Exploring Solar Streamlining and Historic Preservation

New Partners for Smart Growth
2/3/2017

SOLSMART

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What is SolSmart?

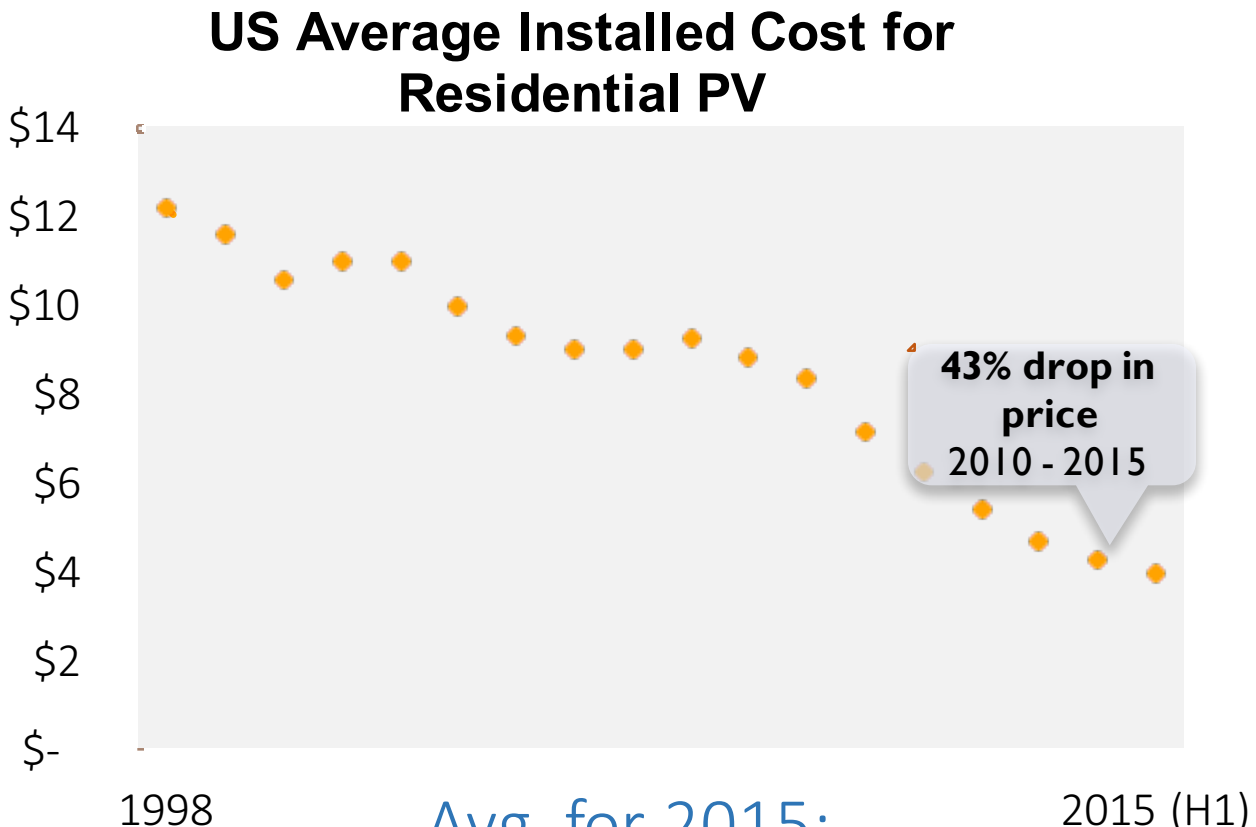
DESIGNATION

- Three-tiered designation program
- Core pre-requisites and options for pathways to success
- Annual awards program and special awards available

TECHNICAL ASSISTANCE

- Communities seeking designation can receive technical assistance to help achieve desired tier
- All SolSmart TA is program-funded.

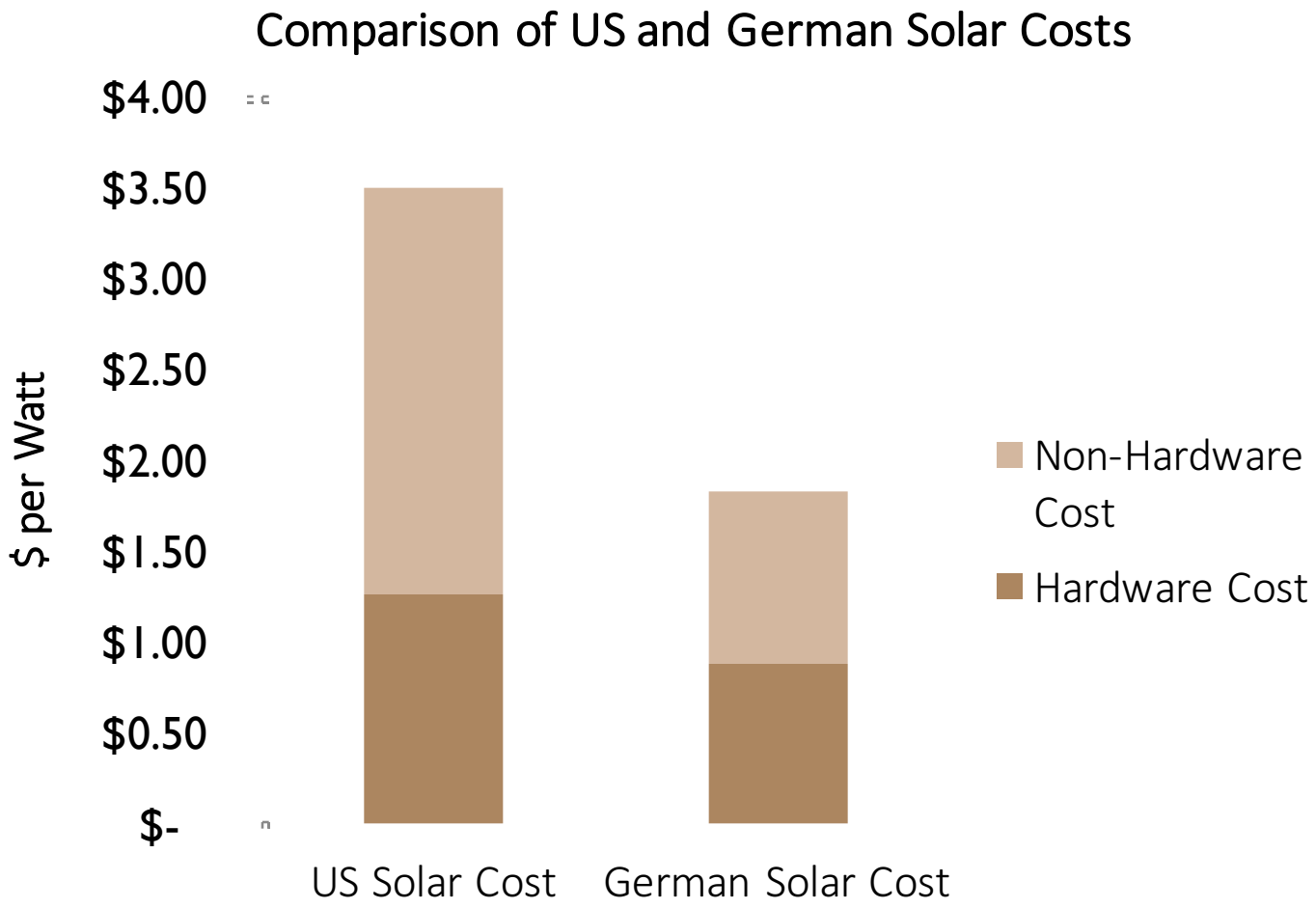
The Cost of Solar PV



Avg. for 2015:
$3.50/W (SEIA)

Tracking the Sun VIII: The Installed Cost of Photovoltaics in the US from 1998-2014 (LBNL)

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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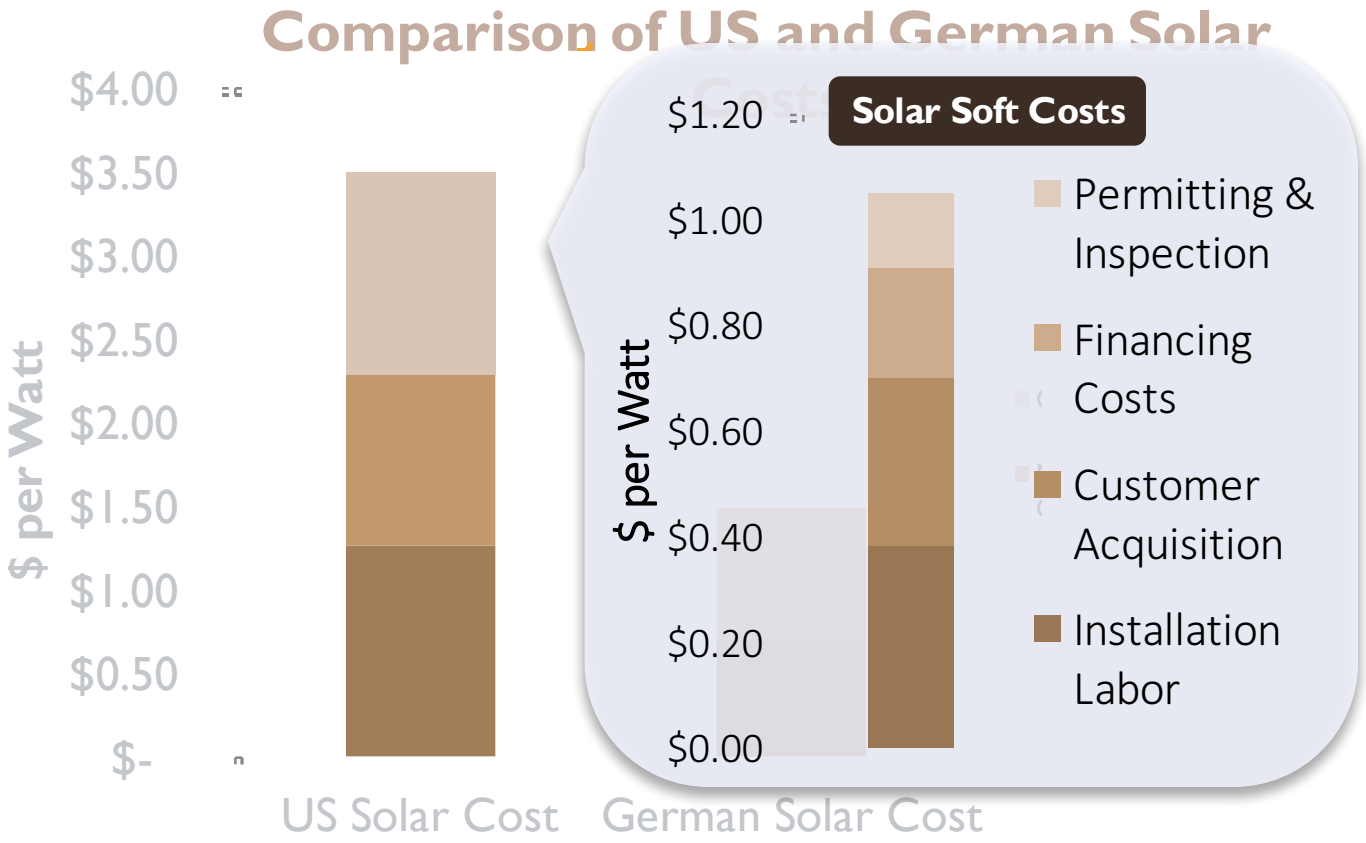
The Cost of Solar in the US



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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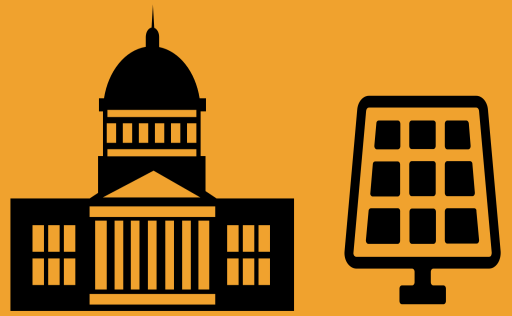
Soft Cost Takeaways

1. Local governments **can impact solar pricing**
2. Soft costs **slow solar market growth**
3. There is **substantial room for improvement**



Benefits of Reducing Soft Costs

Reduced Installation Costs = **Increased Return on Investment** for System Owners

Streamlined processes can save **time and costs for local government staff**

Opening your community for solar business can have **positive impacts on jobs and economic development**

Reducing red-tape for solar can result in **improved business prospects for solar companies**

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Sources: Clean Power Finance (Spruce); The Solar Foundation, LBNL, NREL

SolSmart Designation Structure

- ❑ Address Bronze prerequisites
  - ❑ Solar statement
  - ❑ Permitting checklist
  - ❑ Zoning barrier review
- ❑ Earn 20 points in the Permitting category
- ❑ Earn 20 points in the Planning, Zoning, & Development Regulations category
- ❑ Earn 20 total points across "Special Focus" categories

- ❑ Earn SolSmart Bronze
- ❑ Address Silver prerequisites
  - ❑ Solar by-right in all major zones
  - ❑ Cross-train inspection and permitting staff
- ❑ Earn 100 total points from actions taken across any combination of categories

- ❑ Address Gold prerequisites
  - ❑ PV permitting turnaround for small systems ≤ 3 days
- ❑ Earn 200 total points from actions taken across any combination of categories

Special Awards:
Communities that earn 60%+ of the points in a given category are eligible for special recognition.

No-Cost Technical Assistance

- All communities pursuing SolSmart designation are eligible for no-cost technical assistance from national experts.
- On average, a community can expect 100 hours of technical assistance.
- Technical assistance is designed to help a community achieve the requirements for designation.
- TA may also be available to help designated communities achieve higher levels of designation.

SolSmart Advisors

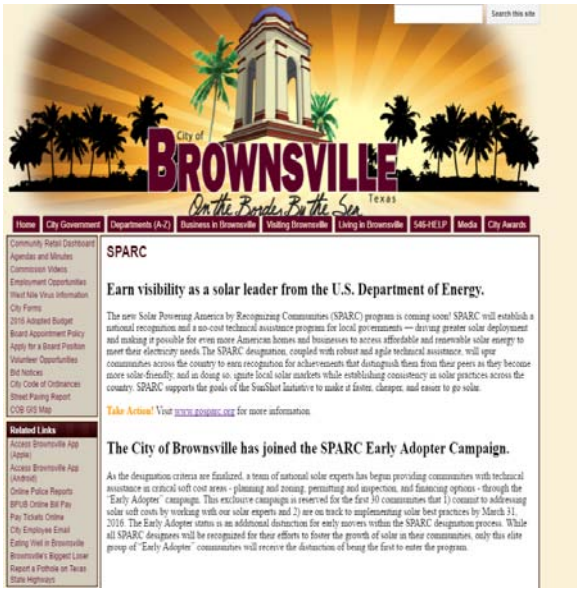
- **Funded temporary staff** to help communities achieve designation. Communities must complete a SolSmart intake form to host an Advisor.
- Advisors will **evaluate existing local government policies/processes** and **apply industry leading best practices** that will move a community toward designation.
- SolSmart Advisors will assist communities through **engagements lasting up to six months**.
- Equates to **hundreds of hours** of in-person technical assistance for communities receiving an Advisor

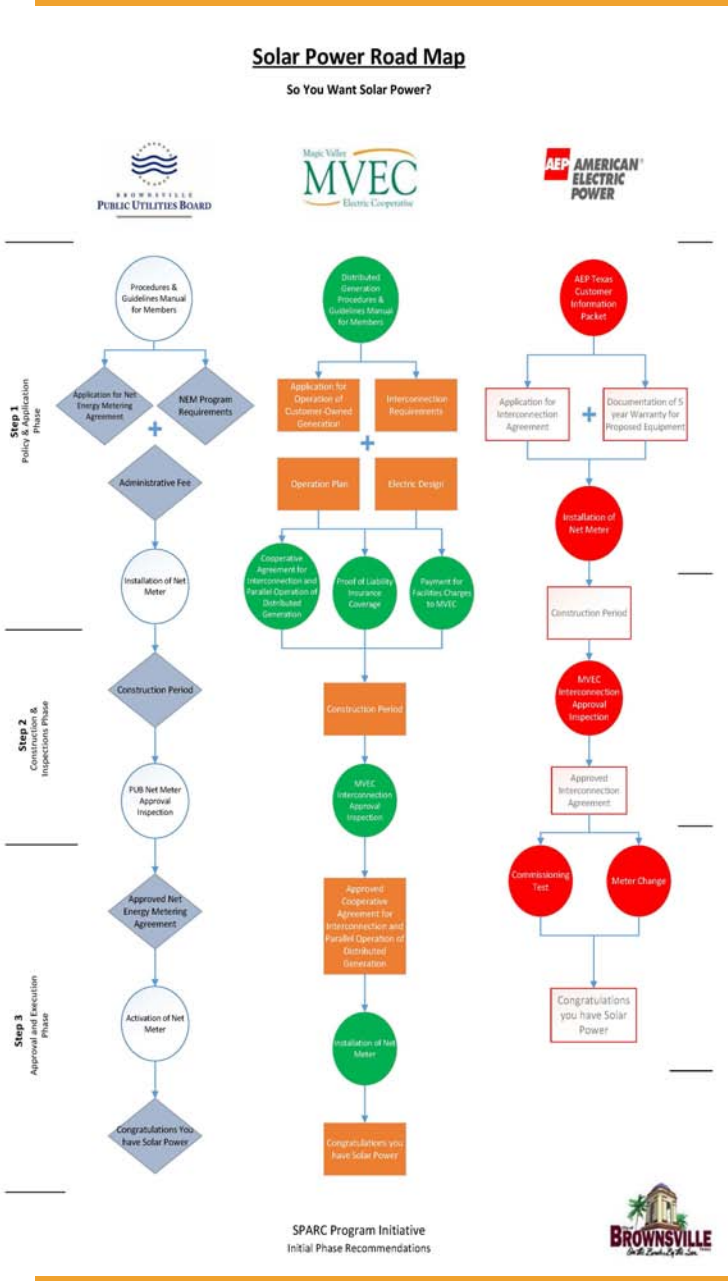
SECOND ROUND OF HOST COMMUNITY APPLICATIONS WAS DUE:
January 31, 2017

Third round pending

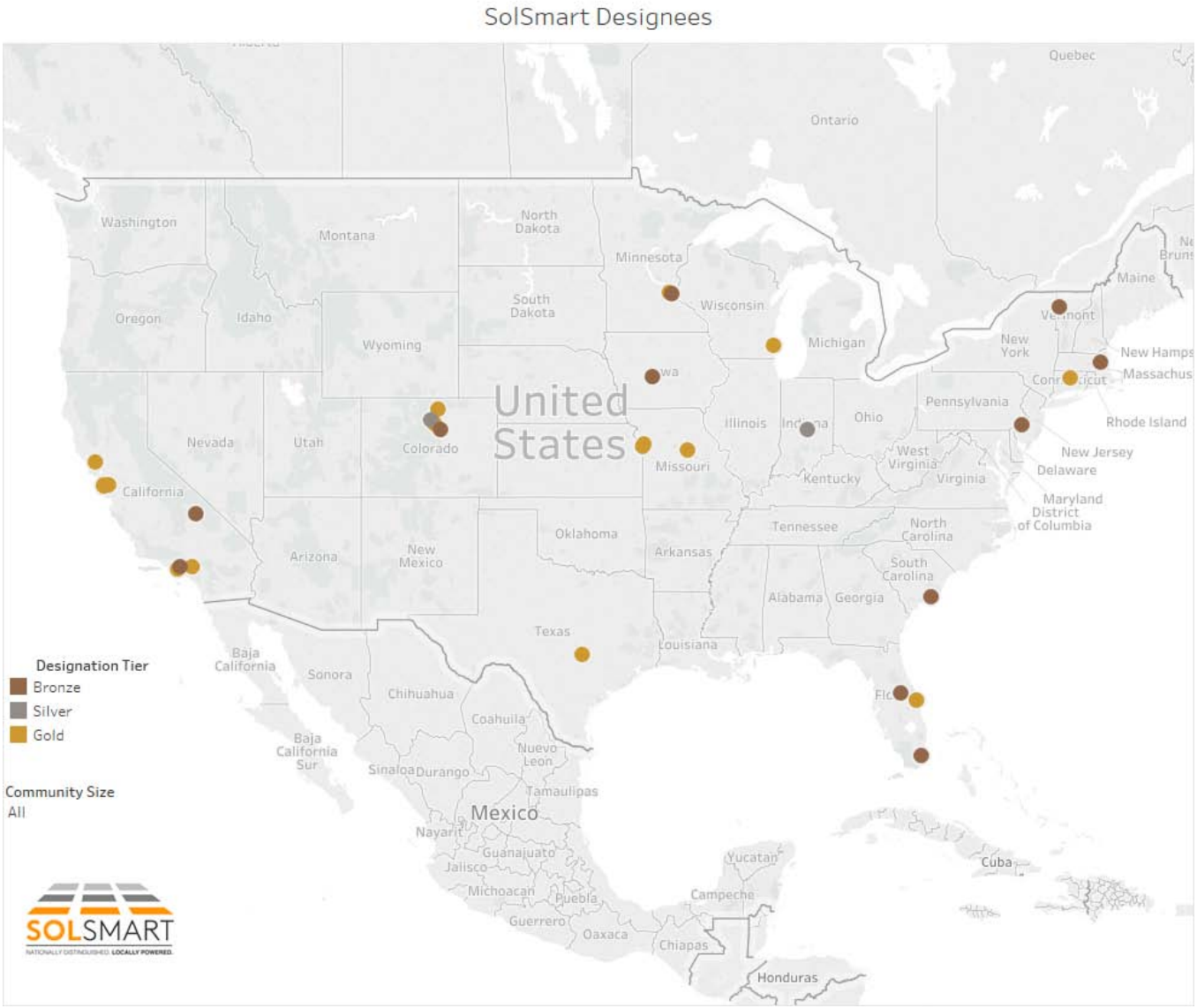
Case Study: Brownsville, TX

- Brownsville, TX had little background in solar.
- SolSmart helped them work with their three utility providers to determine the process to install solar.
- Brownsville also created a webpage dedicated to SolSmart (formerly called SPARC).





SolSmart Designees



To date: 28 designated cities and counties, 100+ communities in the process of getting designated.

Streamlining Solar

Streamlining solar

SolSmart communities cut red tape in:

- Planning, zoning, & development regulations
- Permitting
- Inspections

Example:
P-1 Make available an online checklist detailing the steps of your community's solar permitting process (required)

Streamlining solar

SolSmart helps communities:

- Provide guidance and incentives for solar in **construction codes**
- Provide guidance and options for preserving **access to sunlight** for solar installations
- **Work with utilities** to:
  - Streamline inspections and interconnection requirements
  - Offer community solar options

Example:
CC-3 Offer design guidelines for PV aligned with the National Electric Code and fire code (20 points)

Streamlining solar

SolSmart helps communities:

- Engage the community on solar through:
  - **Education**
  - Partnerships
- Lead through **municipal solar** installations
- Partner on **financing options**

Example:
CE-4a Support or host a community group purchasing program (e.g. Solarize) (20 points)

Solar and Zoning

A conspicuous silence on the part of local policies, plans, and regulations on the topic of solar energy use constitutes a significant barrier to adoption and implementation of these technologies.

–American Planning Association Solar Briefing Papers

Zoning best practices for solar (PZD-1, PZD-2)

- **Definition –** Include solar hot water heating installations in the definition of "solar" or otherwise allow in the code
- **By-right accessory use –** Allow small rooftop and ground mount solar in all major zoning districts
- **Height –** Allow rooftop solar an exemption from or allowance above building height restrictions
- **Lot coverage –** Exempt ground mount solar from lot coverage restrictions that apply to buildings
- **Number of accessory uses on a site** – exempt solar from total
- **Setback** – Use setback applicable to fences, not buildings
- **Aesthetic requirements (e.g. screening)**
  - Exempt solar from rooftop equipment screening requirements
  - Allow PV installations to be seen from public roadways
  - Limit screening or aesthetic requirements to historic districts
- **Roof Coverage –** Include safety and fire code setback requirements to allow access, but do not restrict rooftop solar based on a percentage of rooftop coverage
- **Glare** – glare study only required on or adjacent to airport property, regulated by FAA
- **Ground mount** – Allow for primary use, ground mount installations as conditional use
- **Regulate based on area (square footage) or impact rather than:**
  - Capacity (kW) as efficiencies and technologies change over time
  - Usage (e.g. requiring that any accessory use solar generation be consumed exclusively on-site)

Definitions

Solar Energy System: A **device or** structural **design feature**, a substantial purpose of which is **to provide daylight** for interior lighting or provide for the **collection, storage and distribution of solar energy for space heating or cooling, electricity generation, or water heating**.

Solar Energy System, Large-Scale: Active Solar Energy System that occupies more than 40,000 square feet of surface area.

Solar Energy System, Medium-Scale: Active Solar Energy System that occupies more than 1,750 but less than 40,000 square feet of surface area.

Solar Energy System, Small-Scale: An Active Solar Energy System that occupies 1,750 square feet of surface area or less.

Aesthetics

Maplewood, MN

AN ORDINANCE TO THE MAPLEWOOD MUNICIPAL CODE REGARDING RENEWABLE ENERGY SYSTEMS (Wind, Solar, Geothermal)

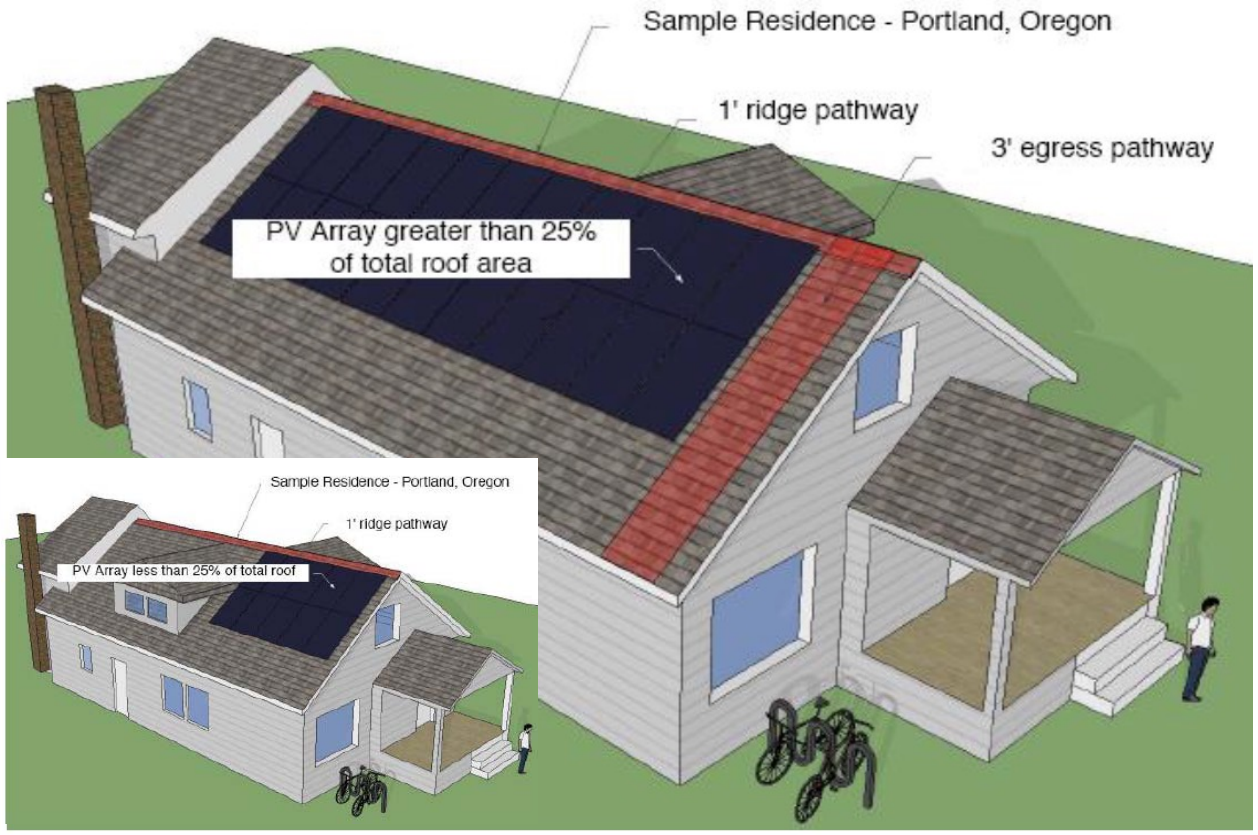
Section 4.c.4. Visibility

Solar energy systems (SES) shall be designed to blend into the architecture of the building or be screened from routine view from public right-of-ways other than alleys.

The color of the solar collector is not required to be consistent with other roofing materials.

Northeast Denver Housing Center's Whittier Affordable Housing Project
Source: NREL/DOE Image 19188

Roof Coverage



Source: 2010 Oregon Solar Installation Specialty Code and Commentary
https://www.oregon.gov/bcd/codes-stand/Documents/2010_OSISC_commentary.pdf

Regulating Solar Energy Use in Code

Adams County, Colorado

4-03-03-02-10 *SOLAR ENERGY SYSTEM*

1. *Property Served:* The solar energy system shall be designed to only provide energy for the property upon which it is located. However, excess energy may be sold as permitted by state and federal law.

Prevents shared or community solar installations and any primary use solar energy installation.

Regulate impacts, not use

Solar and Historic Preservation

Special use and historic districts

Solar Collectors

3.70 Minimize adverse effects from solar collectors on the character of a historic building.

- Place collectors to avoid obscuring significant features or adversely affecting the perception of the overall character of the property.
- Size collector arrays to remain subordinate to the historic structure.
- Minimize visual impacts by locating collectors back from the front facade.
- Consider installing collectors on an addition or secondary structure where applicable.

Place collectors to avoid obscuring significant features or adversely affecting the perception of the overall character of the property.

Source: Plano, TX Downtown Heritage Resource District Design Standards

State Statutes – Solar in Historic Districts

Connecticut Conn. Gen.

Stat. § 7-147f

"No application for a certificate of appropriateness for an exterior architectural feature, such as a solar energy system, designed for the utilization of renewable resources shall be denied **unless the commission finds that the feature cannot be installed without substantially impairing the historic character and appearance of the district**.

A certificate of appropriateness for such a feature may include stipulations requiring design modifications and limitations on the location of the feature which do not significantly impair its effectiveness."

State Statutes – Solar in Historic Districts

Maine 33 MRSA c.

28-A §§

1421-1424

Municipalities, homeowners association and others may not prohibit the installation and use of solar energy devices **except when necessary to, among other things, protect "historic or aesthetic values**, when an alternative of reasonable comparable cost and convenience is available."

Local Code on Solar in Historic Districts

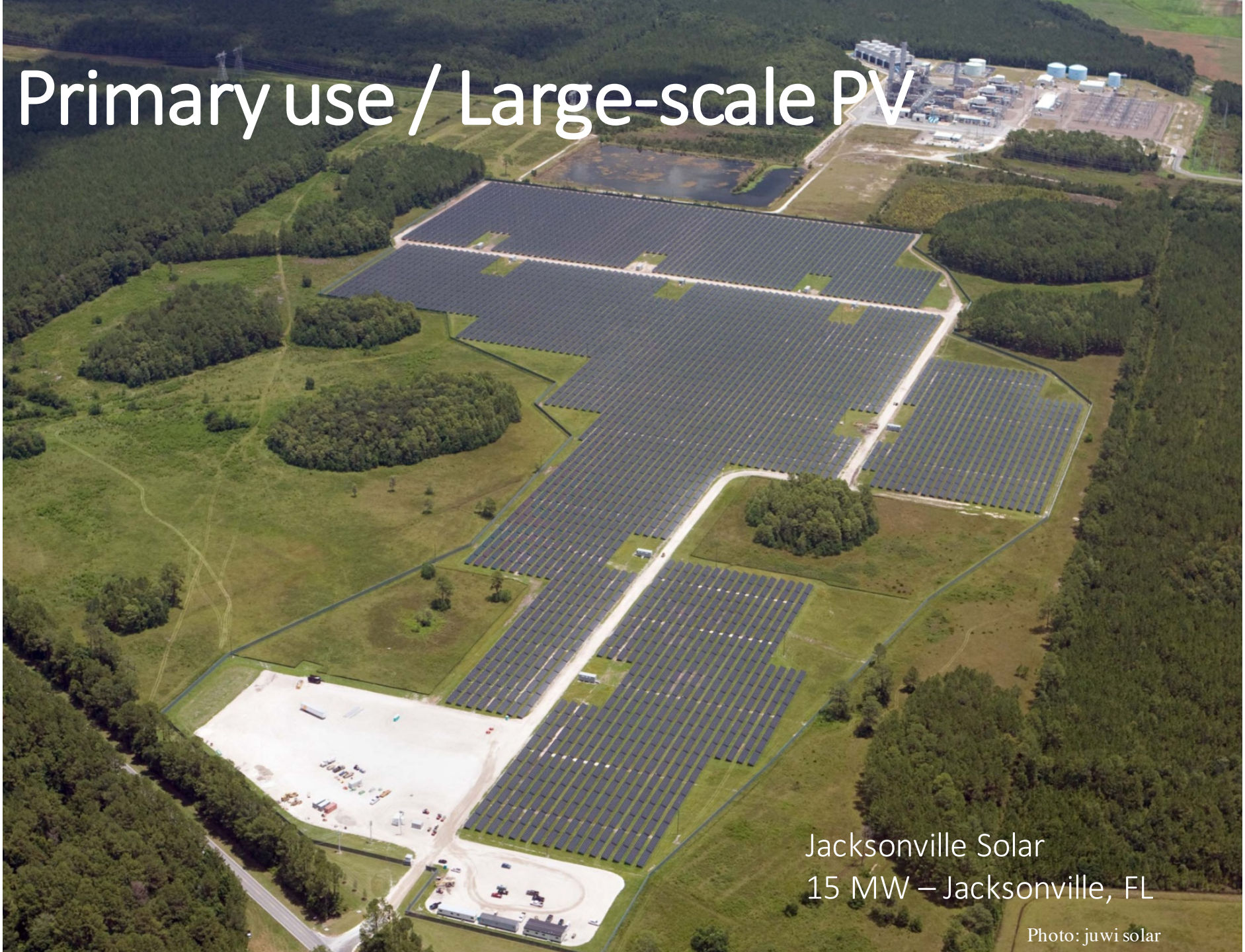
Breckenridge, CO

Within the Conservation District: Solar panels and solar devices are encouraged to be installed on a non-historic building or building addition and integrated into the building design.

More than 2,400 local jurisdictions have historic preservation ordinances. (www.nps.gov/nr/)

Example:
PZD-4 Provide clear guidance for solar in historic and special-use districts (10 points)

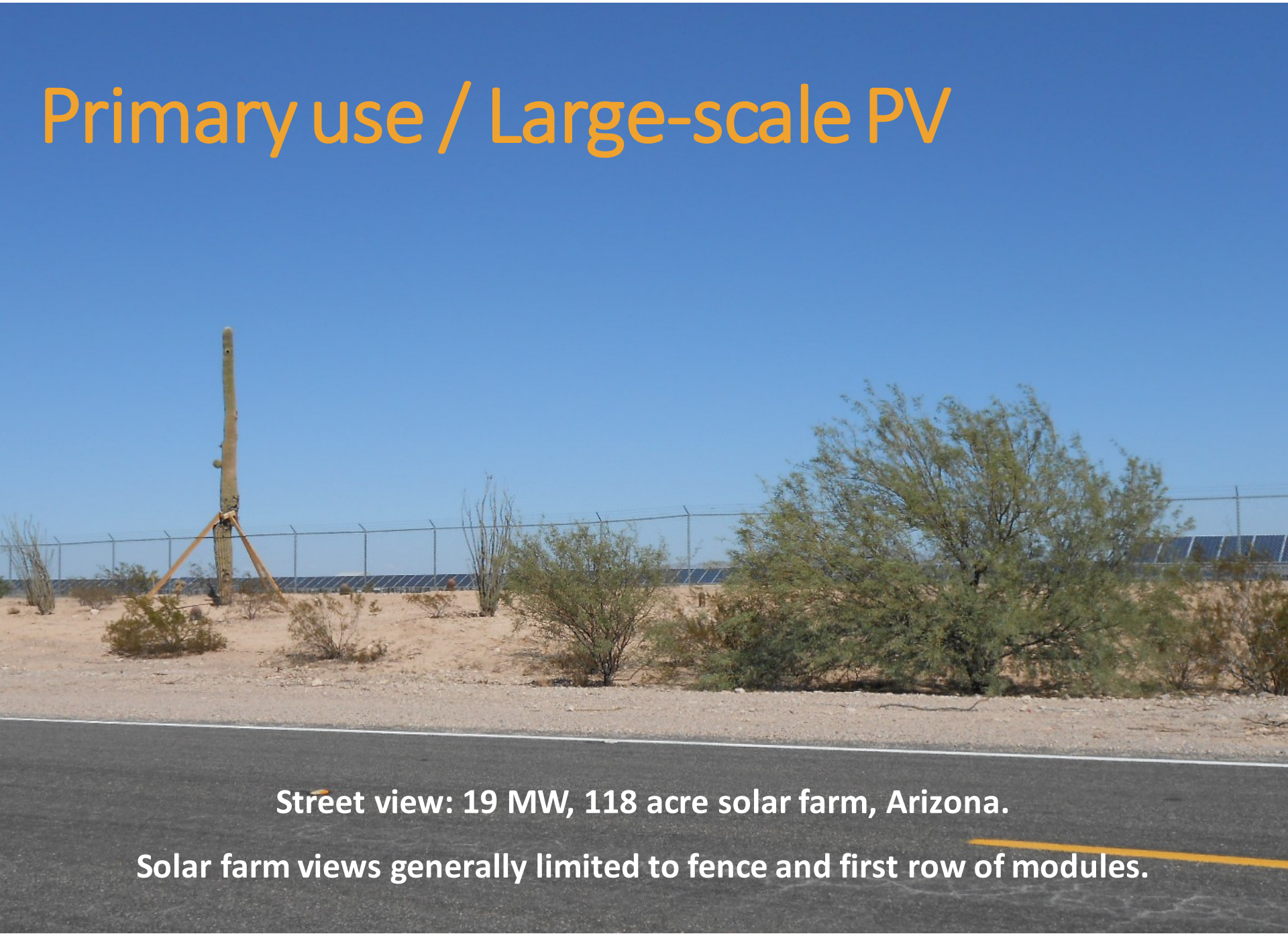
Primary use / Large-scale PV



Jacksonville Solar
15 MW – Jacksonville, FL

Photo: juwi solar

Primary use / Large-scale PV



Street view: 19 MW, 118 acre solar farm, Arizona.

Solar farm views generally limited to fence and first row of modules.

Primary use / Large-Scale PV

No glare	• Less reflective than water and windows and compatible with nearby residential, office, or aviation uses
Very low noise	• 45 decibels at 10 meters from the inverters, which is slightly less noise than a refrigerator makes
Safe	• Photovoltaic modules are enclosed in glass, carry a 25 year warranty, meet all applicable electrical and safety standards
Low voltage	• Far lower voltage than transmission lines – No EMF impacts

Research on PV Deployment and City-Level Solar Policy

Local solar resources

Google Project Sunroof for cities
https://www.google.com/get/sunroof/data-explorer/

ESTIMATED SOLAR INSTALLATION POTENTIAL

Overall

Total estimated size and solar electricity production of viable roofs for Denver, CO

Roofs	Roofs	Roof space	Capacity	Electricity
63%	111K	151M	2.1K	3M
		sq ft	MW DC	MWh AC per yr

apps1.eere.energy.gov/sled/#/

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

State & Local Energy Data

Toolbox: Learn about community energy actions

Explore how communities have implemented energy policies. Find resources to take action today.

Browse Energy Actions

Small Building Rooftop PV Potential, Denver CO

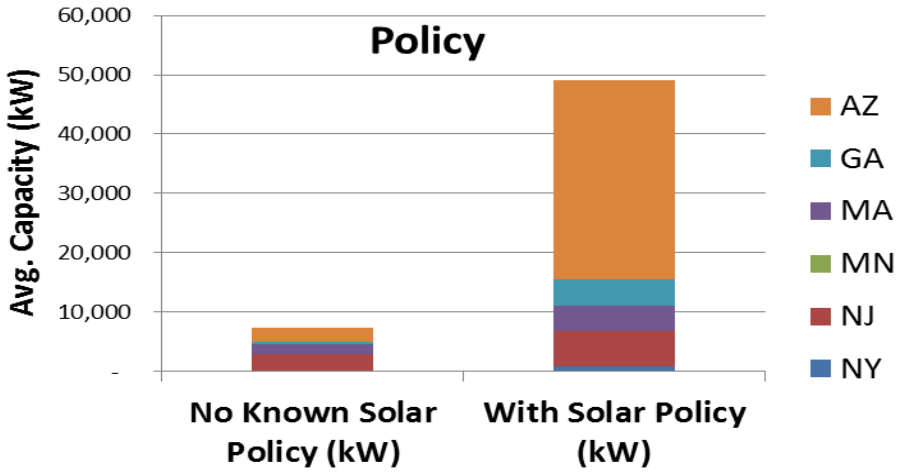
Suitable Small Buildings
108,500 buildings

Unsuitable Small Buildings
64,000 buildings

Suitable area	5,000,000 m2
Capacity potential	700,000 kW
Energy generation potential	1,000,000 MWh

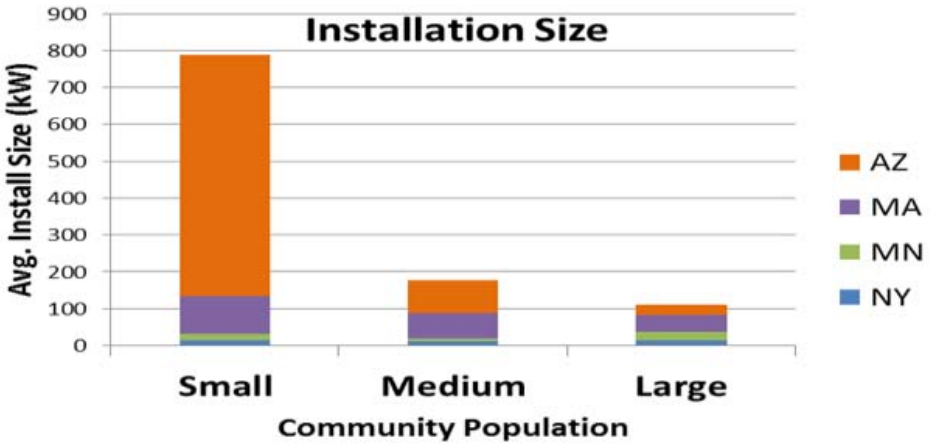
City-Level PV Capacity and Policy Analysis

City-level installed PV capacity was examined for in six states to understand the influence of policy and demographics.



Findings include:

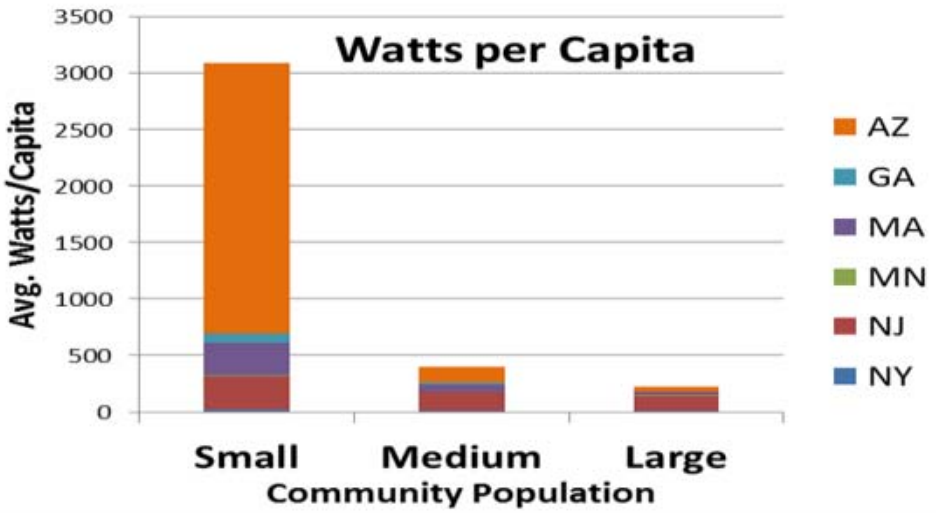
- Adopting solar planning policies and codes is correlated with more installed solar capacity
- Smaller communities tend to have fewer, larger systems

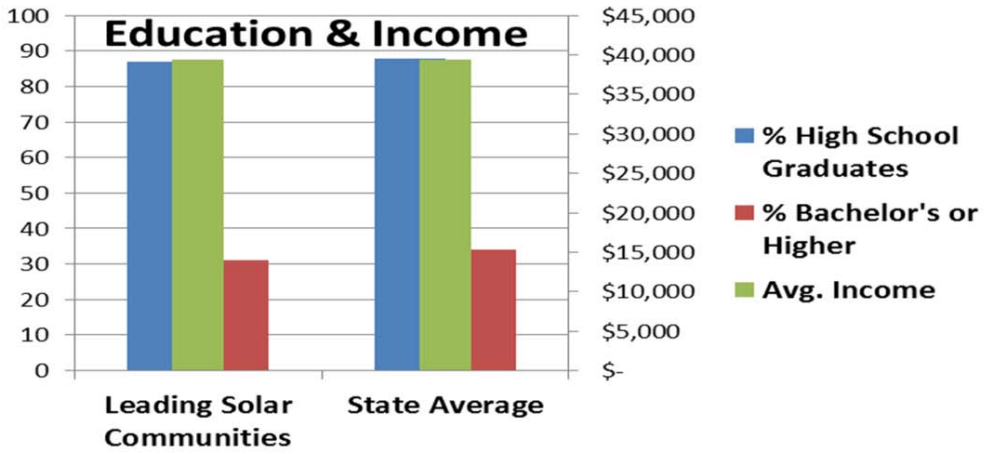


Day, Megan H. "Local Solar: What do leading solar communities have in common?" *Planning* 81, no. 11 (2015): 28-33.
http://www.nrel.gov/docs/fy16osti/64883.pdf

PV Deployment & Education, Income

- Less populous communities tend to have more solar installed per capita
- Communities leading their state in total solar energy generation or watts per capita were, on average, at or slightly below state income and education averages





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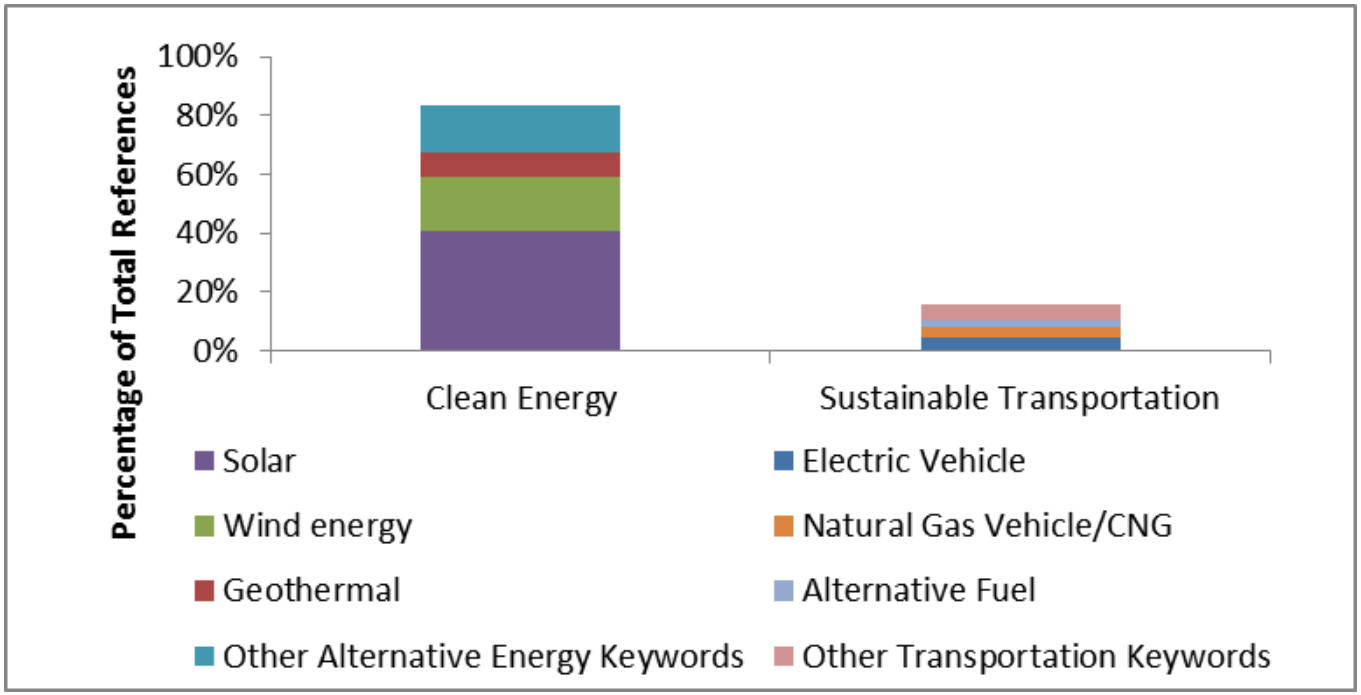
NREL Municipal Code Research

NREL conducted research into clean energy references in municipal codes. Municipalities reference solar in their codes more than any other clean energy term.



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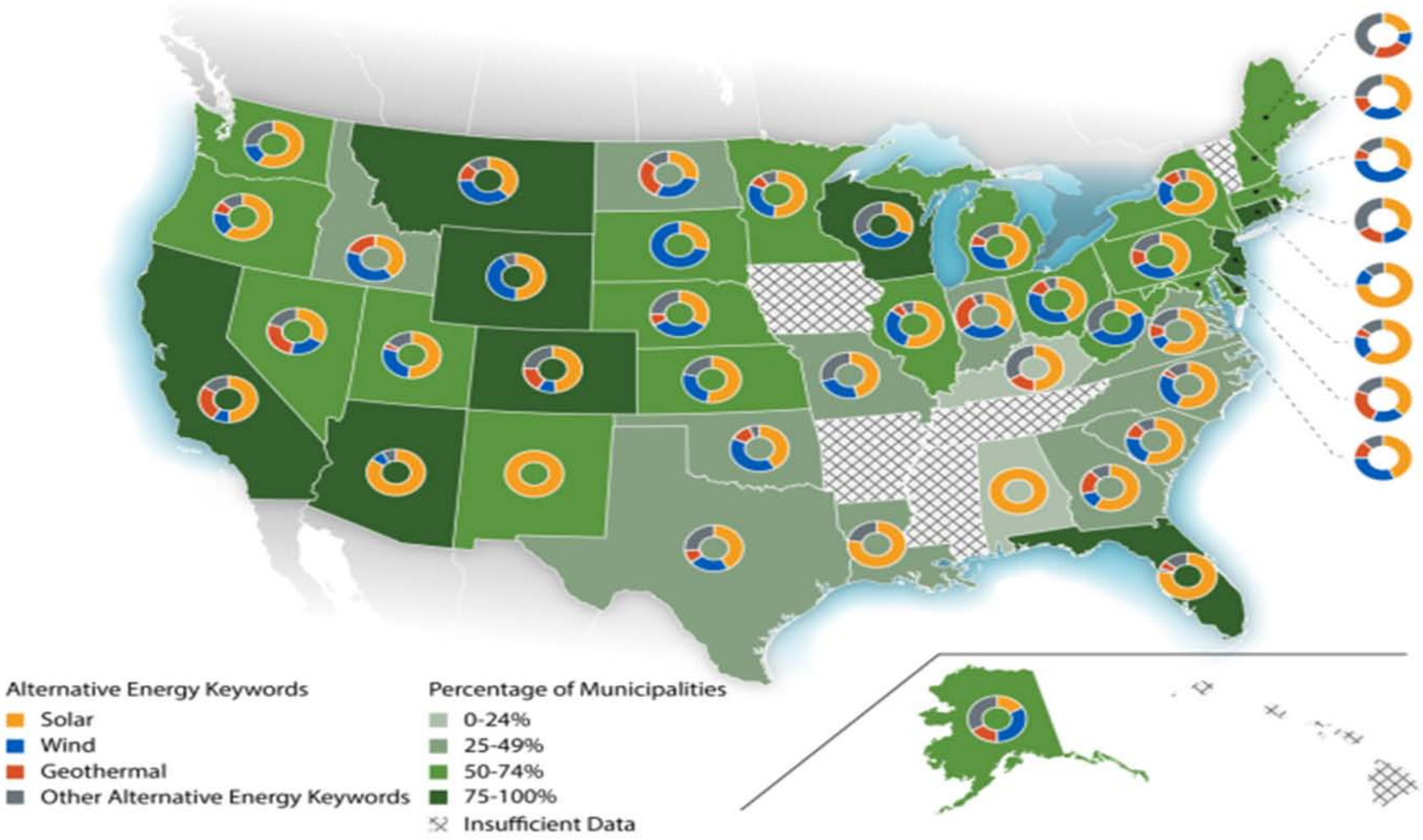
Cook et al. 2016. *Clean Energy in City Codes: A Baseline Analysis of Municipal Codification across the U.S.* NREL-66120. National Renewable Energy Laboratory (NREL), Golden, CO (US). http://www.nrel.gov/docs/fy17osti/66120.pdf

Proportion of municipalities referencing clean energy in codes in each state



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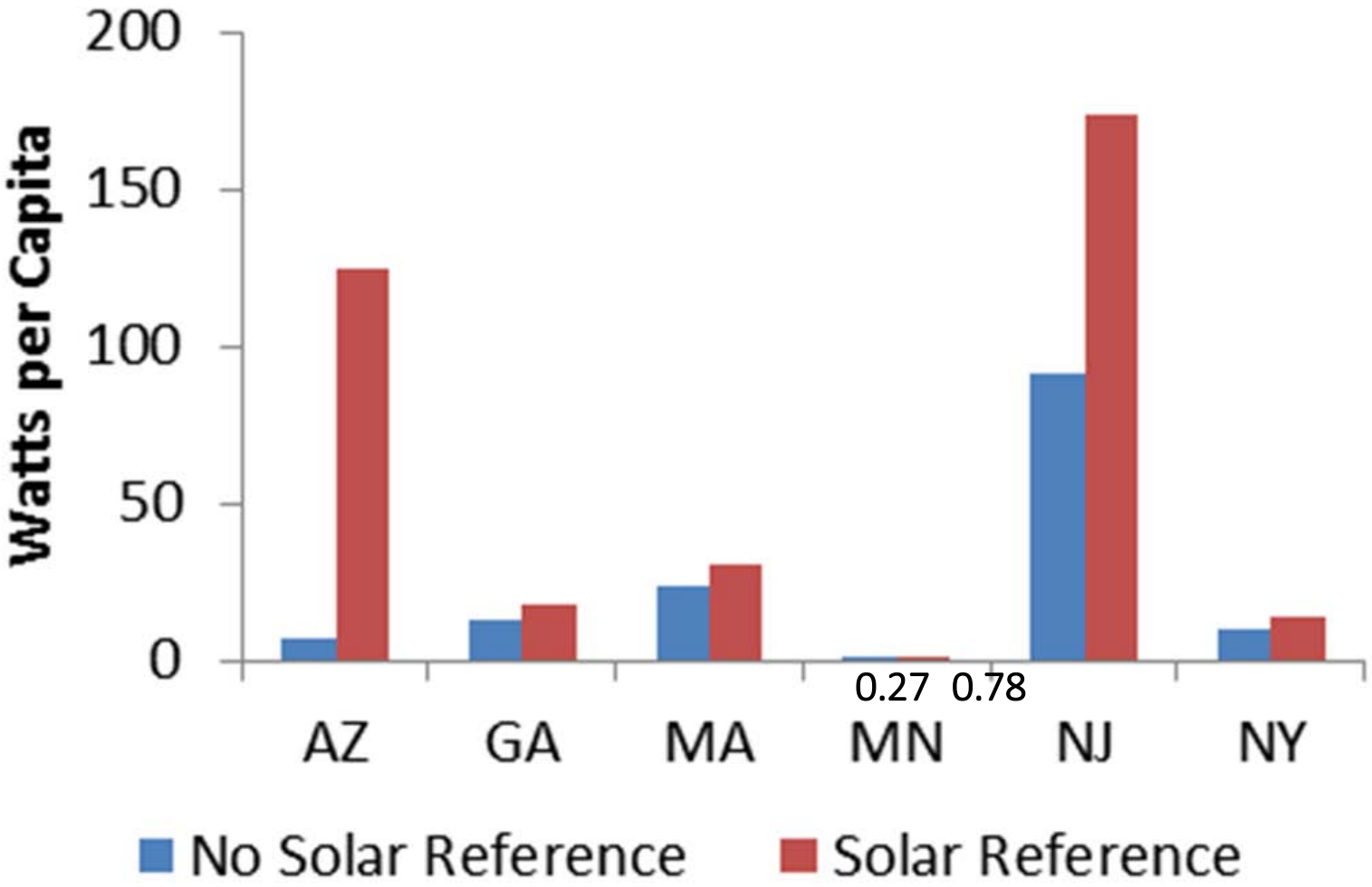
Cook, et all. 2016. *Clean Energy in City Codes: A Baseline Analysis of Municipal Codification across the U.S.* NREL-66120. National Renewable Energy Laboratory (NREL), Golden, CO (US). http://www.nrel.gov/docs/fy17osti/66120.pdf

Municipal PV Deployment Correlation with Solar References in Code



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Cities-LEAP

apps1.eere.energy.gov/sled

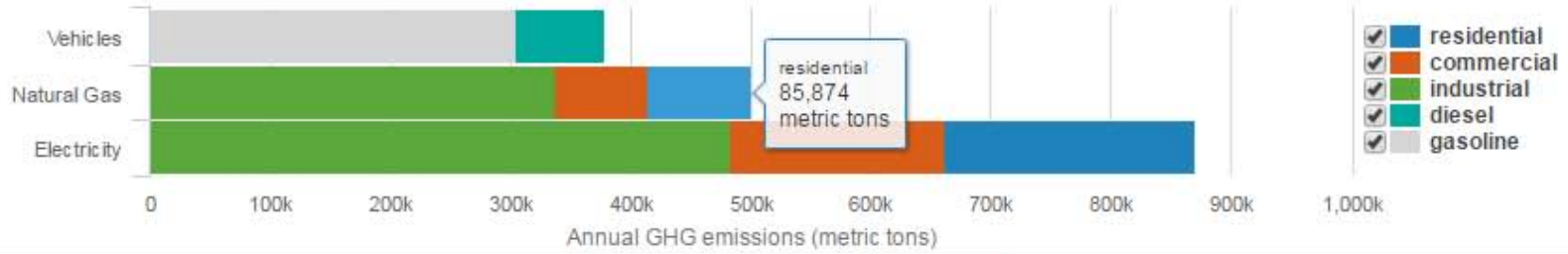
Annual Energy GHG Emissions for Canton, Ohio derived

Total GHG: 1,750,200 metric tons

GHG per capita: 23 metric tons/person

GHG per BTU: 0.10 metric tons/MMBTU

Download Chart

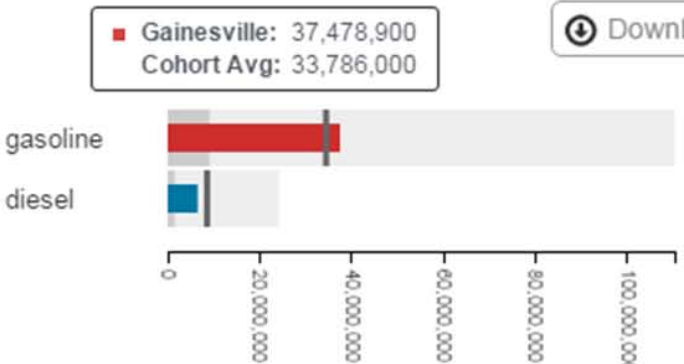


Vehicle Data for Gainesville, Florida in 2013 derived

ON-ROAD VEHICLE FUEL USE (LIGHT, MEDIUM, AND HEAVY DUTY)

(GALLONS)

Download Chart



VEHICLE MILES TRAVELED BY ROAD CLASS

(TOTAL VMT)

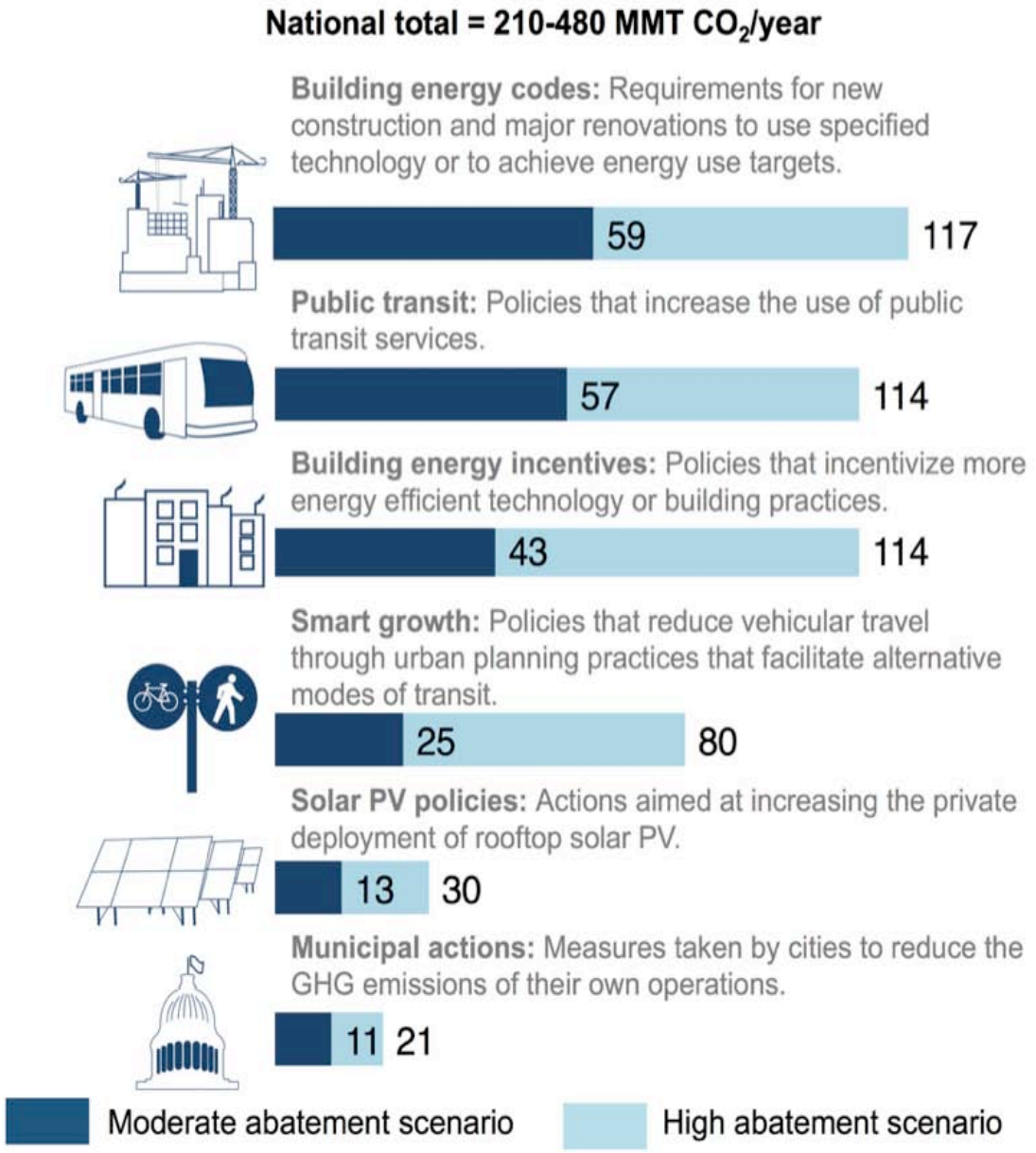
Download Chart

Total VMT = 792,206,200 miles

VMT per capita = 6,400 miles/person

Carbon Pollution Reduction Potential of City Actions

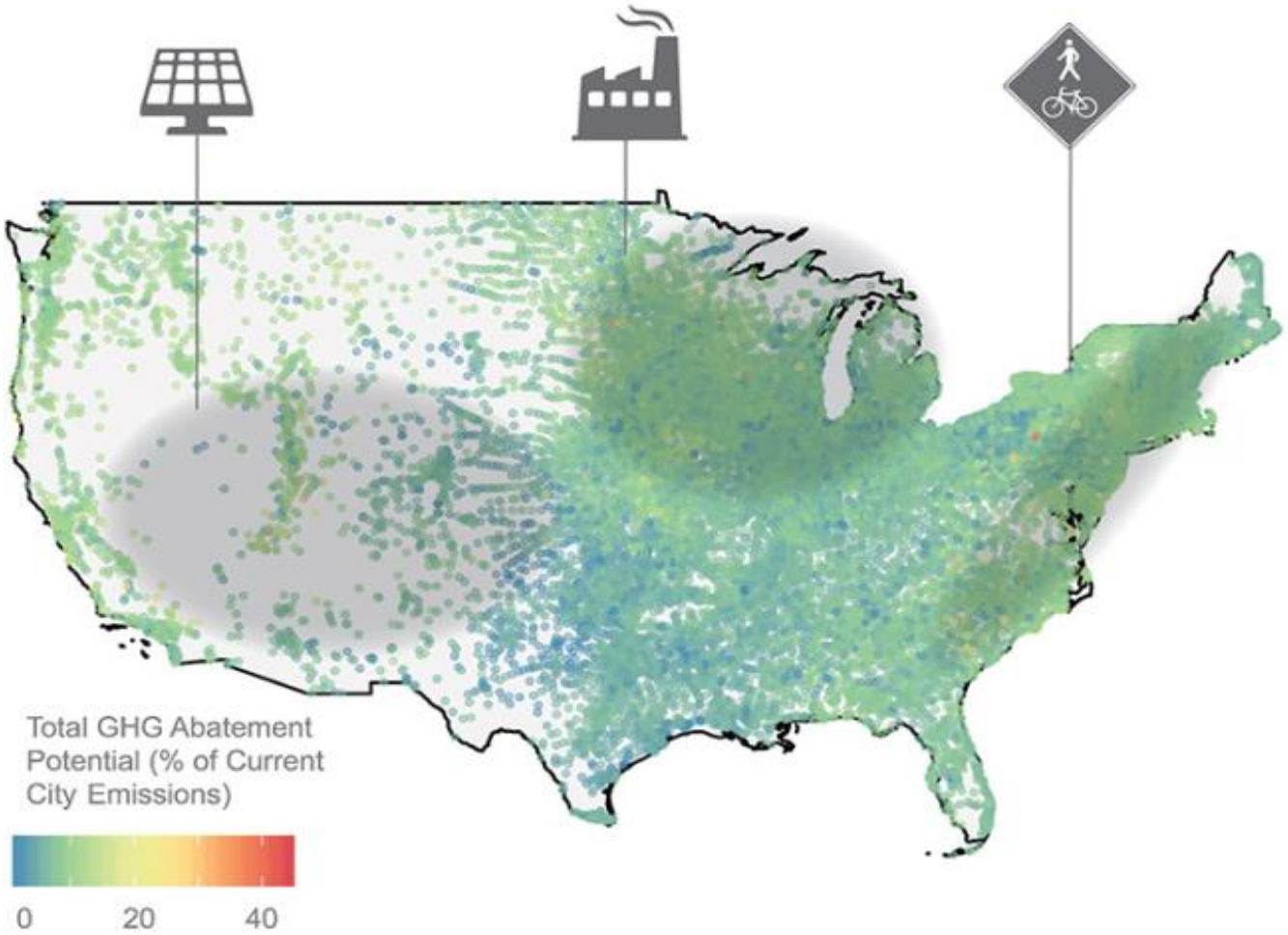
Commonly implemented city actions have the potential to achieve 35% of the remaining US COP21 target



The excellent solar resource in southwestern cities provides an opportunity to use distributed solar PV policies for CO_2 abatement. The CO_2 abatement potential of solar PV policies in Arizona and California was about 20% greater than other cities.[v]

Building energy policies may be more impactful in midwestern and northern cities where buildings use more natural gas for heating during colder winters. The estimated CO_2 abatement potential of building energy requirements is about 50% higher in midwestern cities than other cities.[v]

Transportation-related policies may be more effective in eastern coastal cities where large urban areas result in higher vehicle miles of travel. The estimated CO_2 abatement potential of smart growth policies was about twice as high in eastern coastal cities than other cities.[v]



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