Solar Power Hour

Encouraging Solar on New Construction
(Roadmap Goals Z2-Z3)

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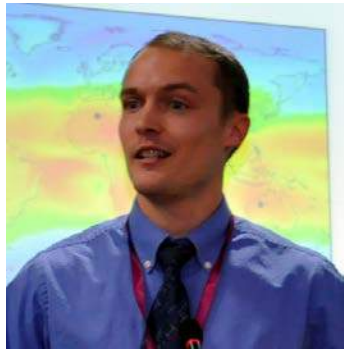
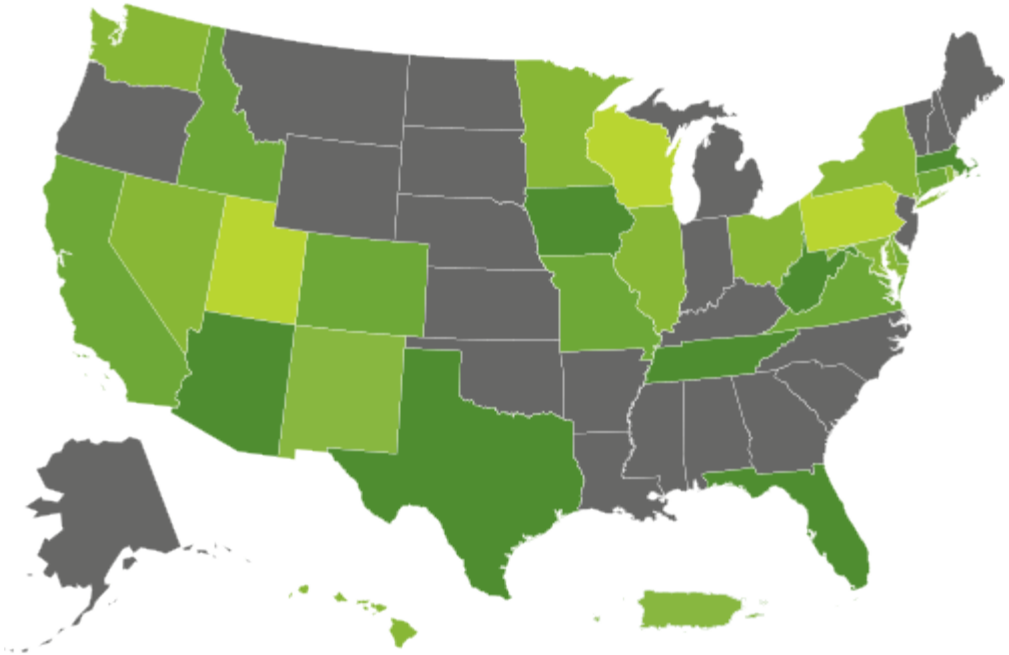


About Solar Roadmap

Initiative to **reduce the total installed costs** of solar systems

And **increase deployment** of solar power across the country



125+ Cities/Counties Across the USA

Focus Areas:

- Utility Interconnection
- Local Permitting Process
- Planning & Zoning Regulations
- Education and Outreach
- Financing Tools and Resources
- Innovative Deployment Programs

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Agenda

Background on Solar Ready Building Standards	15 min
Case Studies	15 min
Getting Started	5 min
Q&A	as needed

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BACKGROUND

Advantages

The relevant design elements

What is already required by code

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Advantages of Solar Ready Standards

For the Community:

- Help meet energy or GHG goals
- Promote local green businesses and associated economic development

For the Industry:

- Cost savings
- Customer acquisition

For the Customer:

- Optimize system performance
- Easier financing
- Mitigate roof life concerns

Solar Ready Design Elements

Solar Access

- East/west orientation of streets and long axis of house
- Shade free roofs
- Zoning laws and solar easement provisions

Roof

Conduit

Interconnection

Solar Ready Design Elements

Solar Access

Roof

- South facing roof surface free of obstruction
- Roof type
- Structural suitability

Conduit

Interconnection

Solar Ready Design Elements

Solar Access

Roof

Conduit

- Pre-install conduit from roof to point of connection

Interconnection

Solar Ready Design Elements

Solar Access

Roof

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Interconnection

- Space for solar equipment
- Electrical panel has sufficient capacity and space for PV breaker
- Internet access

Solar Ready Design Elements

Solar Access

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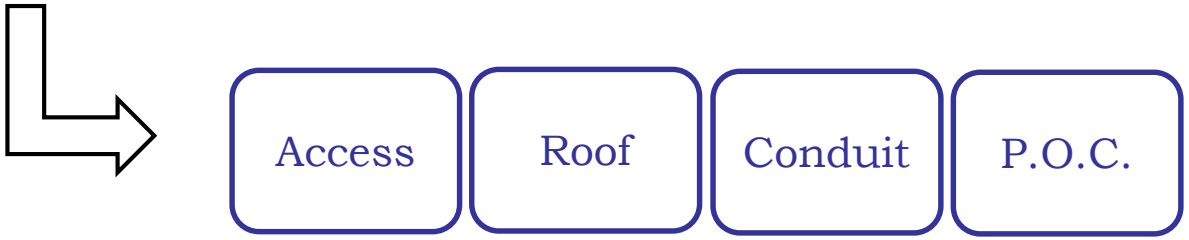


Find more info on design elements at http://www.nrel.gov/docs/fy10osti/46078.pdf

Audience quiz:

Which of these are most common?

Access	Roof	Conduit	P.O.C.

Audience quiz:

Which of these are most common?

Access	Roof	Conduit	P.O.C.

Building Codes

IECC

IGCC

ASHRAE 90.1

ASHRAE 189.1

Rating Systems

Note: There are no national code standards in the U.S. All codes are developed by independent bodies and adopted at the state or local level.

Building Codes

ICC International Energy Conservation Code (IECC)

- EE focused, very limited RE
- Commercial section C406.4 provides minimum requirements for on-site RE, which can be used as an alternative to complying with efficiency standards for lighting or HVAC

IGCC

ASHRAE 90.1

ASHRAE 189.1

Rating Systems

Building Codes

IECC

ICC International Green Construction Code (IGCC)

- Goes beyond the IECC requirements, raising the bar for green building
- For buildings that use energy, Ch.6 Section 610 requires installation of an RE system (PV, SHW, or wind)
  - » If PV, shall offset at least 2% of energy use (or at least 0.5 watts/sqft)
  - » Alternative option to buy RECs for at least 4% offset

ASHRAE 90.1

ASHRAE 189.1

Rating Systems

Building Codes

IECC

IGCC

ASHRAE 90.1 Energy Standard for Buildings Except Low-Rise Residential

- For commercial buildings, an alternative to the IECC. Very similar goals and content.

ASHRAE 189.1

Rating Systems

Building Codes

IECC

IGCC

ASHRAE 90.1

ASHRAE 189.1 Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential

- For commercial buildings, a compliance option for the IGCC

Rating Systems

Building Codes

IECC

IGCC

ASHRAE 90.1

ASHRAE 189.1

Rating Systems

- ICC National Green Building Standard
- LEED

Adopting Code

At the State Level

- Can occur via legislation or through regulatory agencies
- States vary in their speed of adoption
  - » Most states are once cycle behind, some are multiple cycles behind
  - » Each cycle tends to have stricter energy standards

At the Local Level

- Municipalities can adopt independent of state
- Local code officials are responsible for oversight and compliance enforcement
- Municipalities can also adopt one of the Rating Systems for use locally

Check the status of your state at http://www.energycodes.gov/

CASE STUDIES

How other communities are adopting standards

California

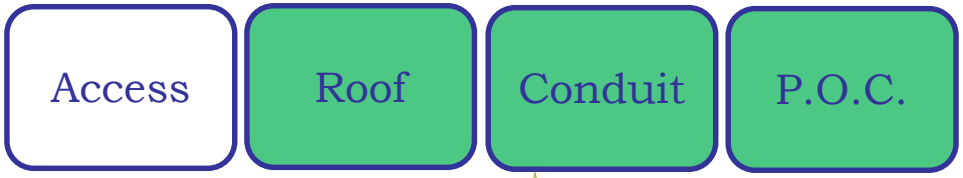
- California Green Building Code (2010) was first statewide building code to incorporate mandatory green building provisions. Residential and commercial.
- No RE mandatory, though two voluntary tiers with RE provisions are available for adoption by local AHJs
  - » Residential: south roof orientation with available space, pre-installed conduit
  - » Commercial: on-site RE for at least 1% offset of usage

Washington

- Country's first law (2005) requiring projects that receive state funding to be built to green standards
- LEED Silver minimum
  - » LEED awards points for on-site RE based on % offset (must retain RECs)

Tucson, AZ: "Residential Solar Readiness Ordinance"

- Mayor and Council unanimously approved June 2008. Rules into effect 1 yr later.
  - Rules developed by stakeholder group, with support from Development Services Dept and Attorney's Office
- To obtain permit for single family home or duplex, must include in plans:
  - Site plan showing best available roof space
  - Site plan showing space for PV equipment near electrical panel
  - Circuit breaker space "Reserved for PV" in electrical panel
  - Conduit stub-out for future installation
  - OR, include a PV system in the plans
- Developers can take a state tax rebate for the cost of the conduit stub-out



See details at
http://my.solarroadmap.com/objectives/viewobjective/84 (resource #3)

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Carbondale, CO: "Residential Efficient Building Program"

- Point based system required of all new construction and additions over 500ft^2
  - » Categories incl conservation, materials, recycling, indoor air quality, energy
- Larger houses required to obtain more points
- RE Provisions:
  - » Pre-installed conduits are required
  - » Points are available for RE installations
  - » Homes over 5,000ft^2 are required to install on-site solar
- REBP Checklist is submitted with permit application. Inspections to ensure compliance.

Access	Roof	Conduit	P.O.C.

See details at http://my.solarroadmap.com/objectives/viewobjective/84 *(resource #2)*

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Rancho Palos Verdes, CA: "Renewable Energy Systems Requirement in Building Code"

- Simple 3 paragraph addition to the Building Code
- Requires new homes and major remodels to:
  - Provide a roof layout plan showing where solar could be accommodated
  - Developer can choose PV or SHW
  - If PV, must pre-install conduit from roof to stubbed junction box next to electrical panel (similar requirement if SHW is chosen)

Access	Roof	Conduit	P.O.C.

See details at http://my.solarroadmap.com/objectives/viewobjective/117 *(resource #3)*

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Lancaster, CA: "Residential Zone Update"

- Became first city in U.S. to require all new homes to include solar (2014)
- Developed by Planning Commission, adopted unanimously by City Council
- The ordinance:
  - All new single family homes must have solar
  - 0.5kW to 1.5kW per home depending on lot size/type
  - Requirement can be met in aggregate for subdivisions
  - Developer can purchase RECs to meet (must be from solar site within City)
  - Verified during plan review

Access | Roof | Conduit | P.O.C.

See details at http://my.solarroadmap.com/objectives/viewobjective/85 *(resource #2)*

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GETTING STARTED

Determining what's possible and setting short- & long-term goals

Currently 13 ASTI Communities working on this goal!

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Take Action!

- Review the status of your community on the Solar Roadmap
- Speak with your planning department

Essential Resources

1. **Green Building Code Guidelines for Renewable Energy**
   Author: California Building Standards Commission
2. **Solar Ready Building Requirements Ordinance in Chula Vista, CA**
   Author: City of Chula Vista
3. **Rancho Palos Verdes Solar Ready Building Code**
   Author: City of Rancho Palos Verdes
4. **Homebuilder's Guide to Going Solar**
   Author: US Department of Energy
5. **Solar Friendly Design Elements for New Subdivisions**
   Author: Energize Connecticut

- Your Solar Roadmap representative will contact you shortly!

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THANK YOU!

For help getting started, contact: thomas.yurysta@optony.com

This presentation is also available online at http://www.solarroadmap.com/z2-z3/

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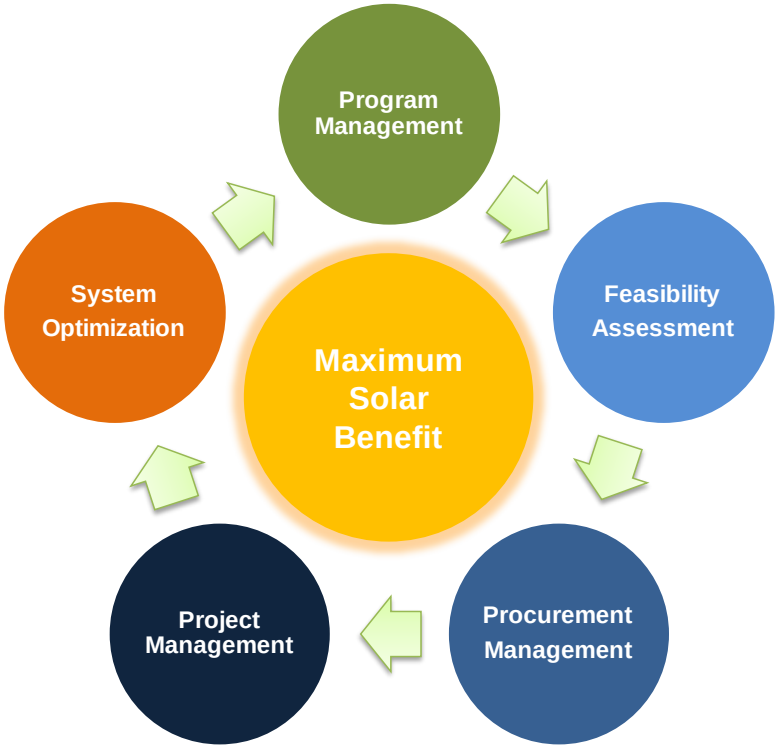
About Optony

Optony develops and deploys solar best practices across the entire solar project lifecycle for government agencies, schools and commercial organizations.

Working with clients across all phases of solar projects creates deep insight into true performance drivers which is used to reduce costs and improve performance at any stage in the process.

www.optony.com



"Optony's consulting service is a must-have for any organization considering an investment in solar. Based on Optony's comprehensive analysis and recommendations, we now have a low-risk, high-return solar strategy."