GRID Alternatives: Solar 101

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Presentation Outline

• GRID Alternatives Overview
• Solar Primer
• Solar Suitability Basics
• Choosing a Contractor
• Solar Financing Options
• Resources and Wrap-up
GRID 101

Who we are and what we do
GRID Alternatives

- **Who?**
  Nonprofit solar contractor

- **What?**
  That installs solar electric systems exclusively for homeowners who qualify as low-income

- **How?**
  With the help of volunteers and job trainees
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GRID Initiatives

- GRID has 10 regional offices – 7 in CA, Colorado, NY/NJ/CT, and DC-Mid Atlantic and an International program in Nicaragua
- National Tribal Program
- National Women in Solar Initiative
- RISE – Diversity in Solar Hiring Initiative
- In CA, we manage 2 major statewide incentive programs, and we use equipment manufactures partnerships and philanthropy to make solar affordable for low-income families
Why Solar for Low-Income Families?

- **High energy costs** - Low-income families spend 10% more of their budget on energy bills than the average American.

- **Unpredictable expenses** make budgeting difficult for people on limited income.

- Average **reduction in monthly electric bills** for low-income families of **80%**.
Why Solar for Low-Income Families?

- Environmental Justice – This sector of society can participate in the environmental movement.
- Homeowners who can least afford clean energy are often exposed to highest levels of environmental pollution.
How does solar work?

System components and key concepts
Photovoltaic (PV) Systems

Solar electric systems use the sun’s light to produce power ("Photo" + "Volts")
Types of PV Systems

• Stand-alone or Off-grid (Requires batteries)
• Grid-tied with battery back-up (Expensive)
• Grid-tied (Net metering)
  – Homeowner will have black out if utility goes down
  – Provides finite amount of electricity per month
  – Homeowner continues to get a utility bill
  – No batteries, Minimal maintenance
Two Types of Current

Solar panels produce **DIRECT CURRENT**....

...inverters convert this to **ALTERNATING CURRENT** so that it can be used by appliances at home.
System Components
DC Side of System – From Roof to Inverter

PV Panels

Inverters

Source: Xantrex, PV Powered

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System Components
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System Components

AC Side of System – From Inverter to Main Service Panel

AC Disconnect

Main Service Panel

Source: Xantrex, PV Powered
System Design Options

Ground Mount

Roof Mount – Tilt-Up

Roof Mount - Flush

Pole Mount
Solar Suitability Basics

Site Selection, Maintenance, Warranties, and Monitoring
Site Selection

- Solar resource
  - Average sun hours
    - Bay Area: 5.4
    - Central Valley: 6.4
    - Los Angeles: 5.6
  - Microclimates

- Roof space requirement

- System orientation

- Shading, Shading, Shading

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System Orientation

Source: NC State University, Pacific Energy Center

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System Sizing

• Available Roof Space
• Electric Usage
• Aesthetics
• If the roof does not have sufficient space or is in poor condition, a groundmount option could work.
Warranties; Length of System life

- 10 year Warranty for LABOR
- 25-year Warranty for most PANELS
- Most INVERTERS Replaced every 15 years

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Maintenance of your solar system

- Relatively minimal
- Recommend cleaning panels by hosing off 1-2 times a year; (more often if you live in an area by freeway/farm)
Project Steps

Finding a Contractor
What to expect with your project
How do I find a quality contractor?

- Research company’s records and experience
- Get references and referrals, check licenses with Contractor’s State License Board (www.cslb.ca.gov)
- Check licenses at C-46 (Solar Installer)
- C-10 (Electrical Contractor)

- Go Solar California has an excellent database (http://www.gosolarcalifornia.org/)
- Other Resources:
  - http://www.findsolar.com
  - http://CalSeia.org
What qualities make a good solar contractor?

Similar qualities of a good general contractor:
- PROFESSIONAL
- DEPENDABLE
- COMPETITIVE PRICING
- GOOD REPUTATION/REFERENCES
- INSURANCE

Additional considerations for solar:
- ROOFING KNOWLEDGE
- LOCAL SOLAR EXPERIENCE
- KNOWLEDGE OF LOCAL BUILDING CODES/PERMIT

Some Certifications:
- NABCEP (North American Board of Certified Energy Practitioners)
- RISE (Roof Integrated Solar Energy)
- NRCA (National Roofing Contractors Association)
Selecting a Contractor

Recommended Steps:
1) Get 3 Quotes from Qualified Licensed Installers
2) Schedule 3 solar site assessments
3) Get written proposals
4) Review contracts/proposals
5) Select solar dealer/contractor and proceed with installation
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STANDARD SOLAR
PROJECT STEPS

Select a contractor

Review designs, sign contracts; permitting

Schedule Installation

Permit sign off, Submit NEM Docs

Enjoy Saving $$ and producing clean energy!

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Net Energy Metering

Interconnecting your solar energy system
Net Energy Metering

Source: Pacific Energy Center
Interconnection: Ties your system to the utility grid

- This means you will be enrolled in a Net Energy Metering (NEM) program. If there is a blackout, your solar will experience the same blackout.
- There are options for battery back-up systems.
- Off-grid, battery back-up systems are cost-prohibitive now, but an exciting area to watch as the market rapidly shifts and develops with Tesla entering for residential batteries paired with solar.
- Primary issues nationwide now: NEM programs and utilities, how to account for solar’s costs and benefits to the grid, do solar customers pay their share of distribution and transmission costs, what happens to utility if customers choose to go off-grid in the future...
Solar Financing and Costs

Comparison of Financial Options
Solar Financial Models

- Buying Outright
- Solar Lease
- PPA
- Tax Credits
Buying Outright

- High up-front cost can be burdensome
- This is a high barrier to many people who want solar
- Over lifetime of system, is the most cost-effective option for those who can afford to. Main driver is the 30% Investment Tax Credit (ITC) benefits go to owner/purchaser
Solar Lease / PPA

- 80% of the CSI general market in 2012 utilized a 3rd party owned financial model; in 2014-15 there is a shift to loans and customer owned systems rather than 3rd party owned.

- 3rd party buys and takes care of solar installation. 3rd party owner receives tax credits and carbon credits.

- **Solar lease:** Client pays a fixed amount every month for solar panels. Client pays the same each month, regardless of how much energy the panels produce.

- **Power purchase agreement:** Client pays a fixed rate per kWh for the electricity the panels produce.

Credit: SunRun
## Comparison of Financial Models

<table>
<thead>
<tr>
<th>Purchase</th>
<th>PPA/Lease</th>
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<tbody>
<tr>
<td>• No finance charges</td>
<td>• No/low upfront cost</td>
</tr>
<tr>
<td>• More straightforward</td>
<td>• Start saving immediately</td>
</tr>
<tr>
<td>• You get renewable energy credits, tax</td>
<td>• Performance guarantee</td>
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<tr>
<td>credits, and rebate</td>
<td>• Monitoring</td>
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<td>• “Free” energy</td>
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Primary considerations for solar on your own home in upcoming years

• ITC expected to be reduced to 10% in 2017. If you are planning on going solar and paying outright, you’ll need to have your system completed by 12/31/2016.

• Net Energy Metering – What is the NEM policy with your utility? Are the rates solar friendly? If you are in CA, this is a huge year for NEM and a new program (that could be less favorable for solar customers) will be in place by end of 2015.

• In CA’s 3 largest utilities (PG&E, SCE, SDG&E) - there is a rush for customers to be grandfathered in the existing program by interconnecting their systems before July 1, 2017 (or earlier in some utilities).
Wrap-Up

How you can get involved and learn more
How can YOU Contribute to GRID?

• **Give the gift of Solar!**
  – Go to our website to donate a solar panel
  – Become a “solar sustainer” monthly donor
  – Donate in honor of someone else – holiday gift, weddings, etc.

• **Spread the word!**
  – Invite GRID to come speak to your employee Green Team, Sustainability Group, or networking event.
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Resources

- CSI Website - [http://www.gosolarcalifornia.org/](http://www.gosolarcalifornia.org/)
- Database of State Incentives for Renewables & Efficiency - [http://www.dsireusa.org/](http://www.dsireusa.org/)
- GRID Alternatives - [http://www.gridalternatives.org/](http://www.gridalternatives.org/)
- PG&E Rates - [http://www.pge.com/tariffs/ERS.SHTML#ERS](http://www.pge.com/tariffs/ERS.SHTML#ERS)
Thank you!

[Image of a group of people waving and holding a banner for GRID Alternatives]