Solar Powering Your Community

Permitting and Inspection

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Agenda

Morning Session: **Permitting**

Afternoon Session: **Zoning**

Morning Agenda: Permitting

- Solar Markets and Technology
- Permitting Best Practices
- DVRPC Model Permitting Documents

Morning Agenda: Permitting

- **Solar Markets and Technology**
- Permitting Best Practices
- DVRPC Model Permitting Documents

Solar Technologies

Solar Photovoltaic (PV)

Solar Hot Water

Concentrated Solar Power

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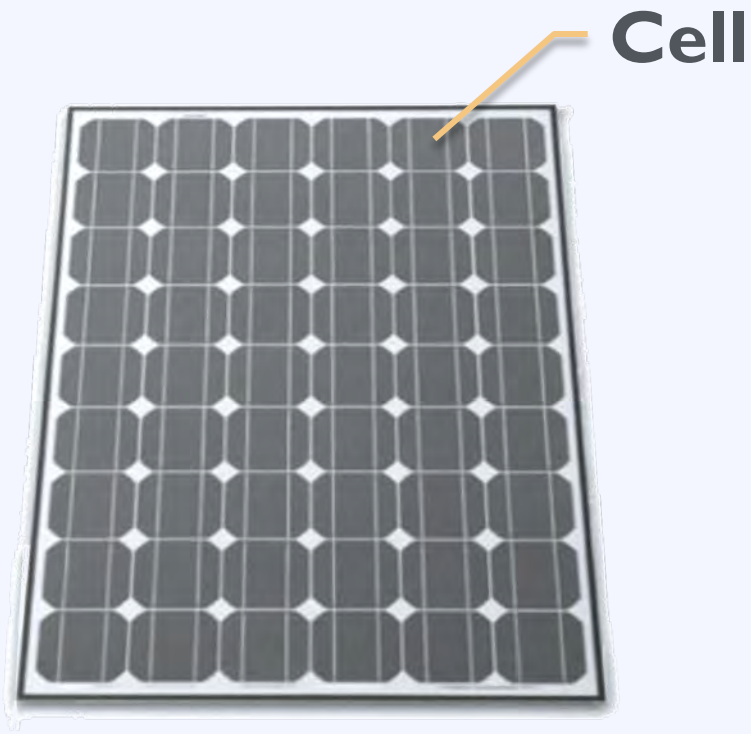
Some Basic Terminology



Some Basic Terminology

Array

Some Basic Terminology

Capacity / Power

kilowatt (kW)

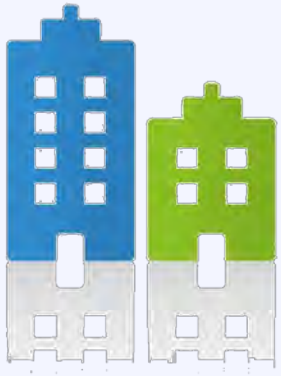
Production

Kilowatt-hour (kWh)

Some Basic Terminology

Residence
5 kW

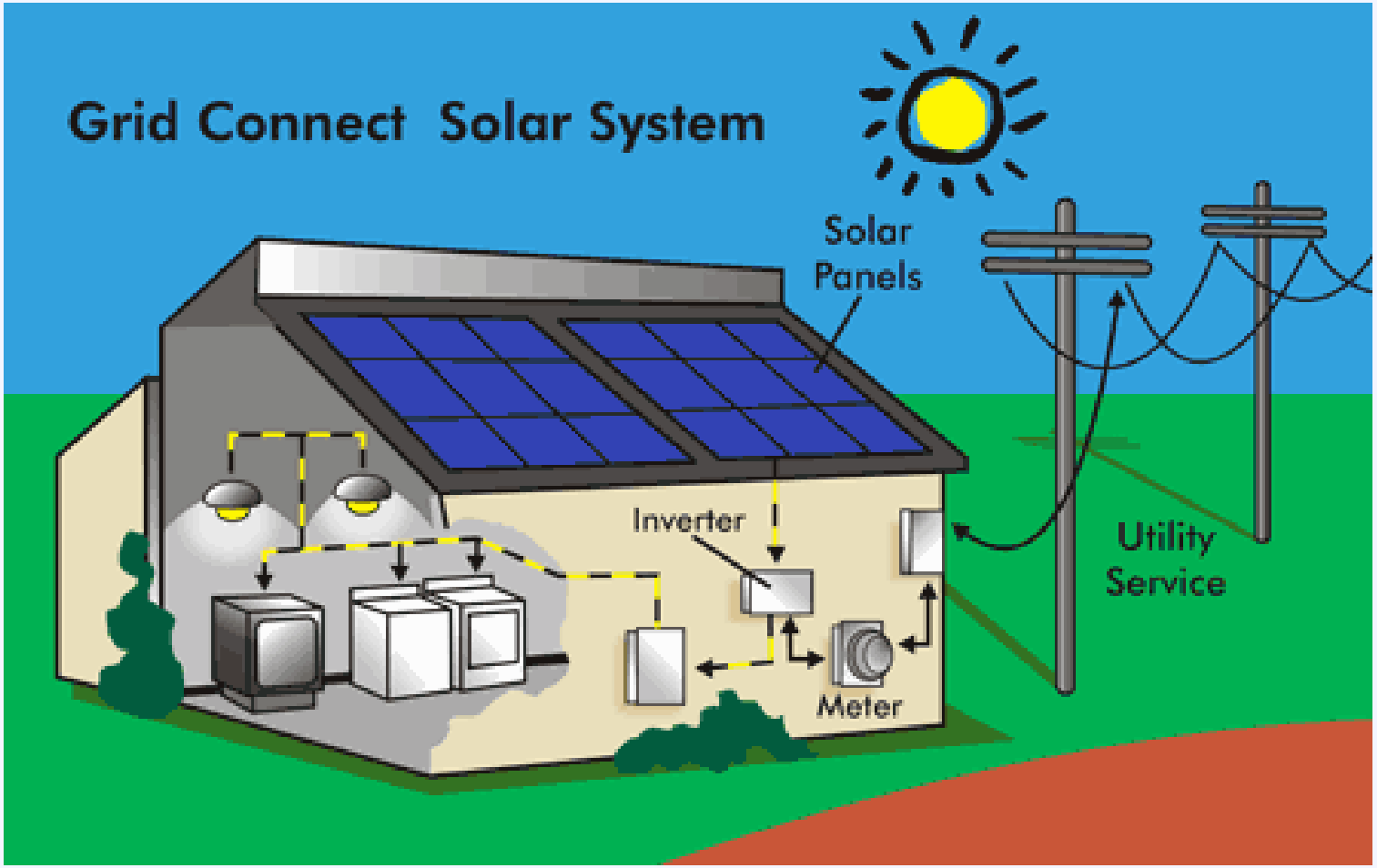
Factory
1 MW+



Office
50 – 500 kW

Utility
2 MW+

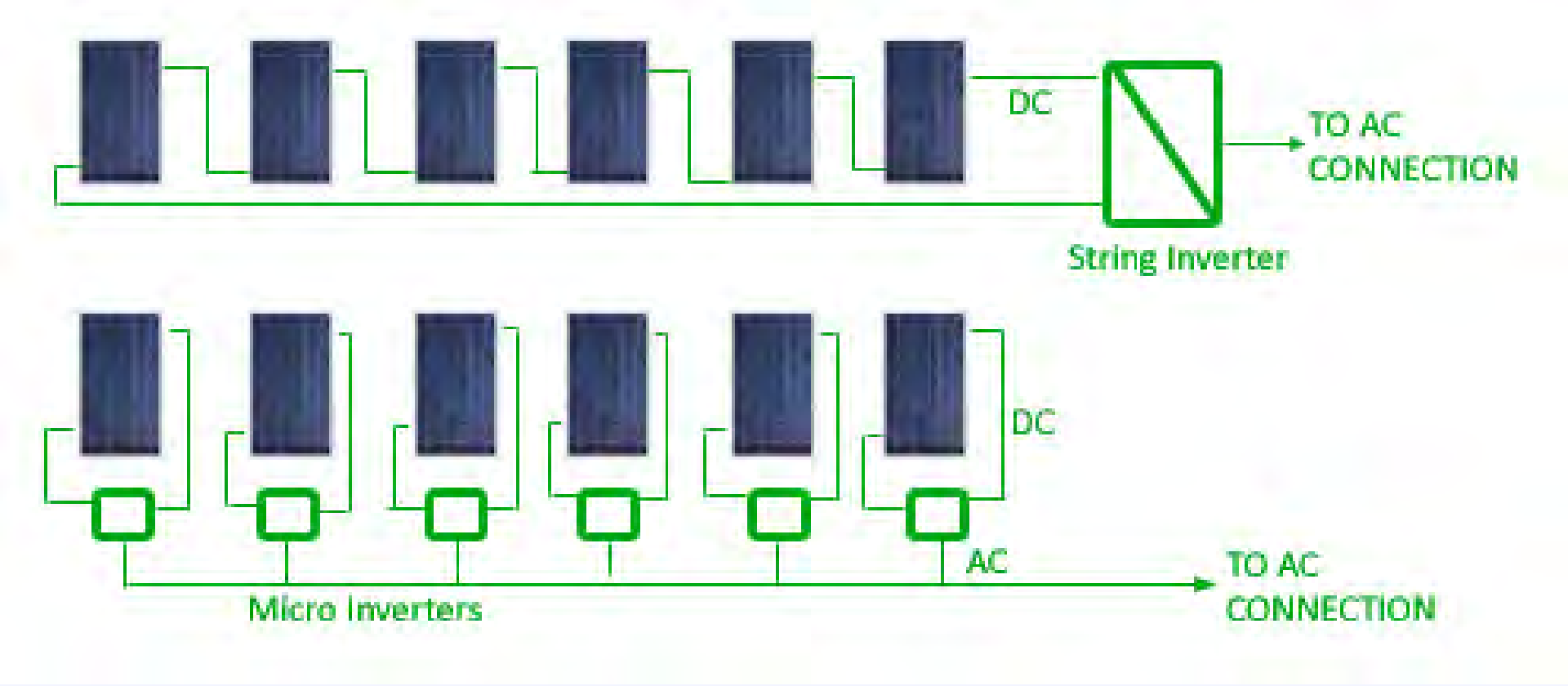
System Design



PV System Components

Image Source: Home Power Magazine

Inverter Technology



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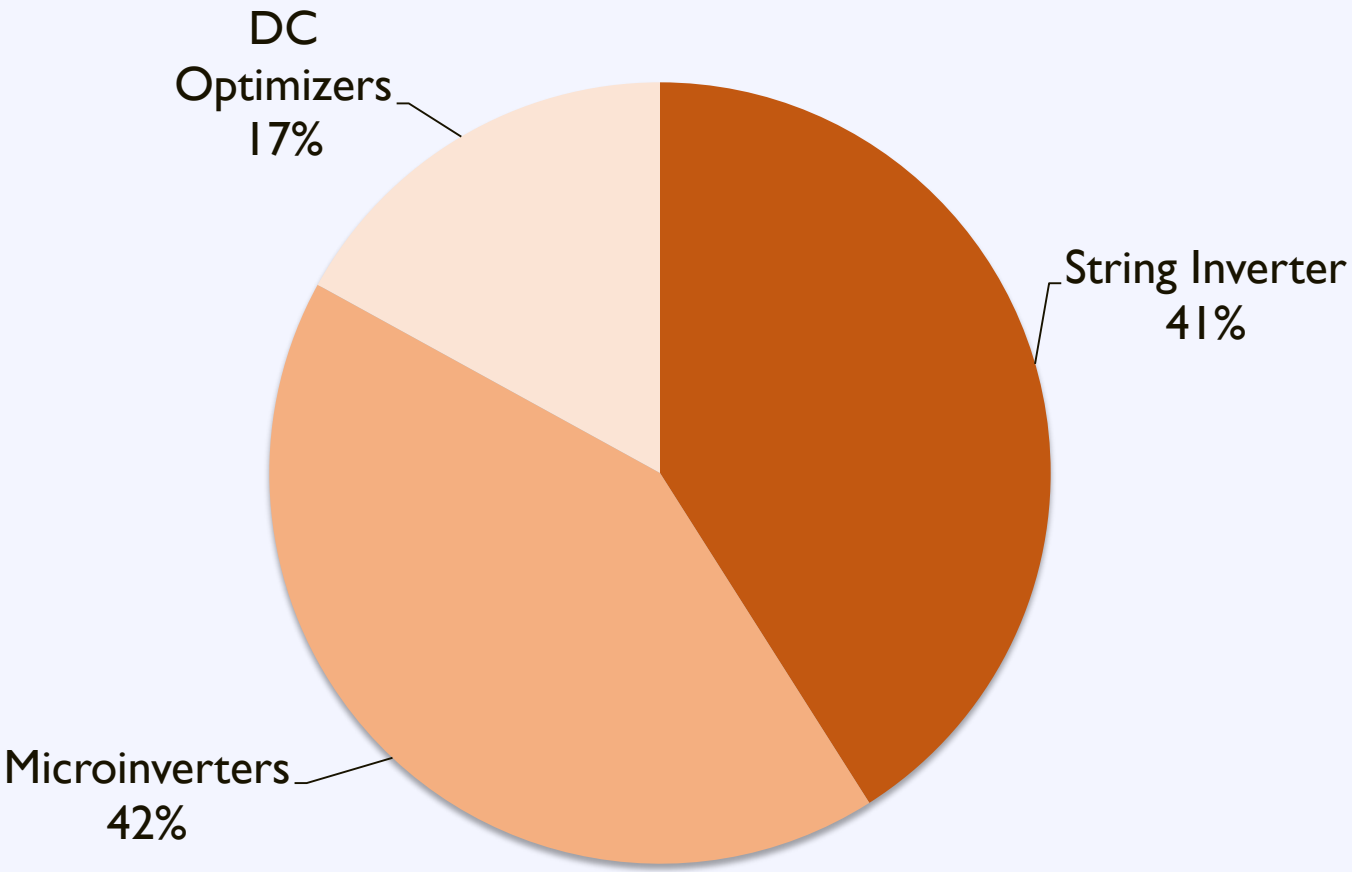


Solar Development in the US

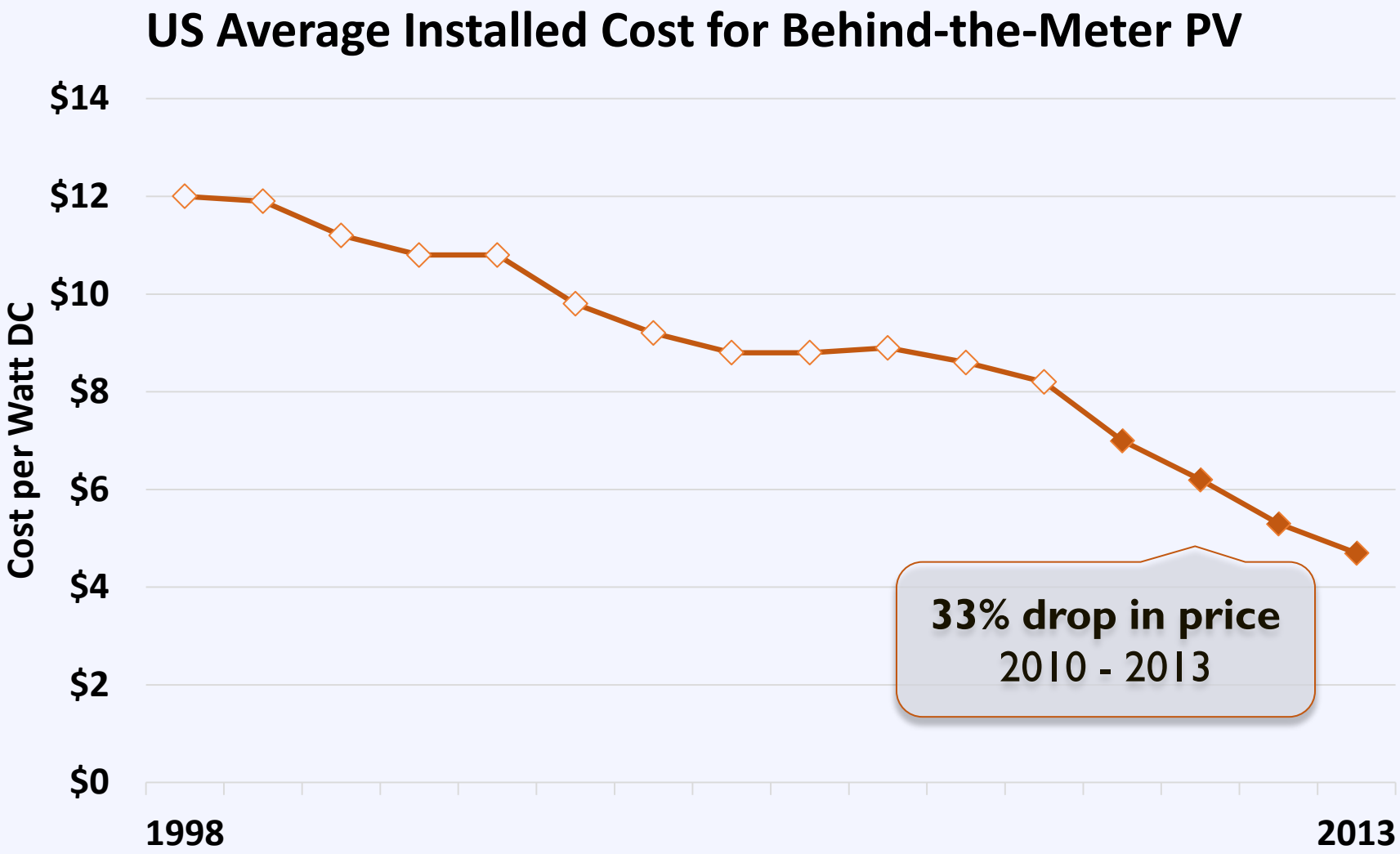
In 2013, the US solar industry installed over

145,000 new solar installations

of which

94% were residential projects

The Cost of Solar PV



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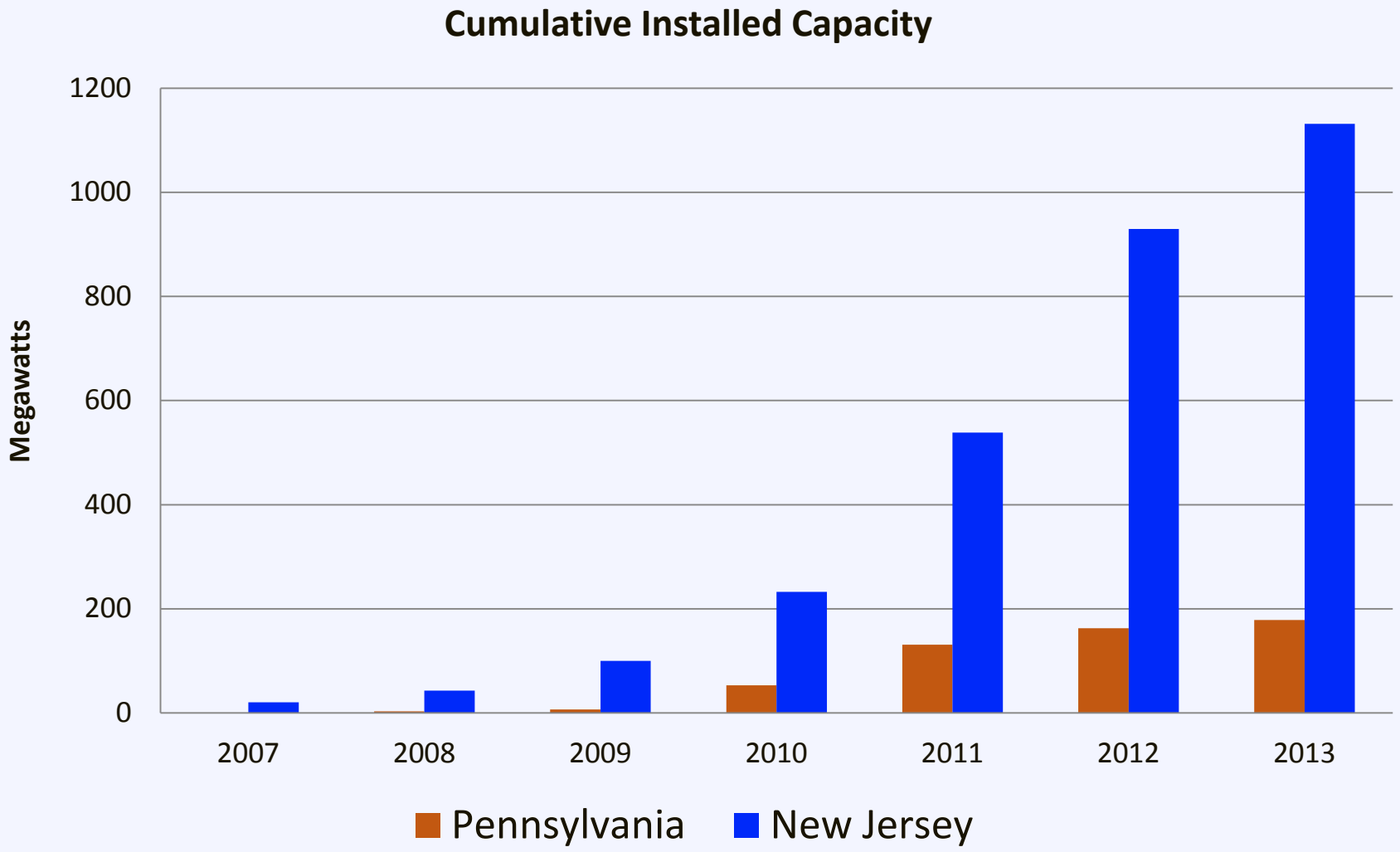
Tracking the Sun VII: The Installed Cost of Photovoltaics in the US from 1998-2013 (LBNL)

Economic Development in PA/NJ

2014 Solar Companies	461	495
2014 Solar Jobs	2,800	7,200
National Ranking	**15**	**5**

PA & NJ Solar Market



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Source: IREC Solar Market Trends (http://www.irecusa.org/publications/)

PA & NJ Solar Market

Pennsylvania

13

watts per person

New Jersey

104

watts per person

US

39

watts per person

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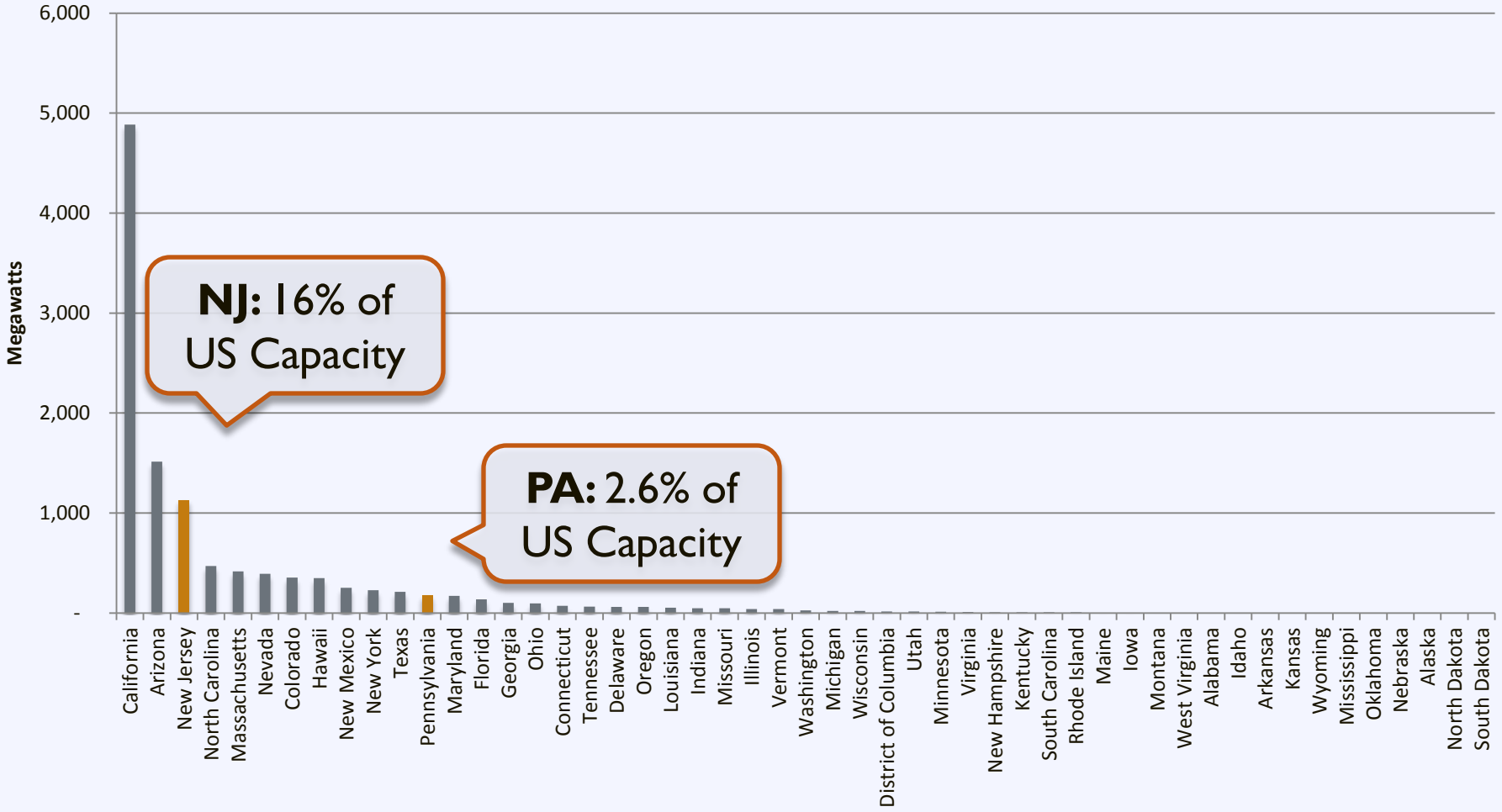
Source: IREC Solar Market Trends (http://www.irecusa.org/publications/)

US Solar Market



Source: *U.S. Solar Market Trends 2013*

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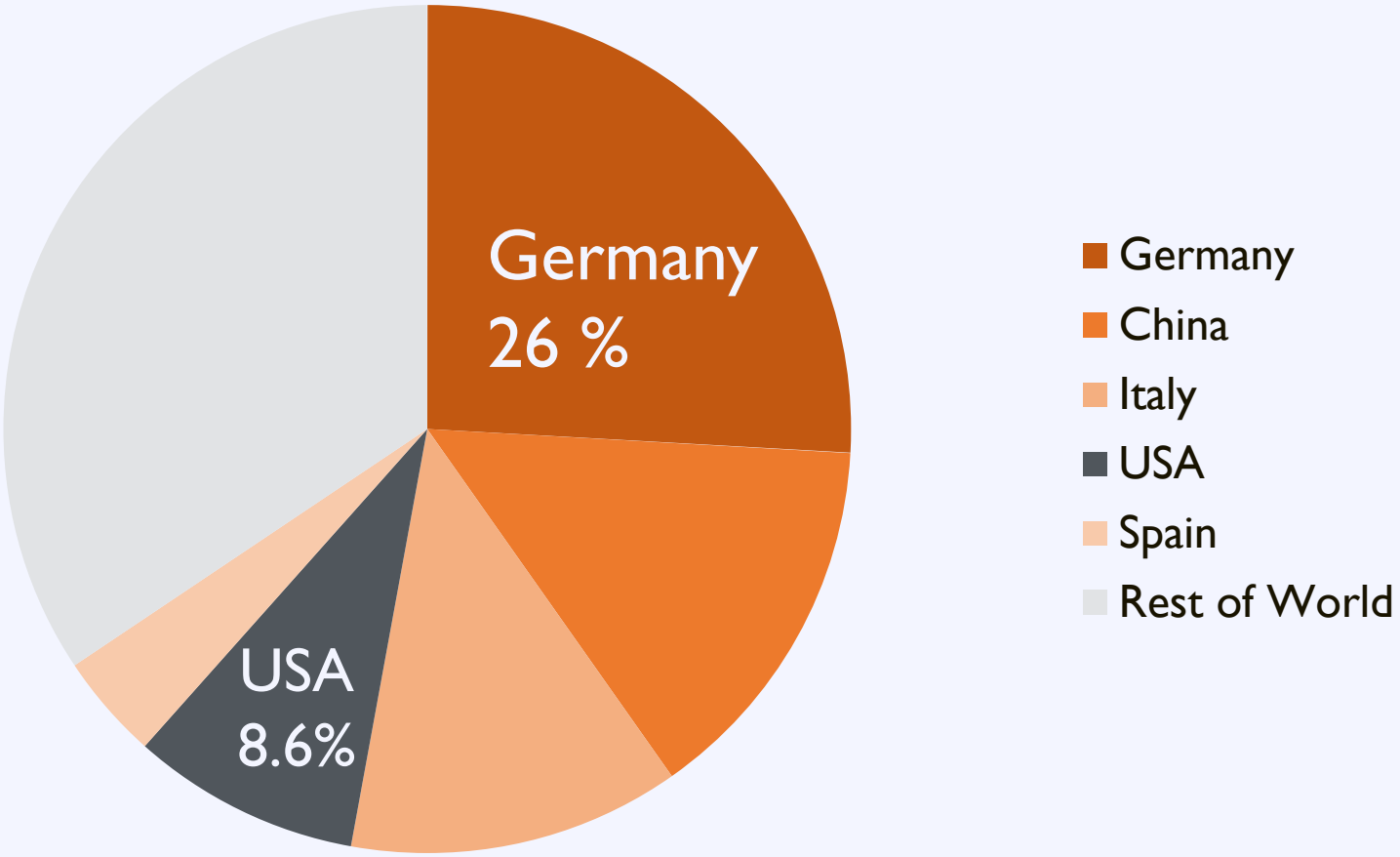
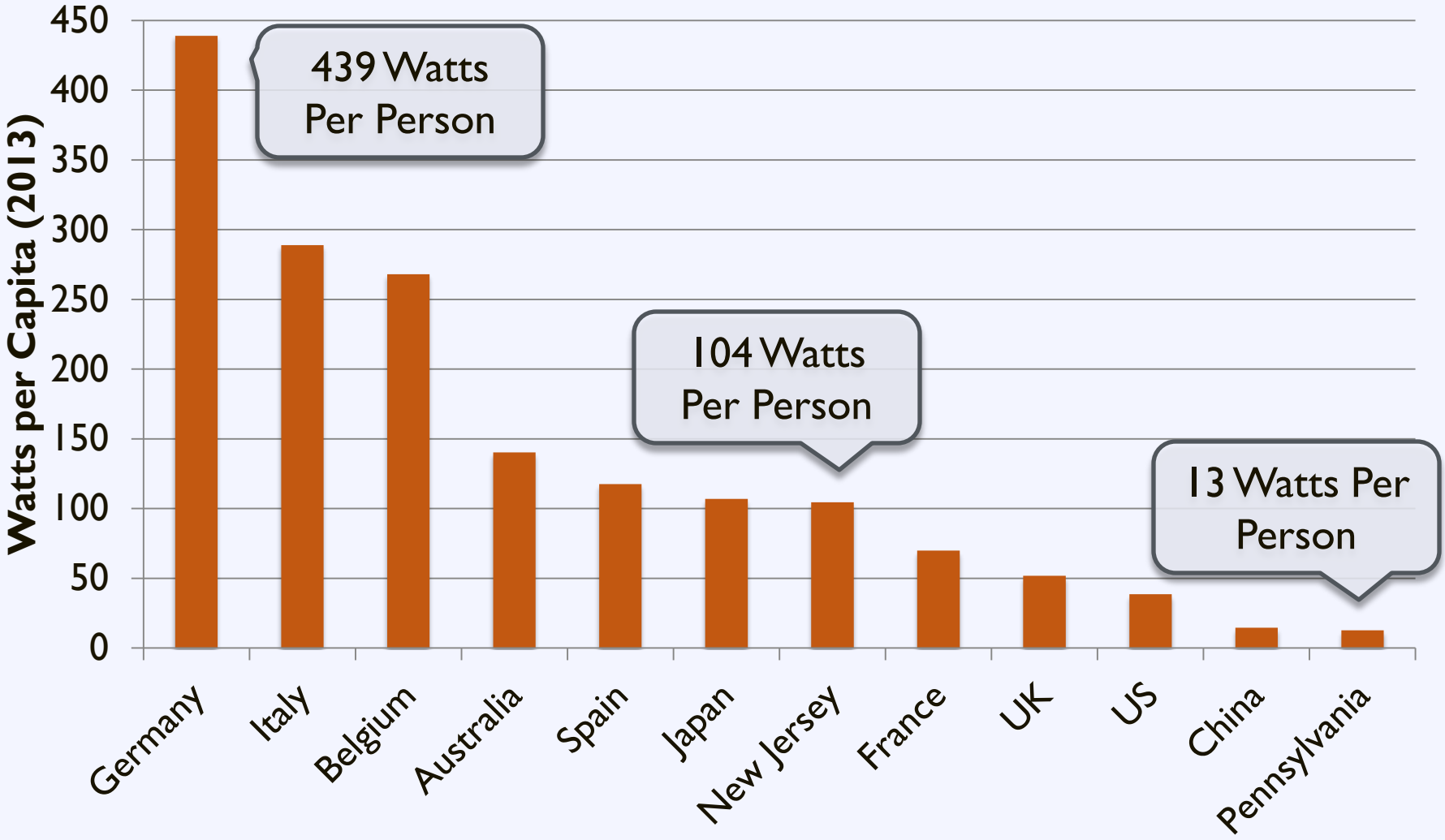
World Solar Market

Top 5 Countries Solar Operating Capacity (2013)



Source: REN 21

Installed Capacity per Capita



Source: REN 21, World Bank

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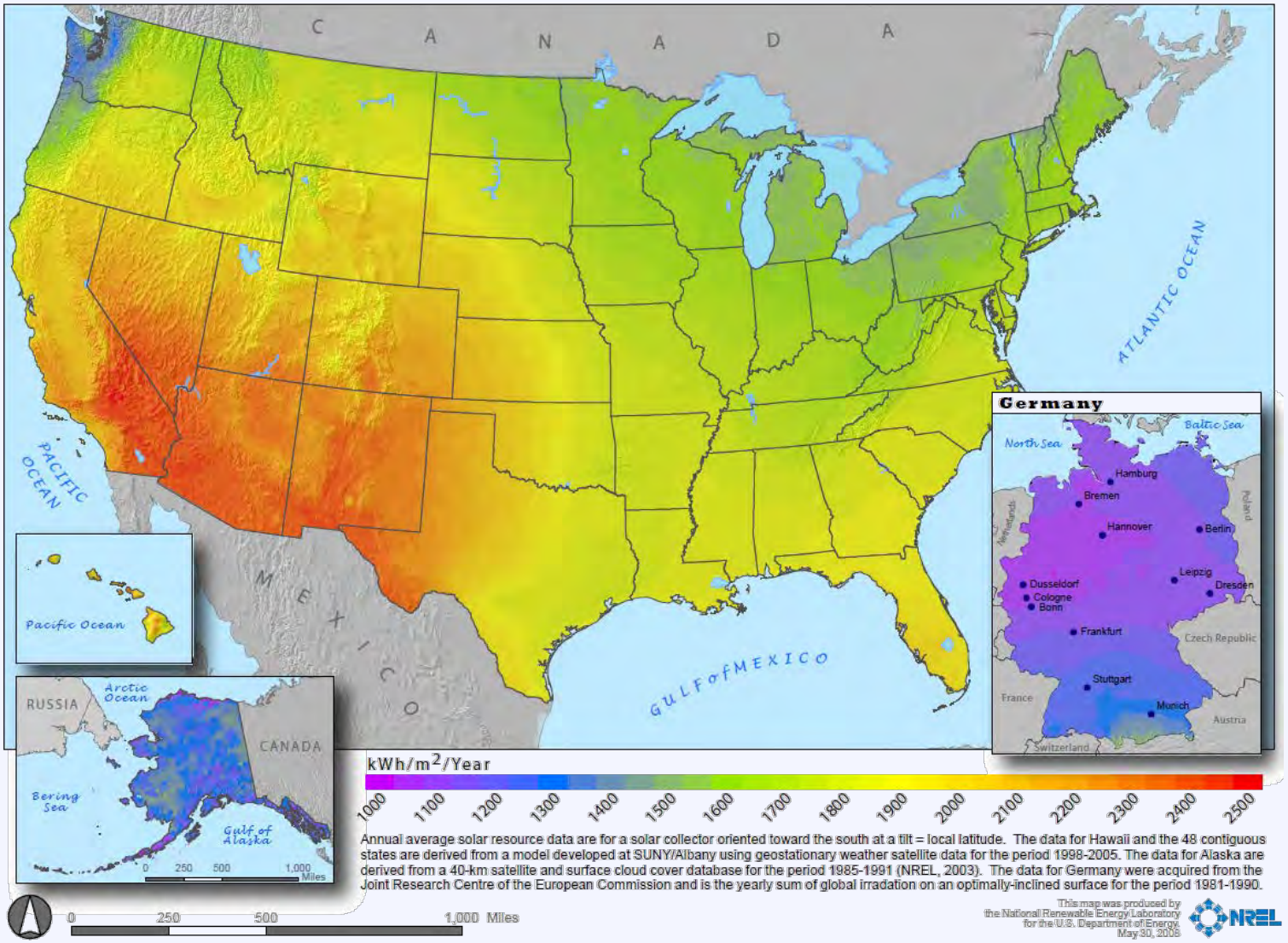
US Solar Resource



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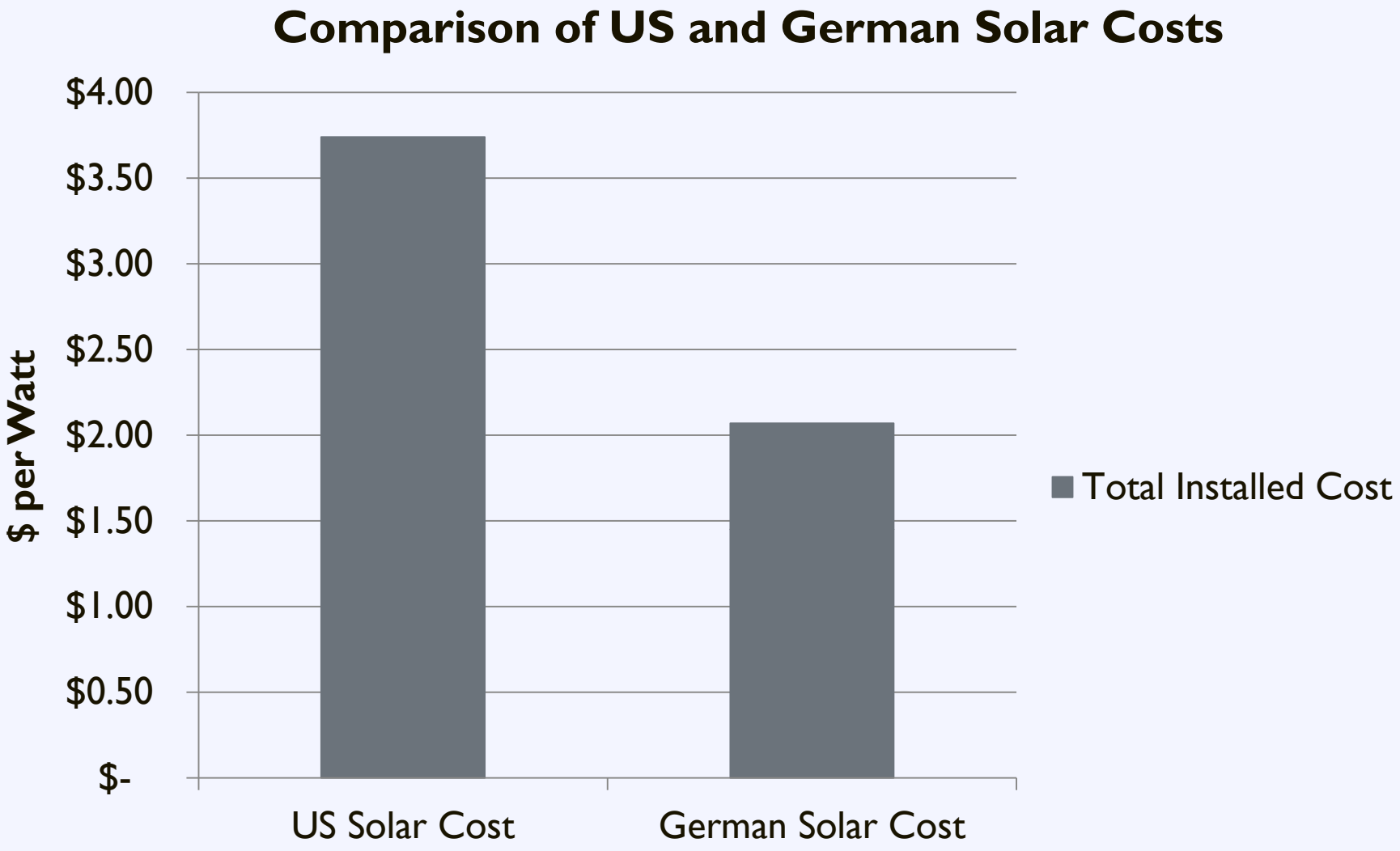
Source: National Renewable Energy Laboratory

The Cost of Solar in the US



Source: NREL (http://www.nrel.gov/docs/fy14osti/60412.pdf)
LBNL (http://emp.lbl.gov/sites/all/files/lbnl-6350e.pdf)(http://www1.eere.energy.gov/solar/pdfs/sunshot_webinar_20130226.pdf)

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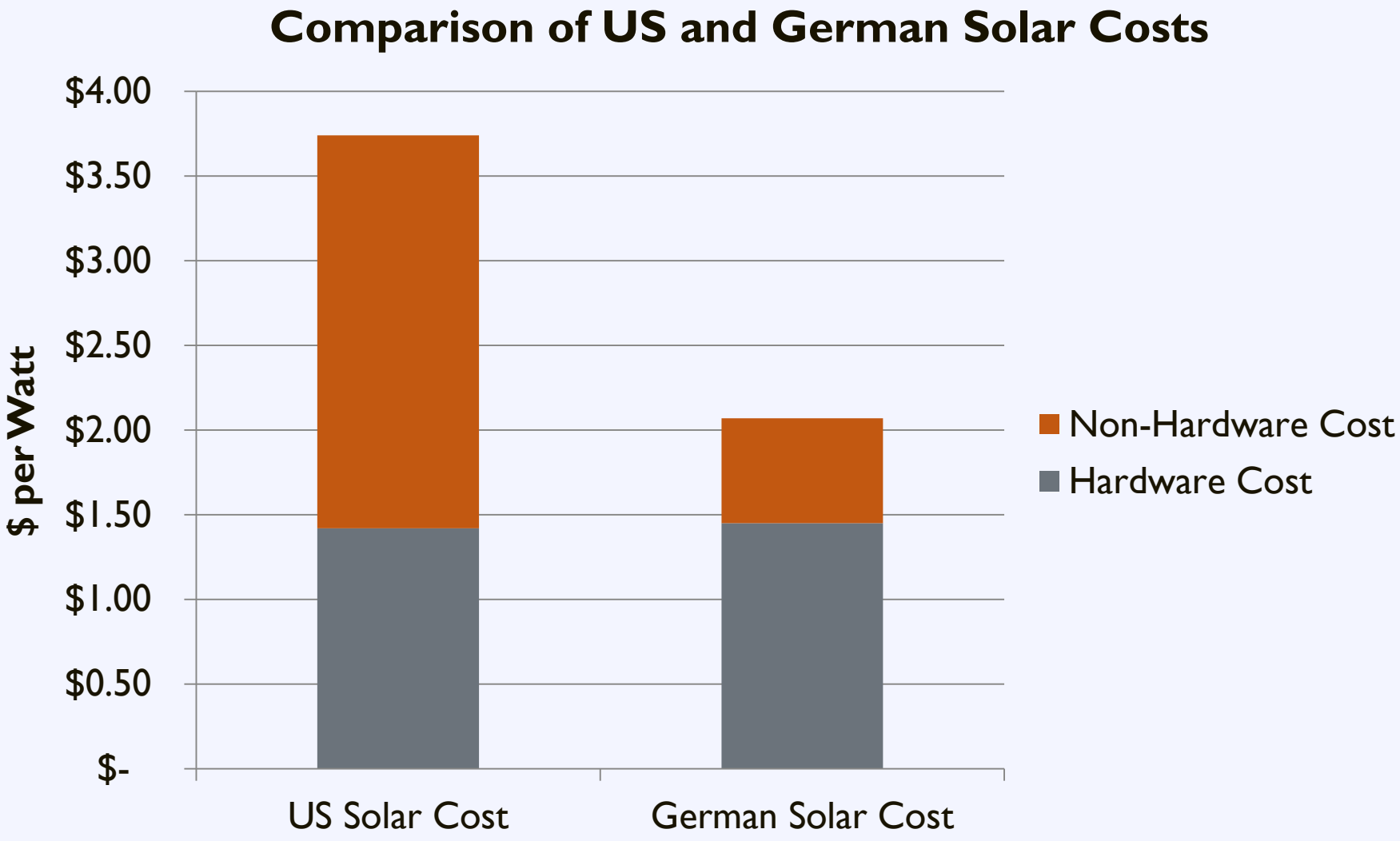

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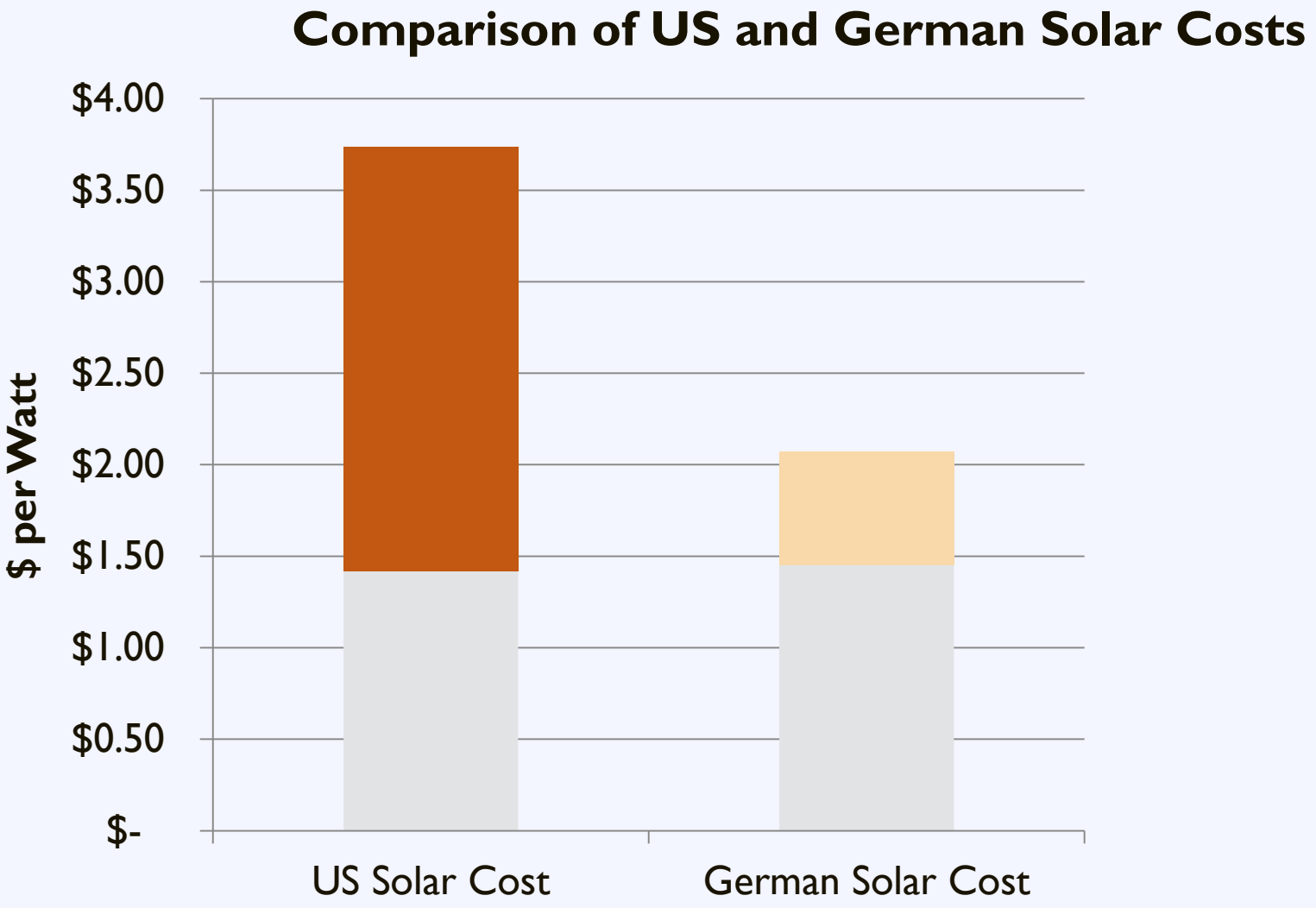

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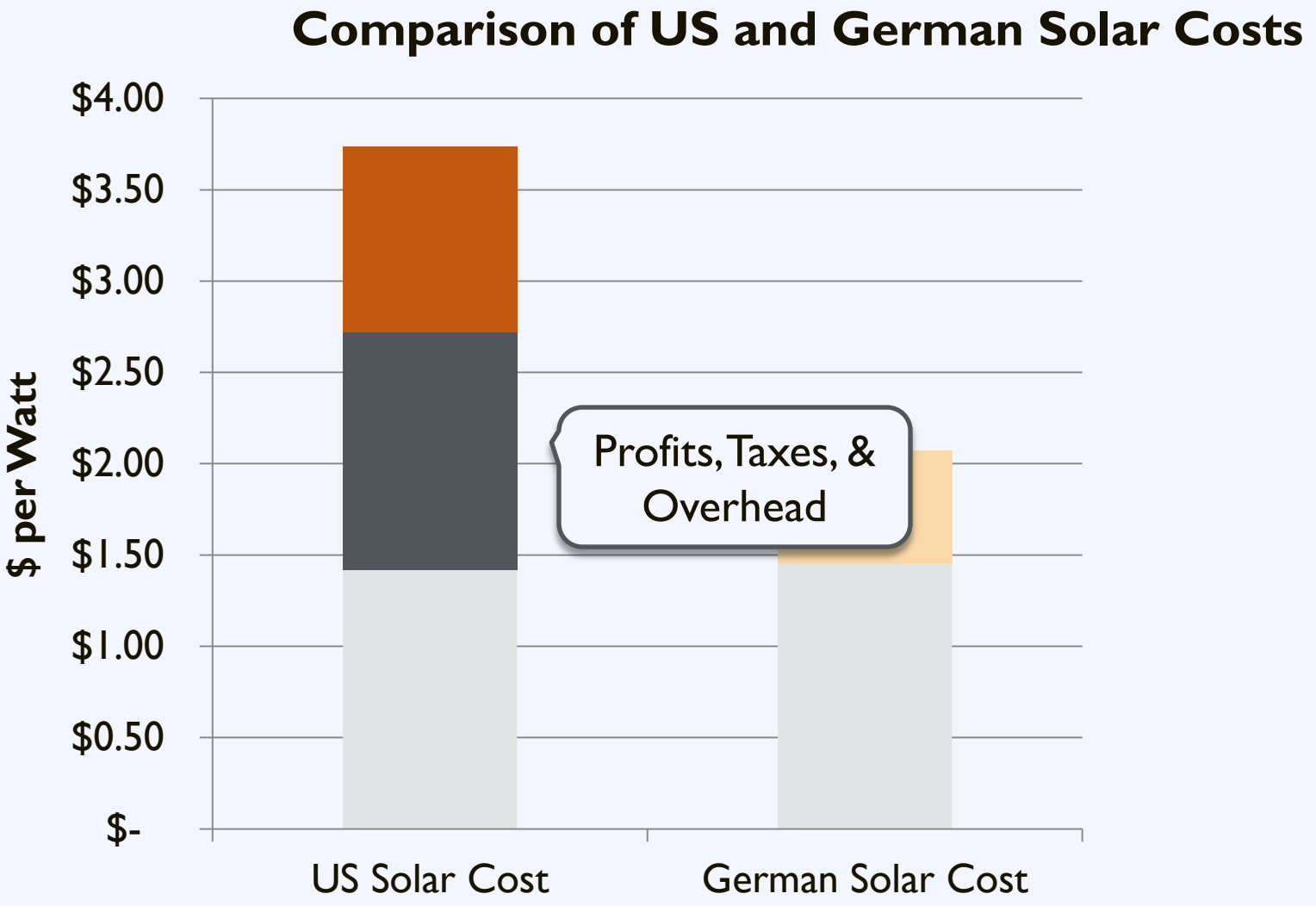

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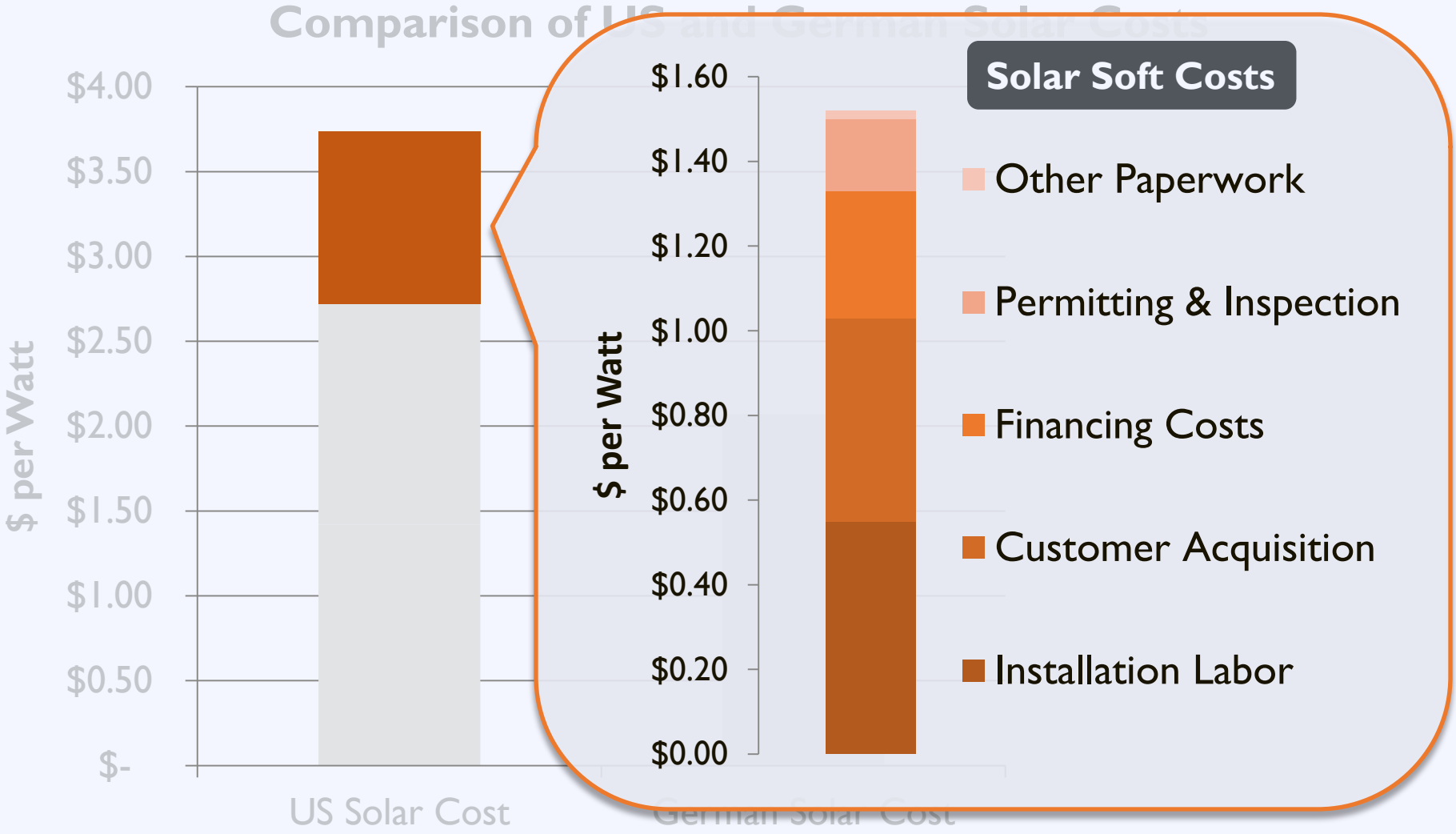

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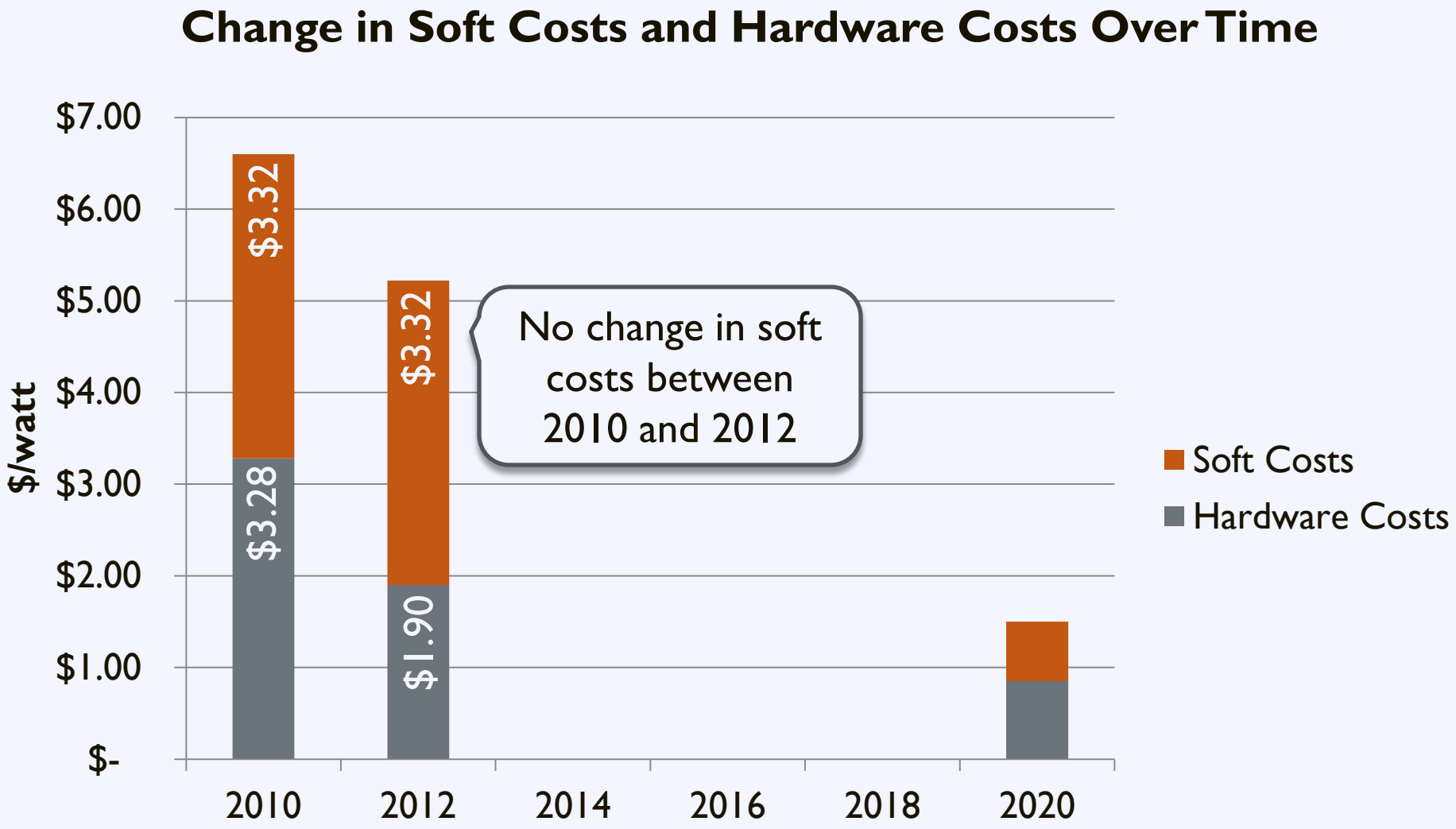

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Challenge: Inconsistency

18,000+ local jurisdictions

with unique zoning and permitting requirements

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

Consumer Challenges

Source: Forbes

Installer Challenges

One in three installers avoid working in certain jurisdictions because of permitting difficulties

24% of permit applications must be resubmitted

Installers encounter jurisdictions without defined solar permitting processes in **11% of jobs**

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Source: Clean Power Finance, Nationwide Solar Permitting Study (2012)

Challenge: Local Difference

In jurisdictions with strong permitting policies and procedures, solar customers save

$0.18/W ($700 for a 5 kW system)

compared to jurisdictions with weak permitting processes.

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

Challenge: Installation Time

New York City's Goal

100 days

from inception to completion

Germany Today

8 days

from inception to completion

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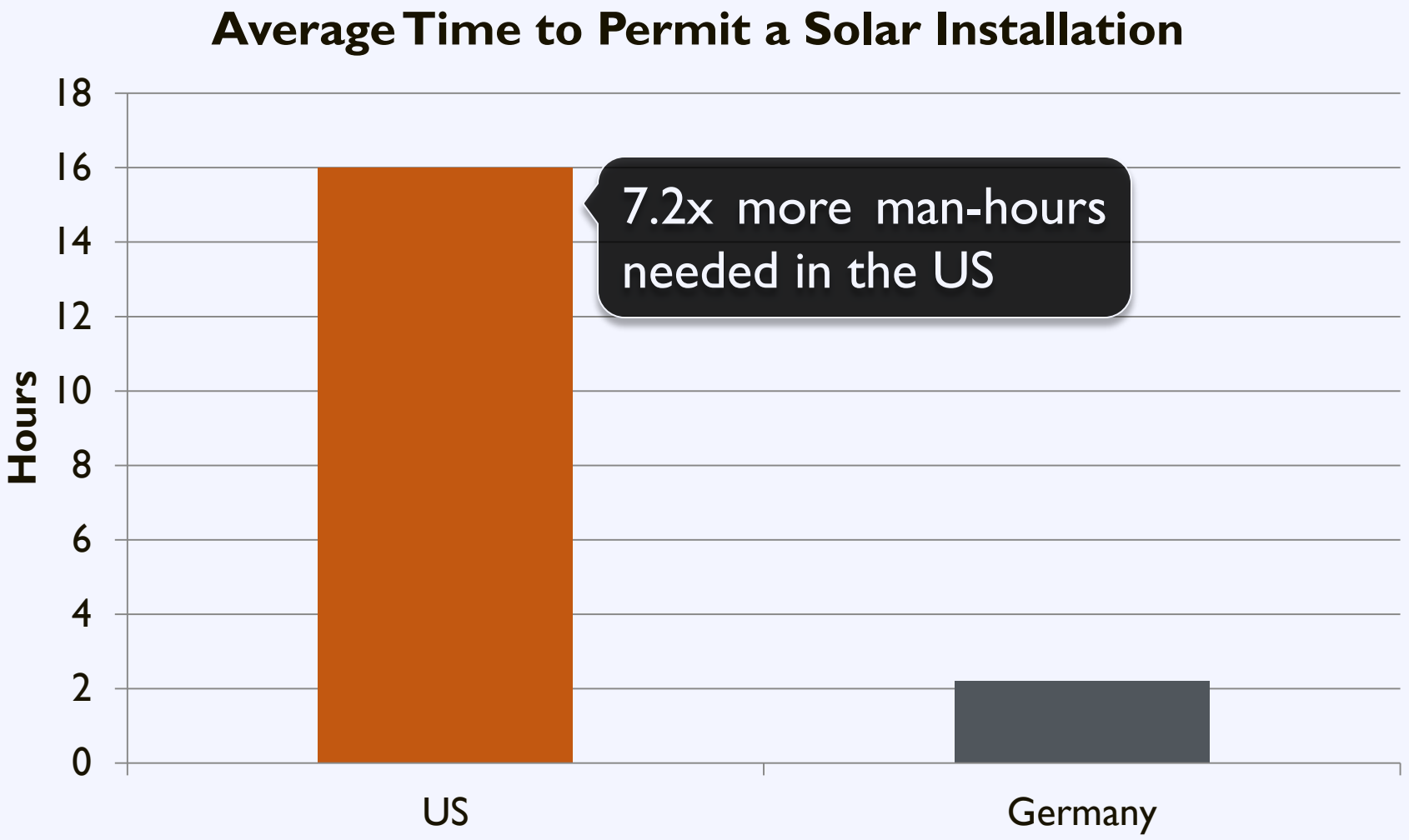
Photon Magazine

Time to Installation



Source: NREL, LBNL

Germany's Success

Consistency and Transparency

through

Standardized Processes

Morning Agenda: Permitting

Solar Markets and Technology

Permitting Best Practices

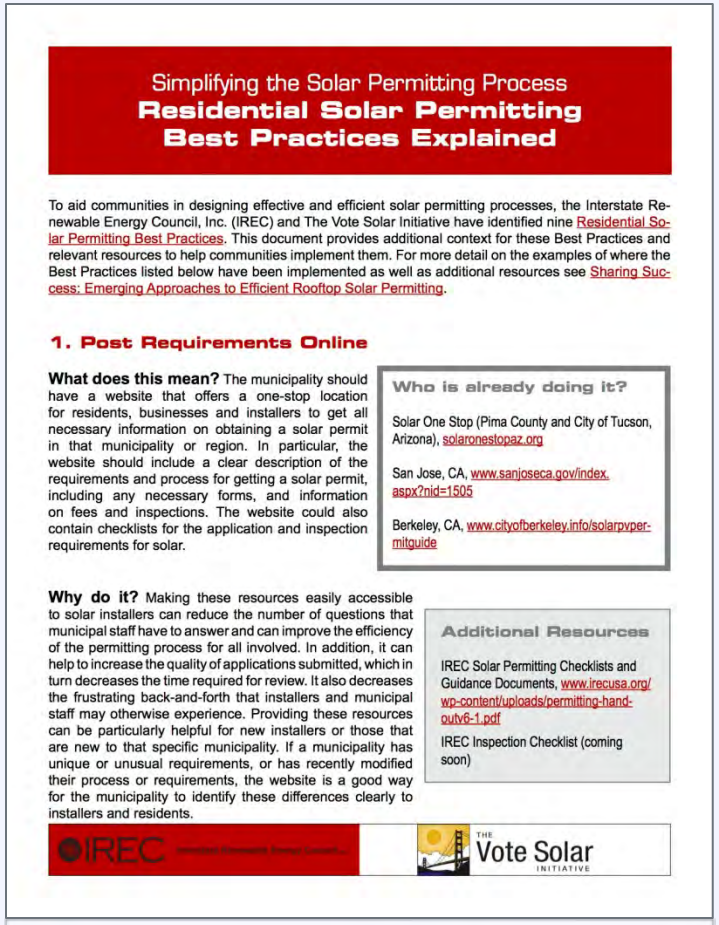
DVRPC Model Permitting Documents

Permitting Best Practices

I. Pre-Application

II. Application Submittal & Review

III. Inspections



Simplifying the Solar Permitting Process

Residential Solar Permitting Best Practices Explained

To aid communities in designing effective and efficient solar permitting processes, the Interstate Renewable Energy Council, Inc. (IREC) and The Vote Solar Initiative have identified nine Residential Solar Permitting Best Practices. This document provides additional context for these Best Practices and relevant resources to help communities implement them. For more detail on the examples of where the Best Practices listed below have been implemented as well as additional resources see Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting.

1. Post Requirements Online

What does this mean? The municipality should have a website that offers a one-stop location for residents, businesses and installers to get all necessary information on obtaining a solar permit in that municipality or region. In particular, the website should include a clear description of the requirements and process for getting a solar permit, including any necessary forms, and information on fees and inspections. The website could also contain checklists for the application and inspection requirements for solar.

Who is already doing it?

Solar One Stop (Pima County and City of Tucson, Arizona), solaronestopaz.org

San Jose, CA, www.sanjoseca.gov/index.aspx?nid=1505

Berkeley, CA, www.cityofberkeley.info/solarpvpermitguide

Why do it? Making these resources easily accessible to solar installers can reduce the number of questions that municipal staff have to answer and can improve the efficiency of the permitting process for all involved. In addition, it can help to increase the quality of applications submitted, which in turn decreases the time required for review. It also decreases the frustrating back-and-forth that installers and municipal staff may otherwise experience. Providing these resources can be particularly helpful for new installers or those that are new to that specific municipality. If a municipality has unique or unusual requirements, or has recently modified their process or requirements, the website is a good way for the municipality to identify these differences clearly to installers and residents.

Additional Resources

IREC Solar Permitting Checklists and Guidance Documents, www.irecusa.org/wp-content/uploads/permitting-hand-outv6-1.pdf

IREC Inspection Checklist (coming soon)

IREC

THE Vote Solar INITIATIVE

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Permitting Best Practices

I. Pre-Application

II. Application Submittal & Review

III. Inspections

1. Post Permitting Requirements Online
2. Implement an Streamlined Permit Process for Qualified Systems
3. Enable Online Permit Processing
4. Ensure a Fast Turn Around Time
5. Collect Reasonable Permitting Fees
6. Do Not Require Community-Specific License
7. Offer a Narrow Inspection Appointment Window
8. Eliminate Excessive Inspections
9. Train Permitting Staff in Solar

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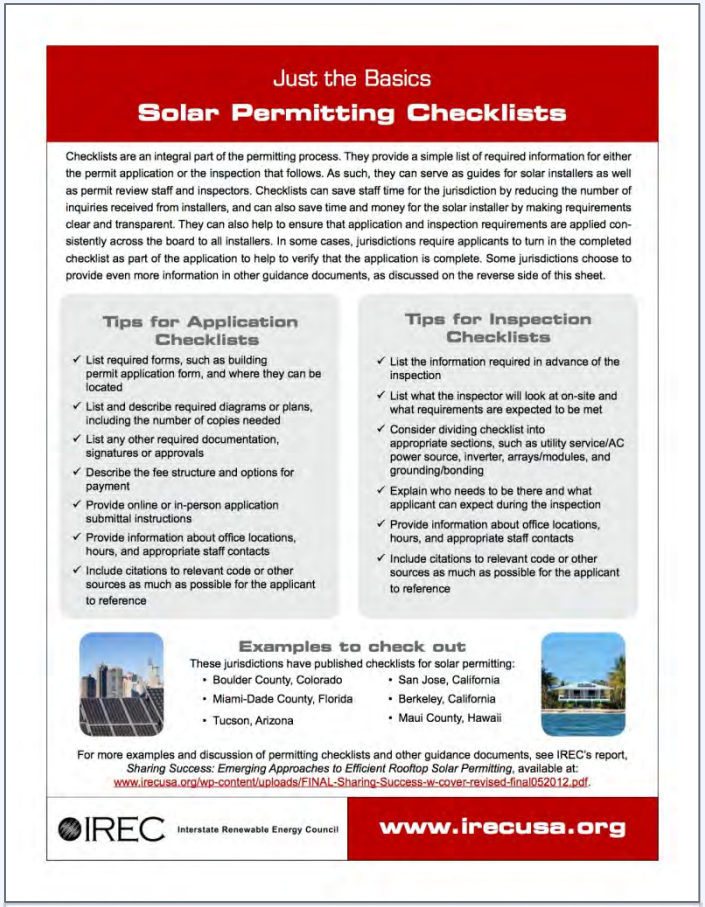
Pre-Application Materials

Resource **IREC Solar Permitting Checklist Basics**

Why do it?

- Minimize installer confusion and questions
- Increase rate of correct and complete applications
- Manage installer and owner expectations
- Get everyone on the same page



Just the Basics

Solar Permitting Checklists

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Tips for Application Checklists

- ✓ List required forms, such as building permit application form, and where they can be located
- ✓ List and describe required diagrams or plans, including the number of copies needed
- ✓ List any other required documentation, signatures or approvals
- ✓ Describe the fee structure and options for payment
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Examples to check out

These jurisdictions have published checklists for solar permitting:

- Boulder County, Colorado
- Miami-Dade County, Florida
- Tucson, Arizona
- San Jose, California
- Berkeley, California
- Maui County, Hawaii

For more examples and discussion of permitting checklists and other guidance documents, see IREC's report, *Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting*, available at: www.irecusa.org/wp-content/uploads/FINAL-Sharing-Success-w-cover-revised-final052012.pdf.

IREC Interstate Renewable Energy Council www.irecusa.org

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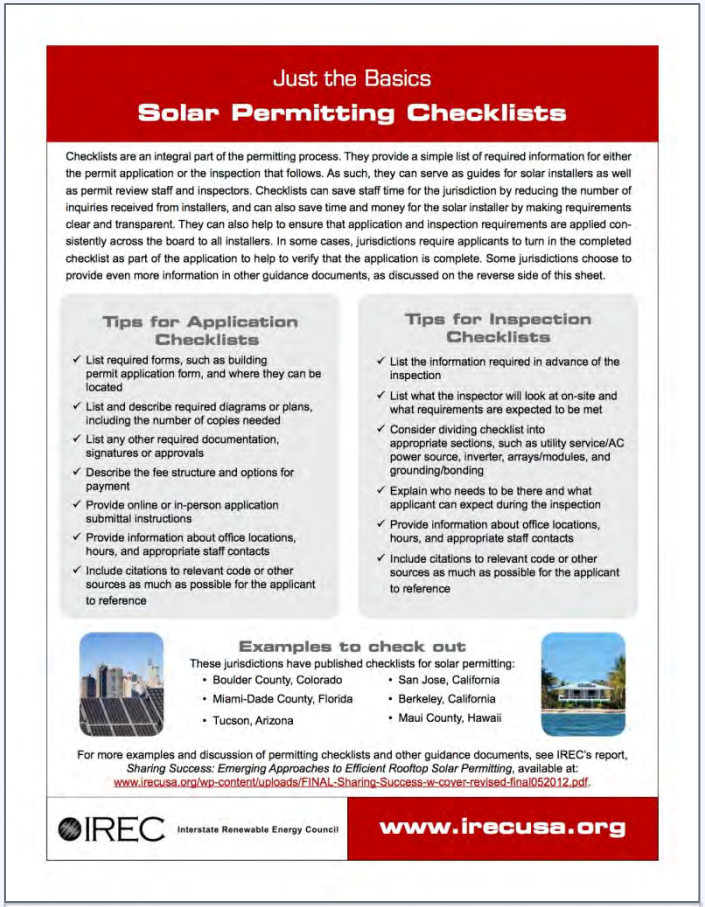
Pre-Application Materials

Resource **IREC Solar Permitting Checklist Basics**

What to do?

- Assemble all necessary solar permits
- Centralize online on dedicated solar permitting landing page
- Publish checklist explaining required permit steps



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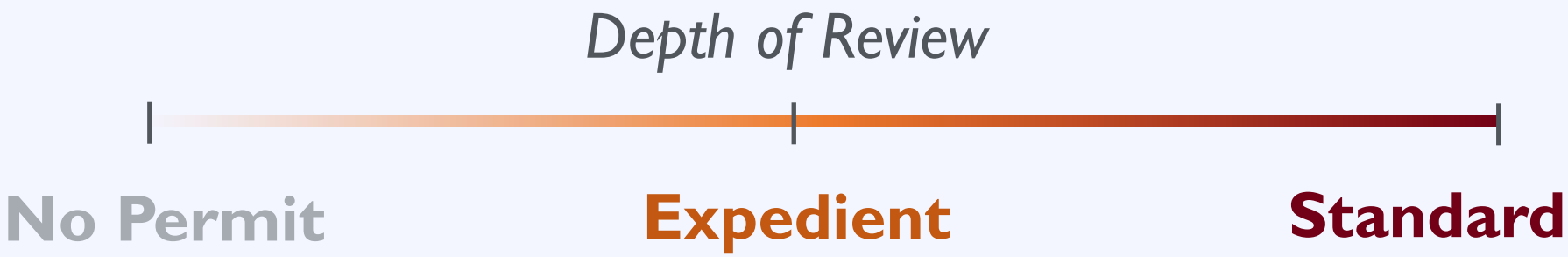
Expedited Review



Expedited Review

Depth of Review

Expedient	**Expedient**	**Standard**
Within established design parameters		Outside of established design parameters
Impacts are well understood		Review necessary to understand impacts
Quick, Easy, Cheap		Flexible

Expedited Review

Depth of Review

Expedient

Within established design parameters

Standard

Outside of established design parameters

1-1. Example Design Criteria:

- Size < 10-15 kW
- Code compliant
- Weight < 5 lb / sqft
- 4 strings or less

Review necessary to understand impacts

Flexible

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Expedited Permitting Process

Resource **Solar America Board for Codes & Standards**

Expedited Permitting:

- Simplifies requirements for PV applications
- Facilitates efficient review
- Minimizes need for detailed studies and unnecessary delays

Expedited Permitting Process

Resource **Solar America Board for Codes & Standards**

Permitting Checklist:

- Quickly identifies simple PV installations where simplified permitting is appropriate
- Estimated 50% - 75% of projects comply with Solar ABCs criteria

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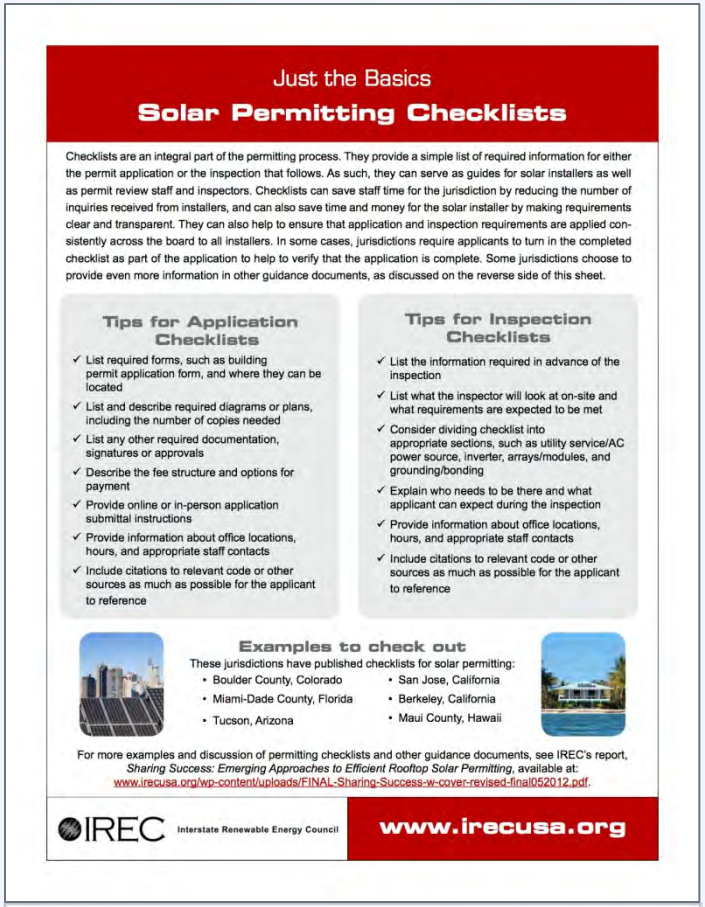
Online Permitting

Resource **IREC Solar Permitting Checklist Basics**

Why do it?

- Avoid installer office visits
- Data standardization and validation
- Integration with fee payment and inspection scheduling process



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Examples to check out

These jurisdictions have published checklists for solar permitting:

- Boulder County, Colorado
- Miami-Dade County, Florida
- Tucson, Arizona
- San Jose, California
- Berkeley, California
- Maui County, Hawaii

For more examples and discussion of permitting checklists and other guidance documents, see IREC's report, *Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting*, available at: www.irecusa.org/wp-content/uploads/FINAL-Sharing-Success-w-cover-revised-final052012.pdf.

IREC Interstate Renewable Energy Council www.irecusa.org

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Online Permitting

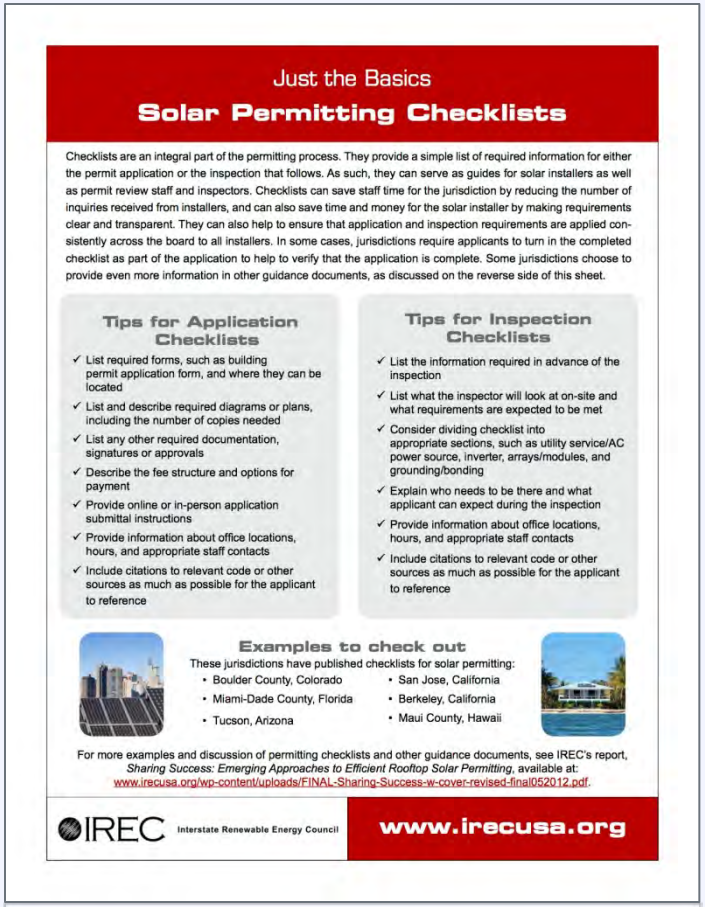
Resource **IREC Solar Permitting Checklist Basics**

Quick and Easy

- Dedicated email address for solar permit submission

Comprehensive

- Fully online permitting application



Just the Basics

Solar Permitting Checklists

Checklists are an integral part of the permitting process. They provide a simple list of required information for either the permit application or the inspection that follows. As such, they can serve as guides for solar installers as well as permit review staff and inspectors. Checklists can save staff time for the jurisdiction by reducing the number of inquiries received from installers, and can also save time and money for the solar installer by making requirements clear and transparent. They can also help to ensure that application and inspection requirements are applied consistently across the board to all installers. In some cases, jurisdictions require applicants to turn in the completed checklist as part of the application to help to verify that the application is complete. Some jurisdictions choose to provide even more information in other guidance documents, as discussed on the reverse side of this sheet.

Tips for Application Checklists

- ✓ List required forms, such as building permit application form, and where they can be located
- ✓ List and describe required diagrams or plans, including the number of copies needed
- ✓ List any other required documentation, signatures or approvals
- ✓ Describe the fee structure and options for payment
- ✓ Provide online or in-person application submittal instructions
- ✓ Provide information about office locations, hours, and appropriate staff contacts
- ✓ Include citations to relevant code or other sources as much as possible for the applicant to reference

Tips for Inspection Checklists

- ✓ List the information required in advance of the inspection
- ✓ List what the inspector will look at on-site and what requirements are expected to be met
- ✓ Consider dividing checklist into appropriate sections, such as utility service/AC power source, inverter, arrays/modules, and grounding/bonding
- ✓ Explain who needs to be there and what applicant can expect during the inspection
- ✓ Provide information about office locations, hours, and appropriate staff contacts
- ✓ Include citations to relevant code or other sources as much as possible for the applicant to reference

Examples to check out

These jurisdictions have published checklists for solar permitting:

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Permitting Best Practices

I. Pre-Application

II. Application Submittal & Review

III. Inspections

1. Post Permitting Requirements Online
2. Implement an Streamlined Permit Process for Qualified Systems
3. Enable Online Permit Processing
4. Ensure a Fast Turn Around Time
5. Collect Reasonable Permitting Fees
6. Do Not Require Community-Specific License
7. Offer a Narrow Inspection Appointment Window
8. Eliminate Excessive Inspections
9. Train Permitting Staff in Solar

Fast Turn Around Time

Best Practice

- Coupled with electronic submission
- Over-the-Counter or Same-Day review for streamlined projects

Next Best Thing

- Only one in-person visit needed

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Permit Fees

Best Practice

- Levy permit fees to pay for necessary staff time, not as a revenue source, and not based on system cost
- **Residential Permits:** Flat and fair fixed fee
- **Commercial Permits:** Fee calculator based on staff time

Residential Permits: Flat Fees

Fee = (Est. Staff Time x Rate) + Additional Review

Residential Permits: Flat Fees

Fee = (Est. Staff Time x Rate) + Additional Review

Cover costs 80% of the time for review and inspection. Allow for one minor correction review.

Residential Permits: Flat Fees

Fee = (Est. Staff Time x Rate) + Additional Review

Additional reviews or inspections incur additional fees

Commercial Permits: Fee Calculator

Fee = (Plan Review Hours + Inspection Hours)
x Rate + Issuance Fee

Commercial Permits: Fee Calculator

Hours spent on:

- Electrical Plan Review
- Structural Plan Review
- Fire Review
- Planning Review
- Clerical Time

Fee = (Plan Review Hours + Inspection Hours) x Rate + Issuance Fee

Commercial Permits: Fee Calculator

Hours spent inspecting:

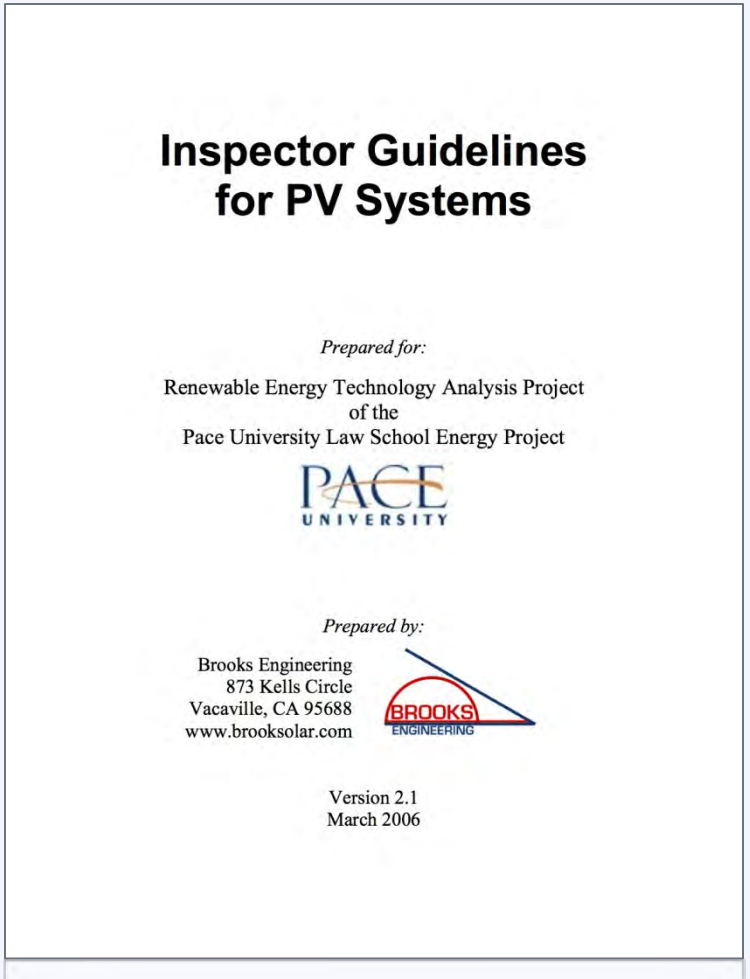
- Building attachment
- Building racking
- Electrical work
- Fire safety

Fee = (Plan Review Hours + Inspection Hours) x Rate + Issuance Fee

What's an Appropriate Fee?

One of Many Suggestions:

- **Systems under 4 kW:**
  $75 – $200
- **Systems 4 kW – 10 kW:**
  $150 – $400
- **Systems over 10 kW:**
  $15/kW – $40/kW



Inspector Guidelines for PV Systems

Prepared for:

Renewable Energy Technology Analysis Project
of the
Pace University Law School Energy Project

PACE UNIVERSITY

Prepared by:

Brooks Engineering
873 Kells Circle
Vacaville, CA 95688
www.brooksolar.com

BROOKS ENGINEERING

Version 2.1
March 2006

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Contractor Licensing

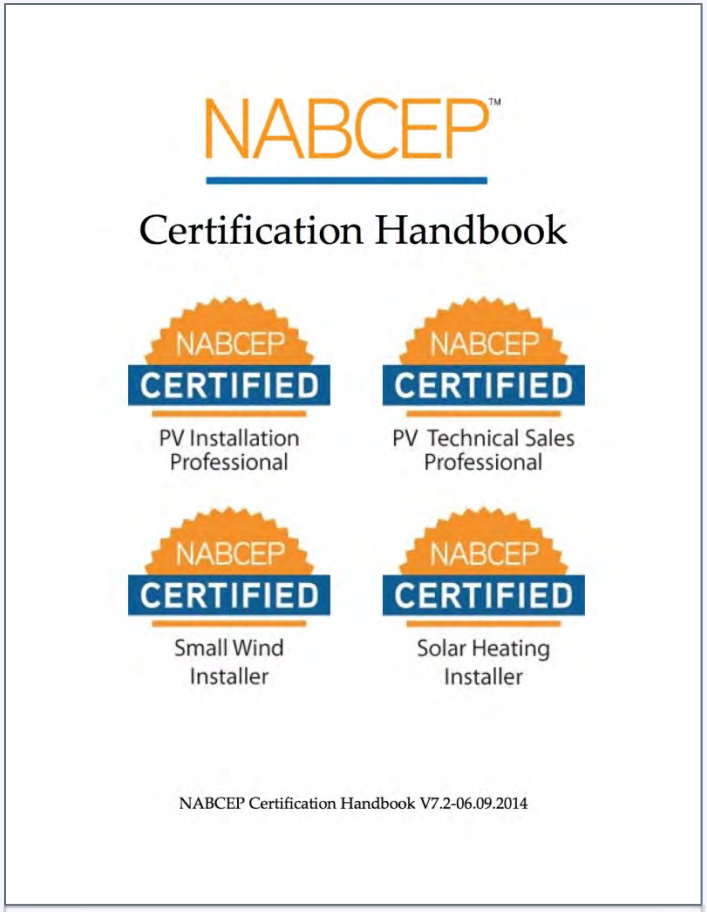
Best Practices

- Use existing national standard (e.g. NABCEP) for contractor licensing requirements
- Provide list of approved contractors to reduce customer anxiety and confusion

Contractor Licensing

NABCEP Certification

- Best practice standard for PV installer certification, recommended by IREC
- Qualifications
  - 58 hours PV training
  - 10 hours OSHA training
  - Mix of educational and professional experiences



Contractor Licensing

Expedited Permitting for Pre-Qualified Installers

- Based on NABCEP or other certification and successful local record
- **Connecticut:** Provides public list of local installers meeting certain criteria
- **Portland, Oregon:** Approved installers qualify for expedited online approval

Permitting Best Practices

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Inspection Window

Best Practice

- Provide contractor with specific inspection time
- Inspector calls contractor when en route to site

Next Best Thing

- Provide a two-hour inspection window

Permitting Best Practices

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Eliminate Excessive Inspections

Best Practice

- Required only one inspection for standard, streamlined projects
- Conduct electrical, structural, and fire safety inspections as one
- Eliminate rough or in-process inspections
- Where possible, coordinate with utility interconnection

Permitting Best Practices

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Train Municipal Staff in Solar

Best Practice

- Offer special trainings to municipal staff
  - **New York:** NYSERDA PV Trainers Network

    (trainings for code officials, inspectors, engineers & first responders)
  - **Solar Instructor Training Network**

    (Regional Training Partner at Penn State University)

Next Best Thing

- Free online training by IREC at www.pvonlinetraining.org/

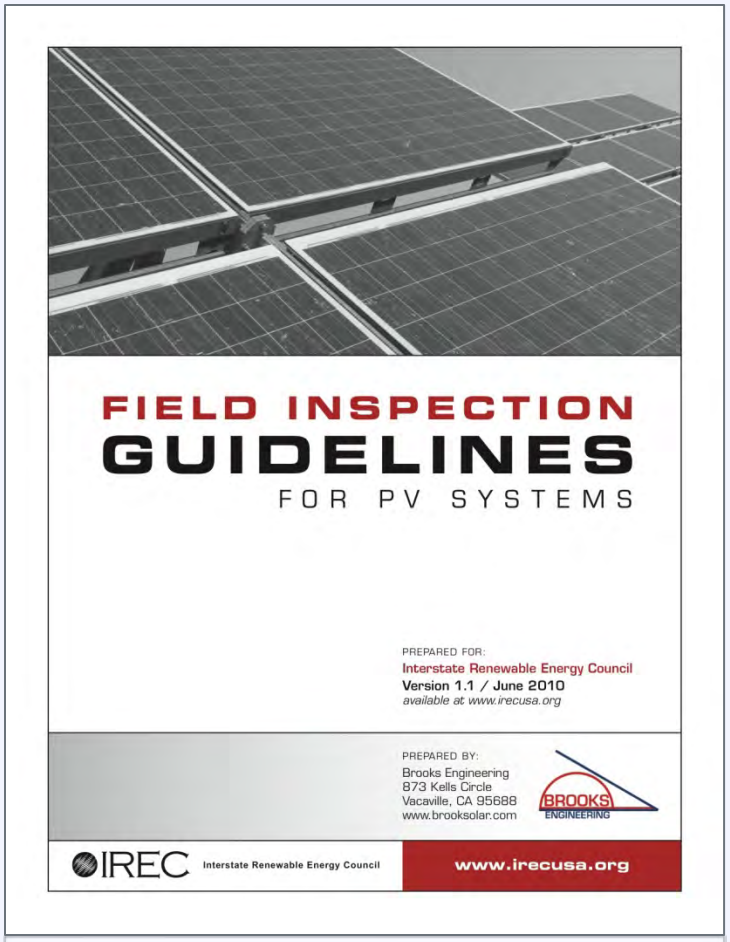
Train Municipal Staff in Solar

Resource **IREC Field Inspection Guidelines**

Provides detailed recommended approach for PV inspection

Notes common installer mistakes and items of note

www.irecusa.org



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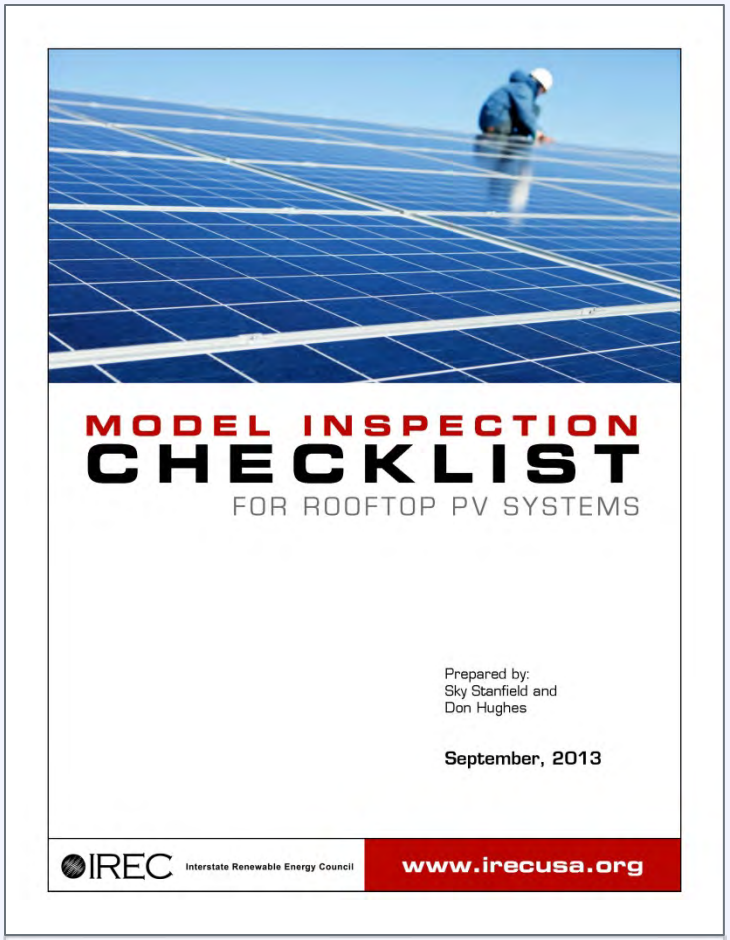
Inspection Checklist

Resource **IREC Model Inspection Checklist**

Why adopt a checklist?

- Provides clarity to inspectors and installers
- Ensures consistency in installation and inspection processes
- Can easily be updated as code requirements change over time

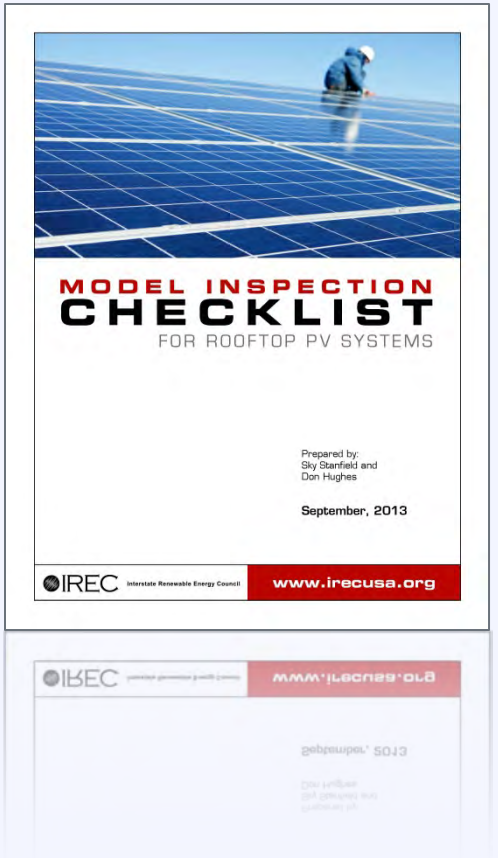
www.irecusa.org



Model Inspection Checklist

Inspection Elements

1. PV Array Configuration
2. Grounding
3. Wire Management
4. Conductors
5. Overcurrent Protection
6. Electrical Connections
7. Charge Controllers
8. Disconnects
9. Inverters
10. Batteries
11. Signs and Labels
12. Fire Safety



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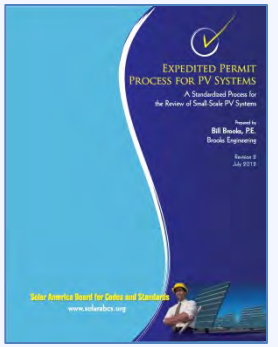
Permitting Resources

Solar ABCs

www.solarabcs.org

Expedited Permit Process for PV Systems



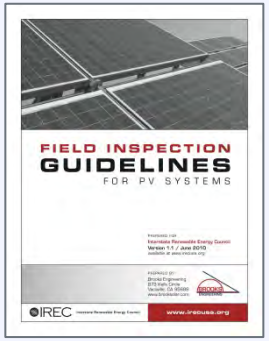
IREC

www.irecusa.org

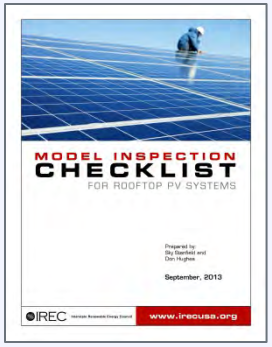
Residential Solar Permitting Best Practices Explained

Solar Permitting Checklists

Field Inspection Guidelines for PV Systems



Model Inspection Checklist for Rooftop PV Systems



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Morning Agenda: Permitting

Solar Markets and Technology

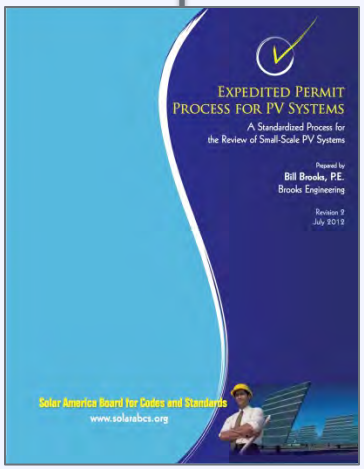
Permitting Best Practices

DVRPC Model Permitting Documents

Existing Resources

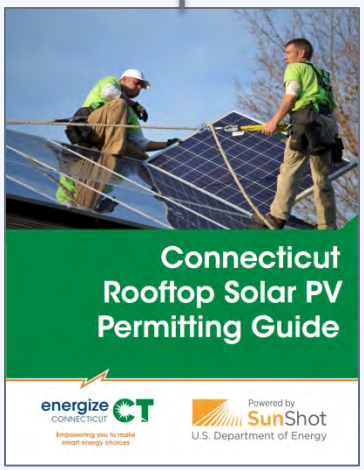
Solar America Board of Codes & Standards

Expedited Permitting Guide



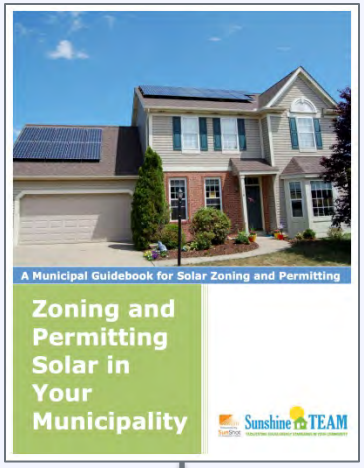
EnergizeCT

Rooftop Solar Permitting Guide



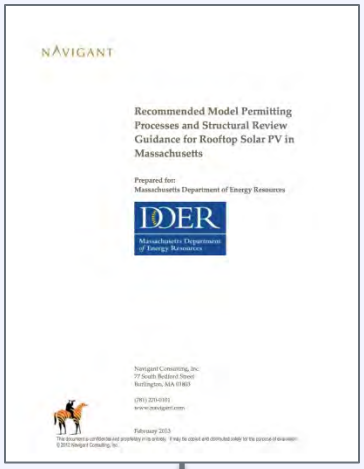
PennFuture

Zoning and Permitting Guidebook



Massachusetts DOER

Model Permitting and Structural Review Process



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DVRPC Solar Permitting Guide

Recommended Submissions

1. Existing Building or Electrical Permit
2. Additional Solar Information
3. Site Plan
4. Electrical Diagram
5. Equipment Spec Sheets
6. Attachment Details

Local Government Decision Points

1. Streamlined Permitting Process for certain systems?
2. Prescriptive Structural Review for certain systems?

Recommended Submissions

Additional Solar Information

Applicant & Site Information

- System description
- Owner and Installer contact information
- Installer qualifications *(NABCEP, UL, etc)*
- Building Type, Height, permit status

(rooftop systems only)

Recommended Submissions

Additional Solar Information

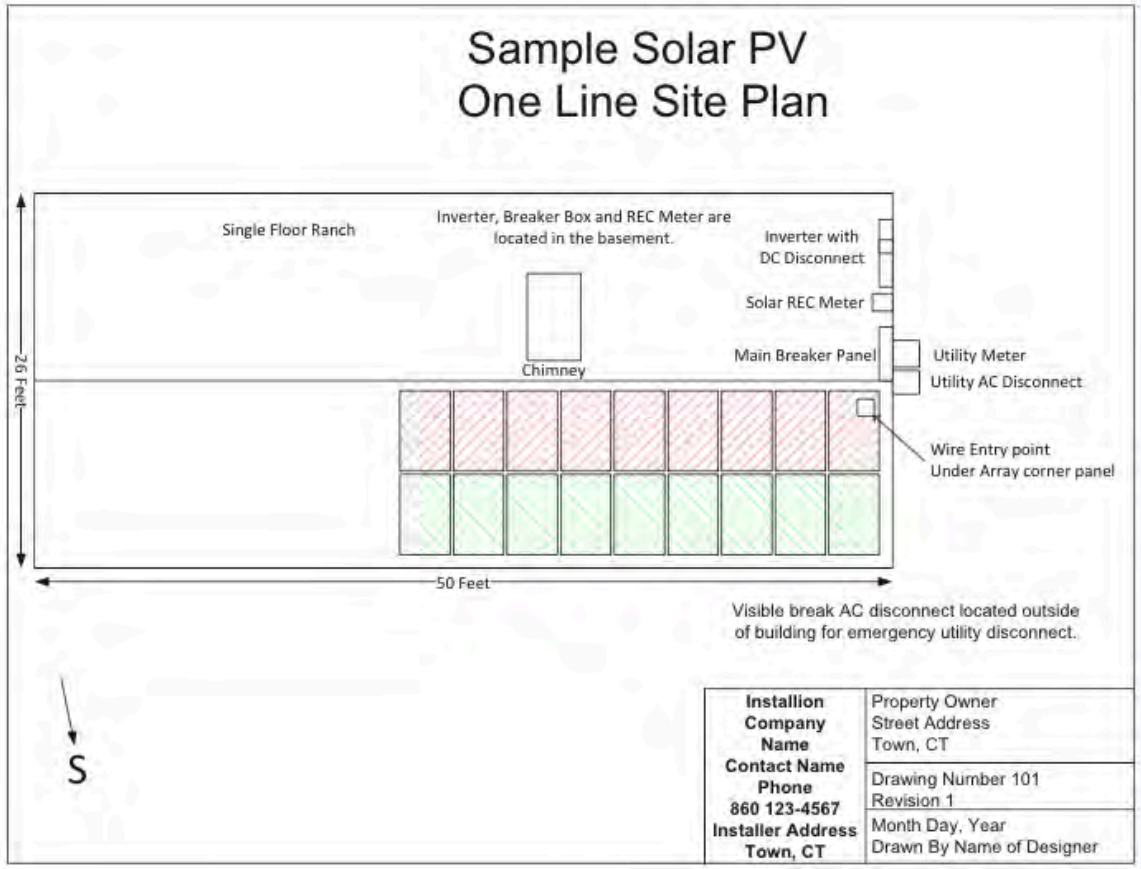
Electrical Information

- Electrical service size and type
- Main breaker amperage & change (if needed)
- Bus bar amperage
- Type of interconnect (load-side or supply-side)
- Location of electrical panel
- If load-side connection with subpanel intertie, subpanel bus bar amperage and breaker value

Recommended Submissions

Site Plan

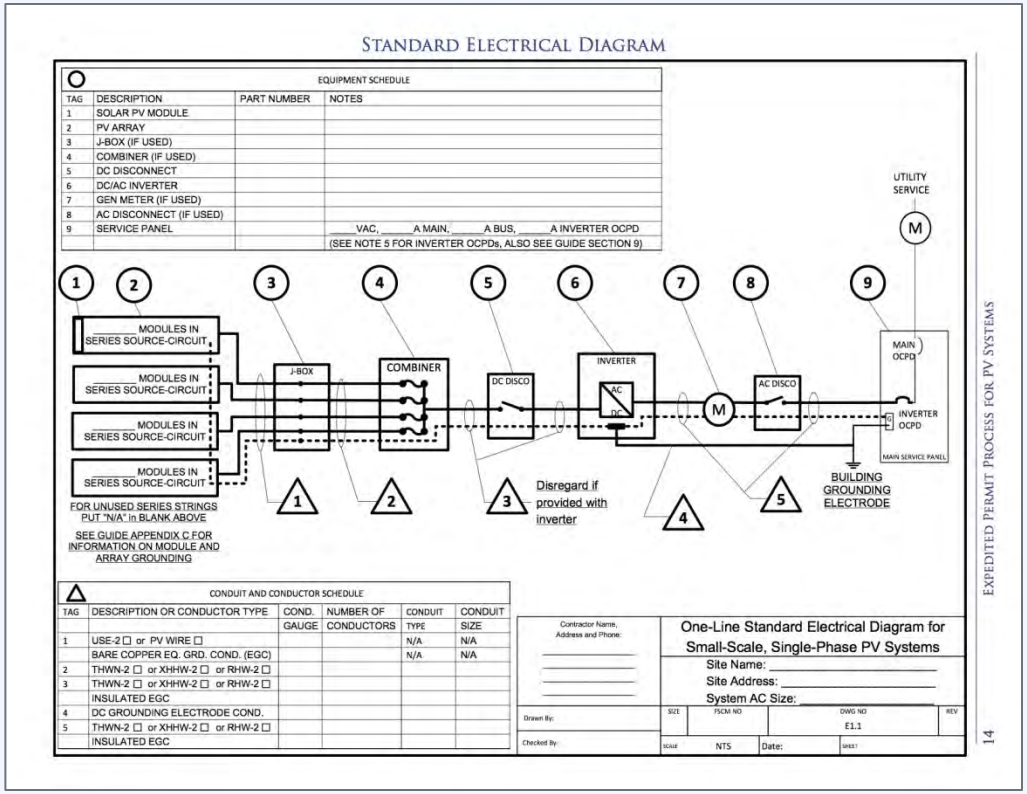
- Simple diagram
- Identify system components and location on site, as well as any setbacks
- Doesn't need to be to scale



Recommended Submissions

Electrical Diagram

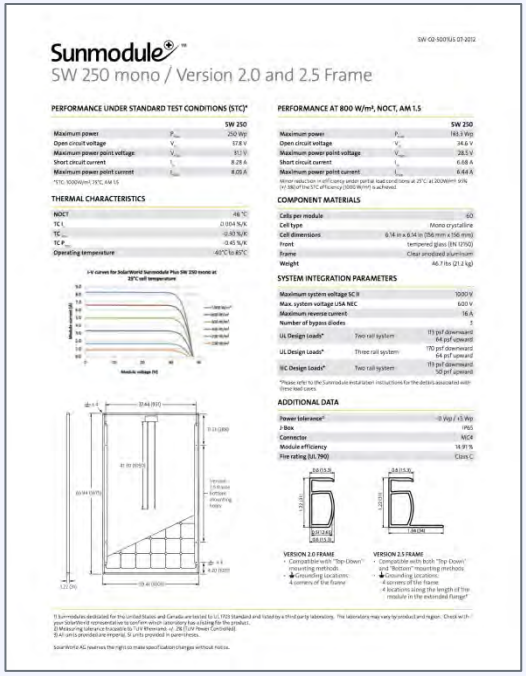
- Standard Templates and notes provided
  - Standard system
  - Micro-inverters
  - AC module
  - Supply-side connection
- Intended to apply to majority of residential PV projects



Recommended Submissions

Spec Sheets

- Provide at least for inverter and module
- Make & model
- Voltage, overcurrent, other relevant specifications



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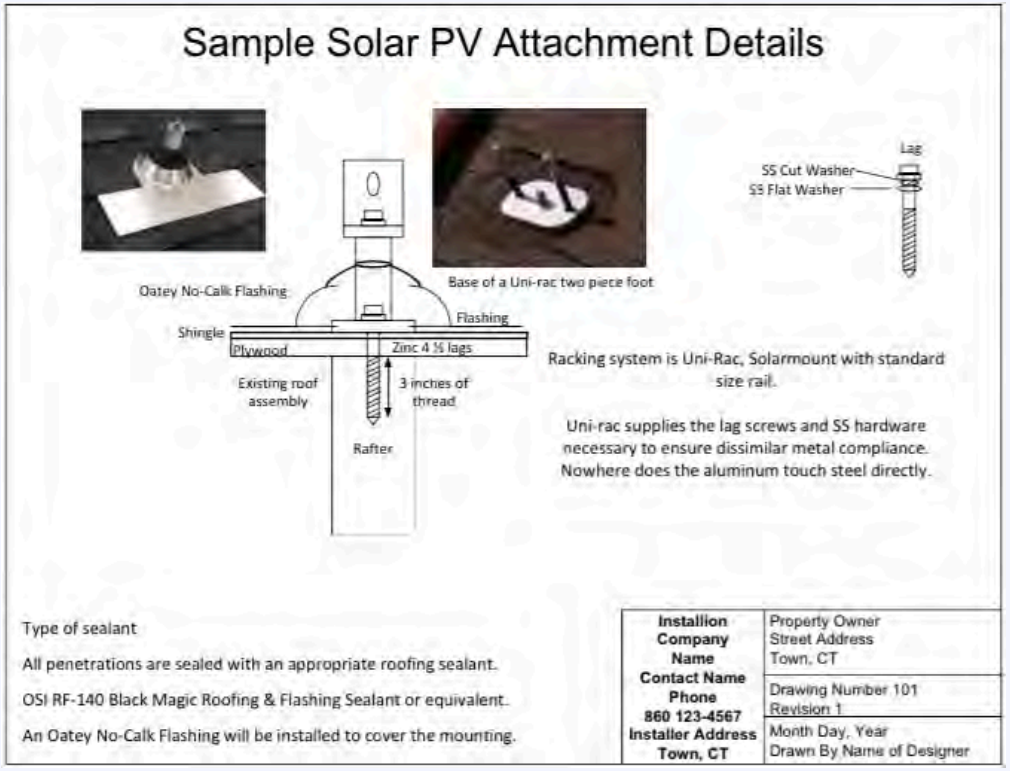
Recommended Submissions

Mounting Details

(Roof Systems)

- Racking System (make, model, type)
- Flashing description
- Fastener detail
- Treatment of dissimilar metals



Recommended Submissions

Mounting Details

(Ground Systems)

- Racking System (make, model, type) & Spec Sheets
- Manufacturer's Pre-Engineered Document or PE Stamp
- Code Compliance Manual (optional)
- Distance to interconnection point
- Grounding details
- Height of system
- Relevant zoning information (e.g. setback)

Streamlined Permitting Process

1. Use a checklist to identify simple projects
2. For these projects, offer simple permitting process requiring minimal effort
3. For complex projects that don't pass the checklist, conduct standard in-depth permit review

Streamlined Permitting Process

Simplified Solar Checklist and Permit for the (City/Town/Other) of _____

Section 1. Timeline, Fees, and Submission

This application may be submitted via email to _____. It may also be submitted in person at _____. The fee for application processing is $**XX**, due at time of submission and payable via _____.

Permit determinations will be issued within __ days of receipt of a complete application and fee. Notice of an incomplete application will be provided within __ days of receipt. If an inspection is required, it will be scheduled within __ days of inspection request.

Section 2. Streamlined Permit Eligibility Checklist

Verify that the proposed installation complies with each item in the eligibility checklist below. If the installation does not comply with any item, the project cannot be permitted under this streamlined process and must be permitted through the (City/Town/Other) of _____'s standard permitting process. Any violations identified in the inspection process must be addressed and are subject to penalty.

☐ 1. CONTRACTOR REQUIREMENTS
The contractor performing the solar installation holds the necessary licenses and permits to perform this work in this jurisdiction, including *(list specific licensing requirements in jurisdiction)*.

☐ 2. MAXIMUM CAPACITY
The capacity of the proposed PV project is less than 10 KW.

☐ 3. PROJECT LOCATION
The proposed PV project will be a rooftop system.

☐ 4. PROJECT CODE COMPLIANCE
The structure that the proposed project will be mounted on is code-compliant and the proposed solar installation is compliant with all relevant fire and electrical codes, including setback requirements

☐ 5. ZONING VARIANCE
The proposed solar installation will not require a zoning variance.

☐ 6. EQUIPMENT STANDARDS
The proposed equipment meets all relevant certification standards.

☐ 7. WEIGHT LIMIT
The system will have a distributed weight of less than 5 pounds per square foot and less than 45 pounds per attachment point to roof.

☐ 7. MODULE TILT
To mitigate wind loads, the proposed system will be mounted flush against the roof surface or tilted with no more than an 18 inch gap between the module frame and the roof surface.

☐ 8. ELECTRICAL CONNECTION
The proposed solar installation is composed of 4 series strings or less.

☐ 9. HISTORIC/ARCHITECTURAL REVIEW
The proposed solar installation is not located on a building subject to historic or architectural review.

Streamlined Permitting Process

Simplified Solar Checklist and Permit for the (City/Town/Other) of _____

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Streamlined Permitting Process

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Streamlined Permitting Process

Section 3. Streamlines Permit Application

1. SITE OWNER INFORMATION

Site Owner Contact Information

Name: _____ Phone: _____ Email: _____

Site Address

Street: _____ City: _____ Zipcode: _____

Parcel ID: _____

2. SITE INFORMATION

Building Type: ☐ Residential ☐ Commercial Number of floors: _____

Roofing Material: _____

Weatherproofing Method: _____

3. CONTRACTOR INFORMATION

Contractor Contact Information

Company Name: _____ Phone: _____ Email: _____

Business Address

Street: _____ City: _____ Zipcode: _____

License #: _____

Streamlined Permitting Process

4. SOL AR SYSTEM INFORMATION

Module Information

Quantity: ___ Manufacturer: _____ Model: _____

Inverter Information

Quantity: ___ Manufacturer: _____ Model: _____

Mounting System Information

Manufacturer: _____ Model: _____

Is the mounting system an engineered product designed to mount solar panels?

□ Yes □ No (provide structural attachment details in a letter certified by a design professiona

System Weight/Arrangement

Total weight of module and rails (lbs): _____

Number of Attachment Points: _____ Weight per attachment point (lbs): _____

Maximum spacing between attachment points (inches): _____

Total surface areas of modules (sqft): _____ Module weight per sqft (lbs): _____

Streamlined Permitting Process

5. SITE PLAN

Provide a site plan showing the location of solar system components and other equipment on structure (including, but not limited to, the solar array with orientation and tilt noted, electrical service connection, utility meter, and inverter).

6. ELECTRICAL DIAGRAM

Provide an electrical diagram showing PV array configuration, wiring system, overcurrent protect inverter, disconnects, required signs, and ac connection to building.

7. MANUFACTURER SPEC SHEETS

Provide manufacturer spec sheets for all system components.

Streamlined Permitting Process

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☐ 4. PROJECT CODE COMPLIANCE
The structure that the proposed project will be mounted on is code-compliant and the proposed solar installation is compliant with all relevant fire and electrical codes, including setback requirements

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☐ 8. ELECTRICAL CONNECTION
The proposed solar installation is composed of 4 series strings or less.

☐ 9. HISTORIC/ARCHITECTURAL REVIEW
The proposed solar installation is not located on a building subject to historic or architectural review.

Prescriptive Structural Review

1. Determine whether wet stamps should be used for all, some, or no projects
2. If allowing prescriptive review for some projects, create eligibility checklist

Prescriptive Structural Review

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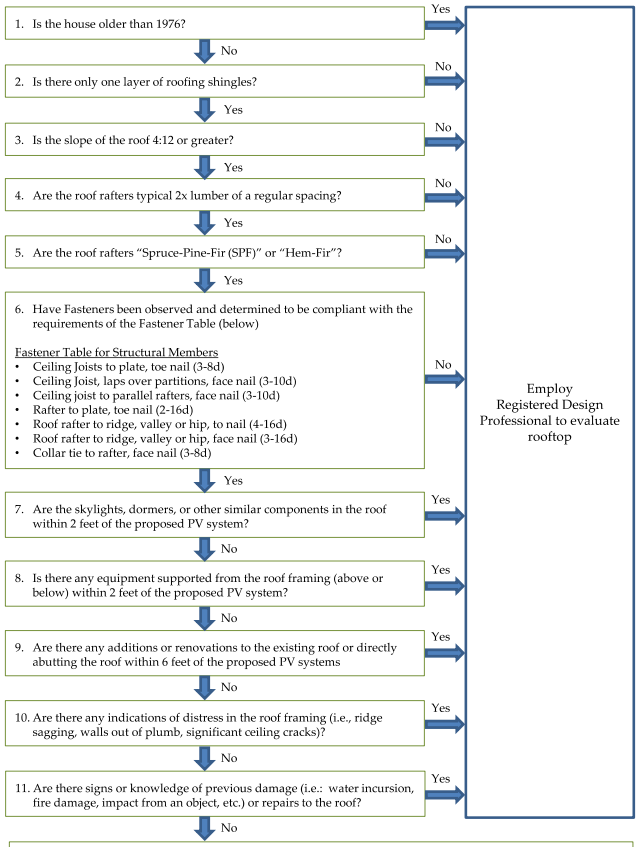
Appendix B. Prescriptive Process for Structural Approval of Small PV Systems

Prescriptive Process Flowchart for Residential PV <10 kW



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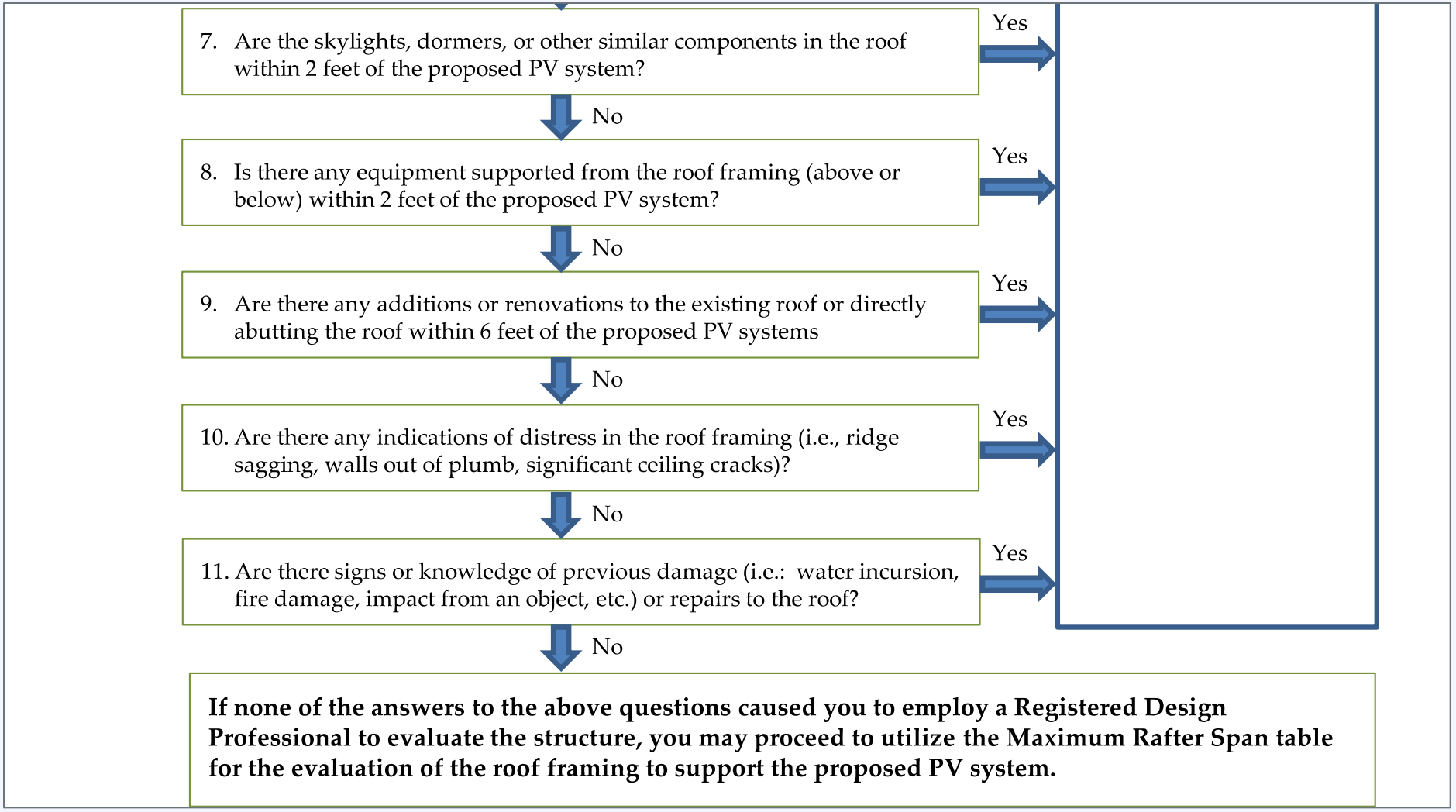
Prescriptive Structural Review

1. Is the house older than 1976?
   - Yes → Employ Registered Design Professional to evaluate rooftop
   - No ↓
2. Is there only one layer of roofing shingles?
   - No → Employ Registered Design Professional to evaluate rooftop
   - Yes ↓
3. Is the slope of the roof 4:12 or greater?
   - No → Employ Registered Design Professional to evaluate rooftop
   - Yes ↓
4. Are the roof rafters typical 2x lumber of a regular spacing?
   - No → Employ Registered Design Professional to evaluate rooftop
   - Yes ↓
5. Are the roof rafters "Spruce-Pine-Fir (SPF)" or "Hem-Fir"?
   - No → Employ Registered Design Professional to evaluate rooftop
   - Yes ↓
6. Have Fasteners been observed and determined to be compliant with the requirements of the Fastener Table (below)
   - No → Employ Registered Design Professional to evaluate rooftop
   - Yes ↓

<u>Fastener Table for Structural Members</u>

- Ceiling Joists to plate, toe nail (3-8d)
- Ceiling Joist, laps over partitions, face nail (3-10d)
- Ceiling joist to parallel rafters, face nail (3-10d)
- Rafter to plate, toe nail (2-16d)
- Roof rafter to ridge, valley or hip, to nail (4-16d)
- Roof rafter to ridge, valley or hip, face nail (3-16d)
- Collar tie to rafter, face nail (3-8d)

Prescriptive Structural Review



Prescriptive Structural Review

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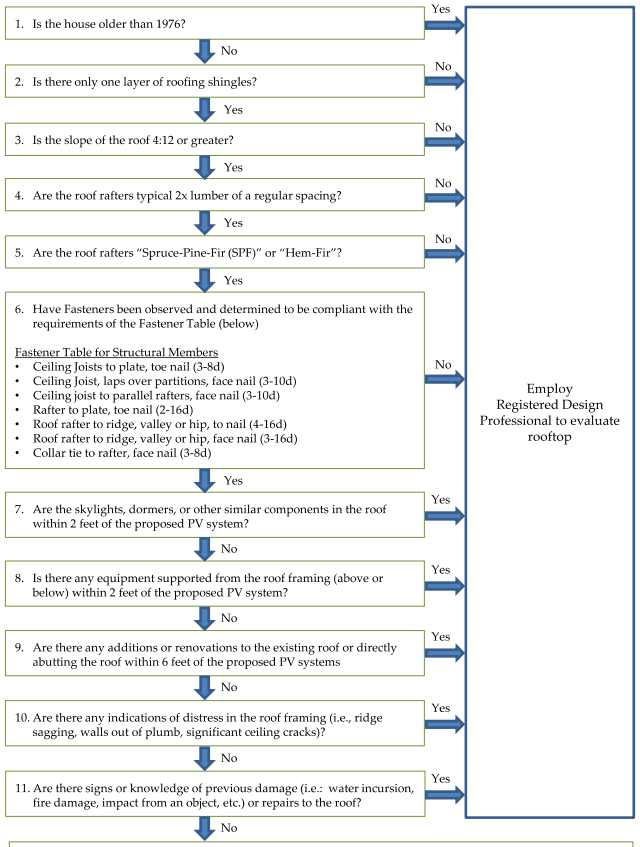

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