

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.



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



Photo Credit: City of Milwaukee



Photo Credit: NREL



Photo Credit: NREL

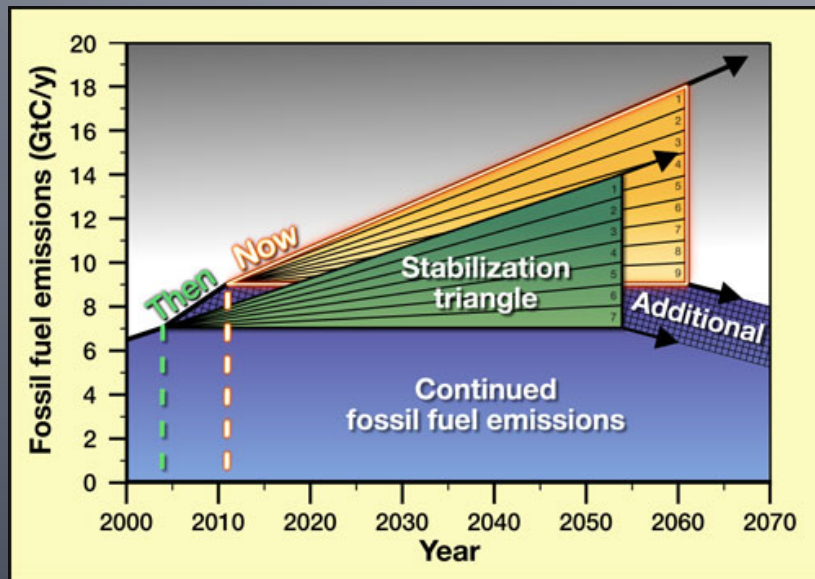
How is the adoption of solar energy related to smart growth?

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



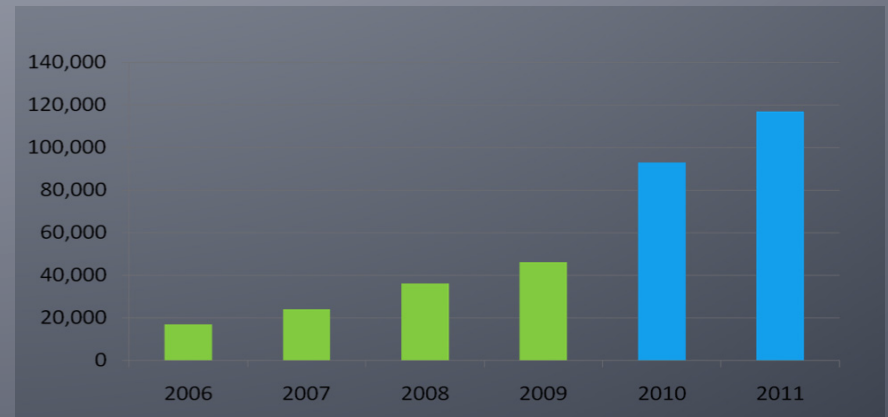
How is the adoption of solar energy related to smart growth?

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



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

Estimated U.S.
Solar Industry
Employment



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?

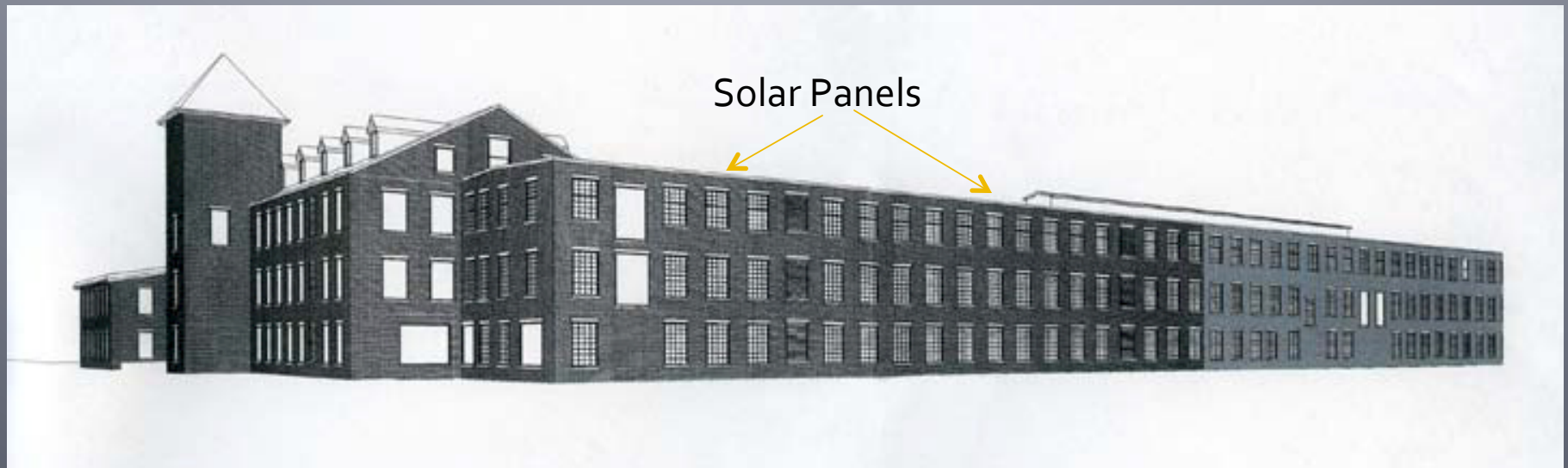


Photo Credit: National Parks Service

Revitalization · Housing · Environment · Business · Economy

What are perceived barriers to solar energy adoption?

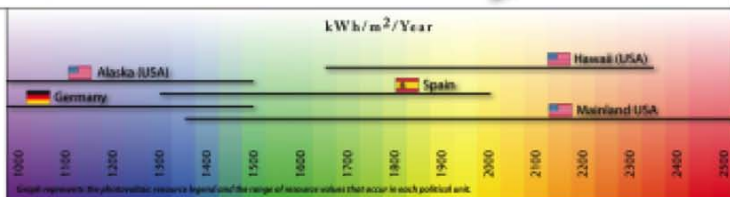
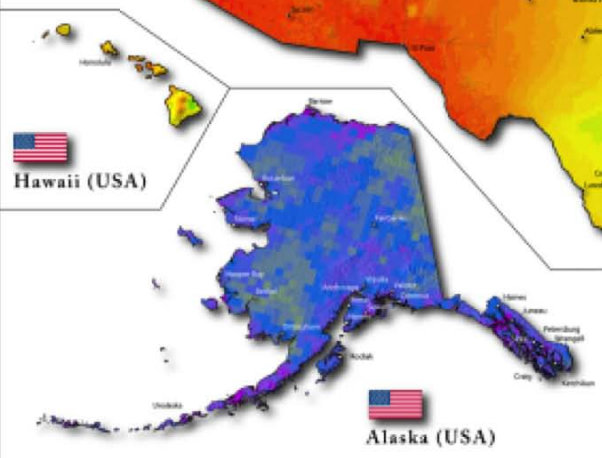
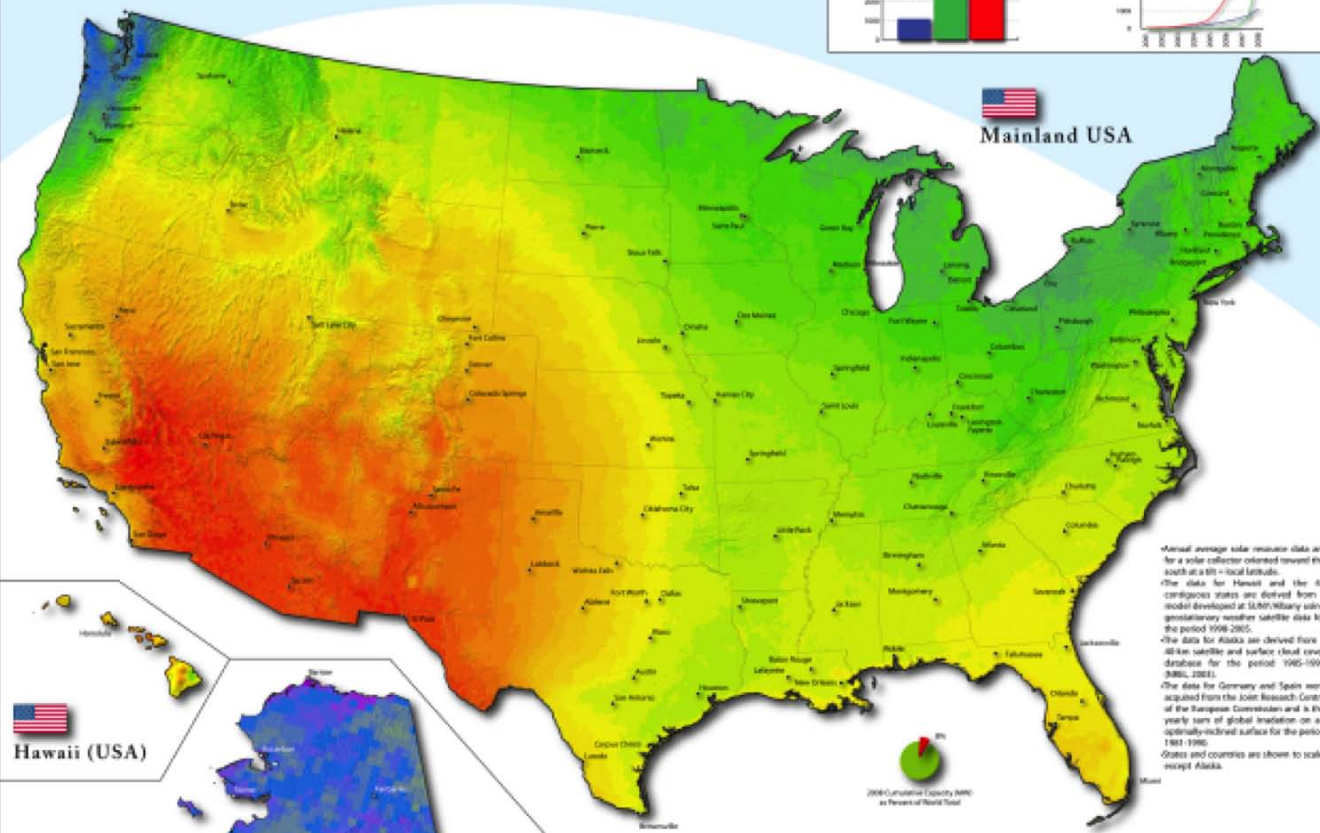
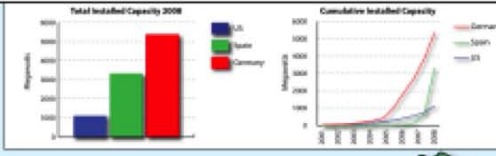
Chad Laurent, Meister Consultants Group

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



Annual average solar insolation data are for a solar collector oriented toward the south at a 60° local latitude.
 The data for Hawaii and the 48 contiguous states are derived from a model developed at NREL using geostationary satellite data for the period 1998-2005.
 The data for Alaska are derived from a 30 km satellite and surface local cover database for the period 1992-1999 (NREL, 2001).
 The data for Germany and Spain were acquired from the Joint Research Centre of the European Commission and the yearly sum of global insolation on an optimally-inclined surface for the period 1981-1990. States and countries are shown to scale, except Alaska.

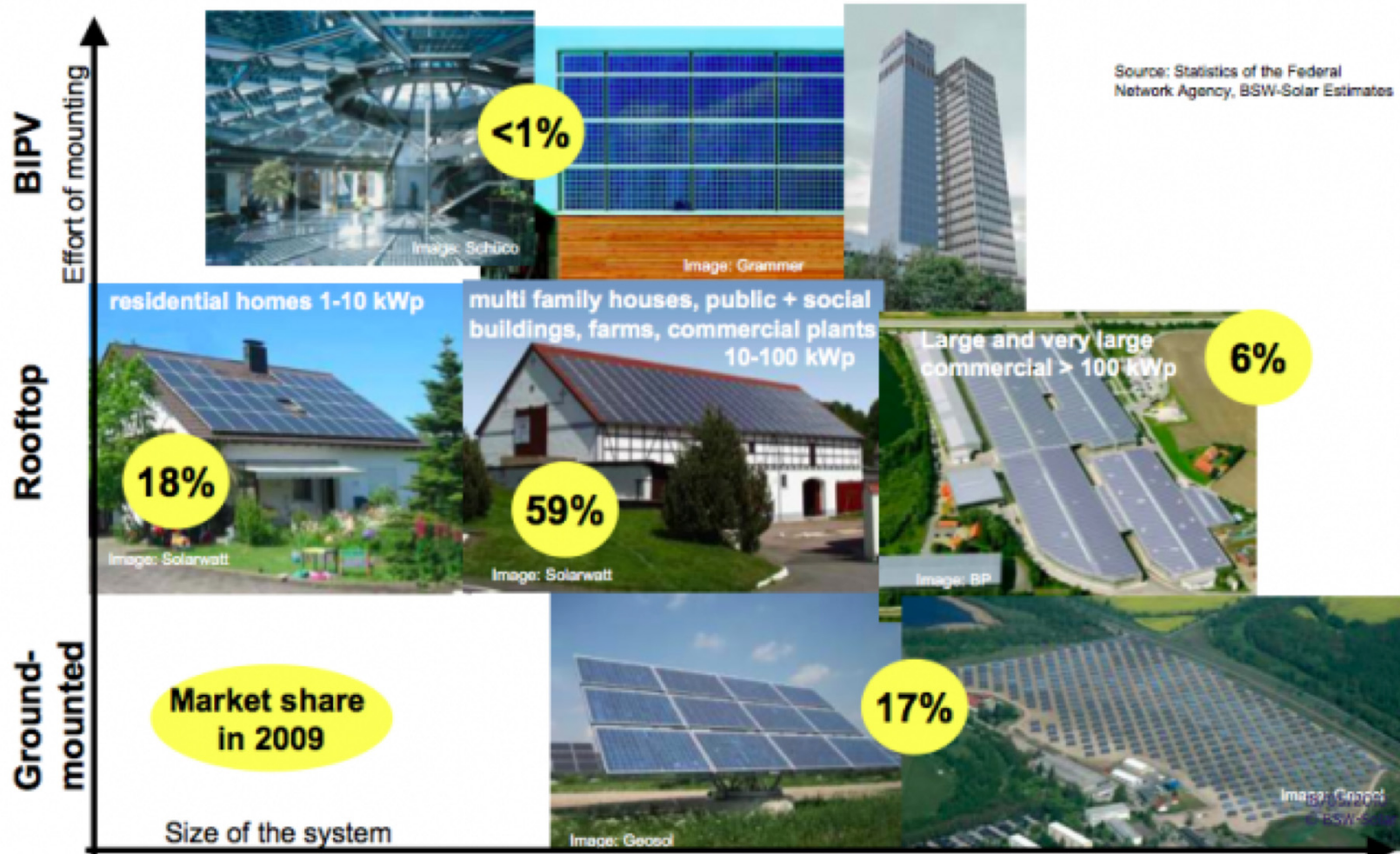
Perceived Barriers

- 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

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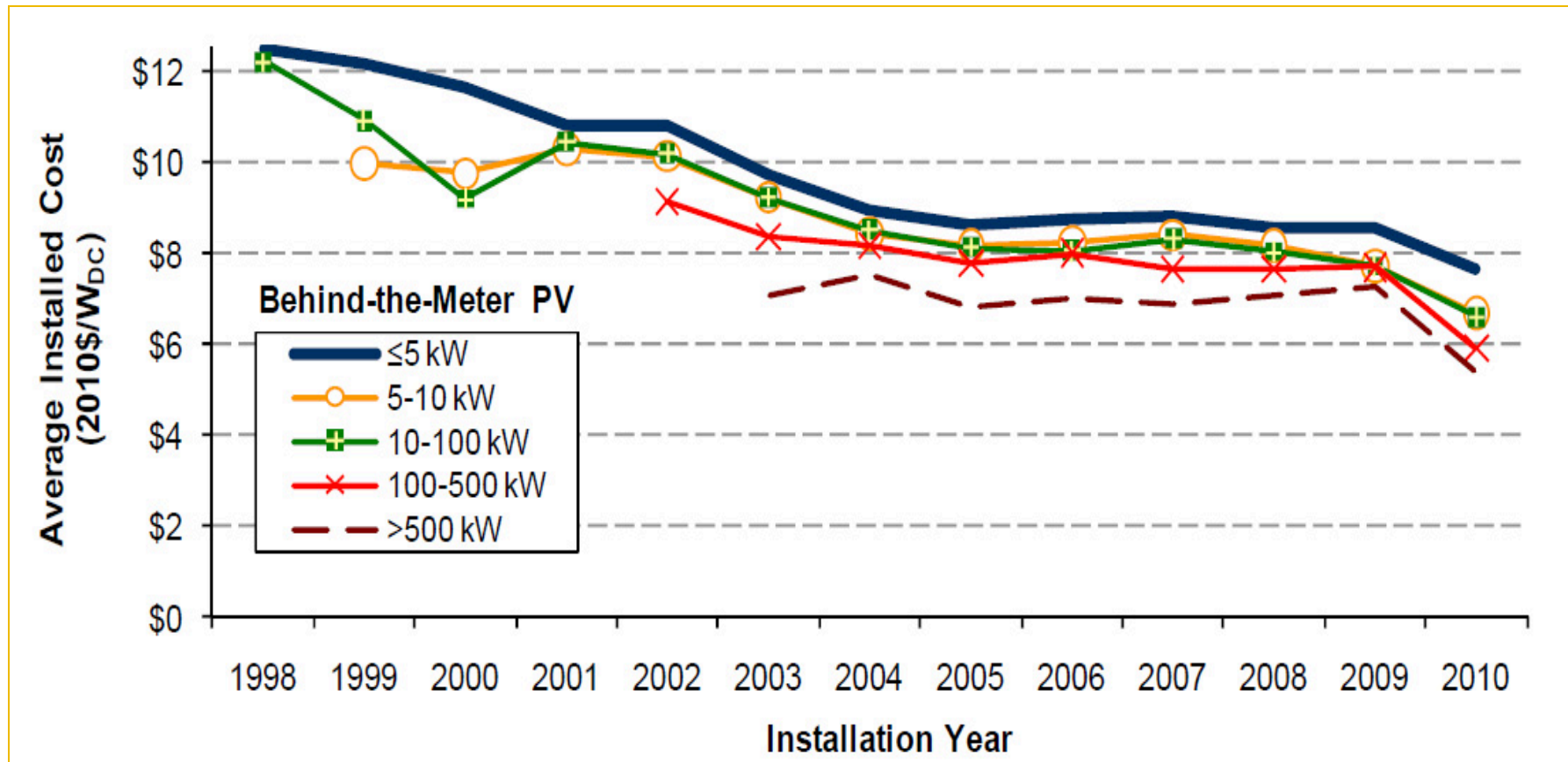
Solar



Perceived Barriers

- It's not sunny enough where I live
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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>.

Federal Subsidies (2002-08)

FOSSIL FUELS
\$72.5 billion

RENEWABLE ENERGY
\$29.0 billion

\$2.3 billion
CARBON CAPTURE AND STORAGE*

\$12.2 billion
TRADITIONAL RENEWABLES

all subtotals in \$ billions

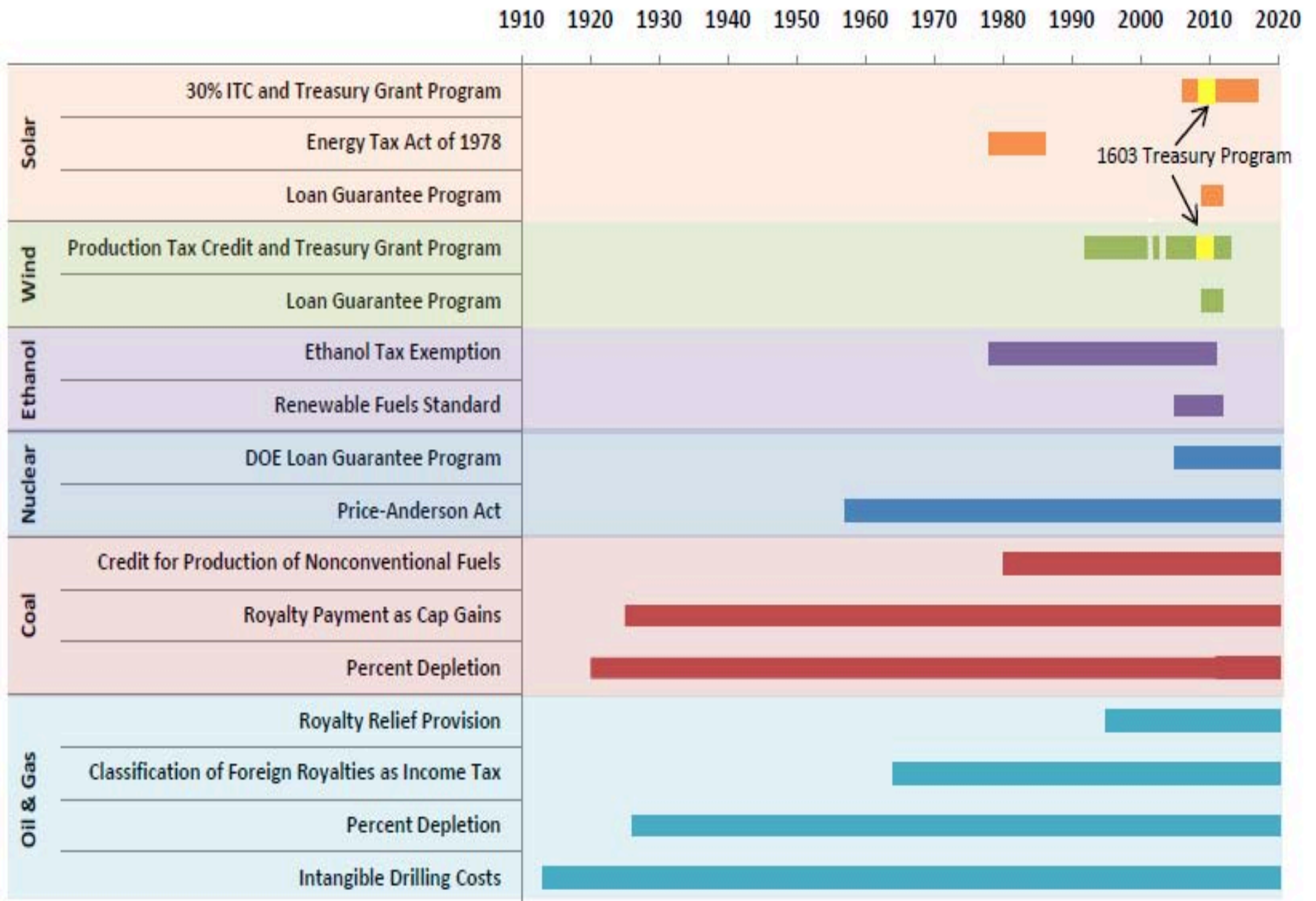
Tax breaks (outer ring) \$53.9 **Direct spending (inner circle)** \$16.3

\$70.2 billion
TRADITIONAL FOSSIL FUELS

\$16.8 billion
CORN ETHANOL**



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



Photo: NREL

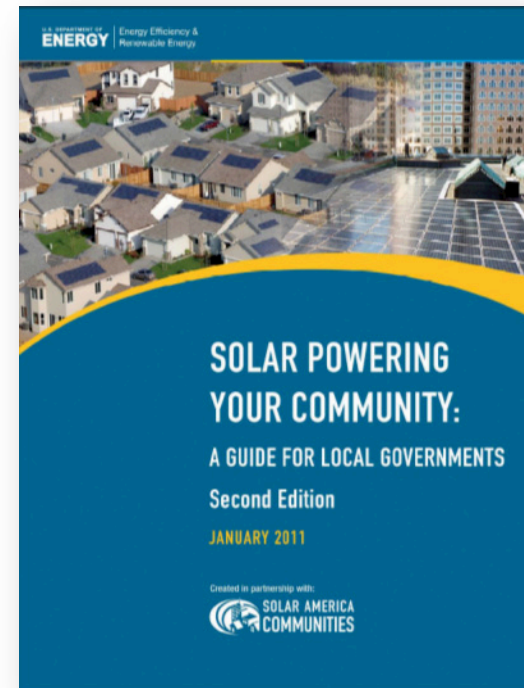


Photo: www.solar.calfinder.com

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...

Southern



Source: solaramericacommunities.gov

An example:

Seattle, Washington: Review of City Codes and Practices

Increase/improve
building energy
standards

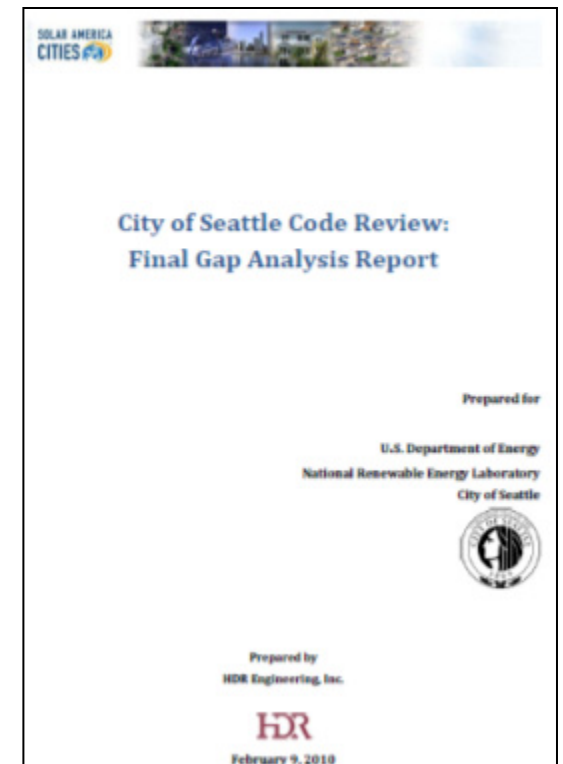
Require solar-ready
construction

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?

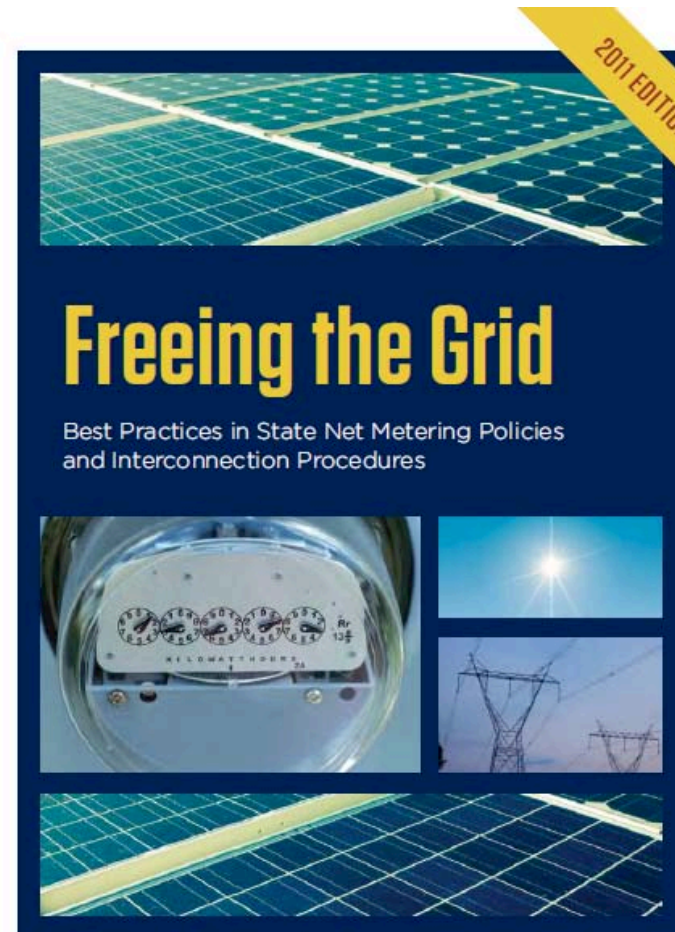
- Expensive roof repairs?
- Electrical upgrade?
- Getting everything up-to-code?



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?

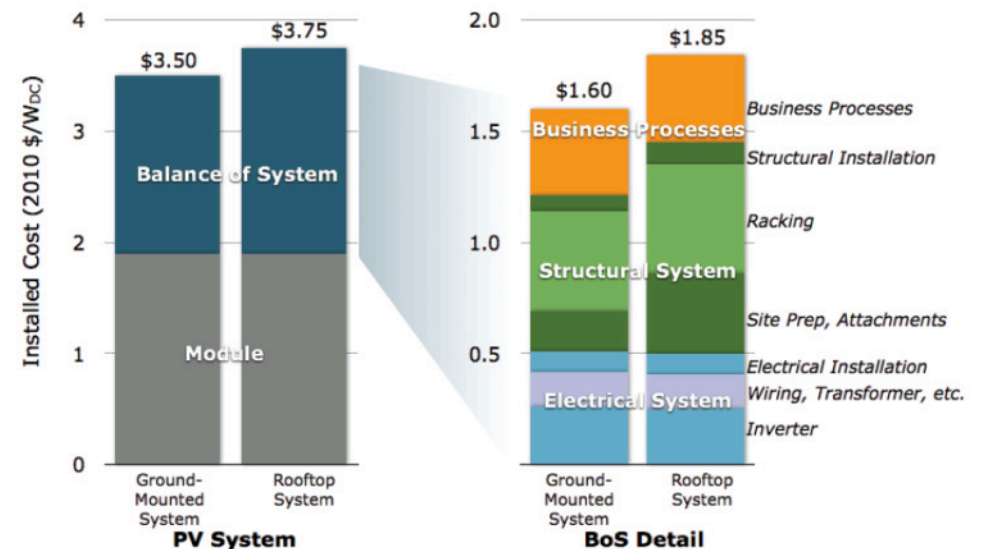
- Ground level disconnect?
- Can I get net-metering?
- Interconnection costs?



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

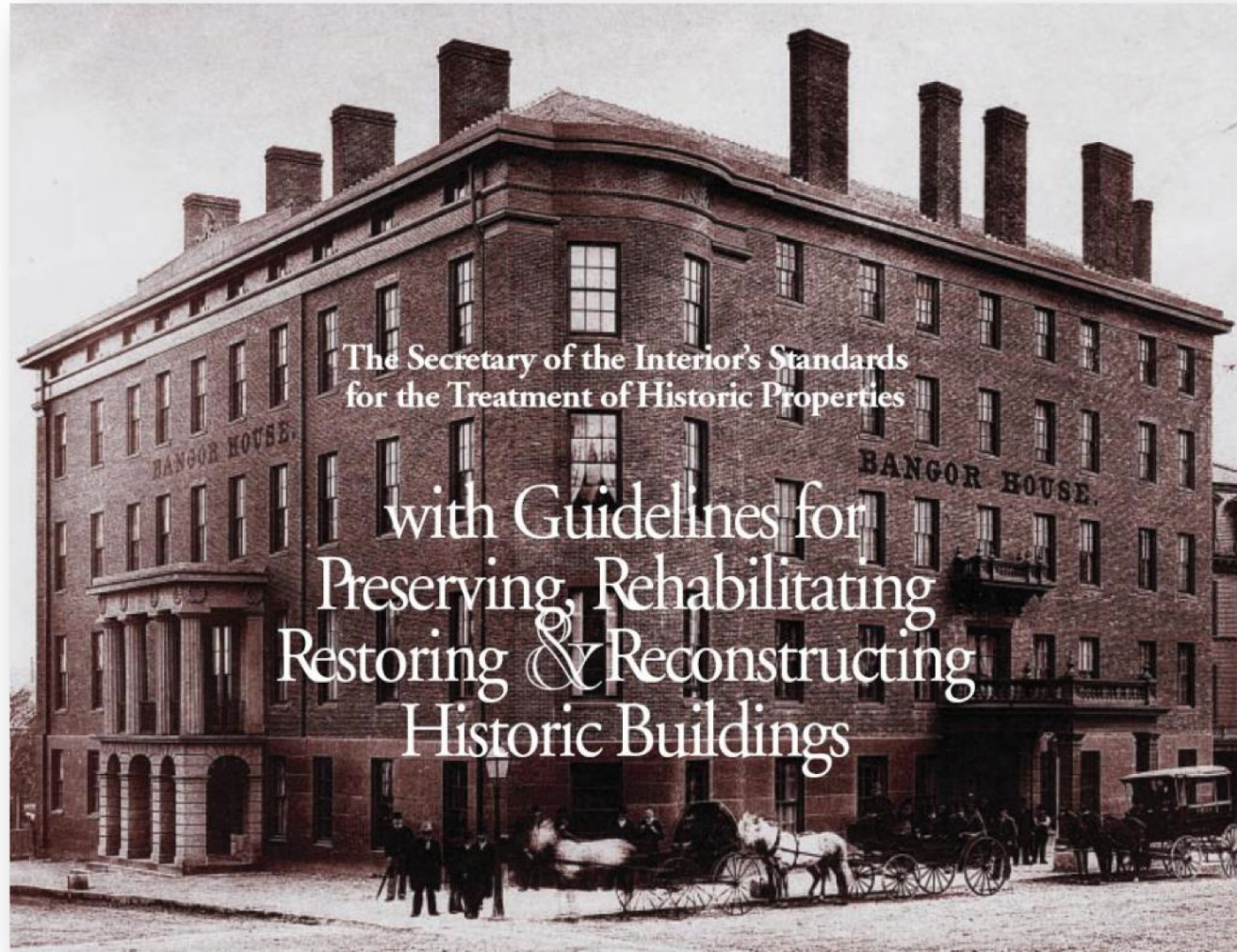


© Clyde Overcash



© 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

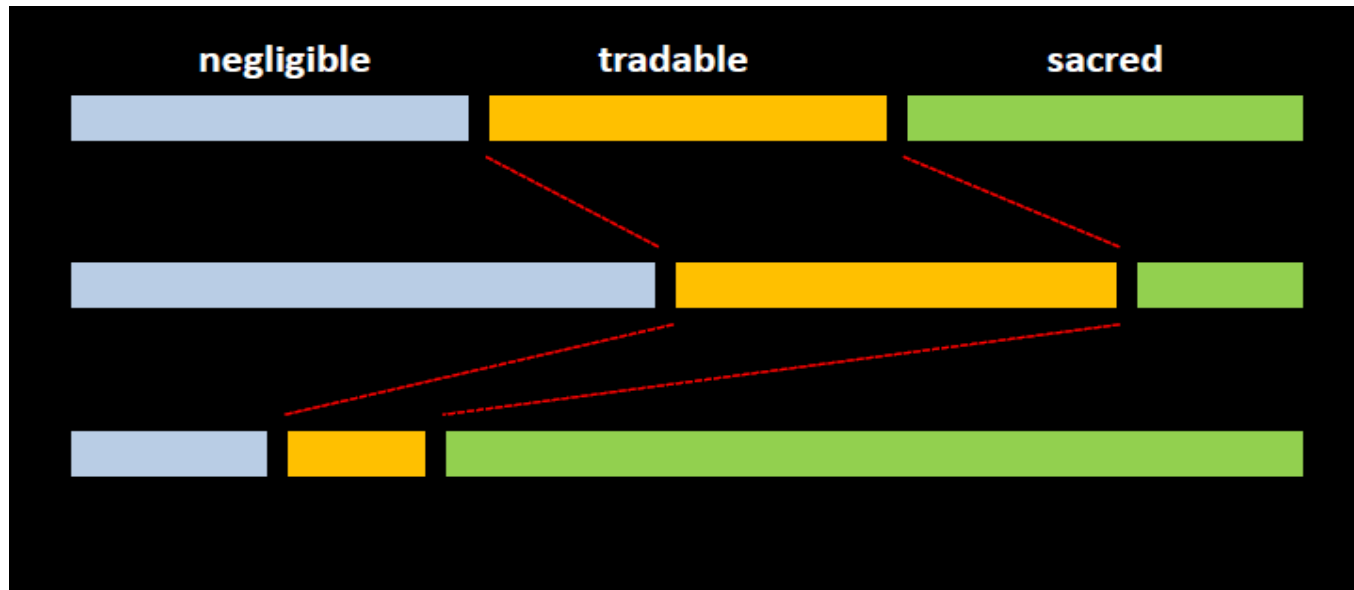


District



Object

How do We Accommodate a Range in Values?



Bar Graph: Randall Mason, University of Pennsylvania

Things to Consider...



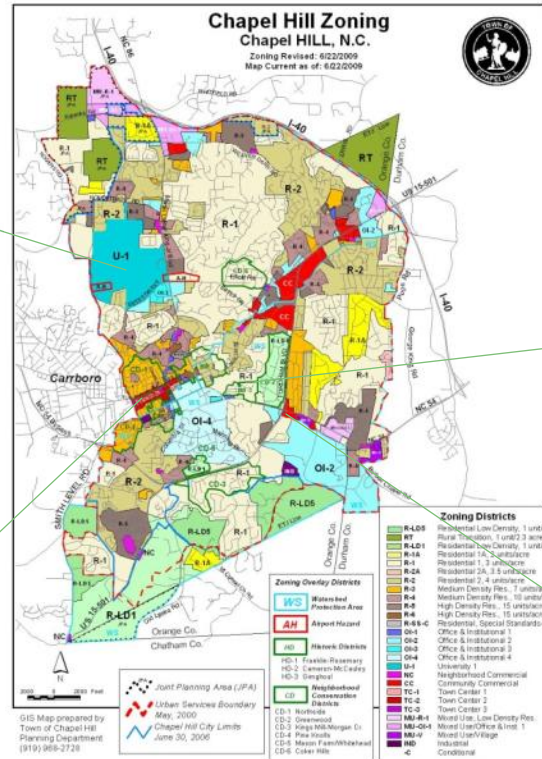
New York, New York

Variety in Communities

Philipsburg, Montana

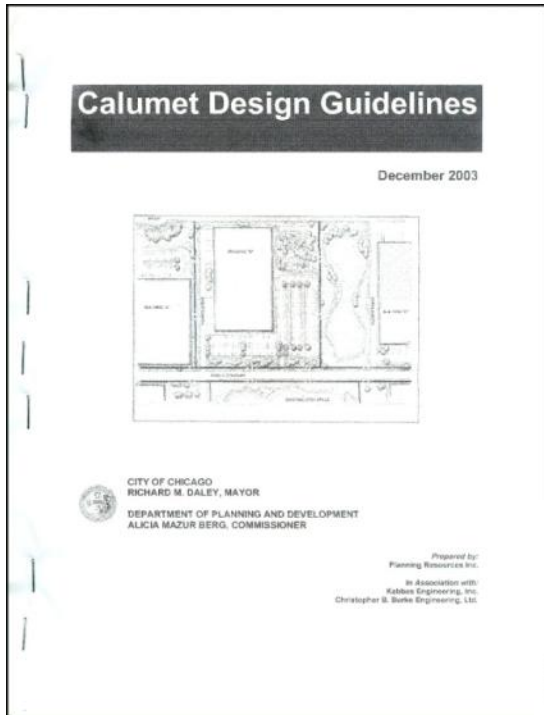


Things to Consider...



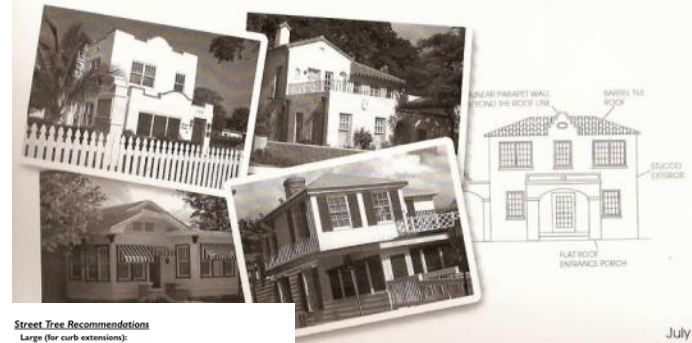
Photos Courtesy of the Town of Chapel Hill, North Carolina

Things to Consider...



Debray Beach

HISTORIC PRESERVATION DESIGN GUIDELINES



July 2003

Cedartown Historic District Design Guidelines

- All renovation projects will be subject to the approval of the Historic Preservation Commission
- Restoration of brick facades, upper floors and original detail work is recommended
- Awnings should be canvas over metal frame and aluminum/horizontal awnings removed
- Retail establishments may display wares and products in the streetscape
- Dining establishments may provide outdoor dining areas and may extend them into parking areas
- All establishments must provide an 8 foot clear zone for free pedestrian movement

Street Tree Recommendations

- Large (for curb extensions):**
- "Erectus" Larch Elm (prev. 2006)
 - "Allen" Larch Elm
 - "Highbeam" Overcup Oak
 - "Highbeam" Willow Oak
 - Nuttall Oak
 - "Forum" Tupelo

Small (for streetscape):

- Tobert Maple
- Sweetbay Magnolia
- Littleleaf Linden
- Musclewood/Hornbeam
- Crape Myrtle
- Fringetree

Pedestrian Lighting:

- Replace 12' Pedestrian lights with ornamental lights 14' high, add receptacles for seasonal lighting and festival use

Dining Areas:

- Optional curb platform extensions for outdoor dining - 8' x 22' typ. Dining space: 12' x 22' - minimum 8' pedestrian path

Street Lighting:

- Replace cobra head style lights with ornamental street lights, space 100' - 120' feet on-center

Tree Planters:

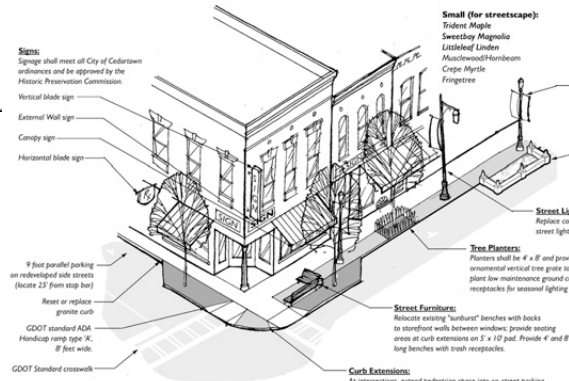
- Planters shall be 4' x 8' and provide a removable ornamental vertical tree grate to protect planter; plant low maintenance ground cover; provide receptacles for seasonal lighting

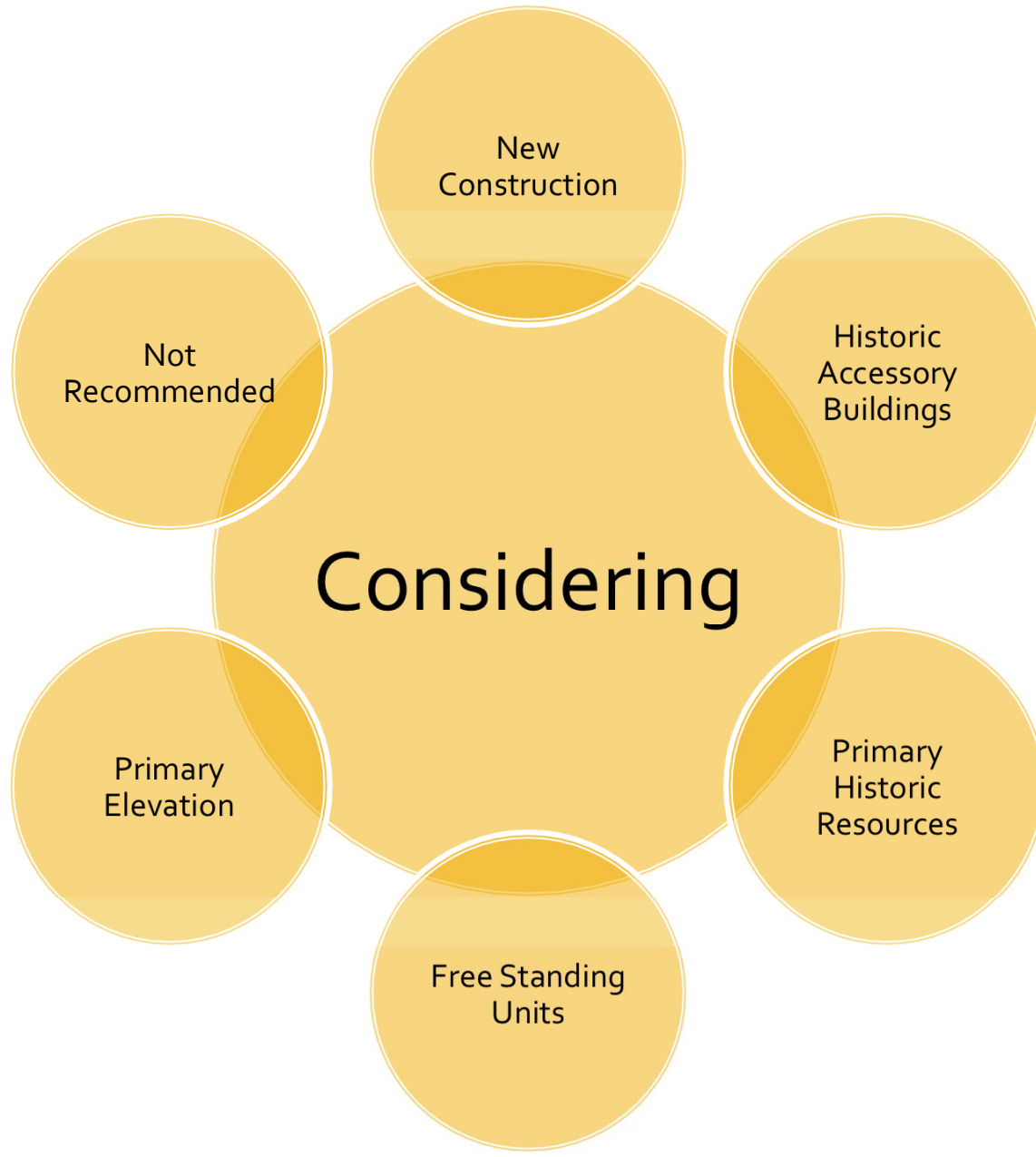
Street Furnitures:

- Relocate existing "barriers" benches with backs to storefront walls between windows; provide seating areas at curb extensions on 5' x 12' pad. Provide 4' and 8' long benches with trash receptacles

Curb Extensions:

- At intersections, extend pedestrian space into on-street parking bays to calm traffic; provide wider turning radius, and add landscape and amenity areas





New
Construction

Historic
Accessory
Buildings

Considering

Not
Recommended

Primary
Historic
Resources

Primary
Elevation

Free Standing
Units

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

Case Study: Durango, Colorado



Credit: Smiley Building



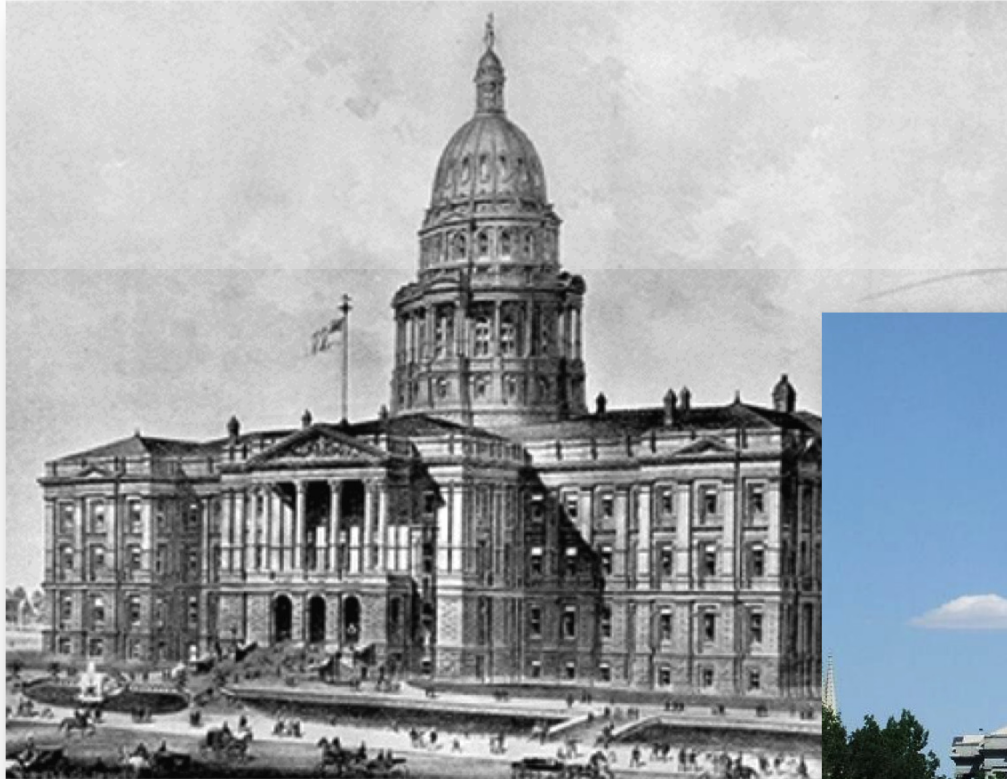
Credit: Smiley Building

Case Study: Durango, Colorado



Credit: Smiley Building

Case Study: Denver, Colorado



Credit: Colorado State Archives

Credit: Squidoo

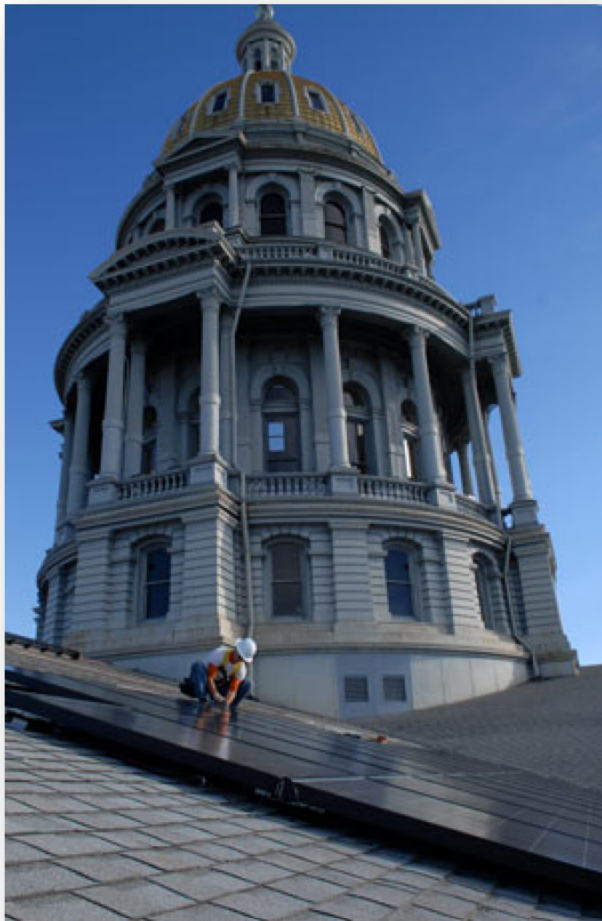


Case Study: Denver, Colorado



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"

Since 1949, planners have turned to PAS for the information they need.
PLANNING ADVISORY SERVICE

Get the job done with APA's **Planning Advisory Service**

POWER TOOLS

Have a Specific Question About
Planning for Solar Energy?

Is your community considering a new program or policy to encourage the use of solar energy technology? APA's Planning Advisory Service (PAS) wants to help. Through its Inquiry Answer Service, PAS provides research assistance to thousands of planners at hundreds of subscribing organizations. Thanks to a partnership with DOE, ICMA, and ICLEI, APA is extending this assistance to all planners, public officials, and solar advocates looking for information about how to promote solar energy use through plans, programs, and development regulations.

Submit your questions to pas@planning.org with a subject line of "Solar Energy Inquiry."

Let PAS help you learn more about these topics:

- using plans and policies to encourage the installation of solar energy systems
- state and local solar access protections
- zoning standards for solar energy systems
- solar-friendly site and building design
- state and local incentives available to help offset the costs of installing solar energy systems

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SOLAR AMERICA COMMUNITIES

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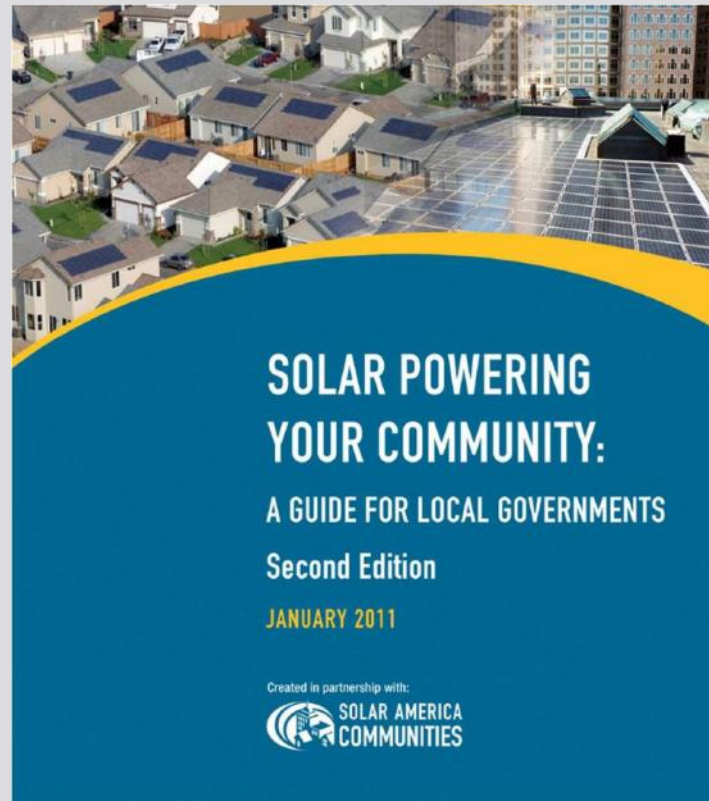
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www.energy.gov/SunShot



www.solaramericacommunities.energy.gov

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