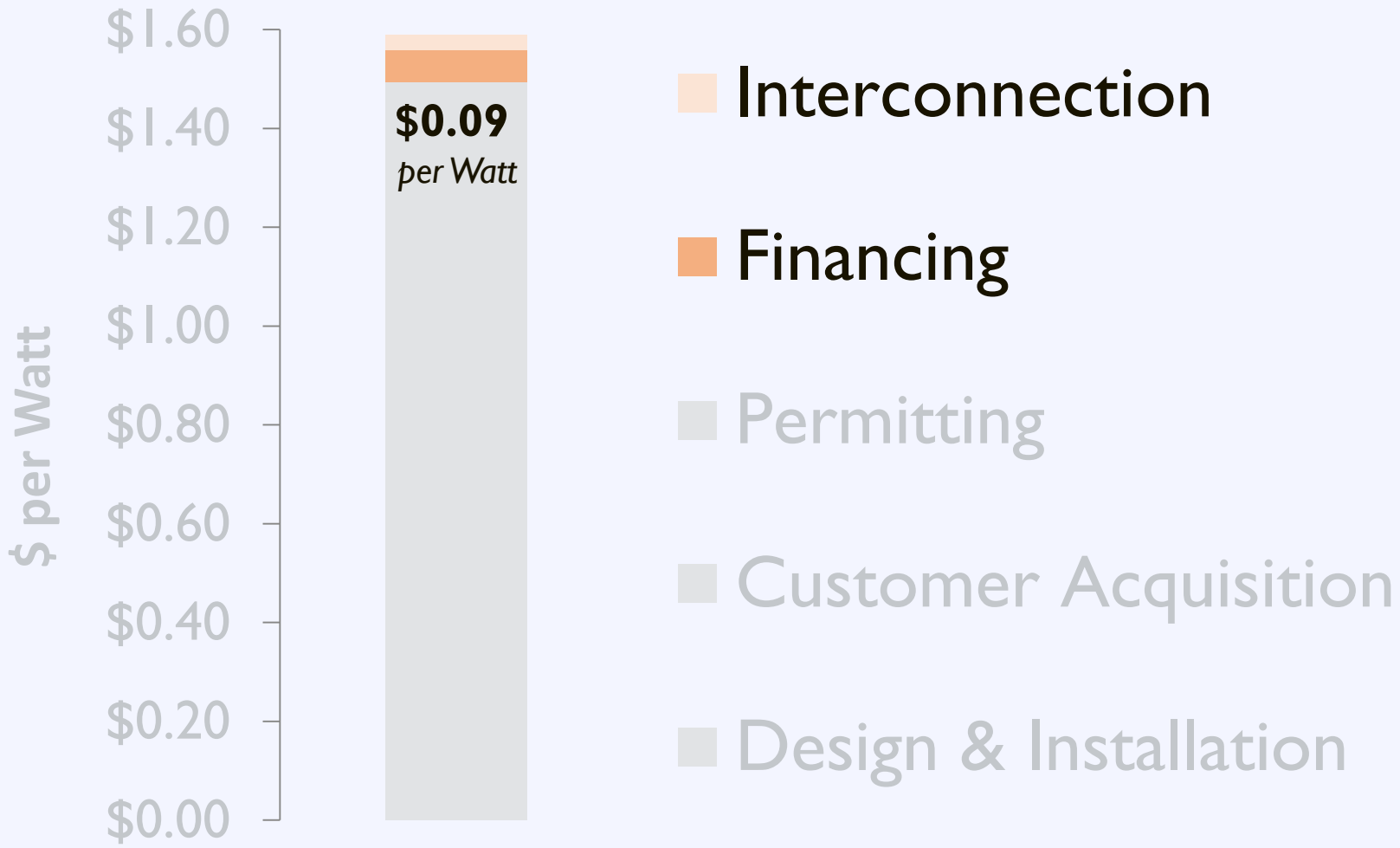
U.S. Department of Energy

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

Mitigate Soft Costs



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

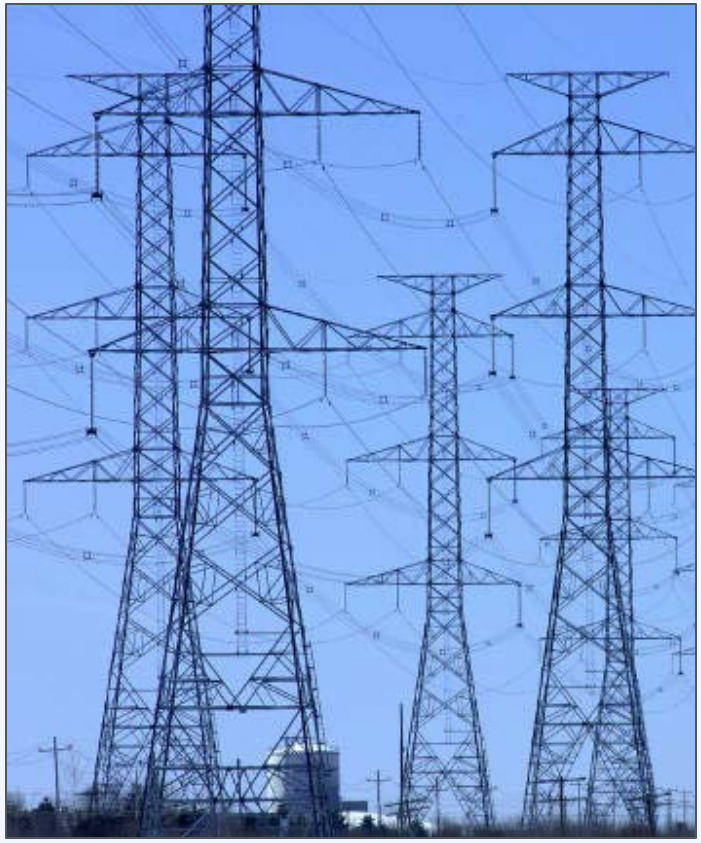
2005: Congress requires state regulator authorities to consider an interconnection standard (IEEE 1547)

2012: 43 States & DC have adopted interconnection standards

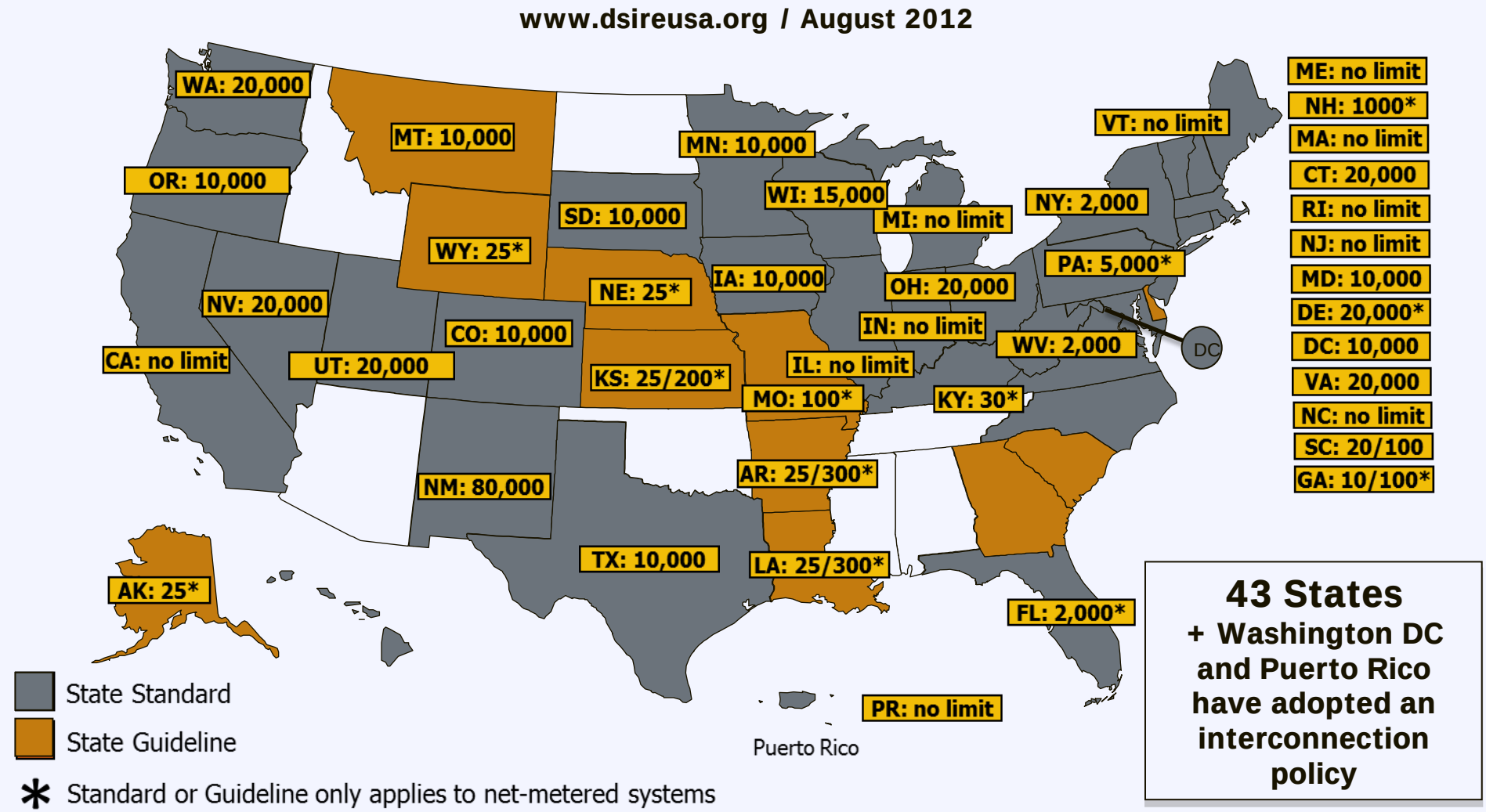
- CA Rule 21
- FERC SGIP
- MADRI Procedures
- IREC Procedures

Interconnection: Best Practices

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



Interconnection: State Policies



Notes: 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.

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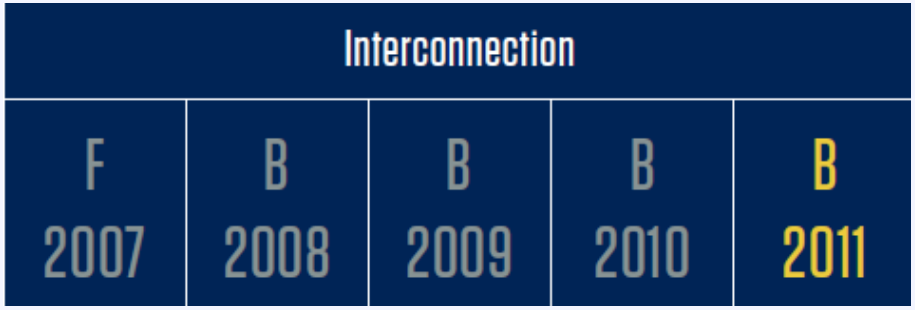
U.S. Department of Energy

Interconnection: North Carolina



Recommendations:

- Prohibit requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance
- Extend interconnection procedures to all utilities (i.e., munis and co-ops)

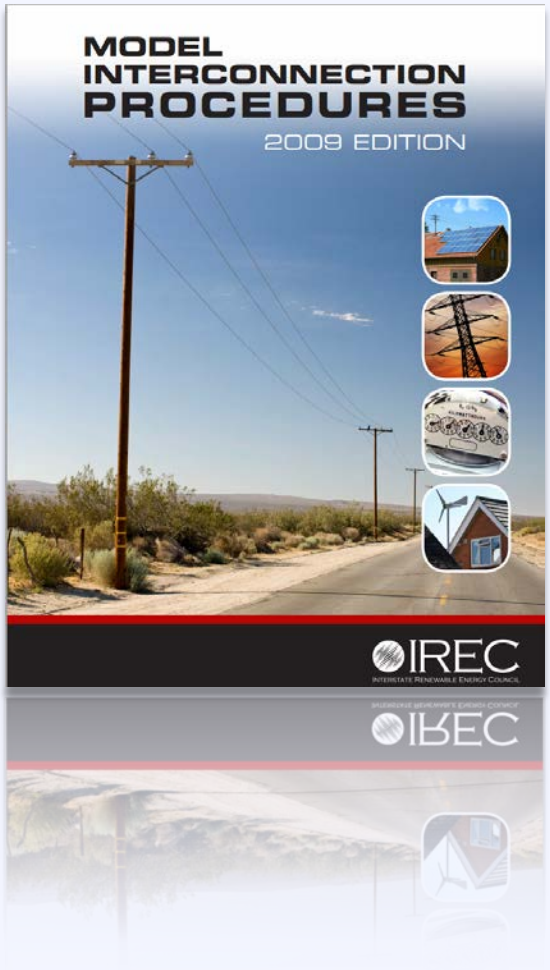
Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Fuel Cells, Municipal Solid Waste, CHP/ Cogeneration, Anaerobic Digestion, Small Hydroelectric, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor Owned Utilities
System Capacity Limit:	No limit specified
Standard Agreement:	Yes
Insurance Requirements:	Vary by system size and/or type; levels established by commission
External Disconnect Switch:	Not required for inverter-based systems up to 10 kW; utility's discretion for all other systems
Net Metering Required:	No

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



Q & A

Agenda

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Understanding Solar Financing

Direct Cash Incentives	RPS/SRECs	Rebates	PBIs/FITs
Financing	3rd Party Ownership	Bulk Purchasing	PACE
Other Incentives	Loans	Community Shared Solar	Property & Sales Taxes

Understanding Solar Financing

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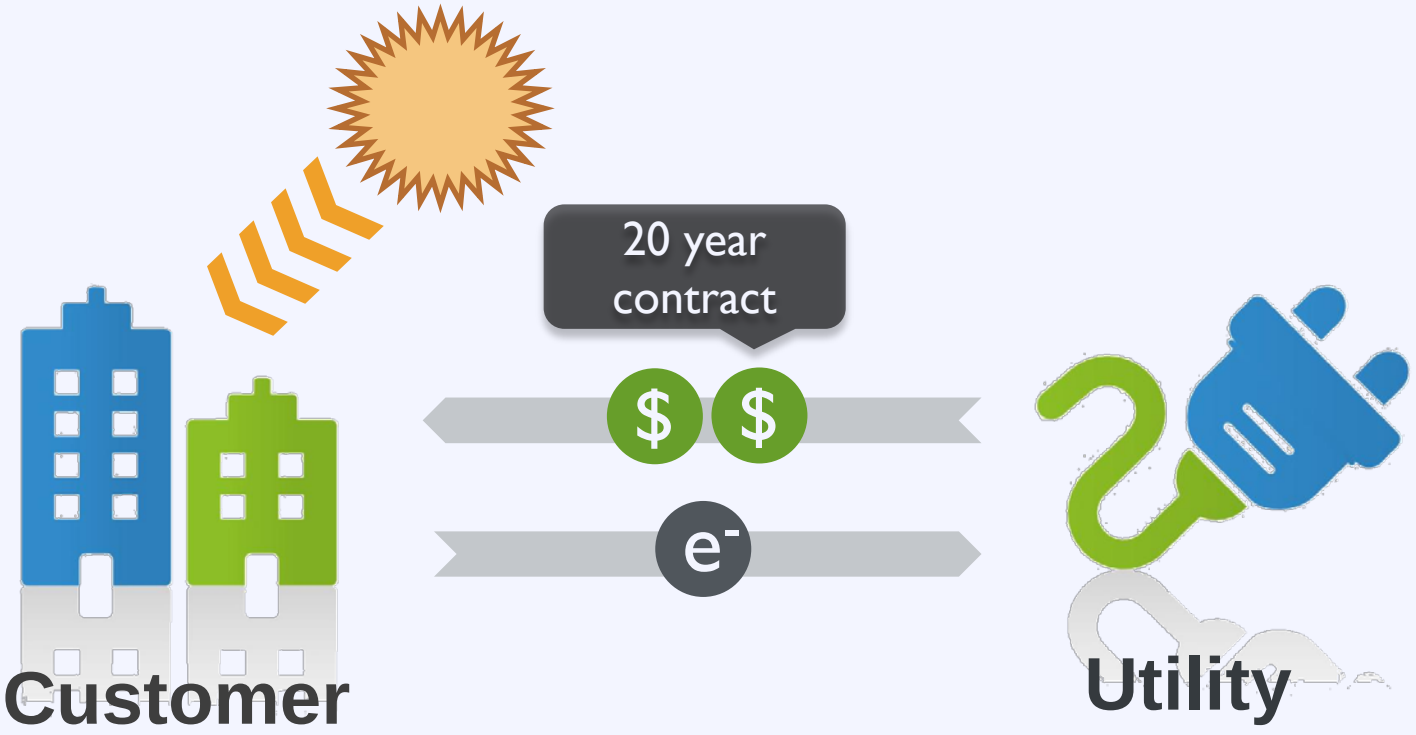
What is a Feed in Tariff?



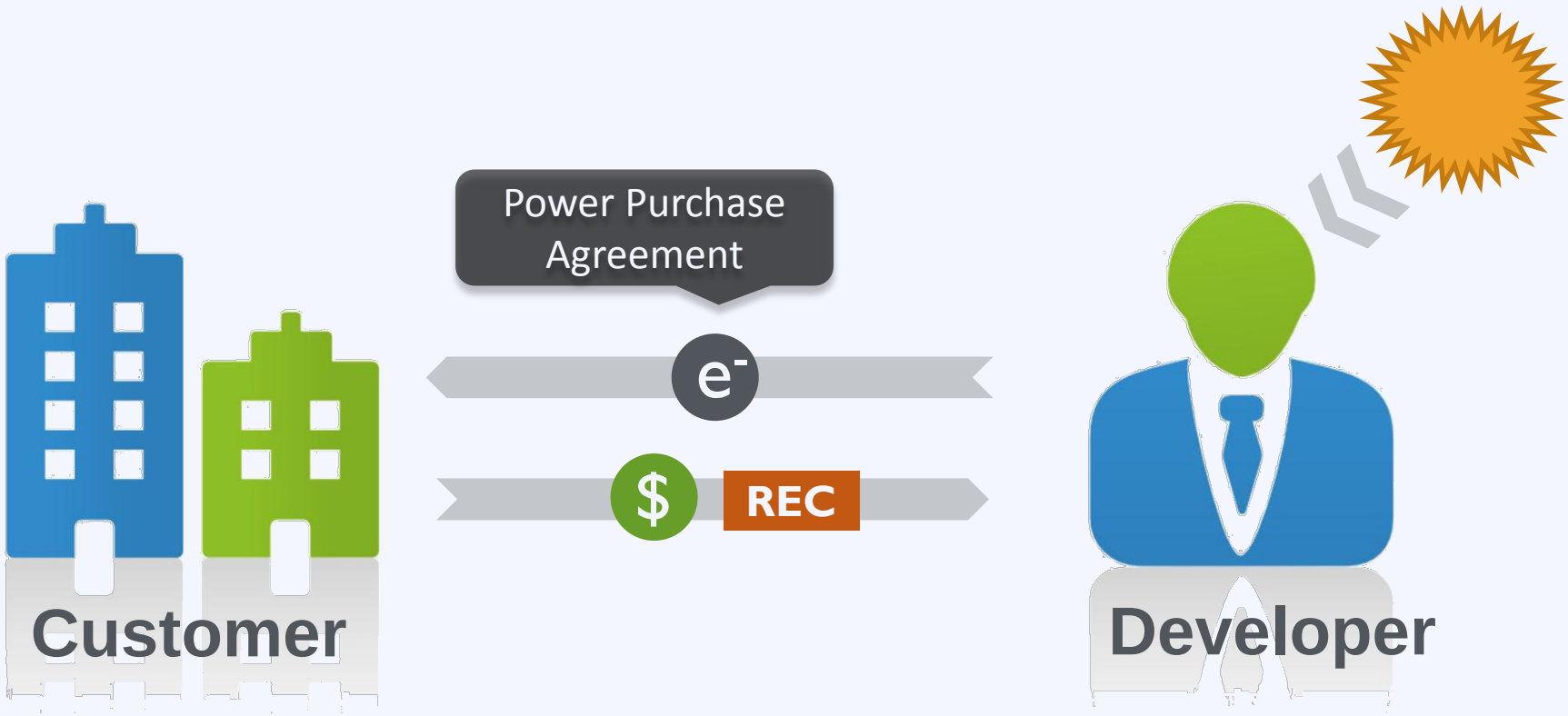
Components of a Feed in Tariff

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

Understanding Solar Financing

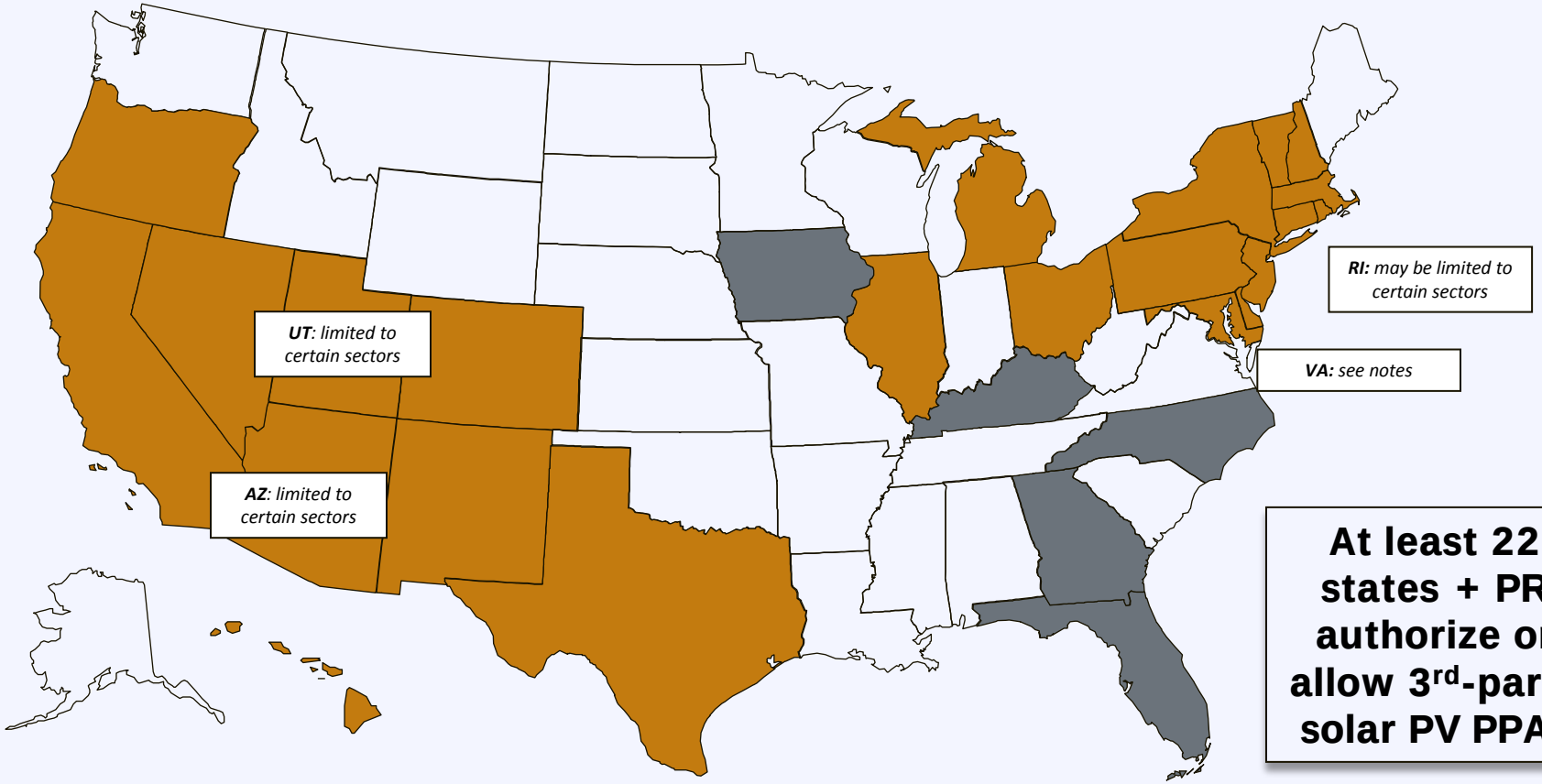
Direct Cash Incentives	RPS/SRECs	Rebates	PBIs/FITs
Financing	3rd Party Ownership	Bulk Purchasing	PACE
Other Incentives	Loans	Community Shared Solar	Property & Sales Taxes

Third Party Ownership



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

www.dsireusa.org / August 2012

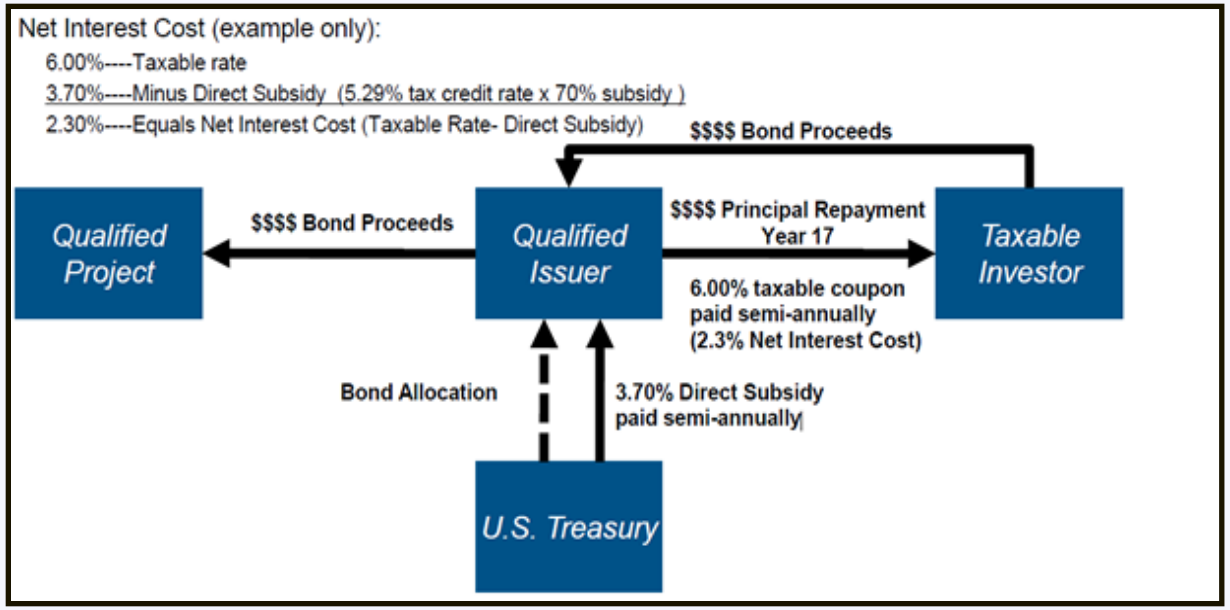


Note: This map is intended to serve as an unofficial guide; it does not constitute legal advice. Seek qualified legal expertise before making binding financial decisions related to a 3rd-party PPA. See following slides for additional important information and authority references.

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



Group Purchasing

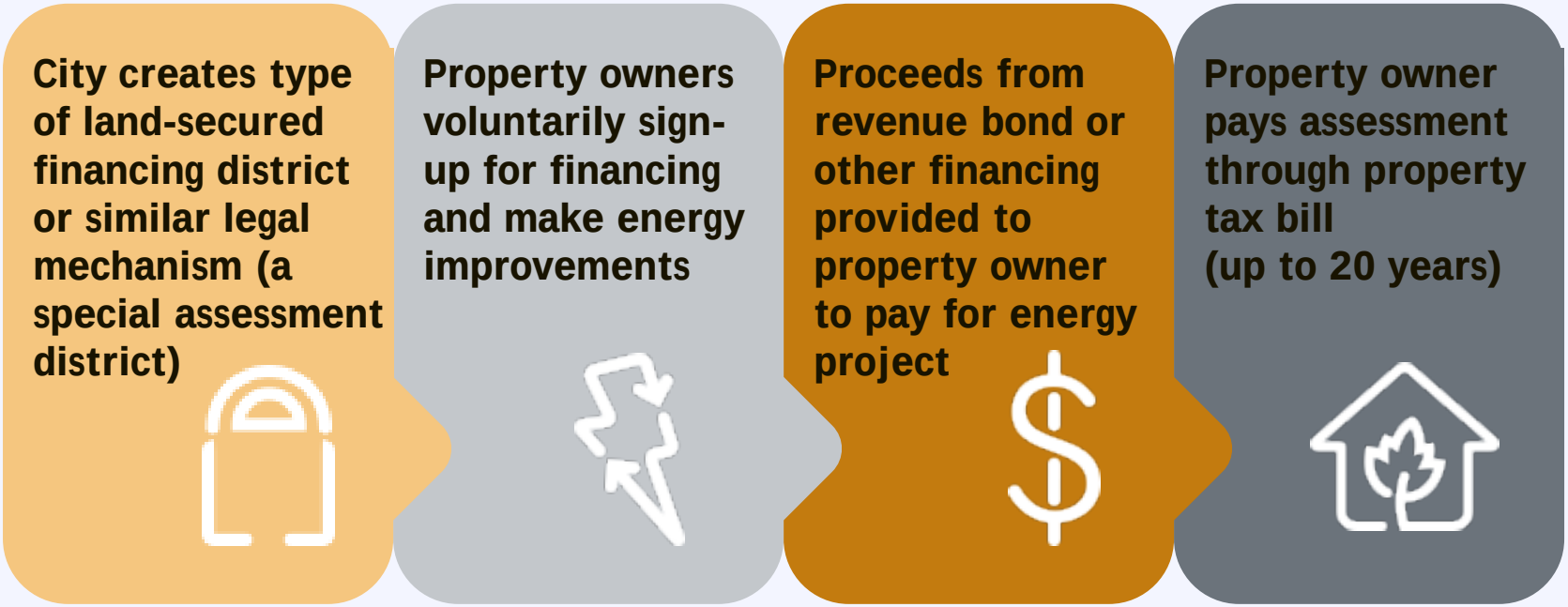
- Many people come together to purchase solar equipment and installation services in bulk
- Economies of scale = lower price per watt

SunShares
Go Solar with Group Buying Power

georgetownenergy.com
HELPING WASHINGTON DC GO SOLAR

solarize portland

Property Assessed Clean Energy



Local Examples: No local governments in NC have created a PACE program thus far

Understanding Solar Financing

Direct Cash Incentives	RPS/SRECs	Rebates	PBIs/FITs
Financing	3rd Party Ownership	Bulk Purchasing	PACE
Other Incentives	Loans	Community Shared Solar	Property & Sales Taxes

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U.S. Department of Energy

Financing: Attractive Loan Options

- One local and some utility loans in North Carolina
- 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

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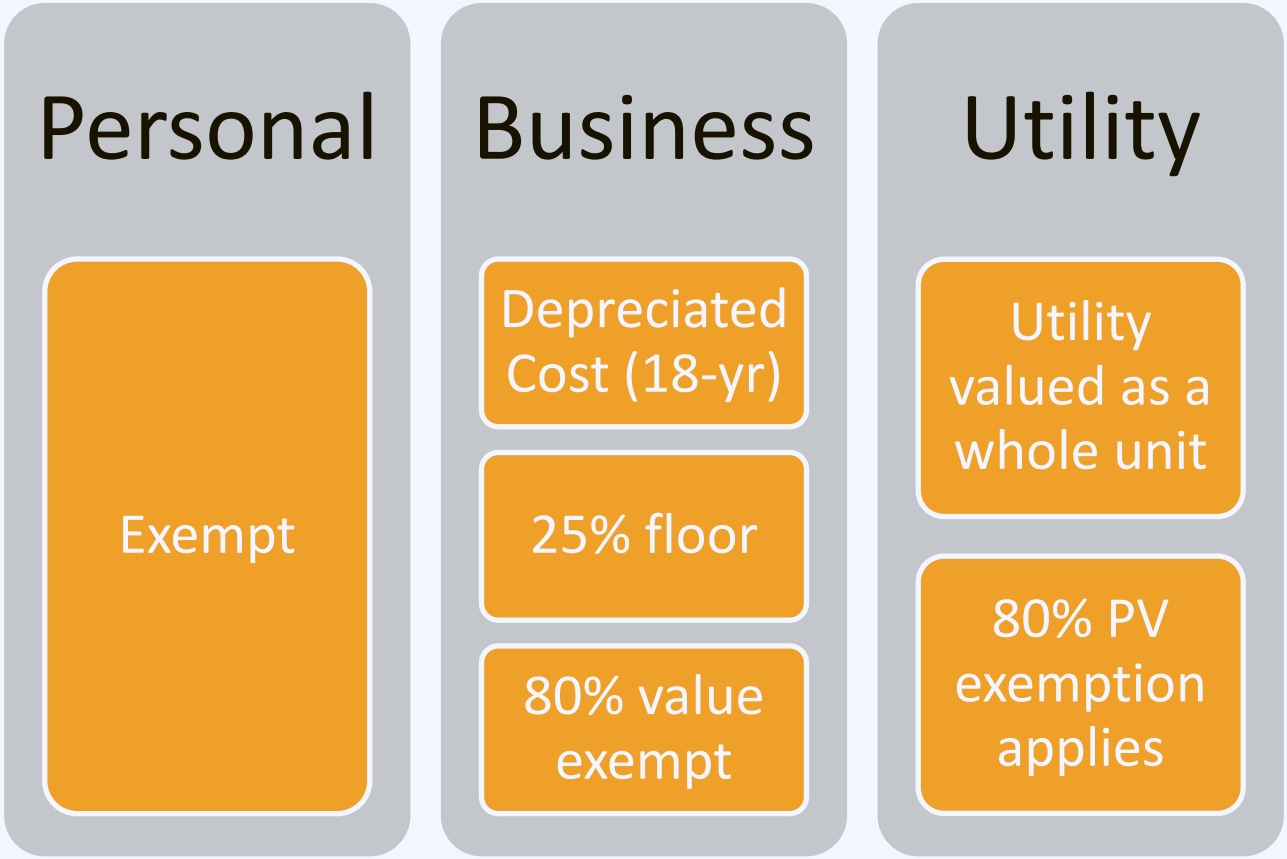
U.S. Department of Energy

Seattle City Light's Jefferson Park Project

PV and Property Taxes

State Policy: 80% reduction in assessed value…



Q & A

Agenda

08:40 – 09:00	Introductions & Discussion
09:00 – 09:50	Creating a Regulatory Landscape for Solar
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12:10 – 12:30	Next Steps for Solar in Region

Process

Decide on Ownership Structure

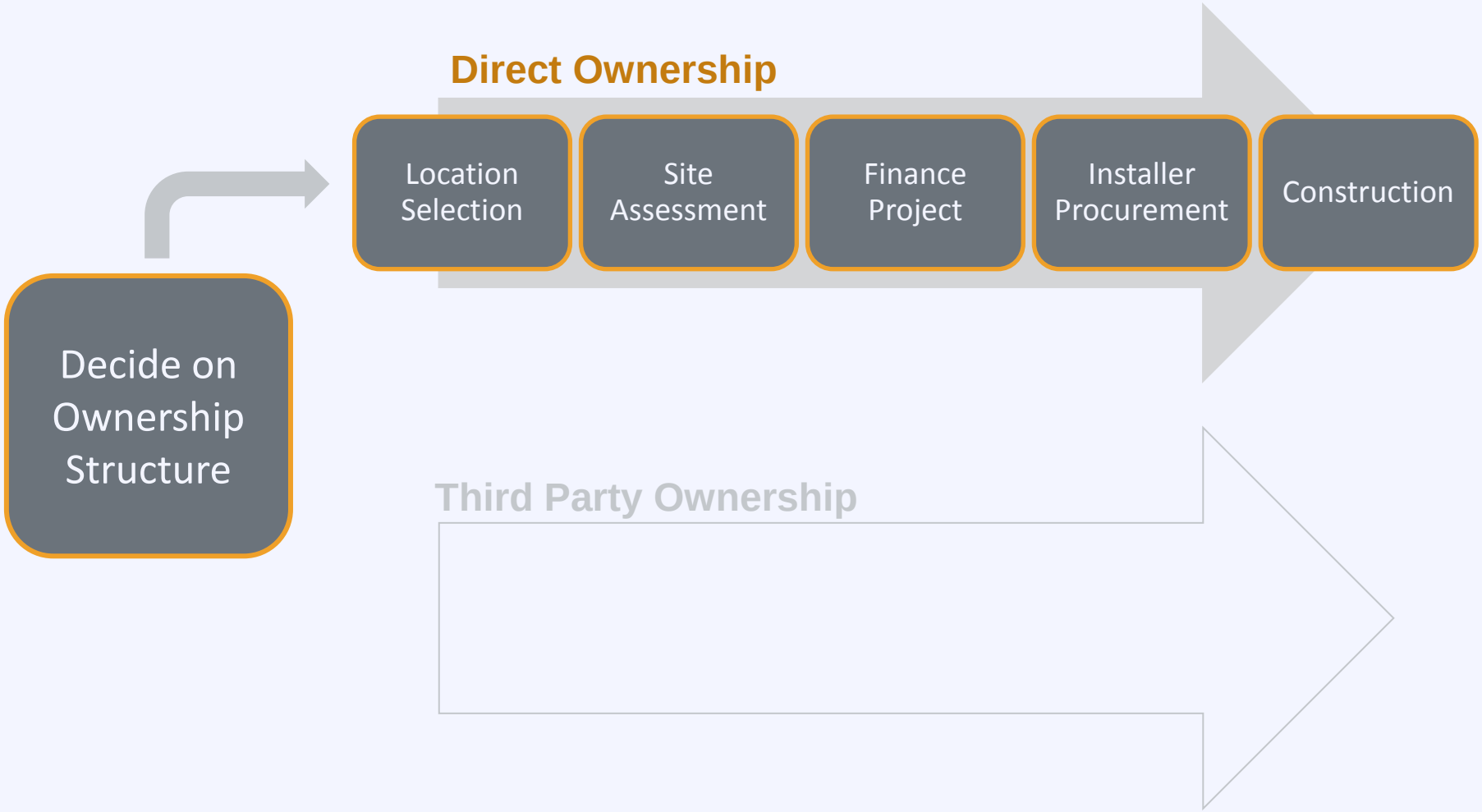
Option 1: Direct Ownership

Option 2: Third Party Ownership

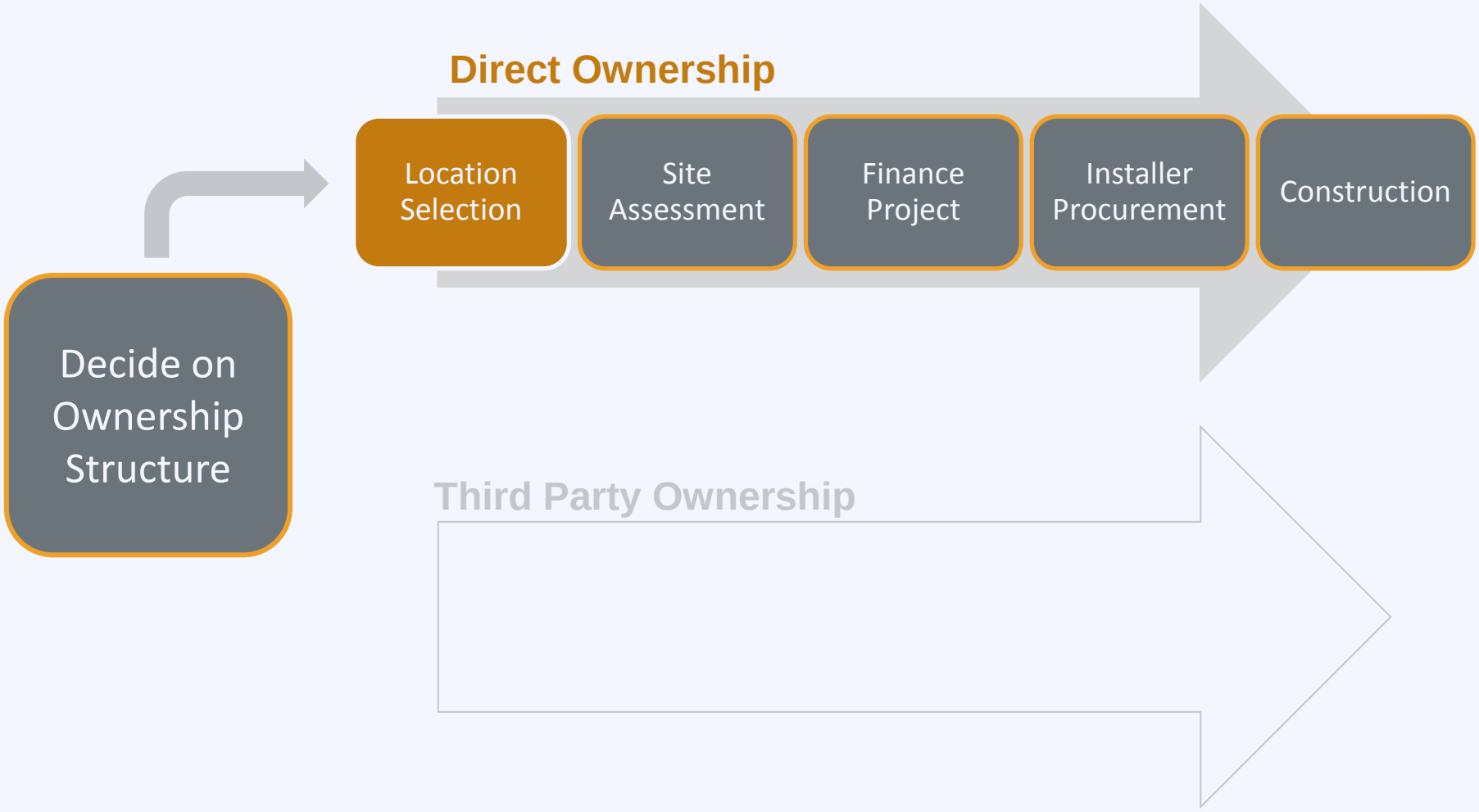
Ownership Structure Decision

- 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?

Process


Direct Ownership
Location Selection
Site Assessment
Finance Project
Installer Procurement
Construction
Decide on Ownership Structure
Third Party Ownership

Process


Direct Ownership
Location Selection
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Construction
Decide on Ownership Structure
Third Party Ownership

Step 1: Location Selection

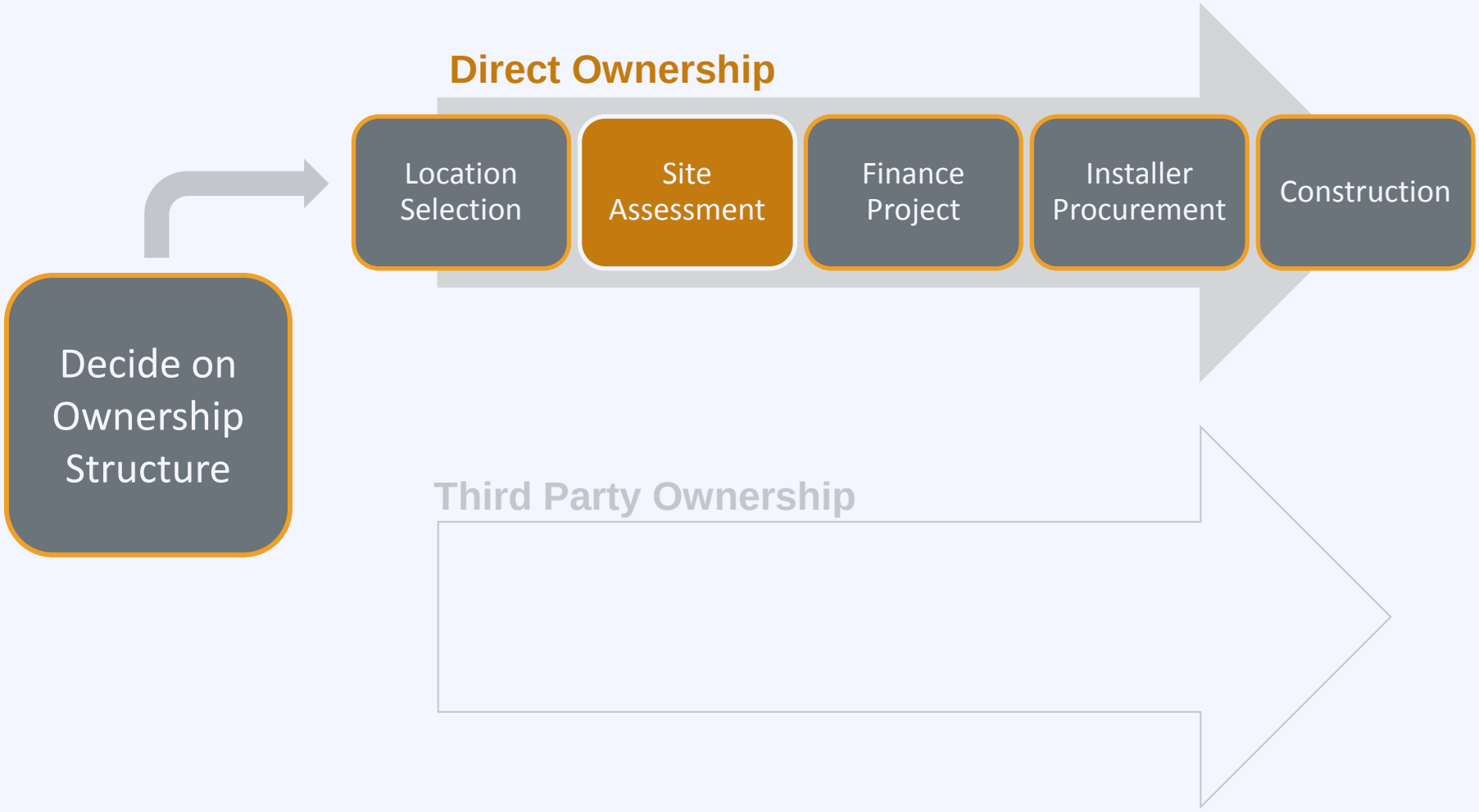
- Who is using the energy?
- Where is the energy being used?
- What is the user's energy load?
- What is the user's energy cost?

Step 1: Location Selection

Rooftop

Ground

Process


Direct Ownership
Location Selection
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Third Party Ownership

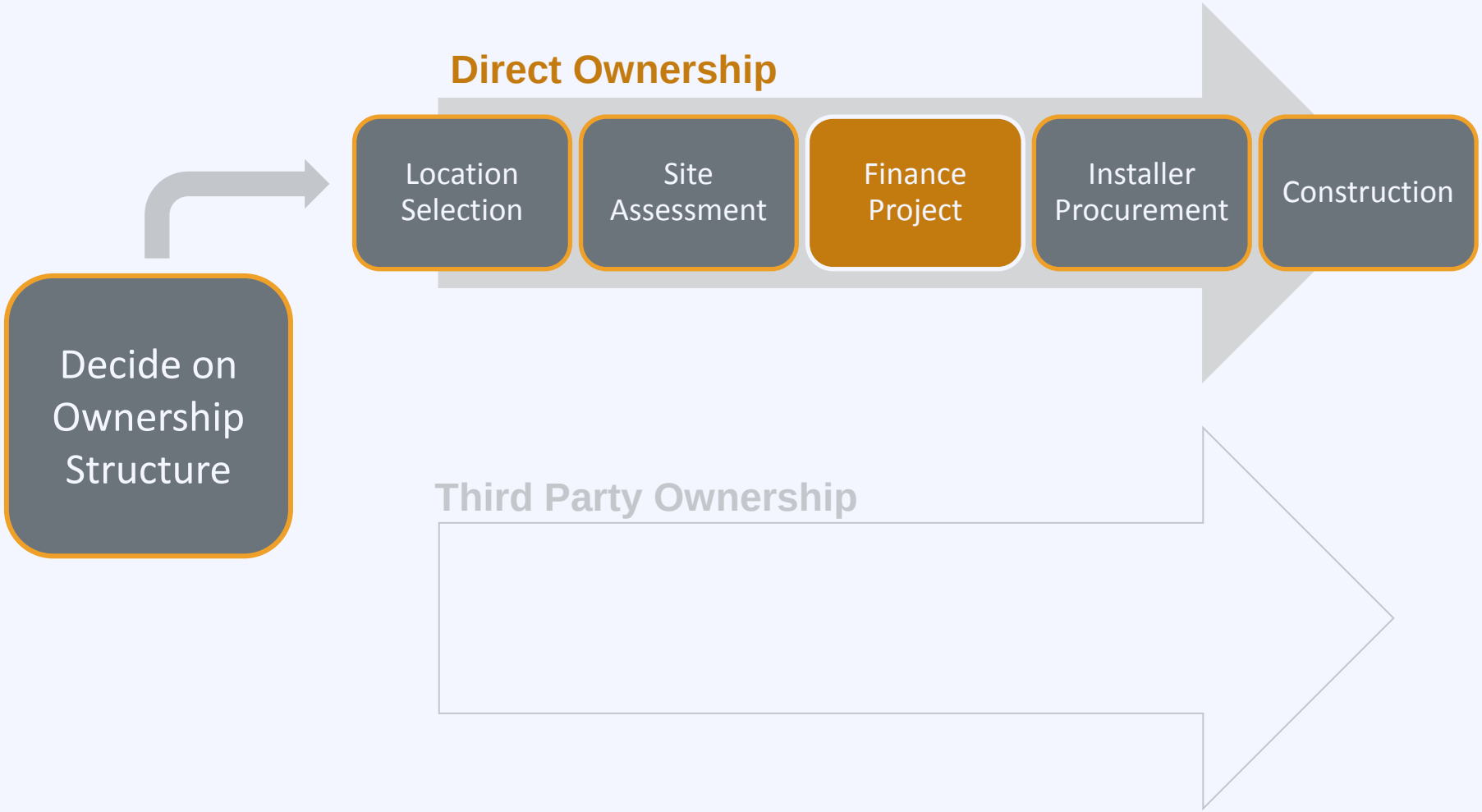
Step 2: Site Assessment

- 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

Process


Direct Ownership
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Decide on Ownership Structure
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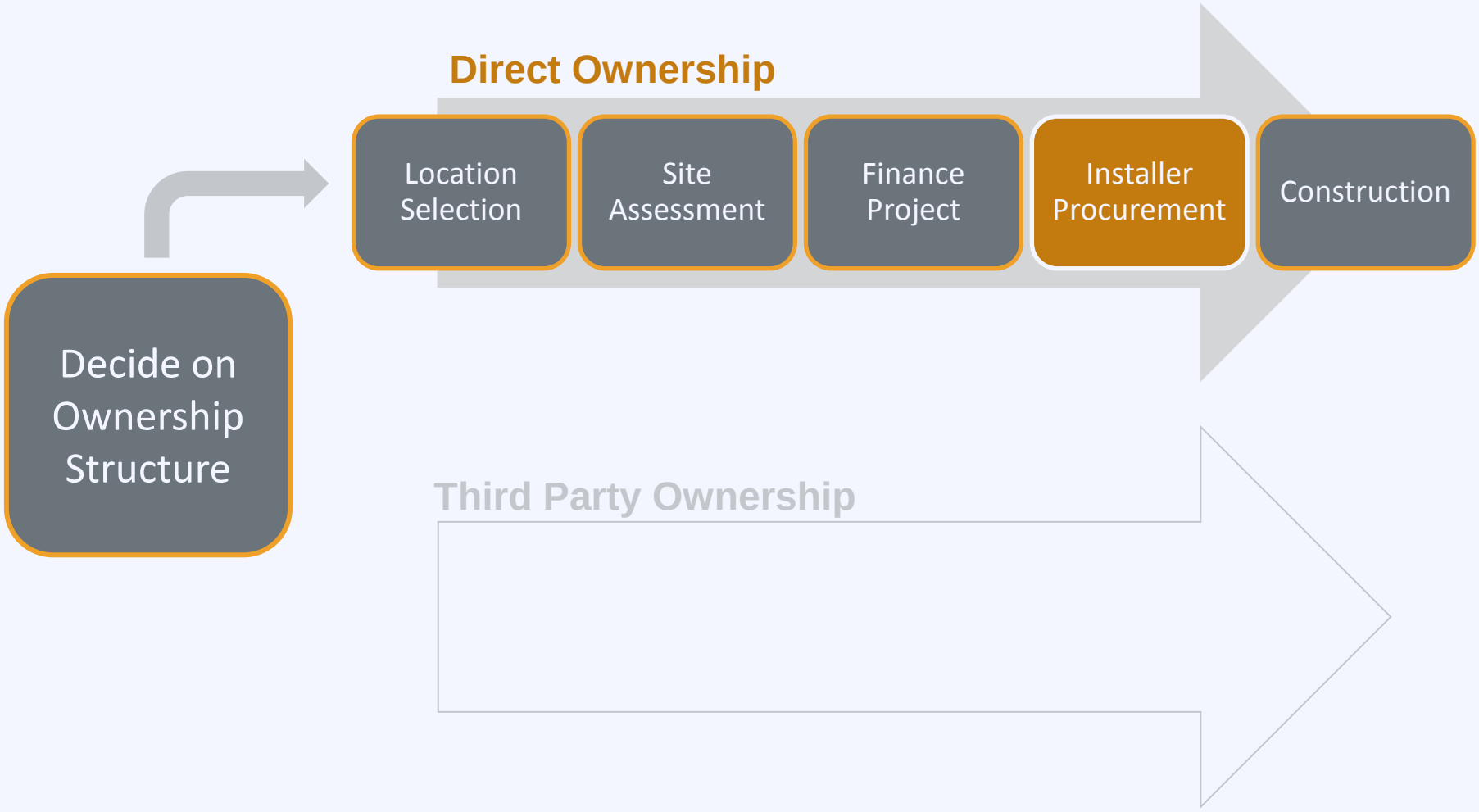
Step 3: Finance Project

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

Process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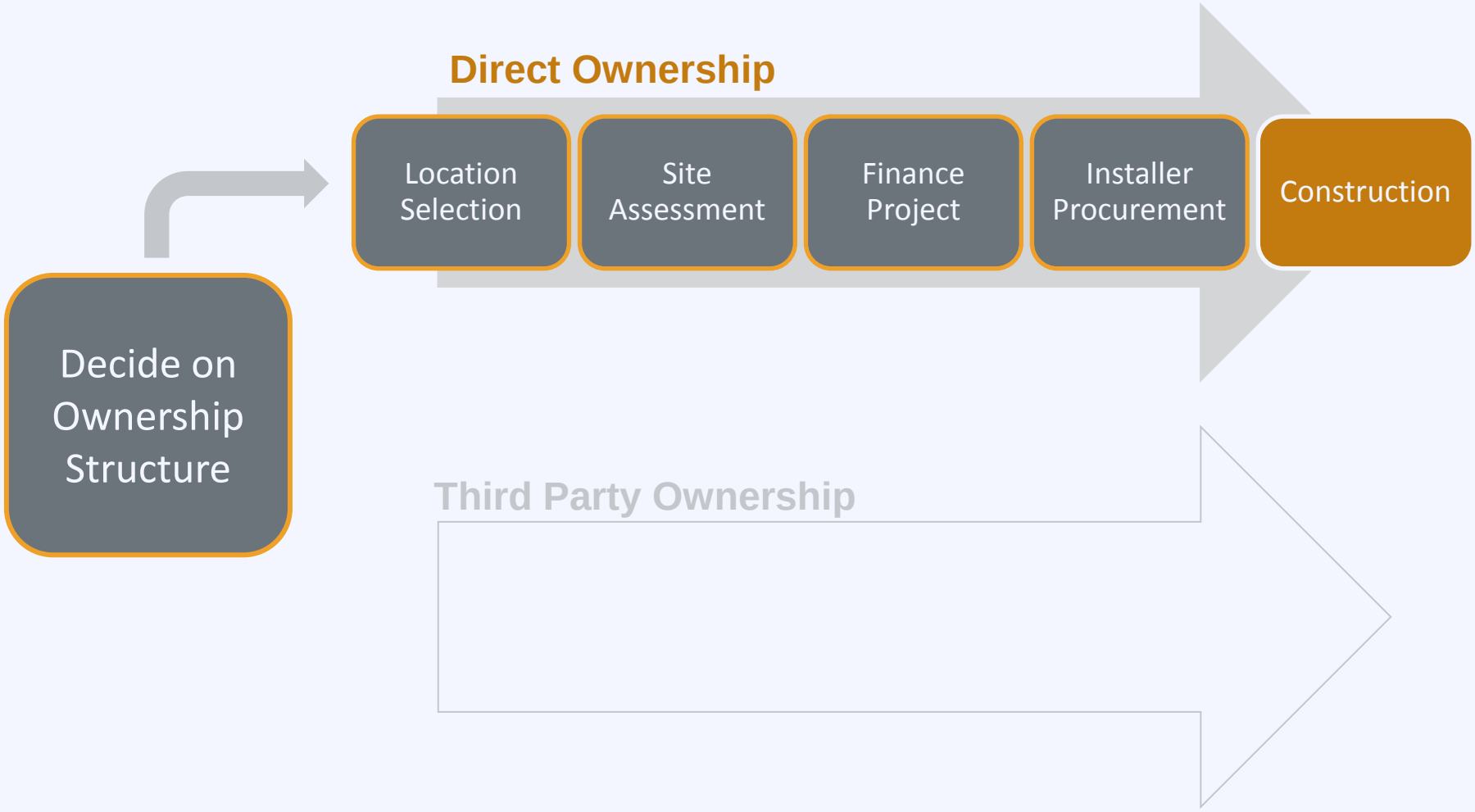
Step 4: Installer Procurement

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

Process


Direct Ownership
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Construction
Decide on Ownership Structure
Third Party Ownership

Direct Ownership

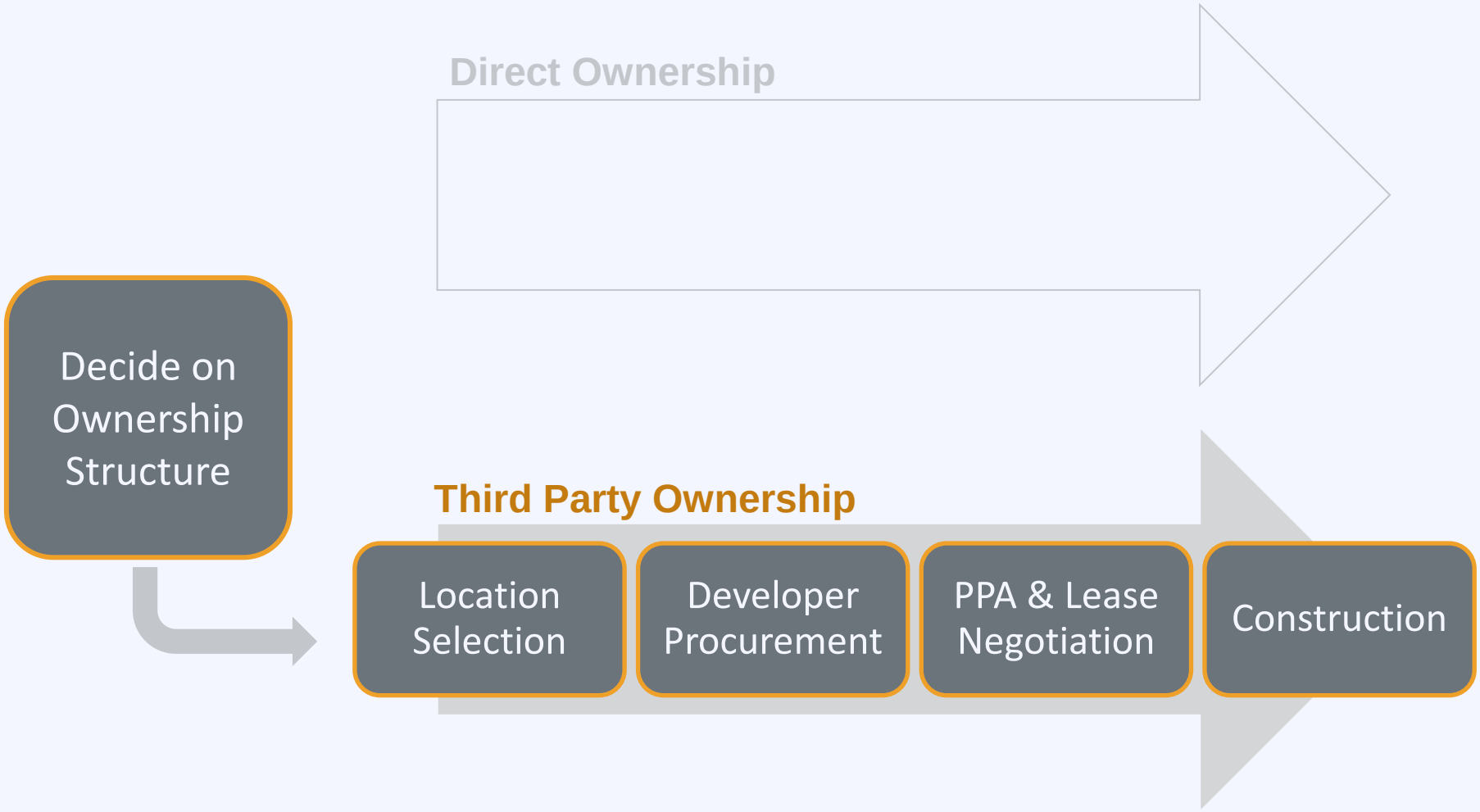
Pros

- Low – cost electricity
- REC revenue
- Maximize underutilized spaces

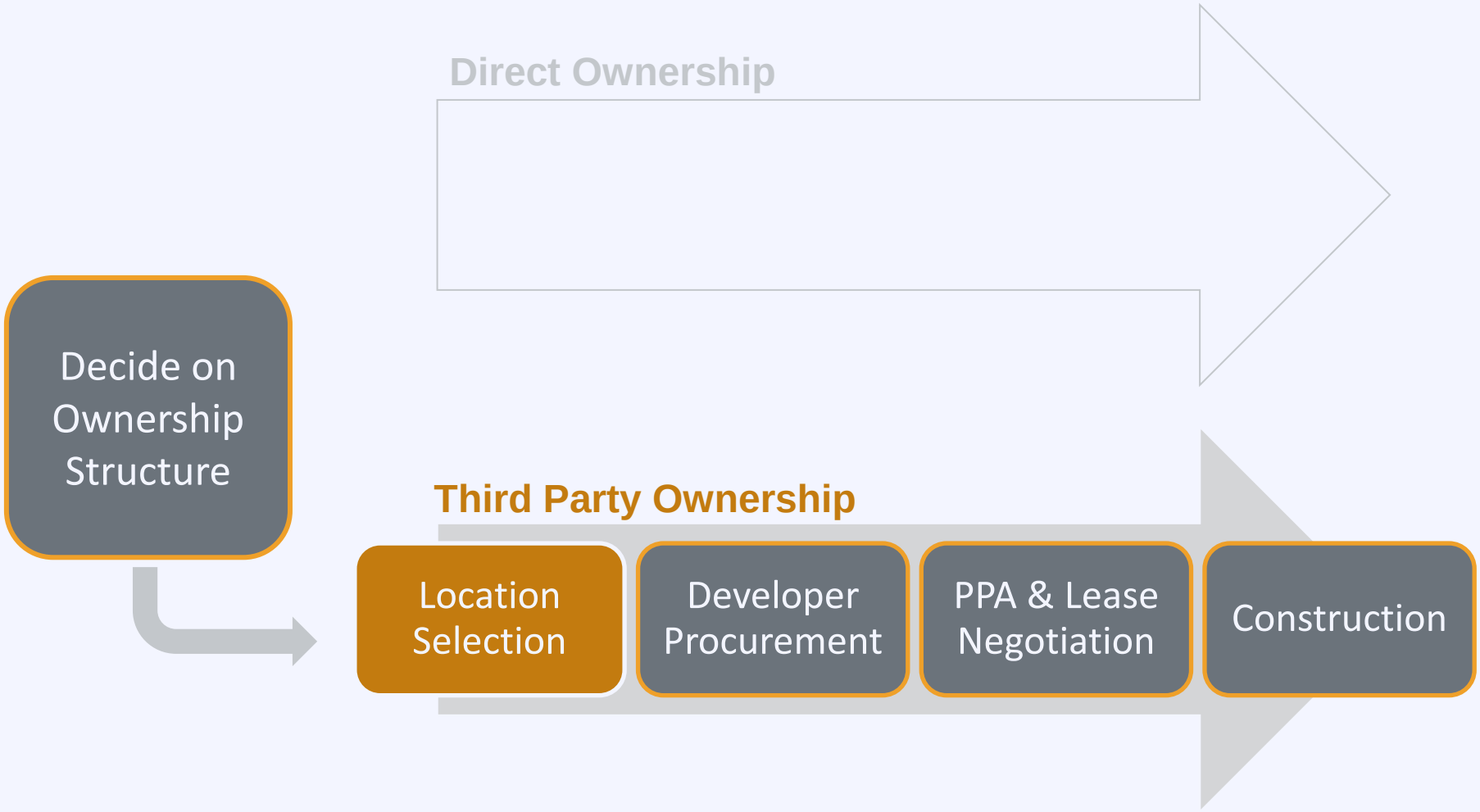
Cons

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

Process


Direct Ownership
Decide on Ownership Structure
Third Party Ownership
Location Selection
Developer Procurement
PPA & Lease Negotiation
Construction

Process


Direct Ownership
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Process


Direct Ownership
Decide on Ownership Structure
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PPA & Lease Negotiation
Construction
RFP vs RFQ

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

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U.S. Department of Energy

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

Step 2: Developer Procurement

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

50% savings in administrative costs

10-15% reduction in energy cost

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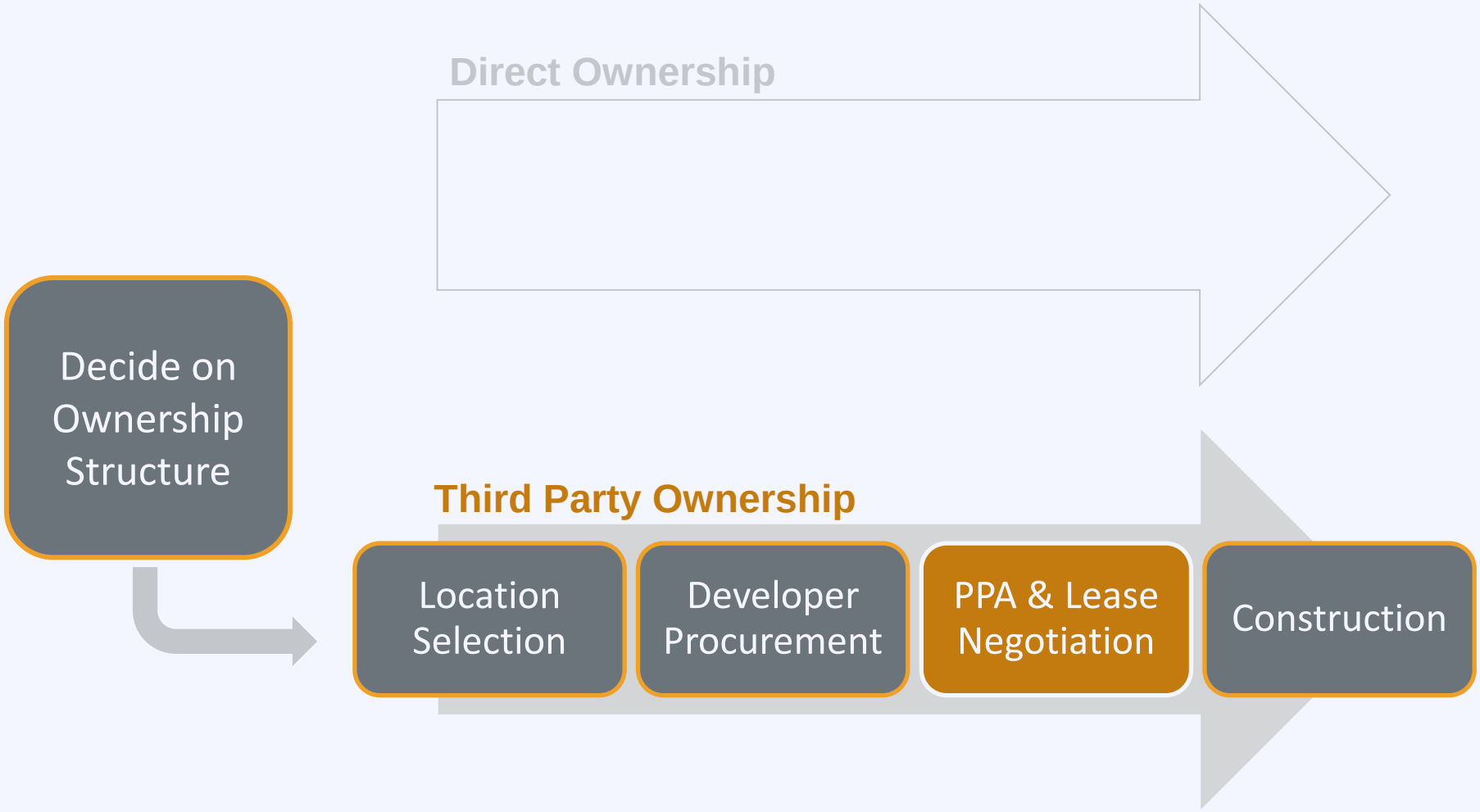
Source: NREL Webinar "Procuring and Implementing Solar Projects on Public Buildings: How to Avoid Common Pitfalls" December 8, 2010

Process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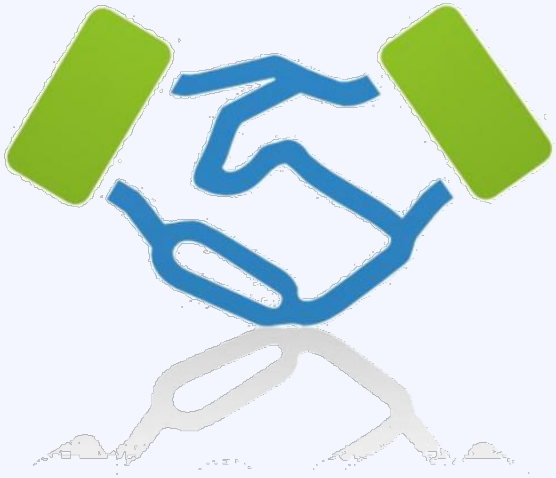
Step 3: Contract Negotiation

Negotiation points:

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



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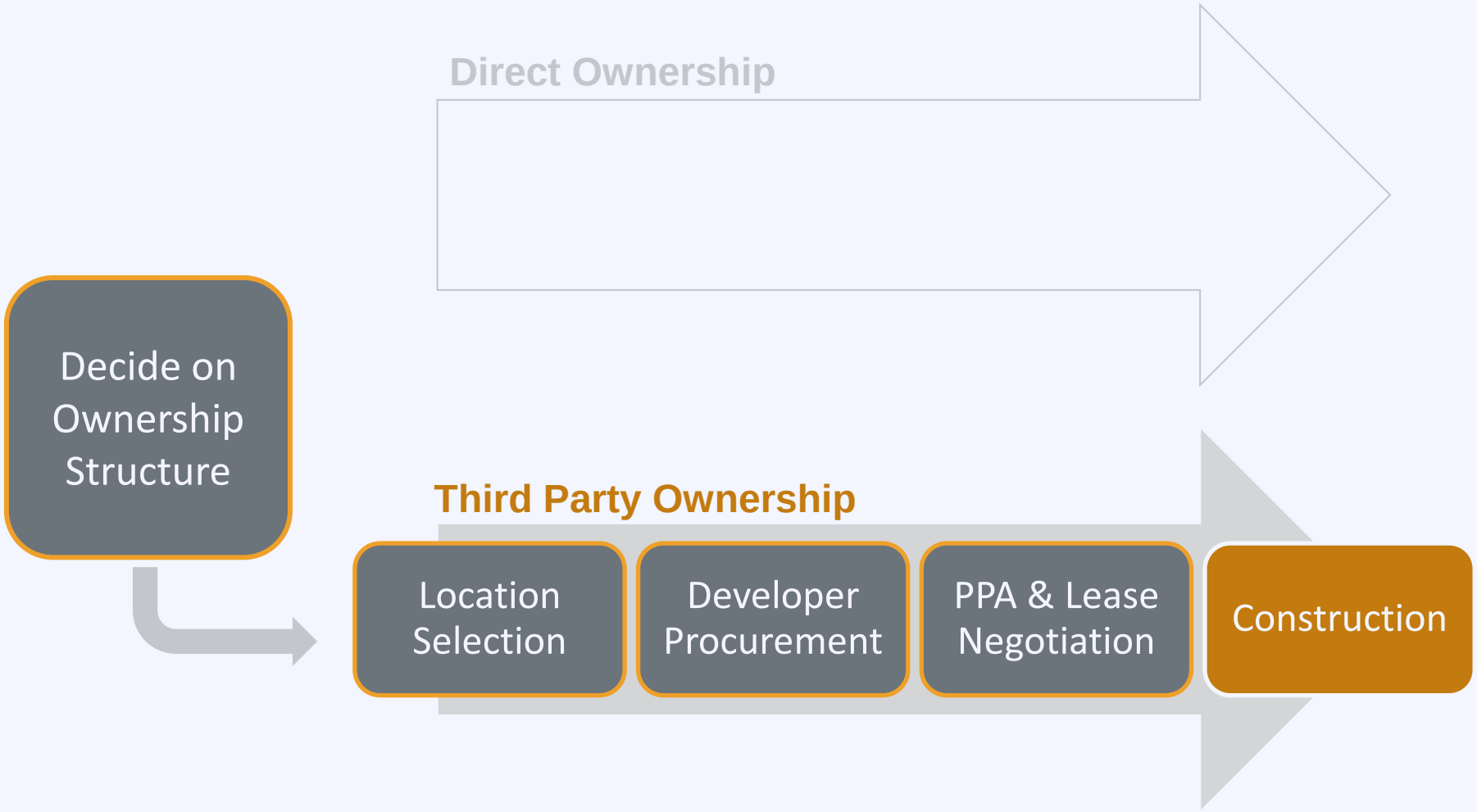
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Construction

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

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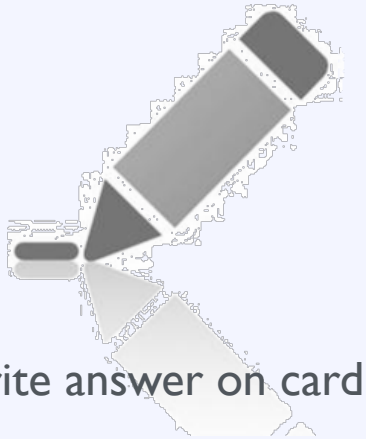
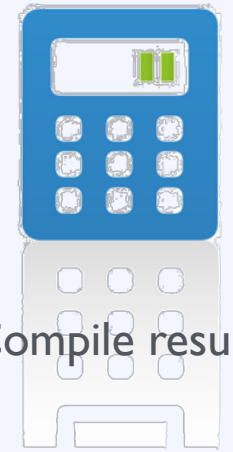
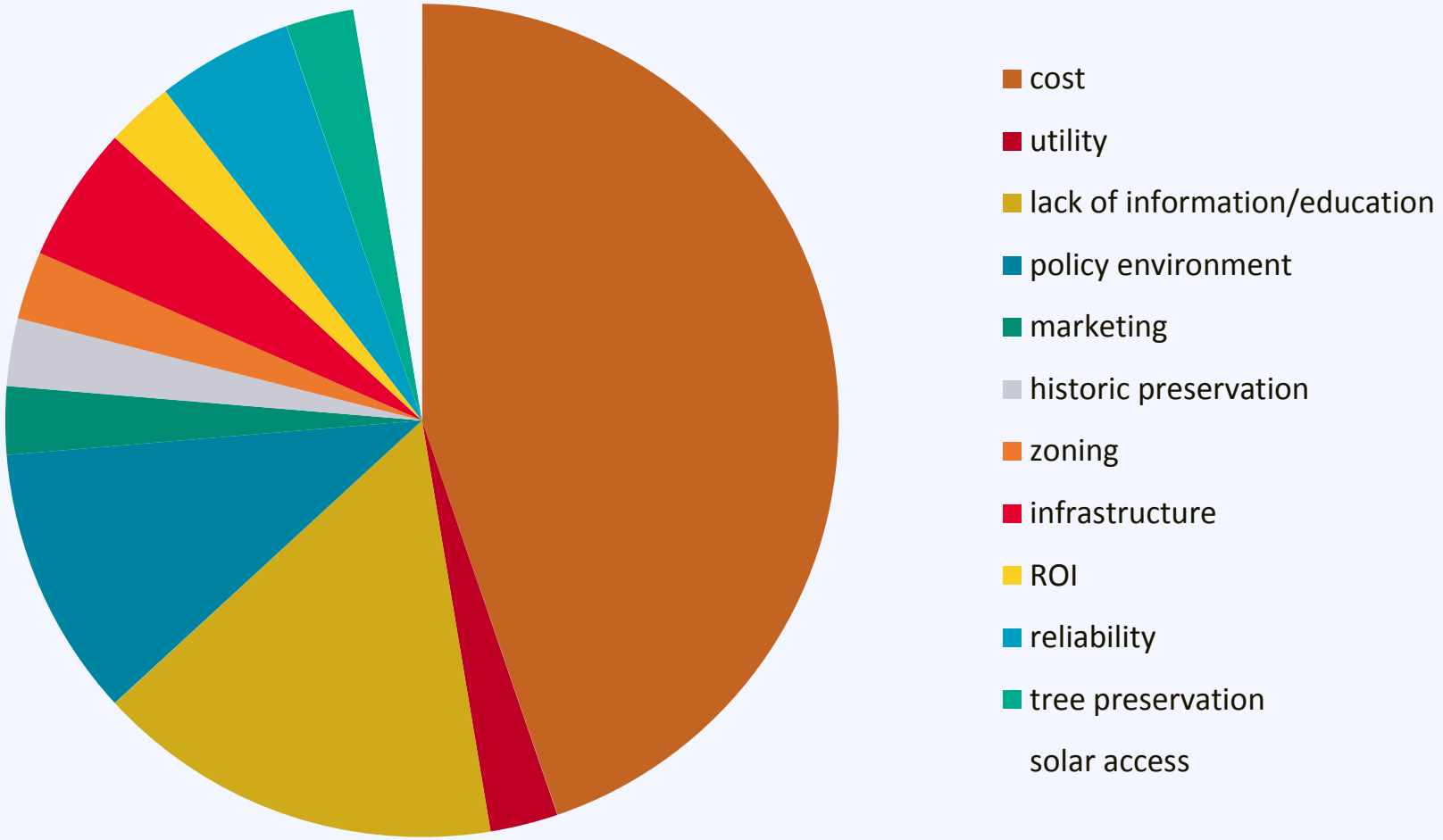
Activity: Addressing Barriers

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

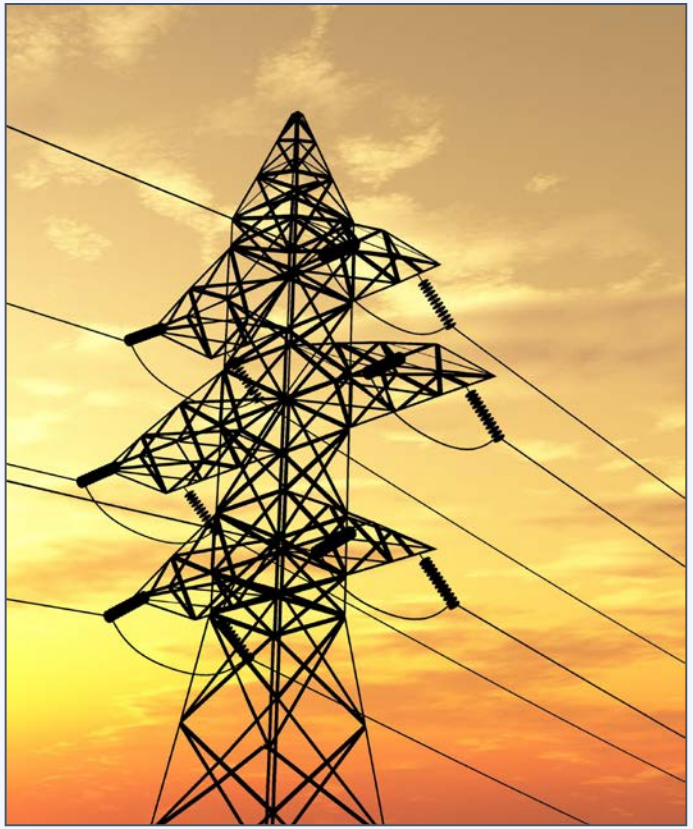
Right Now	During Session	After Break
		
Write answer on card	Compile results	Group discussion

[Results from Survey]



Barriers

- Unfavorable regulations
- Lack of funds / financing
- Weak incentives
- Community pushback
- Time-intensive process
- Lack of consumer education



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Activity: Next Steps

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

Q & A

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U.S. Department of Energy

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