# Solar PV in your Community

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U.S. Department of Energy

1. How is the Solar Market Changing?
2. How Can Municipalities Prepare?
    1. Permitting
    2. Zoning
    3. New Construction
3. What support is available?

# DVRPC's Solar Ready II

Promote best management practices for streamlined and standardized solar regulatory practices at the municipal level

**Solar Ready II will work with municipalities and stakeholders to:**

- Identify existing conditions and barriers to solar photovoltaic (PV) adoption
- Develop and implement a plan to reduce **soft costs** of solar PV
- Provide free **"light" technical assistance** and **training** on solar PV best management practices

**Funded by U.S. Dept. of Energy - SunShot**
**Timeframe: Nov. 2013 – March. 2016**

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

COUNTY OF DELAWARE PENNSYLVANIA

# What is SunShot targeting?

## Soft Costs


=

~~Up to 50%~~ **over 64%** of the cost of a solar installation

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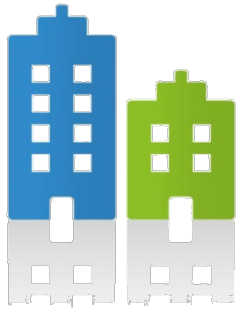
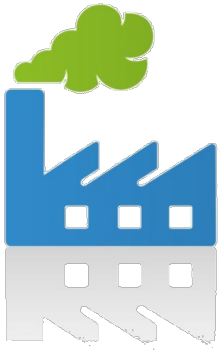
# “Small-scale” Solar PV

**Residential**
1-25 kW



**“Small” Commercial**
1 – 200 kW



**“Large” Commercial**
200 kW+

**Utility**
2 MW+

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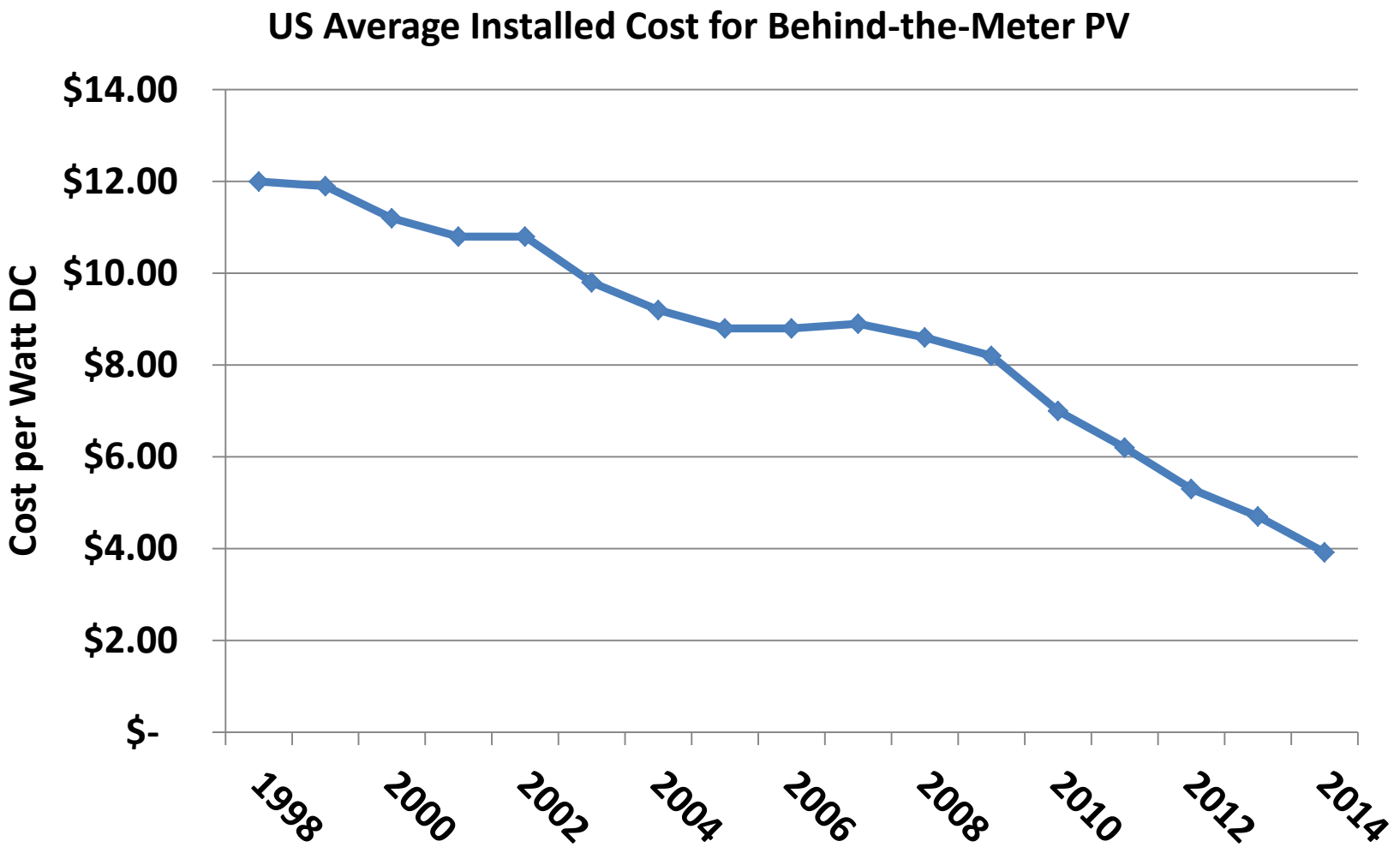
# How is the Solar Market Changing?

**Solar is becoming more affordable.**

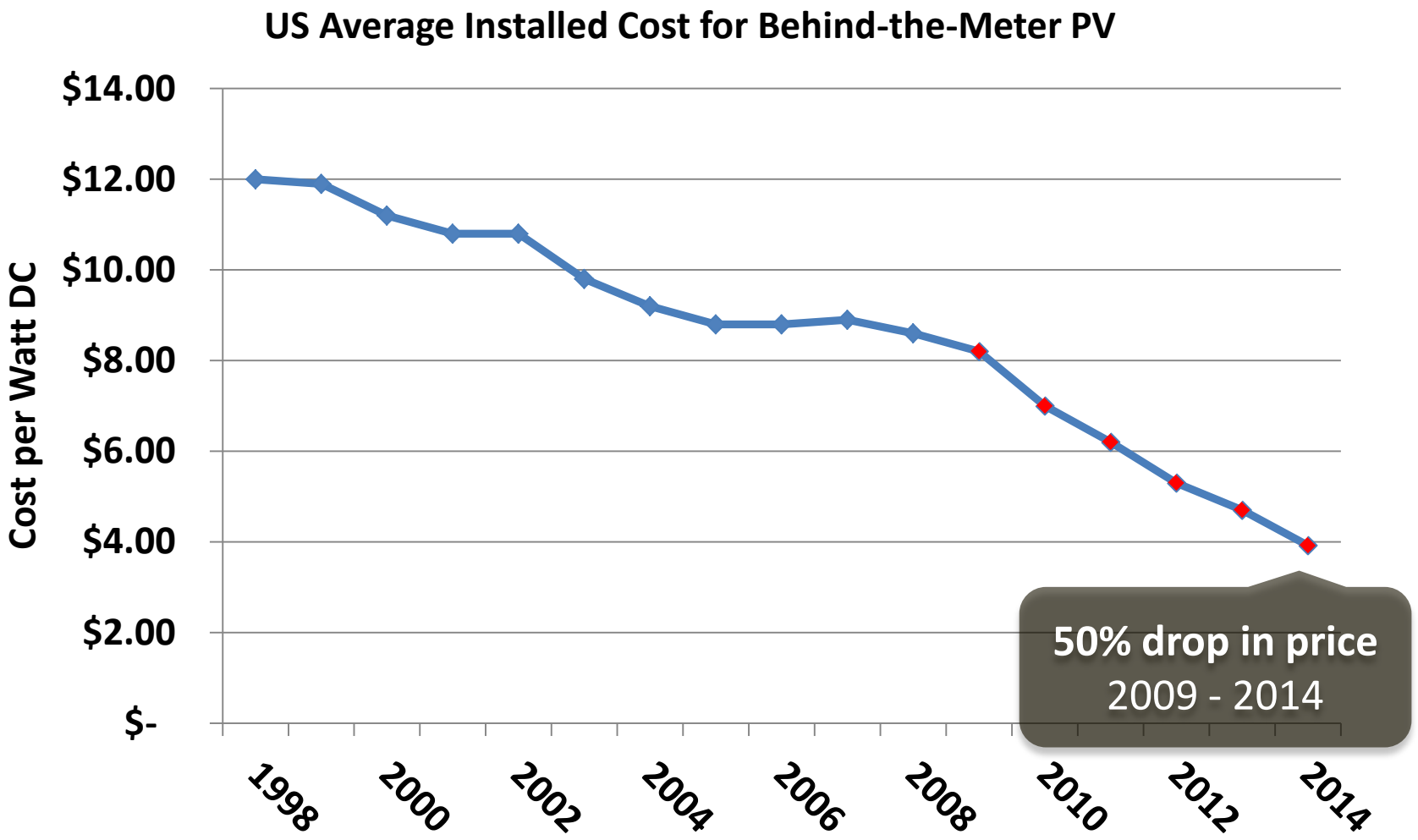
- The price of solar in 2014 was almost half of what it was in 2009, and has continued to fall. Systems installed in early 2015 were 10% cheaper than they were even a year prior.
- 25% of total residential PV installed in the US came online without state incentives – that means the market is driving demand more and more.
- 51% of all new electricity brought online at the beginning of 2015 was solar, outpacing even natural gas.

# Falling Cost of Solar PV




Source: Tracking the Sun VIII (LBNL)

# Falling Cost of Solar PV

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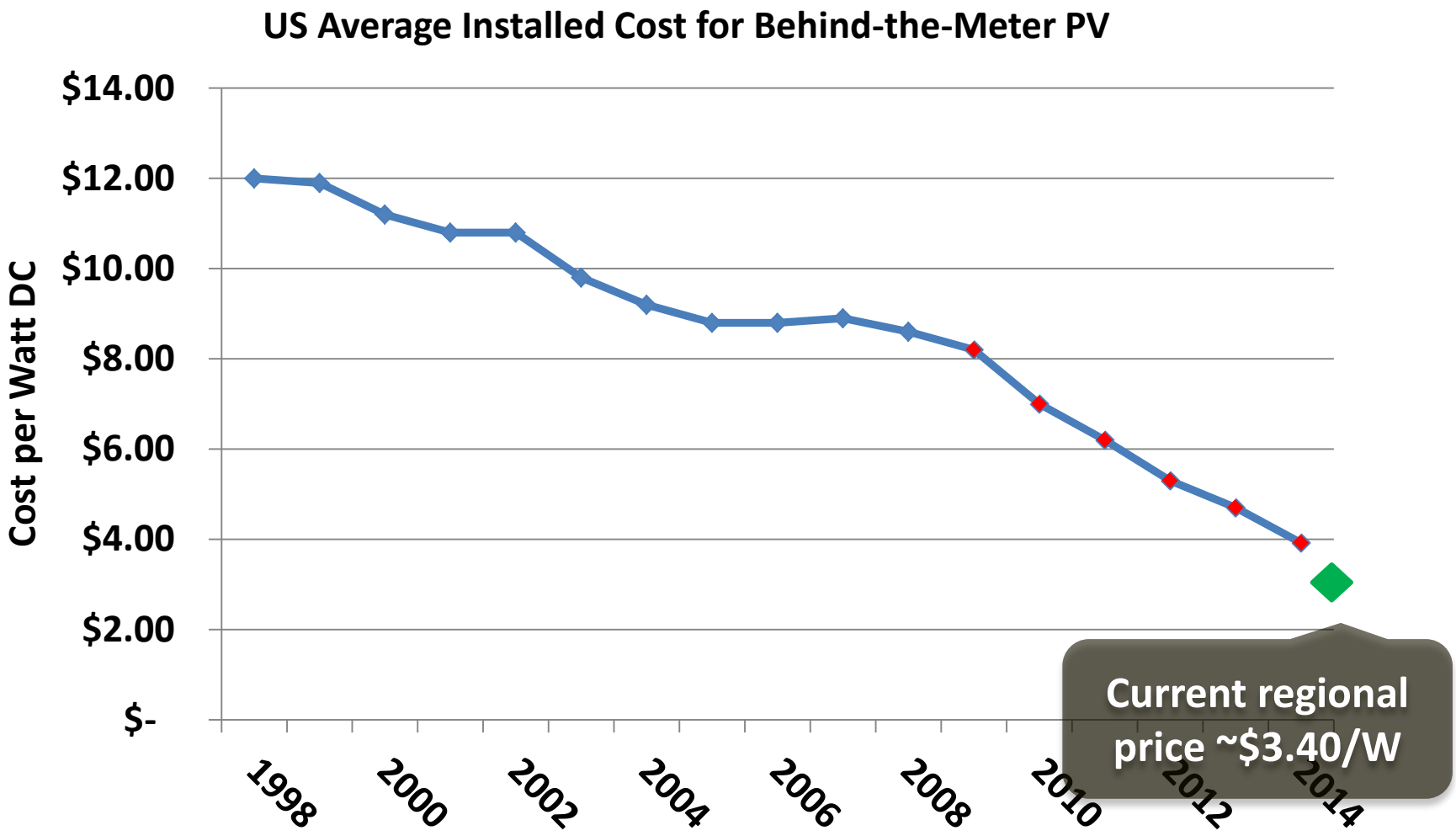



Source: Tracking the Sun VIII (LBNL)

# Other Solar Market Drivers

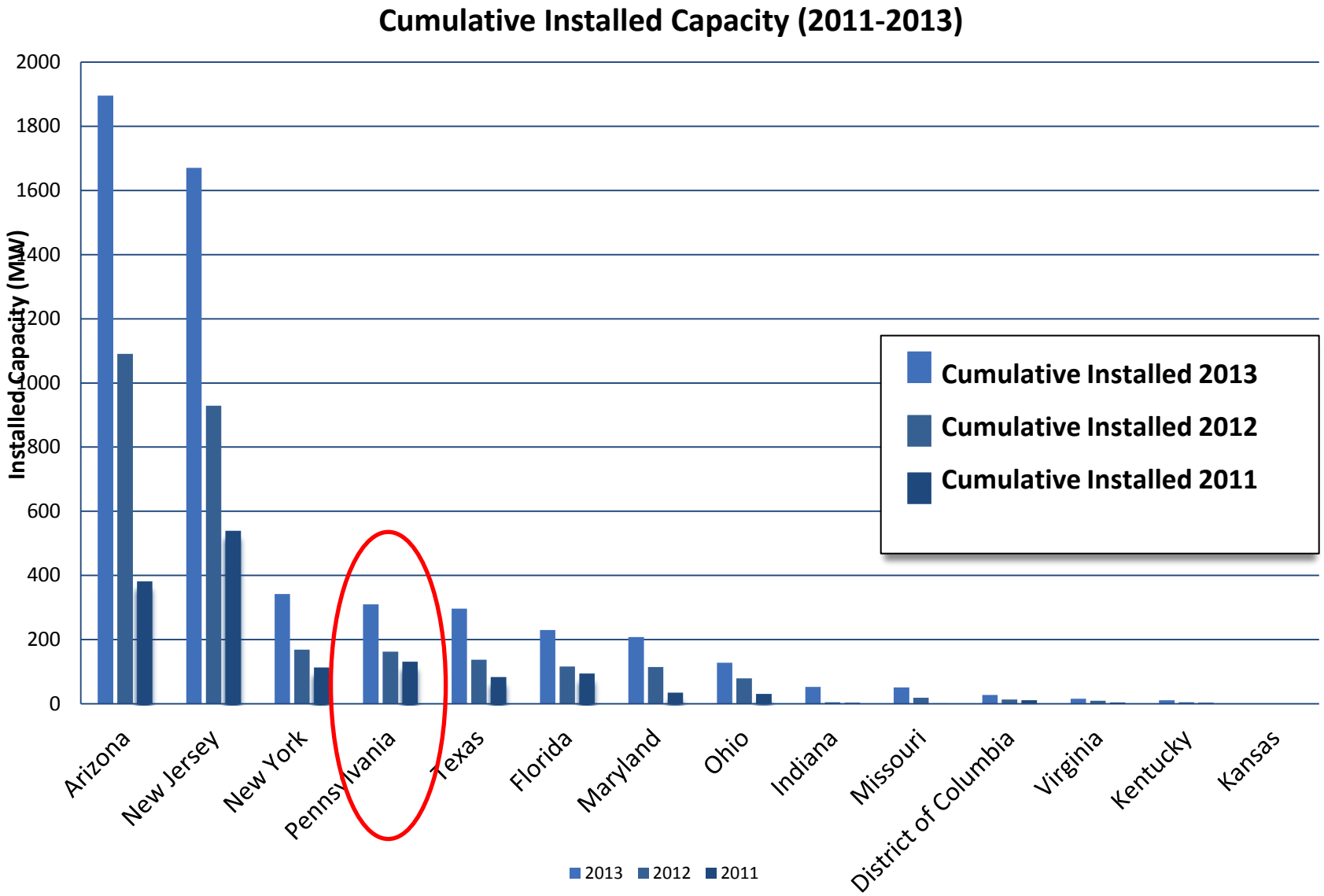
Third party suppliers are entering into the market.

The federal Solar Investment Tax Credit (ITC) recently been extended.

- Could triple the US solar market by 2021 (Bloomberg New Energy Finance)

Pennsylvania's Clean Power Plan poses potential changes to Pennsylvania's state policy on solar.

# Installed Capacity: Your Markets




Source: Meister Consultants Group

# Also…Solarize!

- A community-driven outreach campaign to assist residential customers with overcoming **financial** and **decision** barriers to going solar.
- Competitive selection of solar installer.
- Limited-time customer signup (6-9 months)
- A well-established model with room for innovation.
- Solarize Greater Media

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Solar Ready II

MEISTER CONSULTANTS GROUP

# Solarize Greater Media

- Aston Township
- Brookhaven Borough
- Edgmont Township
- Media Borough
- Middletown Township
- Marple Township
- Nether Providence Township
- Newtown Township
- Ridley Township
- Rose Valley Borough
- Rutledge Borough
- Springfield Township
- Swarthmore Borough
- Upper Providence Township

Solar States –selected installer

**Targetting 400 sign ups and 100 installations across these municipalities.**

Solarize
Greater Media
Save • Local • Together

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# Solarize Mass Harvard

**75** new installations totaling 403 kW

**30% reduction** in installation costs

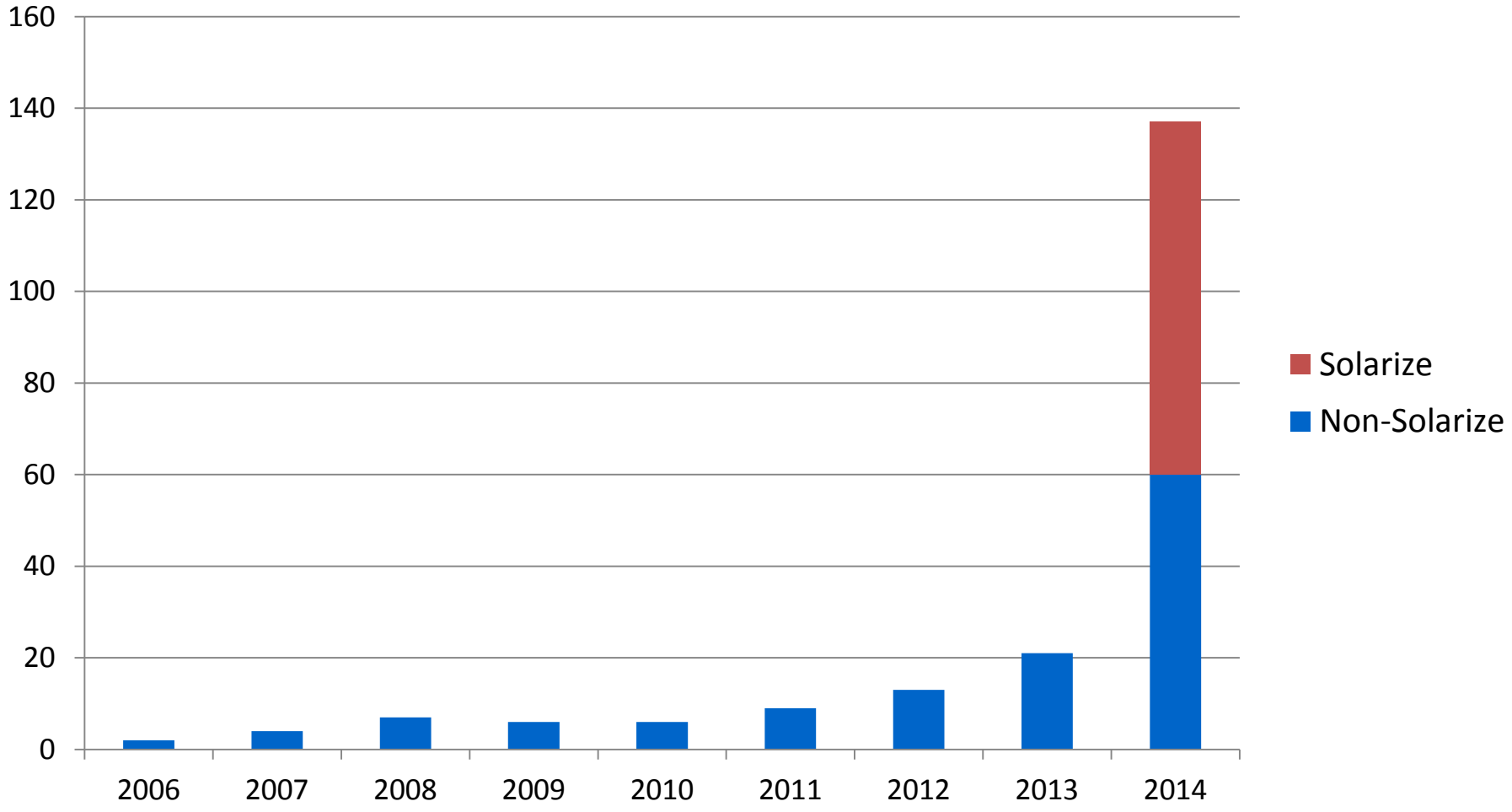
**575% increase** in residential installations

Powered by SunShot U.S. Department of Energy

Source: Meister Consultants Group

# Solarize Impact

## Residential Solar Projects by Year in Solarize Syracuse (NY)




Source: Central NY Regional Planning and Development Board

# Why Plan for Solar Now?

More solar applications likely as market improves.

Proactively prepare your permit process for increase of solar permitting applications.

- Will reduce municipal staff time and hassle
- Will increase your confidence in the permitting process
- Solar Friendly policies will encourage solar development and aid market growth

Solar Ready II provides free technical assistance, guidance.

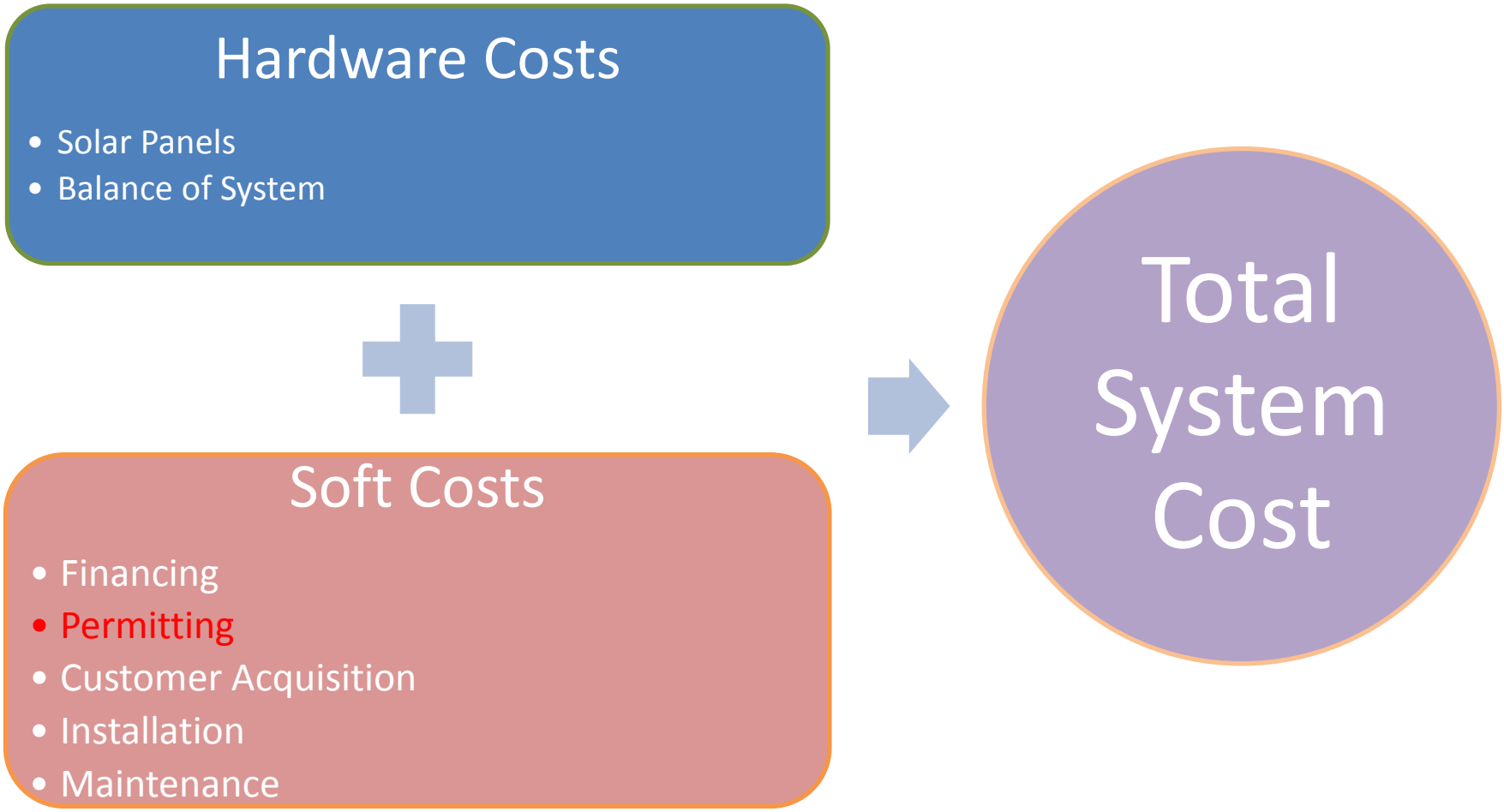
# How can municipalities prepare?

Best practices are standard, clear, supportive:

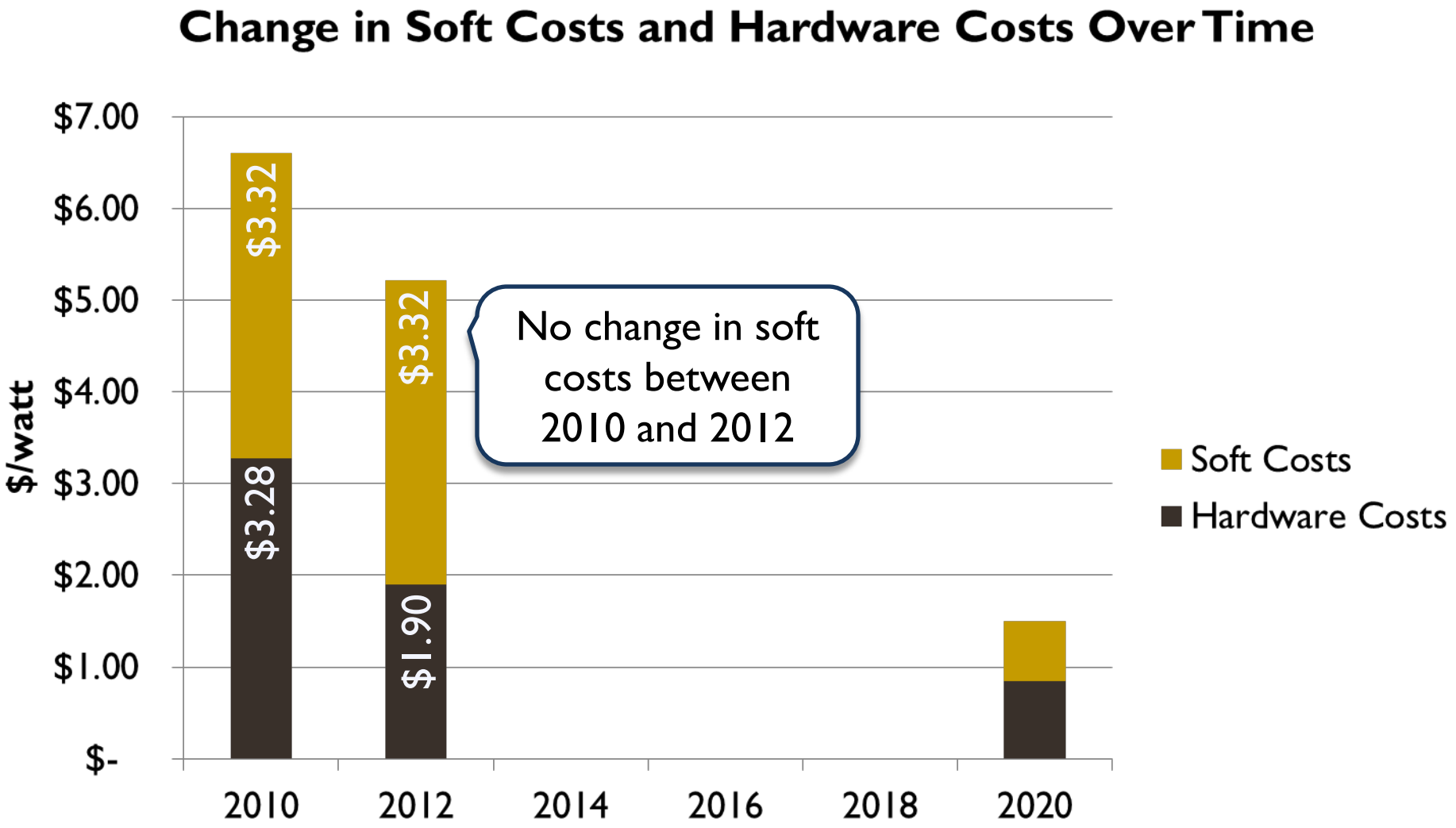
**Permitting:** Transparent, standard, streamlined

**Zoning:** Supportive, standard, appropriate

# How Can Municipalities Impact Soft Costs?



# Cost of Solar in the US

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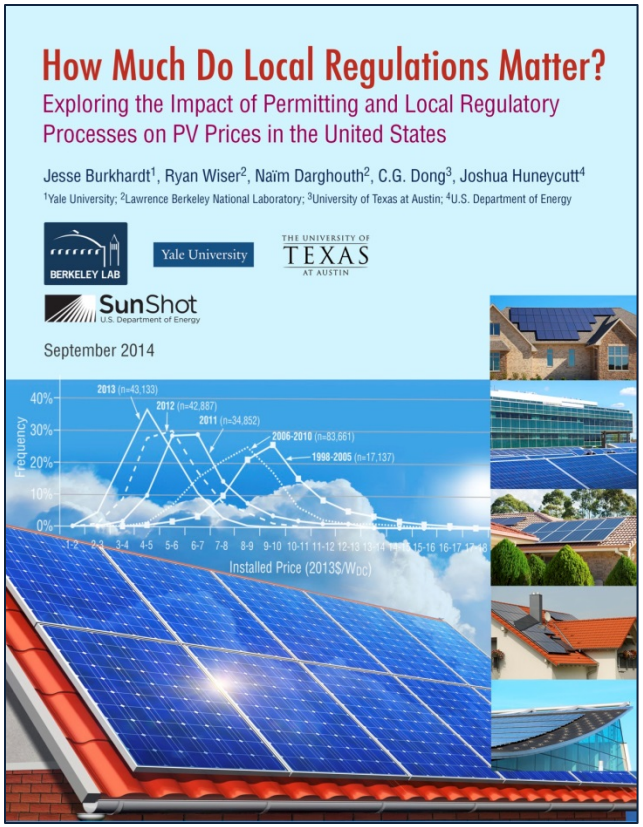
# Permitting and Zoning Costs

- U.S. Dept of Energy study of differences in residential costs in areas with strong and weak solar policies
- Calculated using Rooftop Solar Challenge and Vote Solar data

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http://emp.lbl.gov/sites/all/files/Local_Regulations_and_PV%20Report.pdf

# Permitting and Zoning Costs

| Data Source | Rooftop Solar Challenge | Vote Solar |
|---|---|---|
| **What's Measured?** | Permitting, Interconnection, Planning & Zoning, Financing, Net Metering | Permitting Only |
| **$/W Difference** | $0.64 to $0.93 | $0.18 |
| **5 kW System Price Difference** | $3,200 to $4,700 | $700 |

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http://emp.lbl.gov/sites/all/files/Local_Regulations_and_PV%20Report.pdf

# Permitting

# Permitting Best Practices

## Standard, Transparent, Streamlined

# Permitting Best Practices

I. Pre-Application

II. Application Submittal & Review

III. Inspections

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

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# DVRPC's Permitting Guide

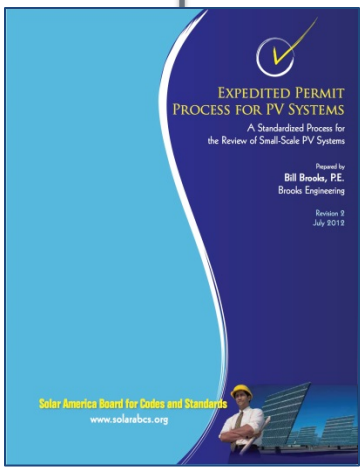
**Resource** **DVRPC Draft Permitting Guide**

- Provides materials that municipalities can **use to supplement and enhance existing solar PV processes in** a way that will make the process easier for the municipality and the applicant.
- Guide includes background information, checklists, templates
- Not intended to wholly replace existing permitting processes (information that applicants will submit in addition to an existing building/electrical permit application.)

# DVRPC's Permitting Guide

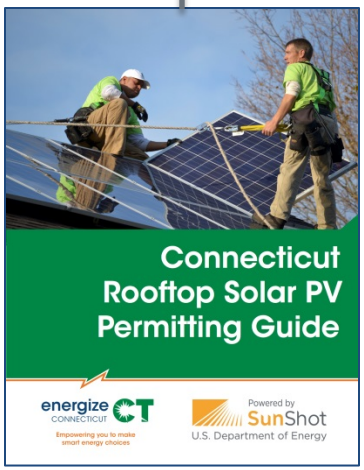
## Solar America Board of Codes & Standards

Expedited Permitting Guide



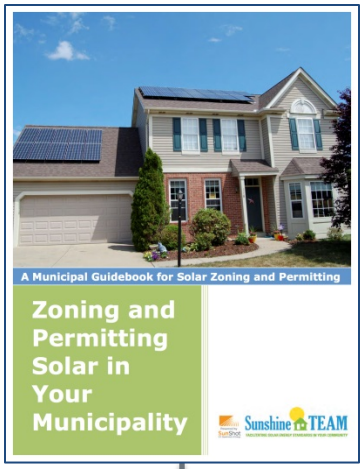

## EnergizeCT

Rooftop Solar Permitting Guide



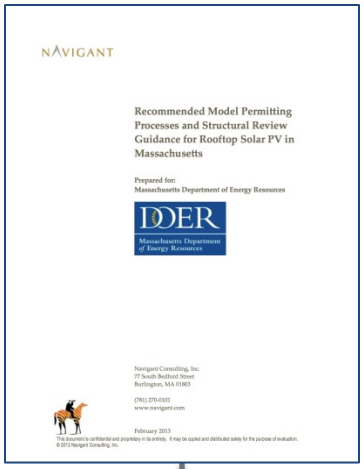

## PennFuture

Zoning and Permitting Guidebook




## Massachusetts DOER

Model Permitting and Structural Review Process




www.dvrpc.org/energyclimate/SolarReady.htm

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# Permitting Resources

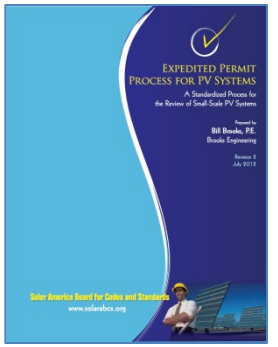
**Solar ABCs**

*www.solarabcs.org*

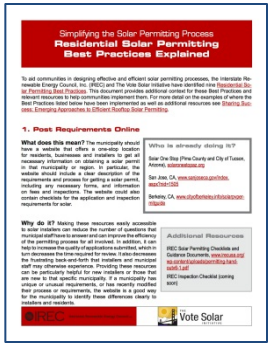
**IREC**

*www.irecusa.org*

Expedited Permit Process for PV Systems

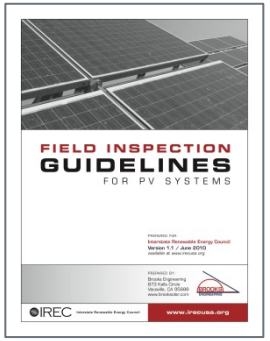



Residential Solar Permitting Best Practices Explained

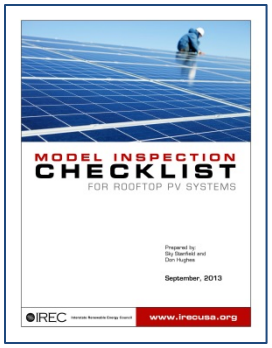



Solar Permitting Checklists


Field Inspection Guidelines for PV Systems




Model Inspection Checklist for Rooftop PV Systems

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# Zoning

# Zoning Best Practices

## Supportive, Standard, Appropriate

# Zoning Best Practices

## Typical Requirements:

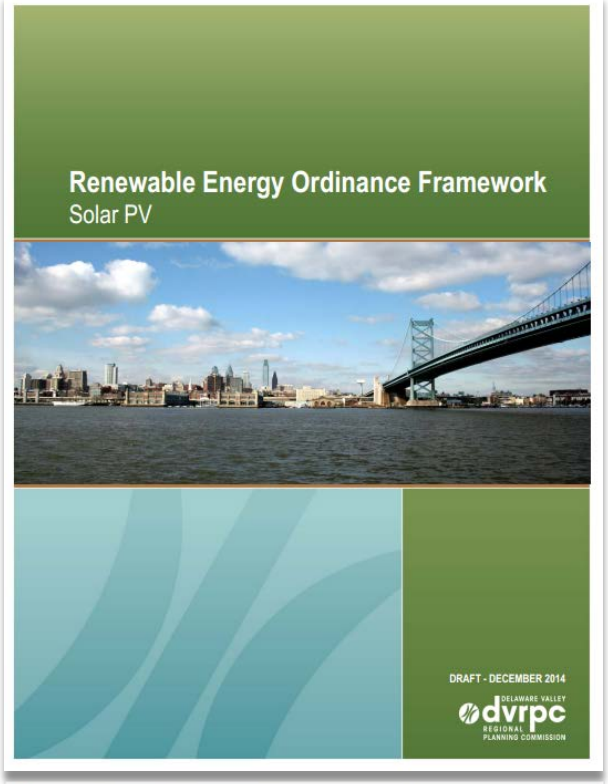
- Permitted as accessory use
- **General Regulation Considerations**
  - **Height – Flat roof vs pitched**
  - **Setbacks**
    - **on rooftop for first responder**
    - **Ground mounted setbacks for nuisance**
  - **Impervious coverage**
  - ~~**Glare**~~
  - ~~**Solar access**~~

# DVRPC's REOF

**Resource**

## DVRPC Renewable Energy Ordinance Framework- Solar PV

- Menu of language options with accompanying guidance
- Provides background and examples for common factors in zoning for solar
- Zoning is a proactive tool to encourage solar siting that is in line with community goals and supportive of technology



# Zoning Guidance

| Section | Topics to Address |
|---|---|
| **Intent/Background** | Goals and benefits |
| **Definitions** | Define technologies & terms |
| **Applicability** | e.g. Primary vs. accessory use |
| **General Regulations** | • Height<br>• Size<br>• Setbacks<br>• Lot coverage |

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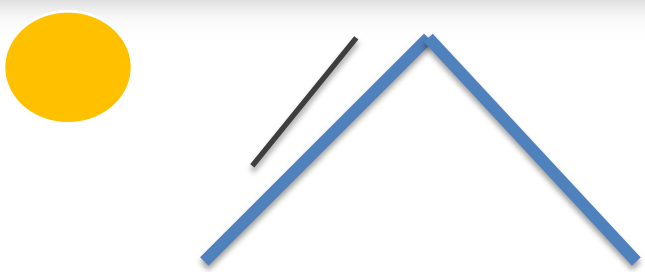
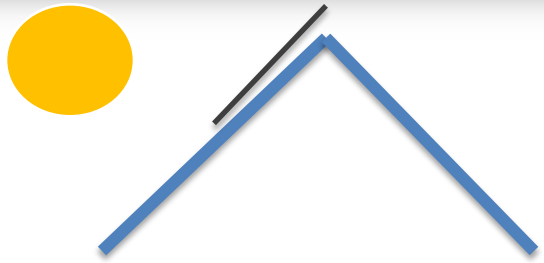
Source: American Planning Association

# Example – Height (sloped)

| Language | Comments and Guidance |
|---|---|
| For a roof-mounted system installed on a sloped roof, the highest point of the system shall not exceed the highest point of the roof to which it is attached as allowed by setback requirements. | It is appropriate to not allow panels to exceed the height of the roof on a pitched roof to ensure adequate setback from the ridgeline and to protect the system from wind loading. |
| *Solar Energy Systems shall not exceed a height of eight inches from the rooftop surface. In no event shall the placement of the solar panels result in a total height including building and panels than what is permitted in the zoning district.* | This language is **not recommended** because it would prohibit the ability to tilt systems. Some systems will be designed with a 10 to 34 degree tilt to maximize solar access. A restriction of distance from the roof surface may prohibit this. |



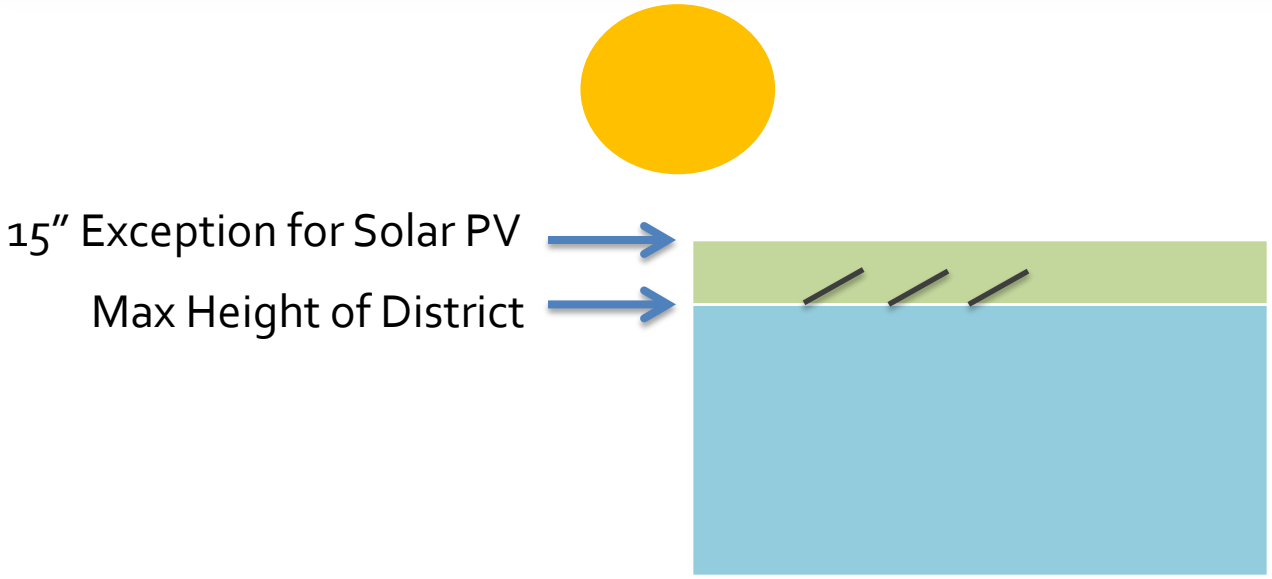
Yes



No

# Example – Height (flat)

| Language | Comments and Guidance |
| --- | --- |
| For a roof-mounted system installed on a flat roof, the highest point of the system shall be permitted to exceed the district's height limit of up to fifteen (15) feet above the rooftop to which it is attached. | **It is important to allow PV systems to exceed maximum height of building structure because the building may have already met maximum height. Additionally, as mentioned, some PV systems will be designed with a tilt to maximize solar access. The language option provided here gives a 15 foot flexibility above maximum height. Municipalities can be more restrictive than this, though it is not recommended that they limit to less than six (6) feet above the rooftop surface.** |



# Zoning – Historic Preservation

## Typical Requirements:

- Prevent permanent loss of "character defining" features
- Possible design requirements
  - Ground mounted
  - Flat roof with setback
  - Panels flush with roof
  - Blend color

Source: SolarCentury

# Zoning – First Responder Safety

Risk

- Shock
- Burns
- Roof Loads

Mitigate

- Setbacks
  - Access
  - Ventilation
- Labeling
- Education

- **ENGAGE FIRST RESPONDERS!**
- **Include appropriate (not restrictive) setback language**

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Source: Adapted from the New York PVTN Fire and Rescue Training Program

# Zoning – Tree Preservation

- Solar Access vs. Tree Protection
- How should the two interact?
- Procedures reflect community priorities

# DVRPC's REOF

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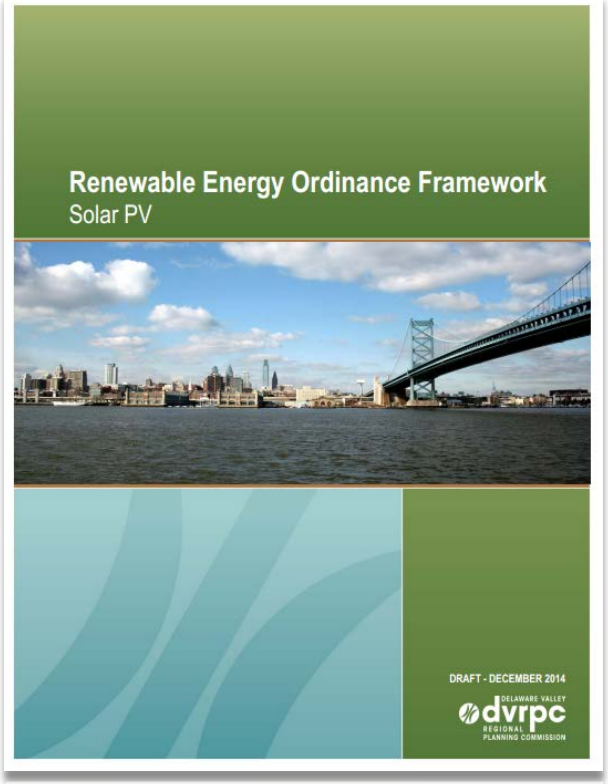

# New Construction

# Solar Ready New Construction Checklist

**Resource**

## DVRPC Solar Ready New Construction Checklist

- New construction considerations which allow for more cost efficient solar PV installation
- Voluntary
- One page
- For audience of home builders

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Solar Ready II | Mid-America Regional Council | National Association of Regional Councils | Meister Consultants Group, Inc. | Council of State Governments

**Solar Ready New Construction Checklist**

Home builders who want to construct houses that are designed to ease the installation of solar photovoltaic systems (Solar Ready Homes) may use this checklist to ensure their houses are constructed to minimize modification to accommodate solar systems. This checklist is not a list of what is needed to install solar photovoltaic systems (PV). Homeowners or developers which plan to install solar PV will need to meet the requirements of the municipality and utility with jurisdiction over the Solar Ready Home location.

Designing for solar access (most important factor)

- ☐ Roofs should be south-facing and located to best avoid shading from trees and other buildings and equipment. Show on the Site Plan the best roof space available for accommodating photovoltaic (PV) solar collector panels or solar PV array.
- ☐ Minimize roof-top equipment and vents to maximize available open space for the solar PV array placement. Minimize or eliminate roof penetrations or chimneys, particularly on the southern side of the roof.

Electrical

- ☐ Provide a Site Plan showing the location of the proposed solar PV array layout on the roof deck(s) and the best space available for accommodating the PV equipment, also known as the balance of system (BOS), which includes the (inverter, disconnect & solar production meter).
- ☐ Locate the BOS or PV equipment adjacent to the electrical service panel if feasible or on a wall close to the proposed solar PV array.
- ☐ Show an Electrical Panel Schedule with a 240 volt circuit breaker space labeled "reserved for Solar PV"; this circuit breaker location should be at the furthest point in the electric panel away from the main circuit breaker or the at the further point along the busbars from the service feeders.
- ☐ Run electrical conduit from the solar PV array location to the electrical panel and other electrical components. If the electrical conduit is run inside the house, it must be metal conduit from the point of penetration to a DC disconnect; also, after penetrating the roof, the metal conduit must run vertical to at least 10 inches below the roof deck before it can run horizontal inside the attic space.

Structural

- ☐ Provide a roof structure designed for the additional solar PV array dead loading (typically 3-6 lbs/SF).
- ☐ Record roof specifications, such as any reinforcement done in preparation for solar, in site drawings to benefit future solar installers. This would include rafter or truss sizes, designs, and spacing.
- ☐ Wind loads on rooftop solar equipment must be analyzed to ensure that the roof structure is sufficient.
- ☐ Verify that roofing warranties accommodate installation of rooftop solar equipment.

DELAWARE VALLEY SMART GROWTH ALLIANCE

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

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# Checklist Elements

One-Page Checklist

1. Designing for Solar Access
   - South-facing
   - Minimized roof shade
2. Electrical
   - Provide site plan & electrical schedule
   - Electrical conduit & BOS
3. Structural
   - Roof structure
   - Warranties & records

By Gray Watson User:E090 (http://256.com/solar/) [CC BY-SA 3.0], via Wikimedia Commons

# Solar Ready New Construction Checklist

**Resource**

## DVRPC Solar Ready New Construction Checklist

- For municipalities who wish to encourage solar installation option in new construction
- Can assist in permitting due to structural and electrical recommendations
- Available at Delaware Valley Smart Growth Alliance website under solar ready new construction recognition program.

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U.S. Department of Energy

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DELAWARE VALLEY SMART GROWTH ALLIANCE

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# How can we help?

DVRPC and Delaware County Planning Department can work with you on permitting and zoning updates.

- One on one technical support
- Review drafts
- Convene with installer (Solarize)

# For More Information


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www.dvrpc.org/EnergyClimate/aeowg.htm

www.narc.org/solarready