Incorporating Solar into Residential New Construction

Solar Decathlon Building Industry Day
Presentation Objectives

• Highlight the benefits of solar energy for homebuyers (photovoltaics or PV)
• Highlight the value of solar PV for builders
• Explain the key factors related to incorporating solar PV into new homes
  – Before, during and after construction
BP Solar Introduction

- More than 35 years experience in the design, manufacture and marketing of solar PV systems
- >2,000 employees worldwide
- 2009 Volume 170 MW
- Annual R&D budget >$10M
- Strong brand awareness and reputation
- 1st Builder America project completed in 1997
PetersenDean Introduction

• Largest independently owned solar roofing company in U.S.
  – Operates in 5 key solar states
  – In operation for 25+ years
• 10+ years of experience providing solar solutions to production homebuilders
• Diverse solar installation expertise
• More than 1 million people live/work beneath our roofs
Solar PV Value to Homebuyers

• The most efficient and logical time to go solar is during construction
  – Efficiency in installation
  – Minimizes costs (vs. retrofit)
  – Built in financing through 30 year mortgage

• Combined with energy-efficiency, solar is typically cash flow positive for most homebuyers in 1\textsuperscript{st} month

• Allows homeowner to better manage the home’s operating costs

• Helps the home appreciate faster and command a higher resale value

• An energy-efficient, solar home is perceived to be a higher quality home
Production Builders are “Going Solar”
Good solar PV starts before construction: Planning

- Starts with community layout, proper orientation of streets and lots
- NREL Subdivision Energy Analysis Tool (SEAT)
Good solar PV starts before construction: Shading & Design

- A southern orientation is ideal
  - East and west facing roofs can still capture over 80% of the energy

- Minimize roof obstructions to maximize PV capacity and aesthetics
  - Shading can significantly reduce energy production
  - Plan for current and future landscaping, neighboring houses and roof “stick-ups”

- Approx 100 sq. ft. of roof for every kW of PV capacity
  - 2.5 – 5.0 kW for new homes depending size of home
Good solar PV starts before construction

- Incorporate PV into the home design (roof elevation plans)
  - South facing roof exposure of homes
  - Consideration of placement of venting to improve usable space

Photo courtesy Shea Homes Active Adult Division
Good solar PV starts before construction: Partners

• Selecting a capable partner
  – Reliability and long term value is key
  – Ability to coordinate well with other trades
  – Ability to support the sales of your green solar home
  – Does partner’s brand support your home sales?
Good solar PV starts before construction: Product

- Latest PV technology not necessarily the best
- Key decision is lifetime cost of solar energy, rather than upfront $/Watt
- Reliability metrics:
  - Low warranty return rates
Good solar PV starts before construction: Aesthetics versus
Good solar PV starts before construction: Aesthetics

- PV system aesthetics are important to homebuilders and to new solar homebuyers
**Good solar PV starts before construction: Standard vs. Option**

- 3 year National Renewable Energy Laboratory study

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<thead>
<tr>
<th>Attributes</th>
<th>Conventional Wisdom</th>
<th>New Market Paradigm</th>
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<tbody>
<tr>
<td>Sales Prices</td>
<td>• HPHs cost more to build vs. other homes</td>
<td>• HPHs can be built and sold competitively and profitably</td>
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<tr>
<td></td>
<td>• HPHs are priced higher</td>
<td></td>
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<tr>
<td>Solar PV as Option vs. Std. Feature</td>
<td>• HPH’s should be an option only</td>
<td>• HPHs should be offered as standard.</td>
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<td>• Sales of HPH’s are minimal</td>
<td>• Transaction costs are often too high when solar is sold separately</td>
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<td>• Homebuyers have difficulty understanding the value of solar as an option vs. other options</td>
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<td>• Sales may be accelerated because salespeople do not have to “sell” the solar feature</td>
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<td>Satisfaction</td>
<td>• Homebuyer satisfaction is contingent on perceived payback of energy features</td>
<td>• Solar HPH owners perceive three major kinds of benefits:</td>
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<tr>
<td></td>
<td></td>
<td>- (1) altruistic</td>
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<td></td>
<td></td>
<td>- (2) financial</td>
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<tr>
<td></td>
<td></td>
<td>- (3) personal satisfaction</td>
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<td></td>
<td>• Solar HPH owners appear to become increasingly more satisfied over time</td>
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Adapted from the NREL report “for Zero-Energy Homes: December 2006 The Comparative San Diego Case Study”, B.C. Farhar & T.C. Coburn
Good solar PV starts before construction: Standard vs. Option?

• Solar PV: upgrade option or standard feature?
  – Some builders have found improved profitably from increased sales velocity that reduces capital costs
  – Enhanced incentives when PV standard feature
  – Salespeople invest more when PV is standard feature

• Challenges of selling as an upgrade option:
  – Selling the value vs. other high priced options
  – Energy product that customers can’t touch and feel

• When offered in a community where solar is also pre-plotted on a certain homes, options may do better.
During construction

- Maintain the roof integrity
  - An integrated solar roofing solution
  - Products that reduce roof penetrations
- Installer that can work within the homebuilder’s production process
  - Scale
  - Forecasting and scheduling
  - Coordination with other contractors
Post Construction

• Promoting your Solar Community
• Training your salesforce and staff
• Educating the prospective solar homebuyer
• After Sale Support
Post Construction

- Expert training for your employees
  - Sell the benefits of a solar home vs. the technology
  - Capitalize on perception that an energy-efficient, new solar home is higher quality
  - No better time to incorporate solar
    - positive cash flow from day one
  - Increased resale value
  - De-bunk the common myths
    - Power available when power outage
    - Solar PV produces electricity not hot water
Post Construction

- Educate the prospective solar homebuyer
  - Energy-savings assessment / rating to communicate the value of energy-efficiency features as well as the PV system
  - Literature, videos, and other tools to simplify the selling
  - Periodic onsite selling support
Post Construction

- Promoting your solar community
  - E-mail blasts
  - Advertising
  - Community leader involvement
Post Construction

• After the Sale
  – Warranty terms and reliability
  – Service calls cost builders time and money – both in responding to calls and customer perception
  – Warranties are not all equal
  – A long warranty does not mean it’s reliable
  – In these economic times, be sure your partner will last as long as the product
Summary

• Combining energy efficiency with solar maximizes homebuyer benefit
• Design and build a community that maximizes energy efficiency and solar potential
• Solar aesthetics matter
• Find strong partners that not only deliver solar but also help your company leverage it to sell more homes
• Train your sales force to understand and educate prospective home buyers on the value of a new solar home