New Partners for Smart Growth
February 4, 2012

Planning for Solar Energy

SunShot Initiative

The U.S. Department of Energy SunShot Initiative is a collaborative national effort to reduce the cost of solar energy by about 75% before the end of the decade. To aggressively drive innovation and make large-scale solar energy systems cost-competitive with other forms of energy, the U.S. Department of Energy (DOE) is supporting efforts by private companies, academia, and national laboratories to reduce the cost of solar electricity to about $0.06 per kilowatt-hour. Part of DOE's larger effort to make solar energy more accessible and affordable, the SunShot Initiative will enable solar-generated power to account for 15%–18% of America's electricity generation by 2030.

SunShot U.S. Department of Energy

ICMA Leaders at the Core of Better Communities

APA American Planning Association Making Great Communities Happen

NARC Building Regional Communities National Association of Regional Councils

ICLEI Local Governments for Sustainability

IREC Interstate Renewable Energy Council

MEISTER CONSULTANTS GROUP

NORTH CAROLINA Solar Center

SEPA solar electric power association

THE SOLAR FOUNDATION

How is the adoption of solar energy related to smart growth?

Photo Credit: City of Milwaukee

Photo Credit: NREL

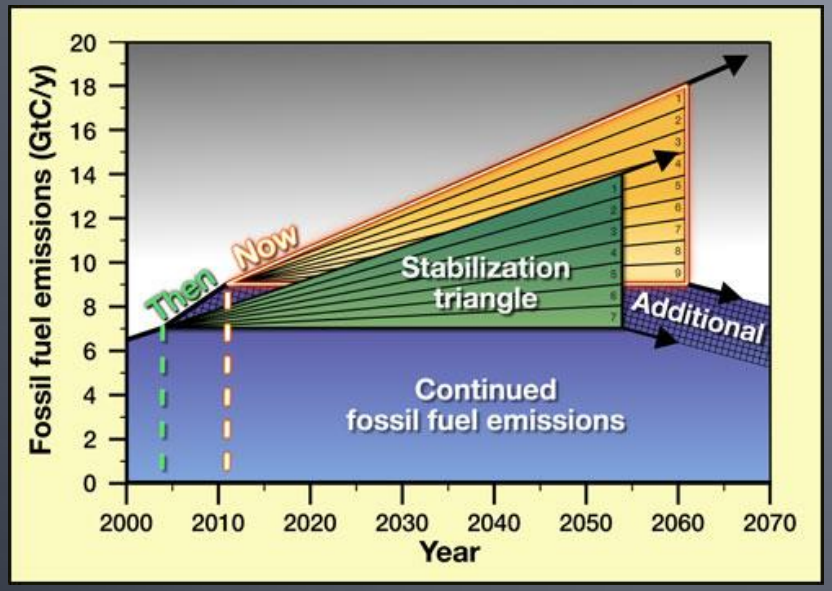
Photo Credit: NREL

How is the adoption of solar energy related to smart growth?

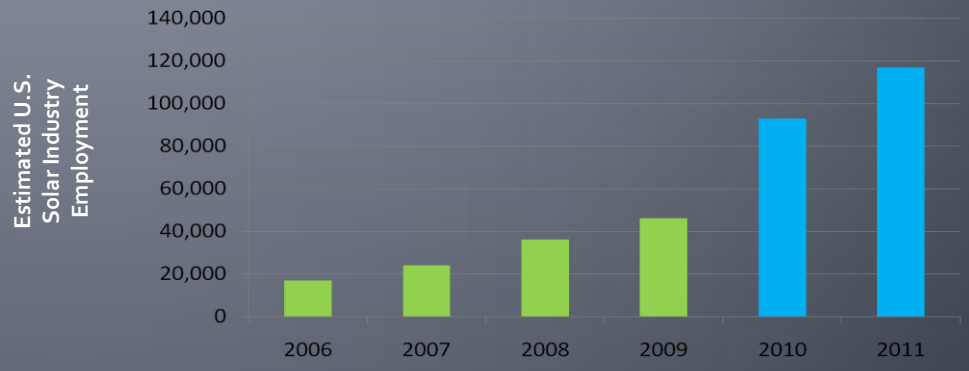
- Can support smart growth goals
- Integrate on existing buildings
- Helps preserve open space & critical environmental areas

How is the adoption of solar energy related to smart growth?

Integration into climate change, energy, and other sustainability goals and use to create local clean technology jobs.



See: http://cmi.princeton.edu/wedges/



Source of information on solar jobs: The Solar Foundation's National Solar Jobs Census 2010

How is the adoption of solar energy related to smart growth?

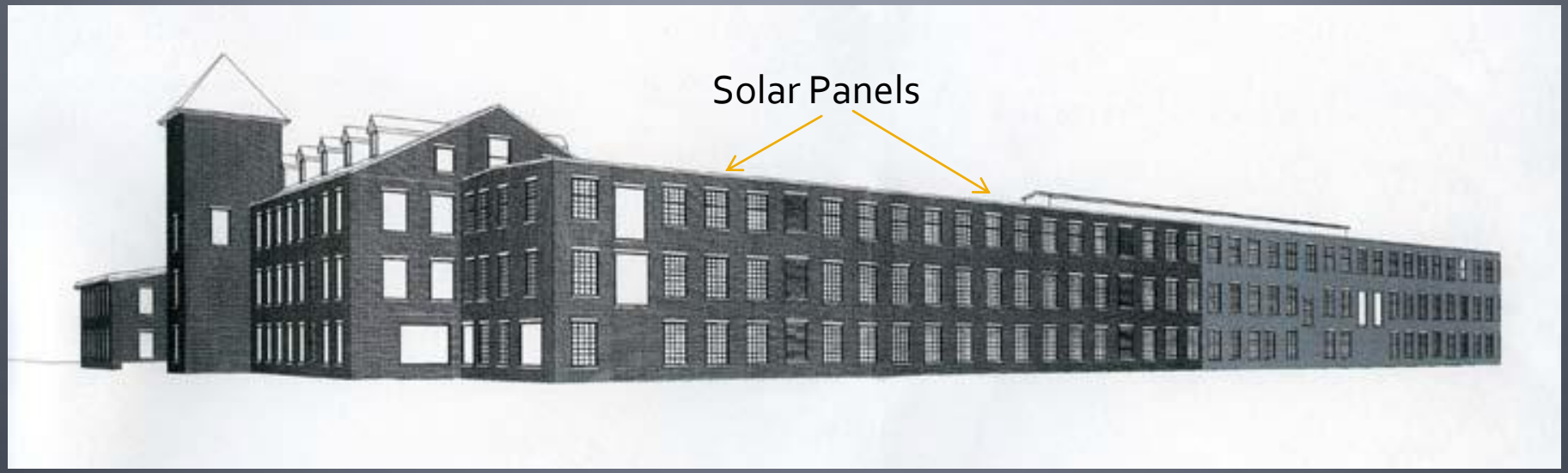


Photo Credit: National Parks Service

Revitalization · Housing · Environment · Business · Economy

What are perceived barriers to solar energy adoption?

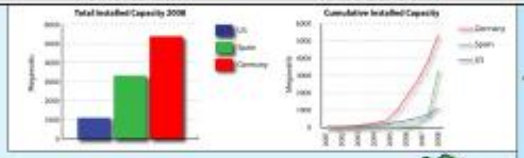
Chad Laurent, Meister Consultants Group

Perceived Barriers

- **It's not sunny enough where I live**
- Solar takes up too much land
- I should wait because a better technology is around the corner
- It's way too expensive

Photovoltaic Solar Resource

The United States of America, Spain and Germany

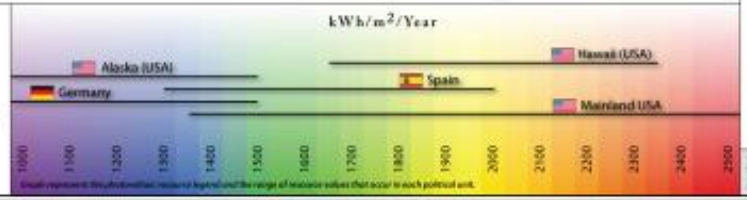


Mainland USA

Hawaii (USA)

Alaska (USA)

- Annual average solar resource data are for a solar collector oriented toward the south at a tilt = local latitude.
- The data for Hawaii and the 48 contiguous states are derived from a model developed at SUNY/Albany using geostationary weather satellite data for the period 1998-2005.
- The data for Alaska are derived from a 40-km satellite and surface cloud cover database for the period 1985-1991 (NREL, 2003).
- The data for Germany and Spain were acquired from the Joint Research Centre of the European Commission and is the yearly sum of global irradiation on an optimally-inclined surface for the period 1981-1990.
- States and countries are shown to scale, except Alaska.



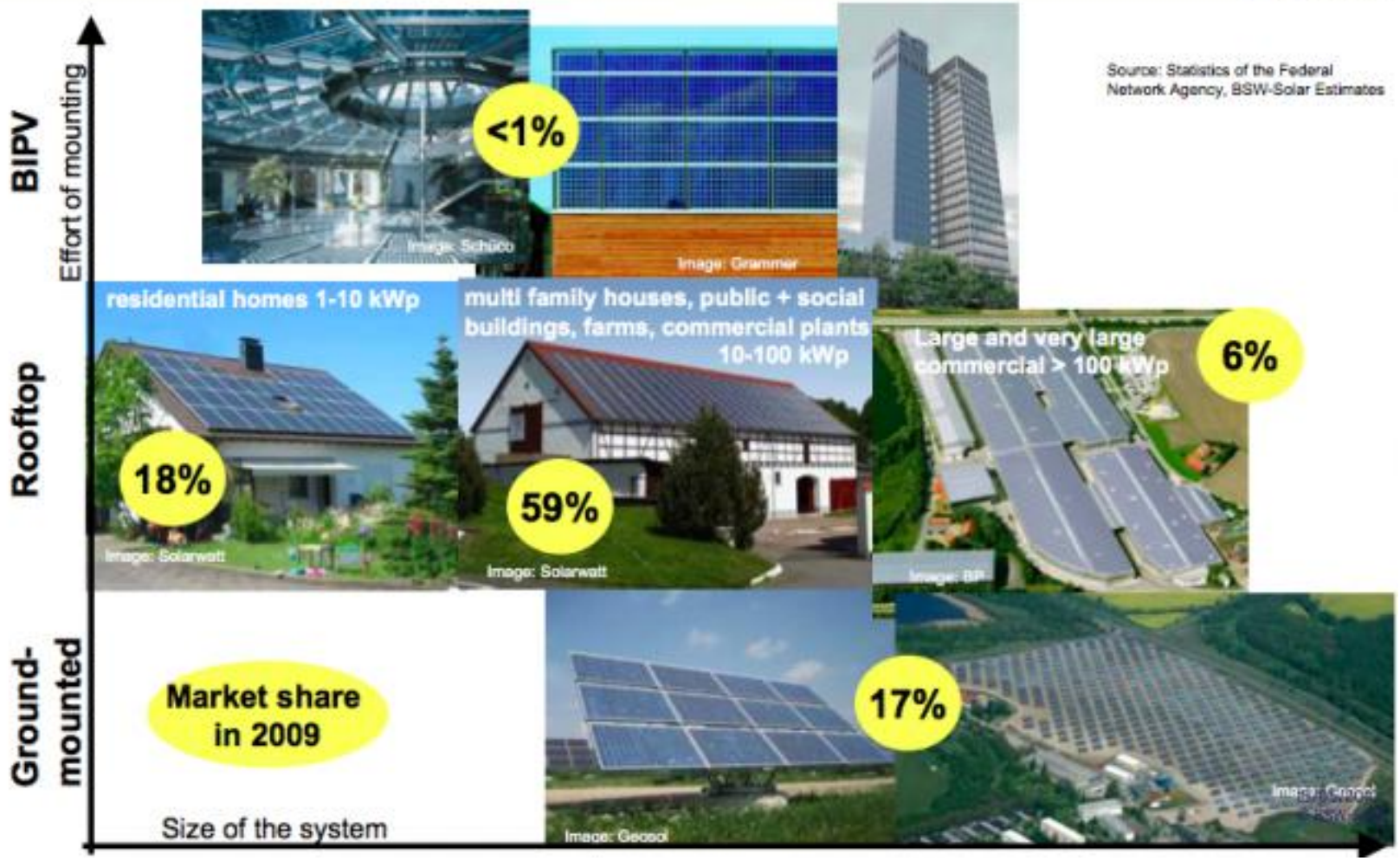
NREL

Perceived Barriers

- It’s not sunny enough where I live
- **Solar takes up too much land**
- I should wait because a better technology is around the corner
- It’s way too expensive

Photo: Walmart Stores seen on Flickr. CC Some rights reserved. Sam's Club in Chino California

Market segments of on-grid PV systems



Perceived Barriers

- It's not sunny enough where I live
- Solar takes up too much land
- **I should wait because a better technology is around the corner**
- It's way too expensive

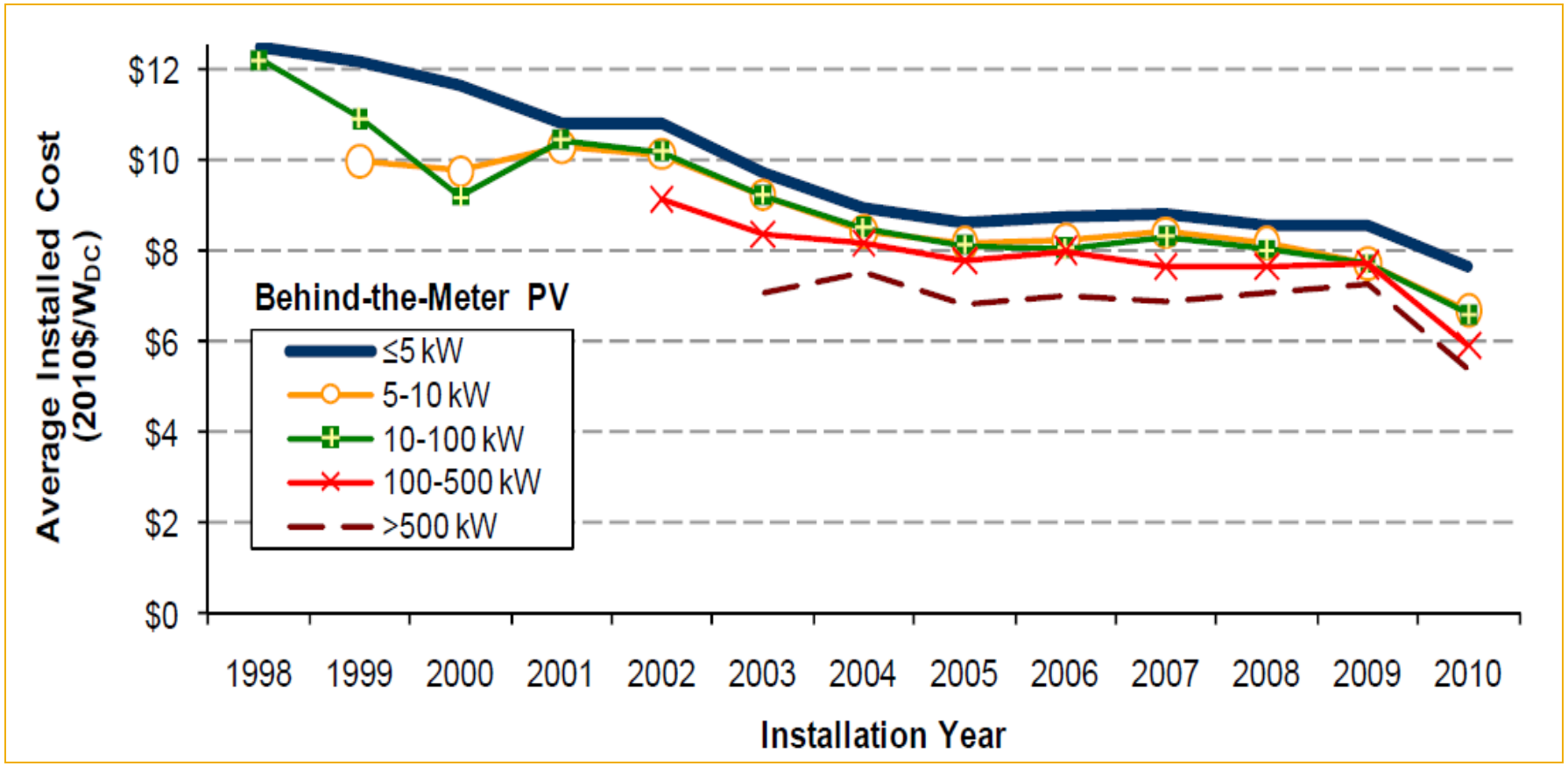
Solar

≠

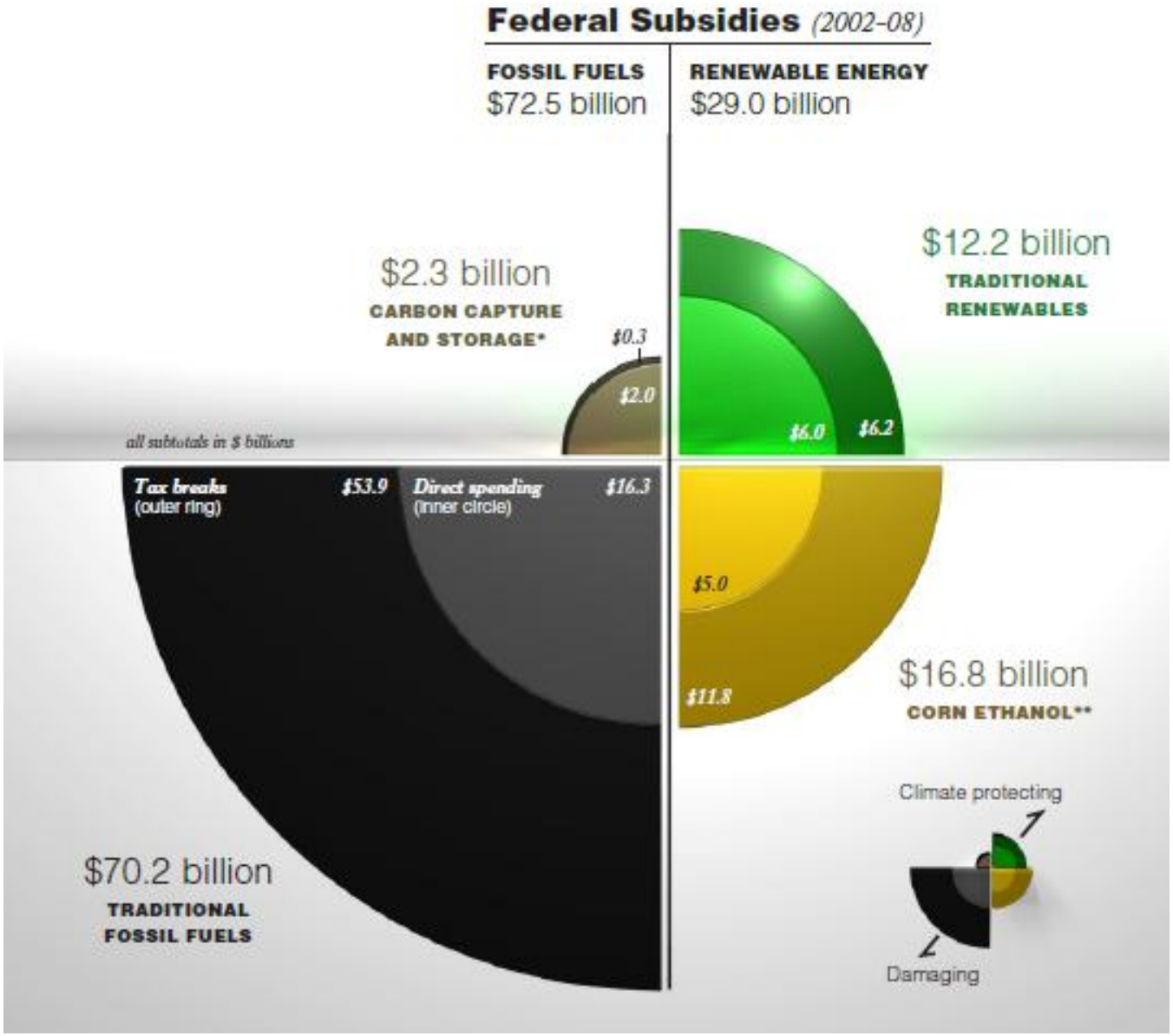
Perceived Barriers

- It's not sunny enough where I live
- Solar takes up too much land
- I should wait because a better technology is around the corner
- **It's way too expensive**

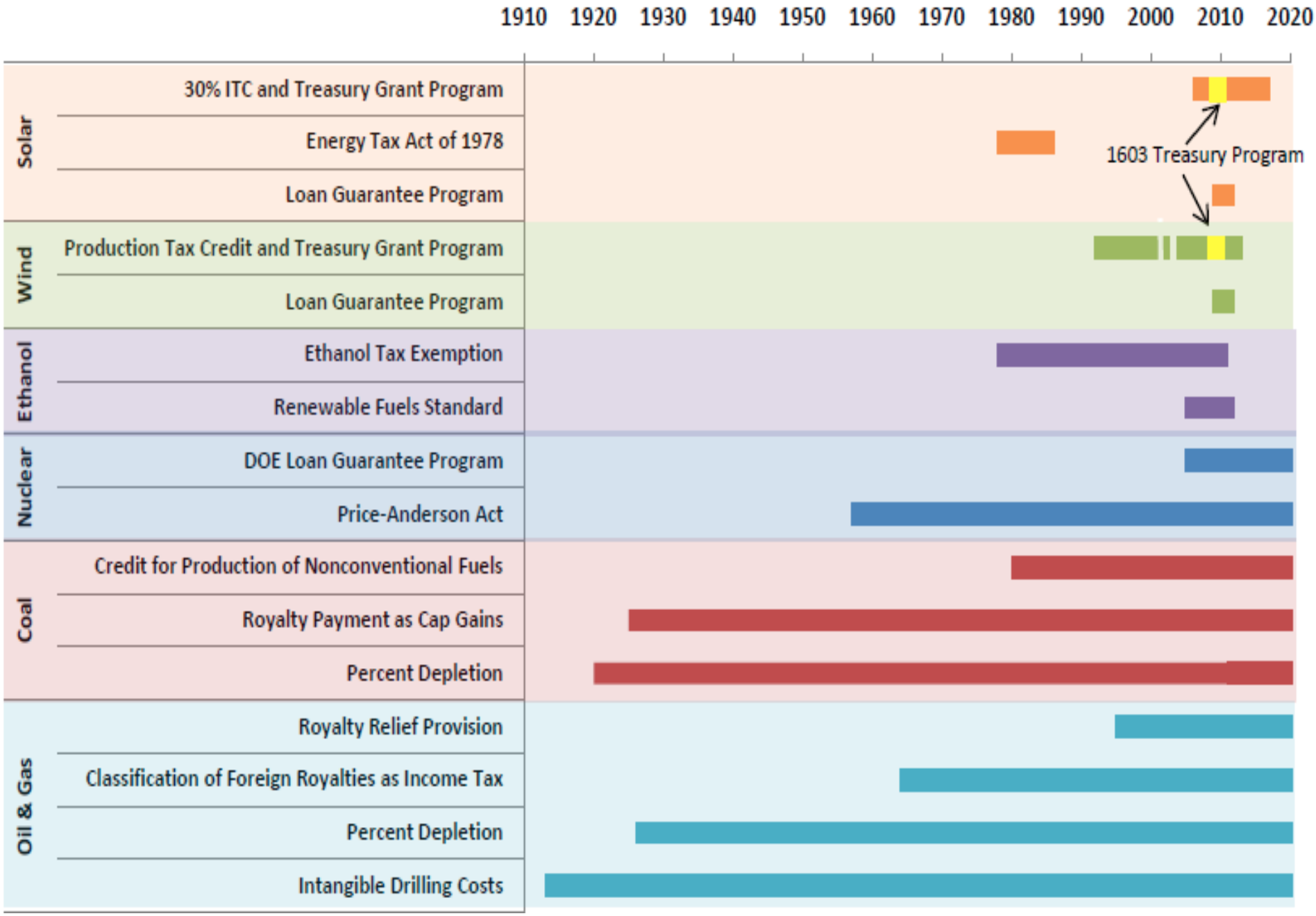
The Cost of Solar is Falling



"Tracking the Sun IV: An Historical Summary of the Installed Cost of Photovoltaics in the United States from 1998 to 2010," by Galen Barbose, Naïm Darghouth, and Ryan Wiser: http://eetd.lbl.gov/ea/emp/reports/lbnl-5047e.pdf.



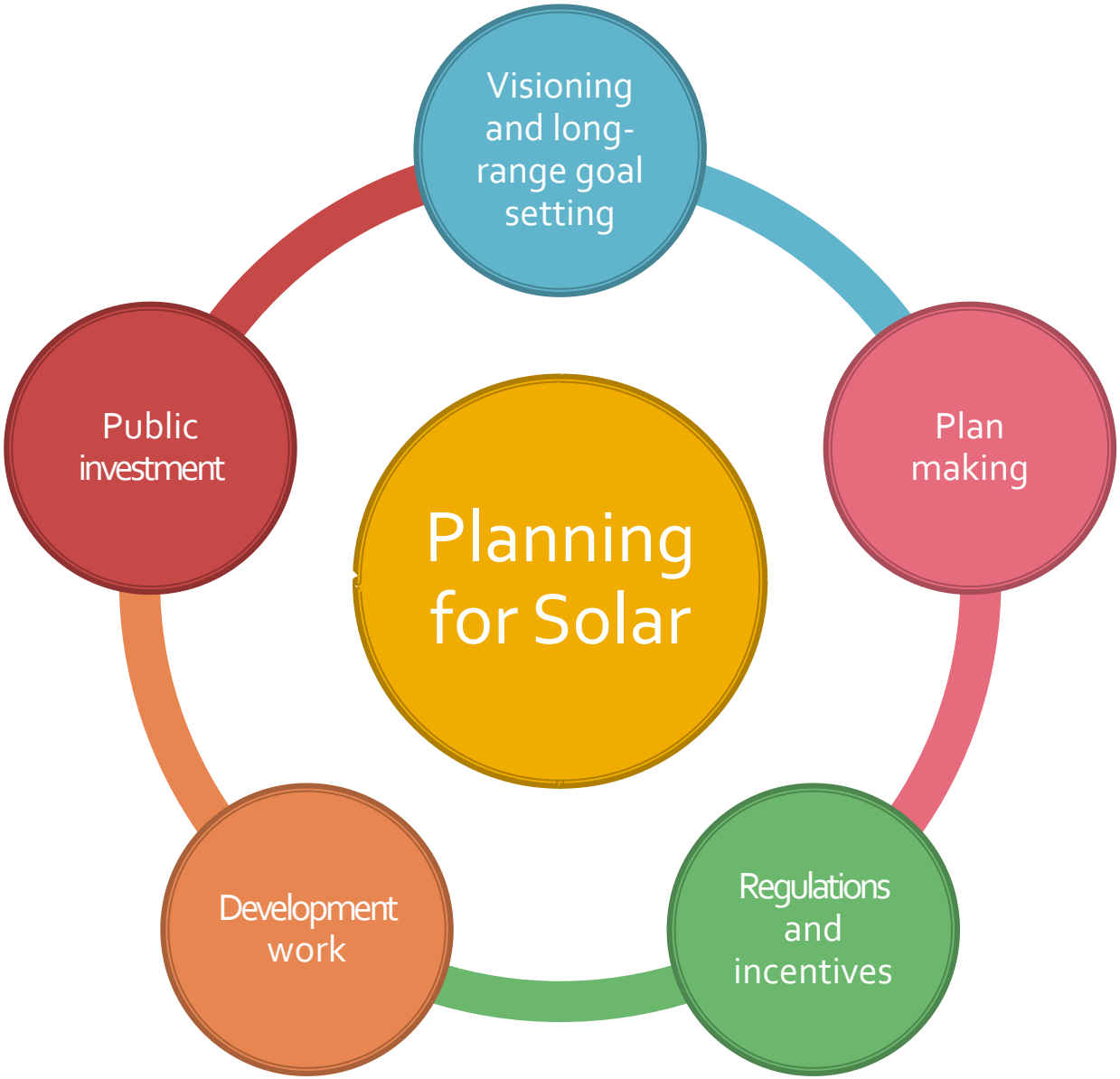
Source: Environmental Law Institute



Source: SEIA, Federal Energy Incentives in the United States (2011), http://www.seia.org/galleries/pdf/Federal_Energy_Incentives_in_the_United_States.pdf

How can solar be integrated into the planning process?

Suzanne Rynne, American Planning Association


Visioning and long-range goal setting
Plan making
Regulations and incentives
Development work
Public investment
Planning for Solar

Visioning and long-range goal setting

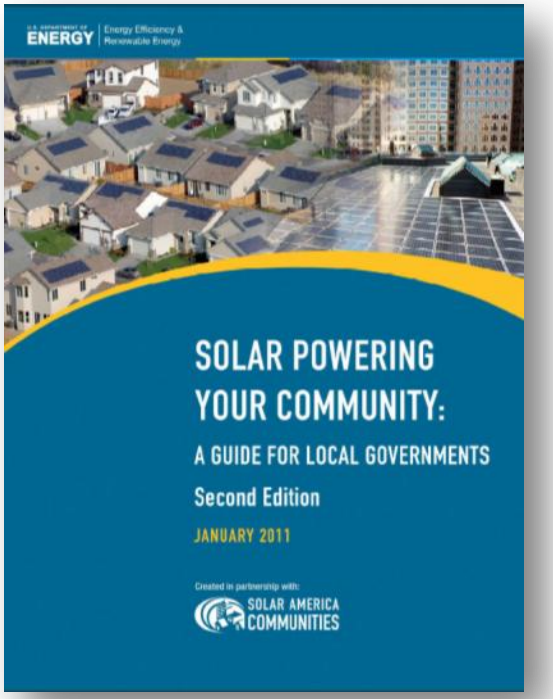
Photo: NREL

Photo: www.solar.calfinder.com

Does solar play a role in the future vision for your community?

Plan Making

- Comprehensive, general, or master planning
- Sub-area plans
- Functional plans



Regulations and Incentives

- Zoning ordinances
- Subdivision ordinances or regulations
- Form based codes
- Planned unit development/ planned residential development ordinances
- Transit oriented development regulations and guidelines
- Historic district architectural or design guidelines
- Transfer of development rights
- Wetlands ordinances
- Tree ordinances

Development Work

Source: www.urbanmilwaukee.com

- Review and approval of development projects
- Public-private development and redevelopment projects
- Development agreements

Public Investment

Infrastructure

- Streets
- Bike paths
- Water systems
- Transit…

Community facilities

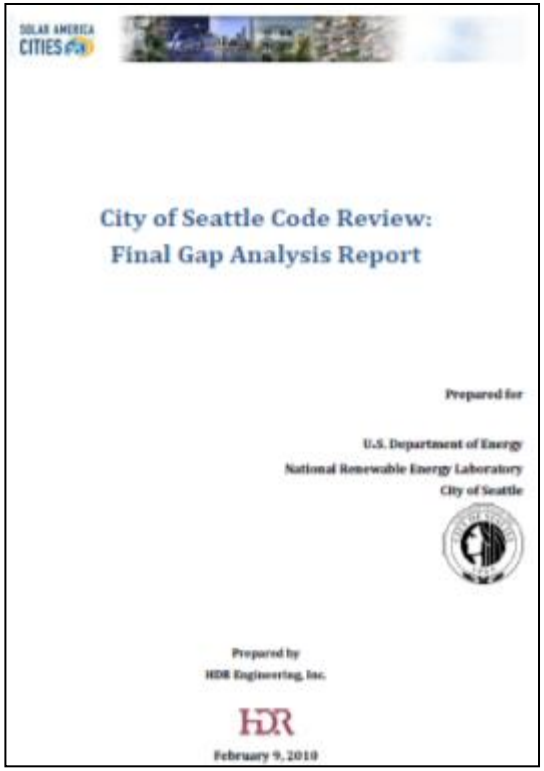
- Schools
- Libraries
- Municipal buildings…

Source: solaramericacommunities.gov

An example:

Seattle, Washington: Review of City Codes and Practices

- Increase/improve building energy standards
- Require solar-ready construction
- Add flexibility to height limits and roof coverage limits
- Develop or refine definitions in the table of uses to ensure that solar energy projects are not unnecessarily prohibited
- Implement a solar access ordinance
- Increase focus on commercial and industrial land use/development



What are actual barriers to solar adoption?

Chad Laurent, Meister Consultants Group

It's unusual to pay for 25 years of electricity up-front

- Up-front cost for residential PV systems can be between $5,000-$15,000 after rebates and incentives.
- I might not stay in my home long enough for the system to payback. 6-15 year payback might seem too long.

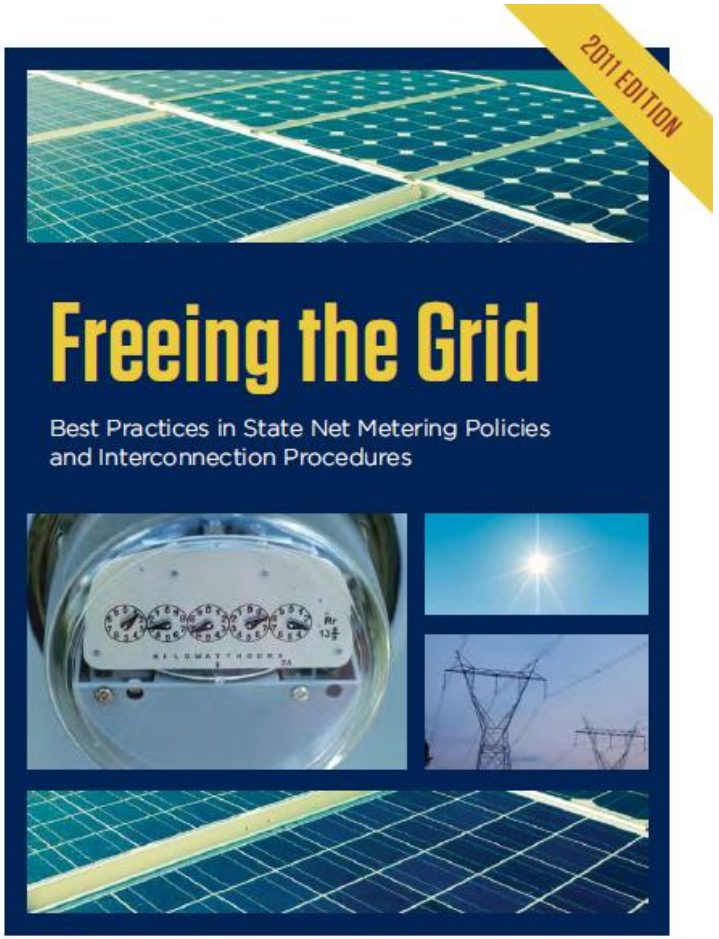
Can I Even Put Solar on My Roof?

- Expensive roof repairs?
- Electrical upgrade?
- Getting everything up-to-code?

Panels on hurricane damaged roof in Florida. From One Block off the Grid:
http://1bog.org/yes-solar-panels-can-survive-a-hurricane/

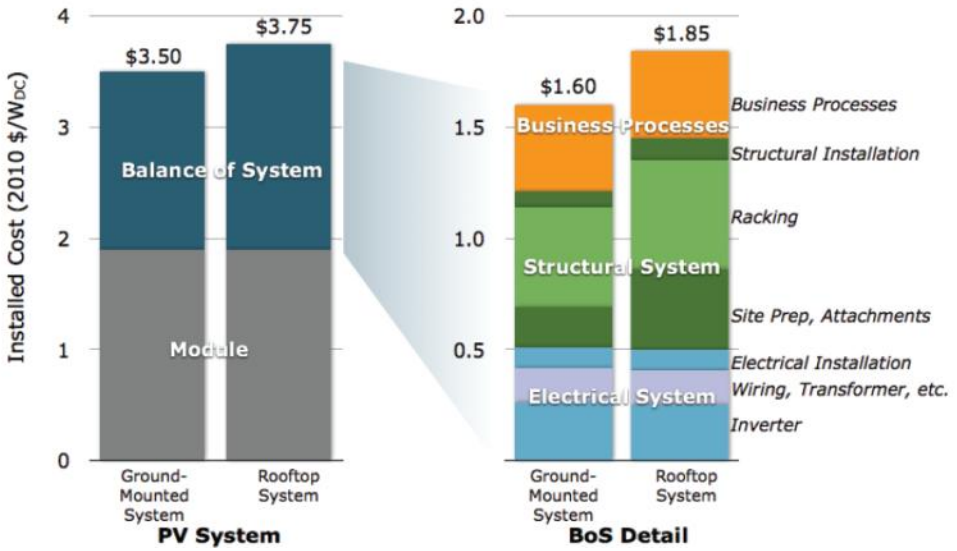
Can I Connect to The Grid?

- Ground level disconnect?
- Can I get net-metering?
- Interconnection costs?



Complex Permitting Processes

- Special permit requirements?
- Fire setbacks?
- Multiple permits and inspections
- Permitting delays
- Local building officials unfamiliar with the technology or local installers



How can barriers to solar be addressed in zoning codes?

Suzanne Rynne, American Planning Association

Zoning Codes

- Typically seen as barrier to solar implementation
- Can be *opportunity* to easily, efficiently incorporate solar with clear provisions

Key Steps

- Remove barriers
- Enact standards
- Create incentives

Enabling Solar Installations

- Encourage solar-oriented lots
- Maximize solar access
- Permitted use in zoning districts

What would be some key considerations when drafting a zoning ordinance?

Considerations When Drafting *Provisions*

- Roof-mounted vs. ground-mounted
- Urban vs. rural location
- Grid-connected vs. off-grid
- Zoning districts (residential, commercial, industrial)
- Form-based code vs. traditional zoning code (focus on use)
- Permitted use, accessory use, or conditional use

Consider What *Standards* May Be Needed

- Height
- Setback
- Visibility
- Coverage
- Plan approval
- Aesthetic conditions
- Safety conditions

How can barriers to solar and historic preservation be addressed ?

Kimberly Kooles, North Carolina Solar Center

Update Preservation Policies

- Historic preservation and sustainability goals *are not* mutually exclusive
- Move away from a culture of saying *"NO"* to a discussion of *"How?"*

Outreach and Education

- Work within communities to *educate property owners* on local preservation policies
- Be *adaptive* to your community's unique historic culture and sustainability goals
- Consistently *train and educate* commissioners

What are key considerations for installing solar on historic properties?

Kimberly Kooles, North Carolina Solar Center

Solar Installations and Historic Preservation

© Fred Shoken

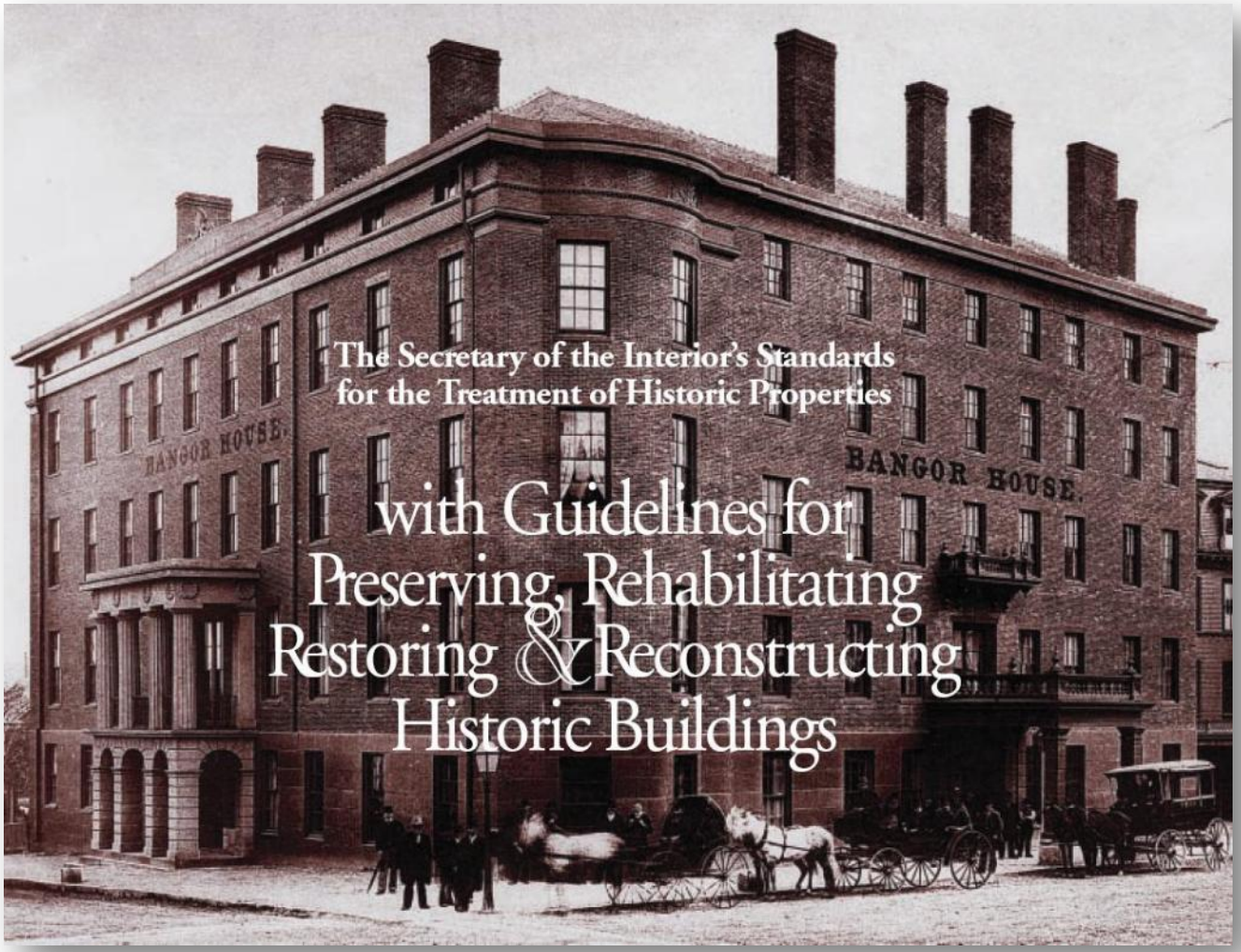
What is Historic Preservation?

© The Downey Historical Conservatory

© Clyde Overcash

© Heather Bartlow

What are the Secretary's Standards?



What is the National Register?

Owners of private property listed in the National Register are **free to maintain, manage, or dispose** of their property as they choose *provided that no Federal monies* are involved.

What is a 'Historic Property'?

Building

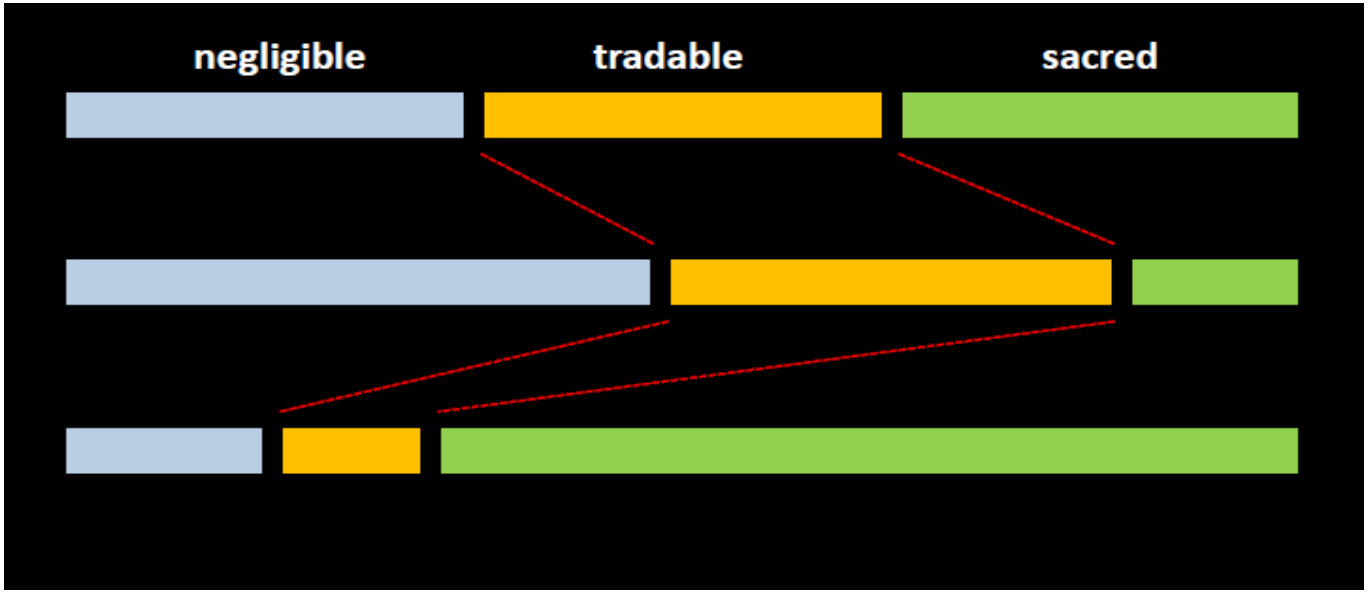
Site

Structure

District

Object

How do We Accommodate a Range in Values?



Bar Graph: Randall Mason, University of Pennsylvania

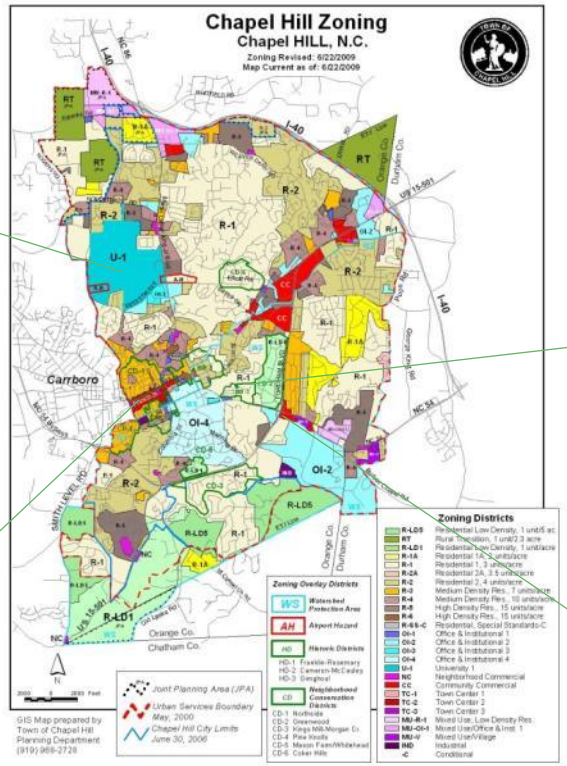
Things to Consider…

New York, New York

Variety in Communities

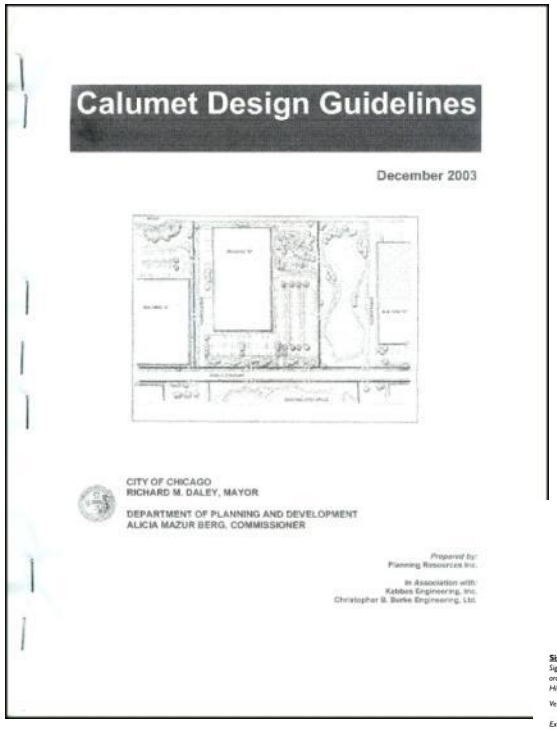
Philipsburg, Montana

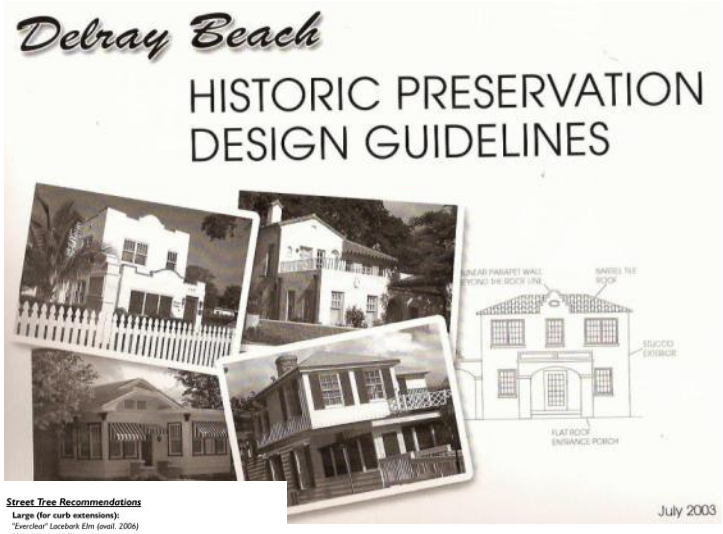
Things to Consider…

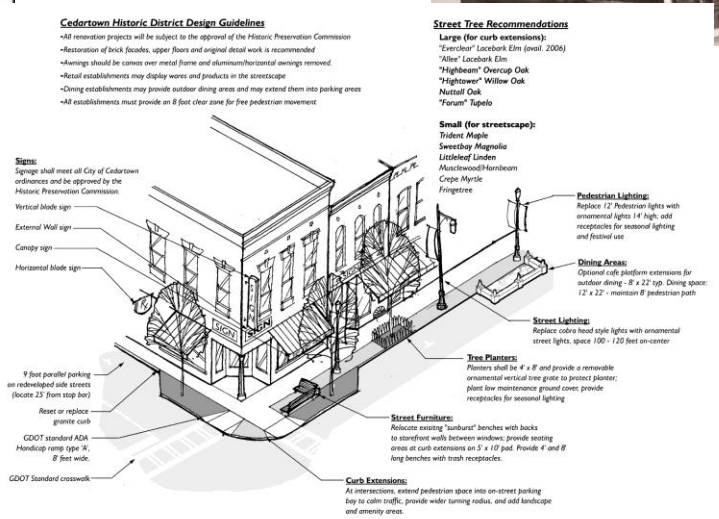


Photos Courtesy of the Town of Chapel Hill, North Carolina

Things to Consider…







Considering
New Construction
Historic Accessory Buildings
Primary Historic Resources
Free Standing Units
Primary Elevation
Not Recommended

What are examples of where solar has been installed on historic properties?

Case Study: Durango, Colorado

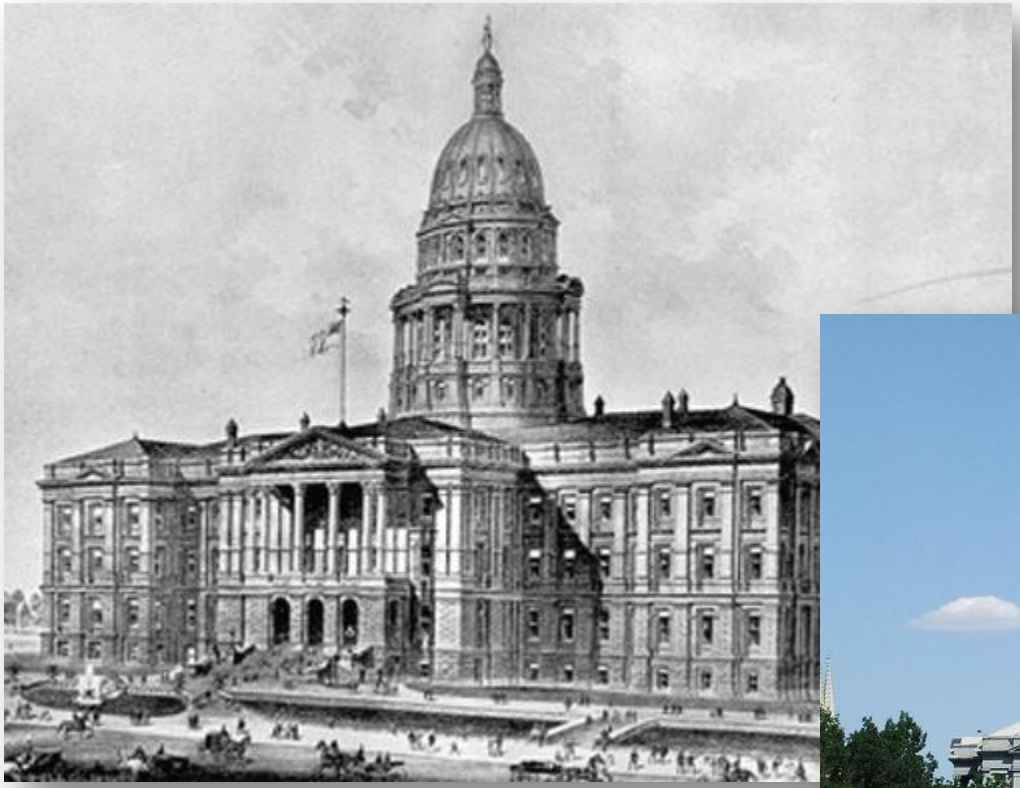
Credit: Smiley Building

Credit: Smiley Building

Case Study: Durango, Colorado

Credit: Smiley Building

Case Study: Denver, Colorado



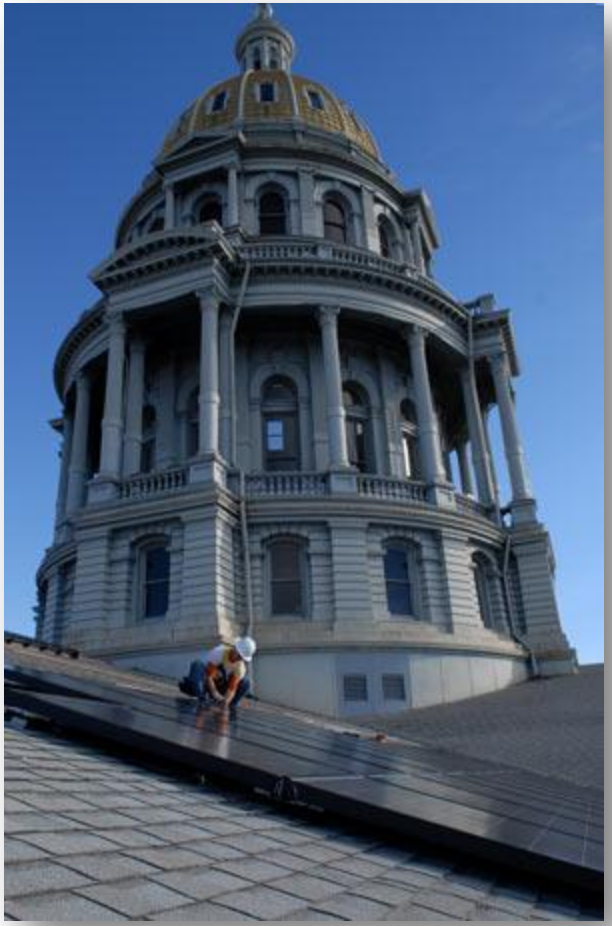
Credit: Colorado State Archives

Credit: Squidoo

Case Study: Denver, Colorado

Credit: Denver Post, Brian Brainerd

Case Study: Denver, Colorado



Credit: Bella Solar

Credit: Eliza Hotchkiss, NREL/PIX 18594

What resources are available?

Resources

- National Parks Service, *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings*
  http://www.nps.gov/tps/standards/rehabilitation/sustainability-guidelines.pdf
- National Trust for Historic Preservation, Solar Panels and Historic Preservation
  http://www.preservationnation.org/issues/sustainability/solar-panels/
- National Alliance of Preservation Commissions. *Sample Guidelines for Solar Panels in Historic Districts*
  http://www.preservationnation.org/issues/sustainability/solar-panels/additional-resources/NAPC-Solar-Panel-Guidelines.pdf
- National Renewable Energy Laboratory, *Implementing Solar PV Projects on Historic Buildings and in Historic Districts*
  http://www.nrel.gov/docs/fy11osti/51297.pdf

Resources

- Solar Powering Your Community: A Guide for Local Governments (2011)
  http://solaramericacommunities.energy.gov/resources/guide_for_local_governments/
- Planning and Zoning for Solar Energy Essential Info Packet
  http://www.planning.org/pas/infopackets/open/eip30.htm
- Solar Energy Standards in *From Policy to Reality: Updated Model Ordinance for Sustainable Development*
  http://www.crplanning.com/pdfs/susdo6_09/solar.pdf
- *Site Design Strategies for Solar* Access in the Sustainable Community Development Code Framework
  http://law.du.edu/documents/rmlui/sustainable-development/SolarAccess.pdf

Ask About Planning For Solar Energy

Ask APA's Planning Advisory Service Inquiry Answer Service about Planning for Solar Energy!

Email pas@planning.org with subject line "Solar Energy Inquiry"

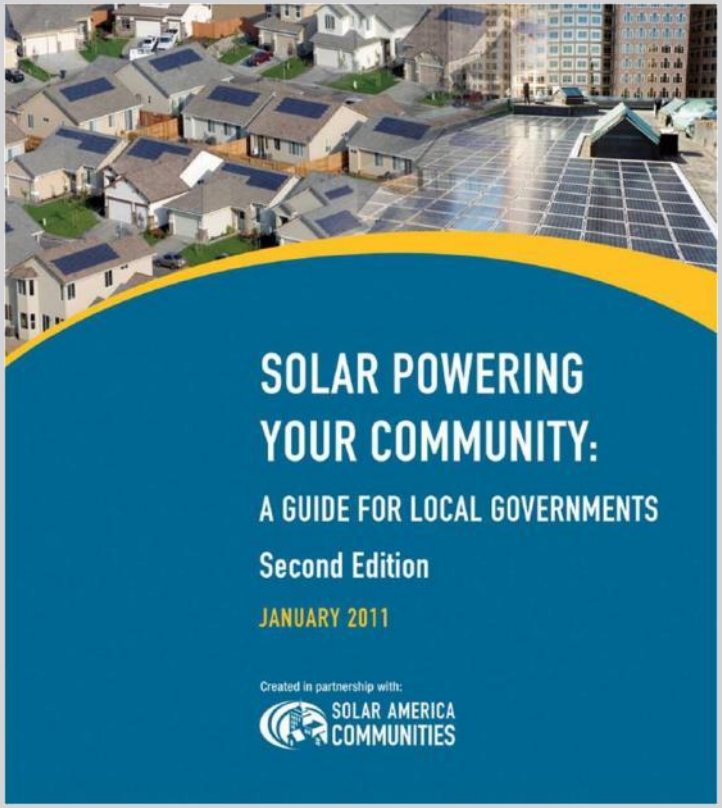
Contact Information

Kimberly Kooles
NC Solar Center
kim_kooles@ncsu.edu

Chad Laurent
Meister Consultants Group
Chad.laurent@mc-group.com

Suzanne Rynne
American Planning Association
srynne@planning.org

www.energy.gov/SunShot



www.solaramericacommunities.energy.gov
www.energy.gov/SunShot