

Zero Energy Homes

Successes with Communities
of Super-Efficient Homes
With Integrated Solar Generation

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Principal



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What is ZEH? or “Marketable ZEH”

- DOE Program
 - Produce as much energy as consume
 - By 2020 Communities
- Today
 - Demonstration homes
 - Communities: 50% bill reduction
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 - 60% bill reduction
 - Net zero annual electricity bill



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Why Build ZEH?

- ... Other than reduced dependence on foreign oil, reduced emissions, reduced peak-electricity demand...
- Market Differentiation
- Press Exposure
- Increased Profits



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Motivating Factors

- Quality
 - Customer satisfaction
 - Increased value
 - Warranty issues
- Market Differentiation
- Profit



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ZEH Builders

- Clarum Homes, East PA & Watsonville CA
- Morrison Homes, Sacramento CA
- Pardee Homes, San Diego & Orange Co CA
- Pardee Homes, Las Vegas
- Peppertree, San Diego
- Pinnacle Homes, Las Vegas
- Premier Homes, Sacramento
- Ponderosa Homes, Pleasanton



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Morrison Homes

- “Lakeside” Elk Grove
- 10% of Homes (1/Release) is ZEH
- Available as Option
- \$18,000 premium
- Excellent Press
- Excellent Traffic
- Sold All ZEH Lots



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Clarum Homes

- “Shorebreeze” East Palo Alto, CA
- All 20 Homes ZEH
- Sold Out Faster Than Expected



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Clarum Homes

- “Vista Montana”
 - 257 Homes, All ZEH
 - Mix: SF Attached & Detached
 - Affordable, Entry, Move-Up
- Over 60% Sold before Grand Opening
- No Marketing Used
 - Only Press from ZEH



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Pardee “Soleil”

- Grand Opening July 2004
- 100 homes
- 10% ZEH Standard
- 30% PV Standard
- ZEH Option
- EVHA Gold Medal



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Pardee Homes

- “Evergreen” Ladera Ranch
- “Santa Barbara” San Diego
- “Bordeaux” San Diego
- “Ventana” Las Vegas
- “Aliso” Las Vegas
- “Palo Verde” Las Vegas
- Several More coming



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Premier Homes

- “Premier Gardens” in Sacramento
 - 94 homes, all ZEH
 - Some entry-level homes
 - Excellent press and traffic
 - Sold out in 9 months
 - EVHA Silver Medal
- “Premier Oaks”
 - Roseville
 - 49 homes, all ZEH



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Premier Gardens



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Energy Efficiency

- Envelope
 - Optimize R-Value
 - Quality Insulation Installation
 - Great Windows
 - Low Air Infiltration



Energy Efficiency

- HVAC
 - Tight Ducts, Short Runs
 - In Conditioned Space or Very Well Insulated
 - Condensate Furnace
 - High Efficiency Hydronic
 - High SEER
 - Ground-Source HP



Water Heating

- Solar
- Tankless, High EF
- Insulated Mains
- Home-Run Layout
- Demand Circulation
 - No other recirculating systems



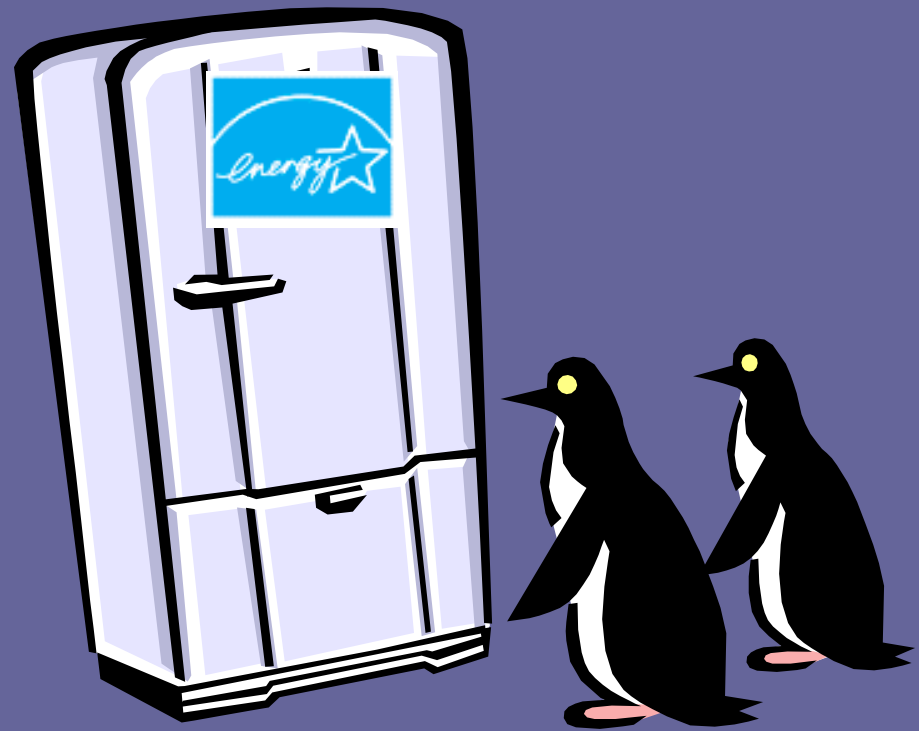
Lighting

- All Fluorescent
 - 2700 – 3000°K
 - CRI Rating 80% or Greater
- Cans Air-Tight and IC Rated
- Decorative Spots
 - Halogen IR
 - Minimize



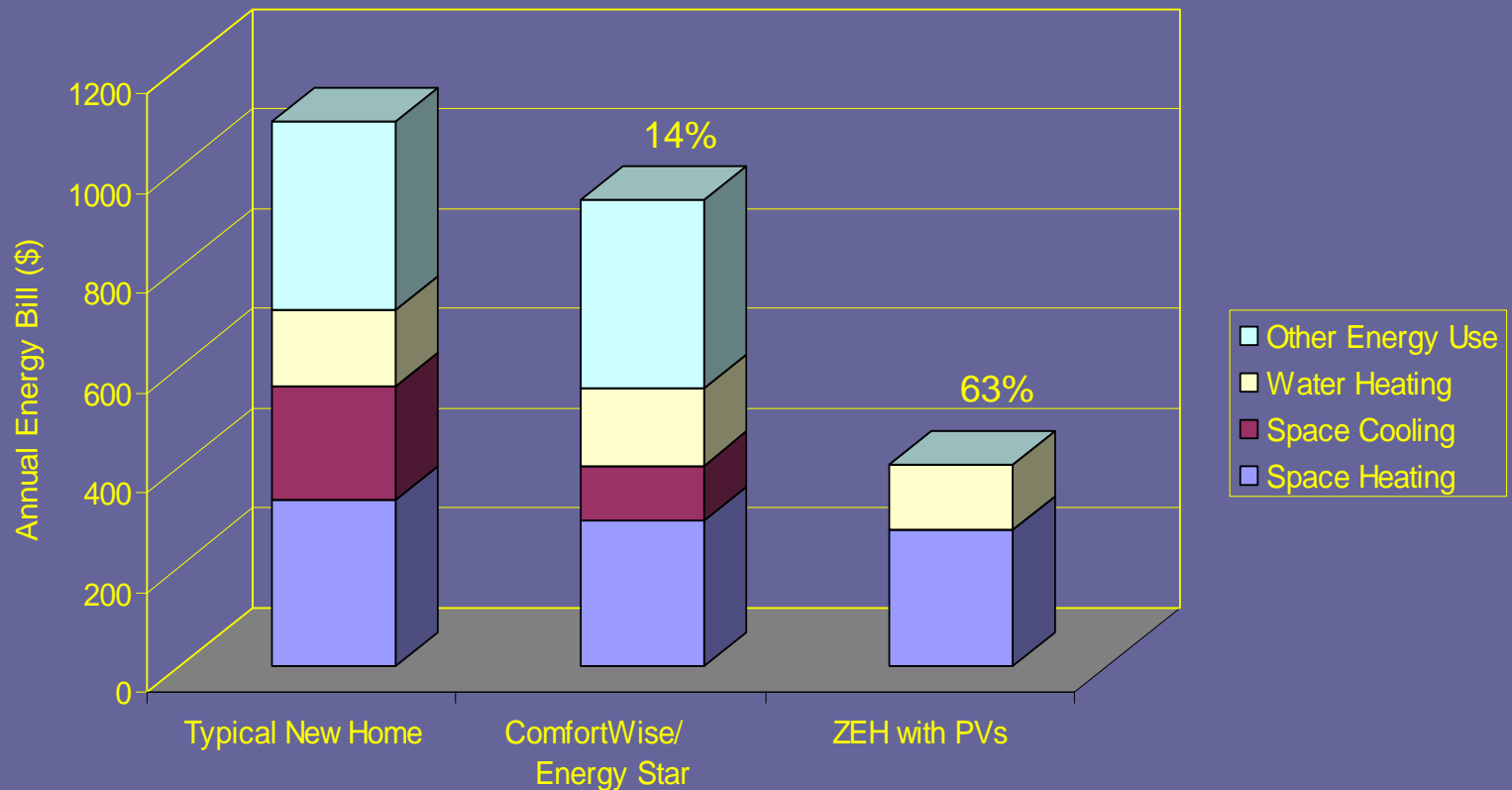
Appliances

- EnergyStar Rated



Typical "ConSol" ZEH

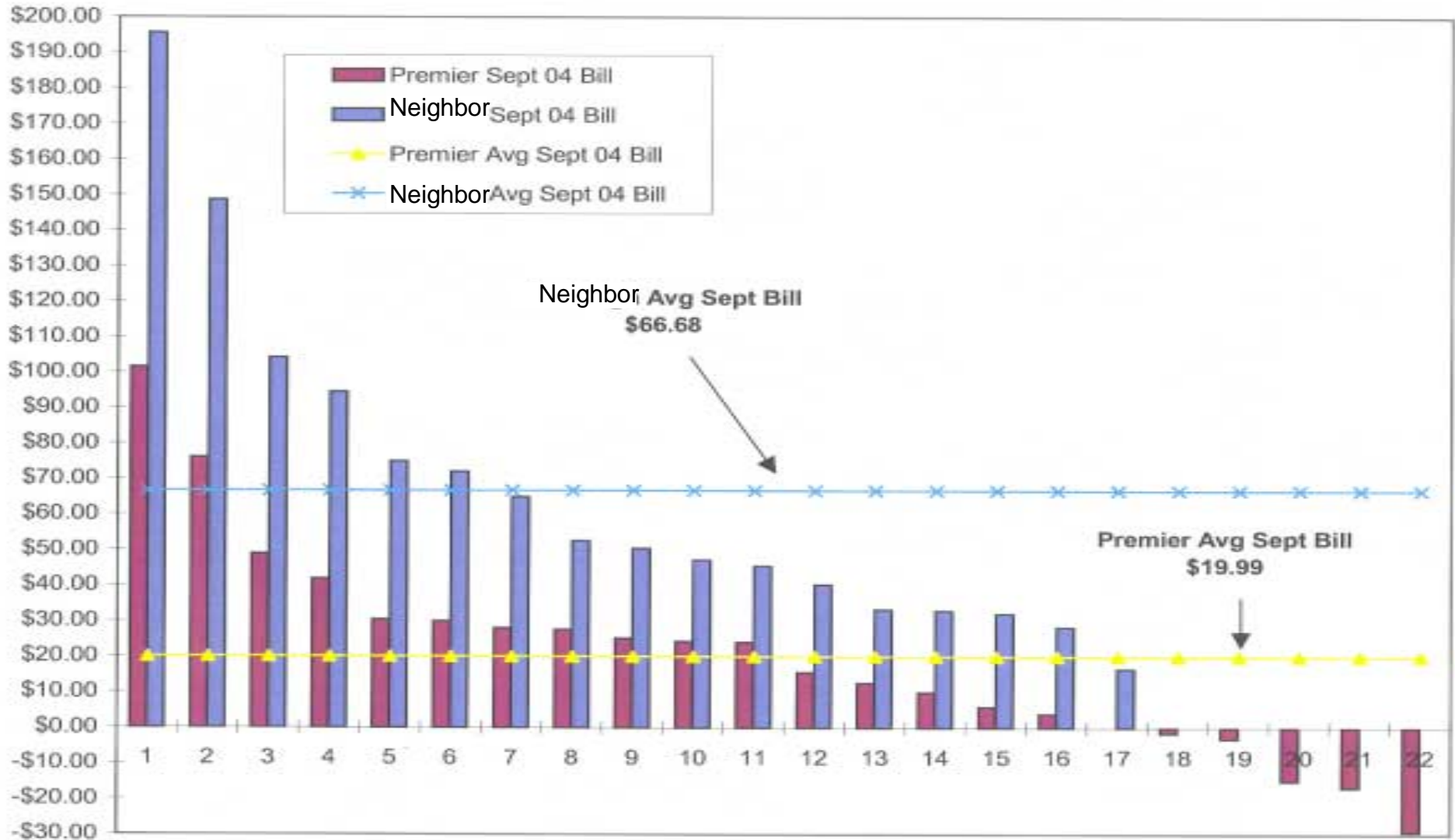
Annual Energy Bill Comparison



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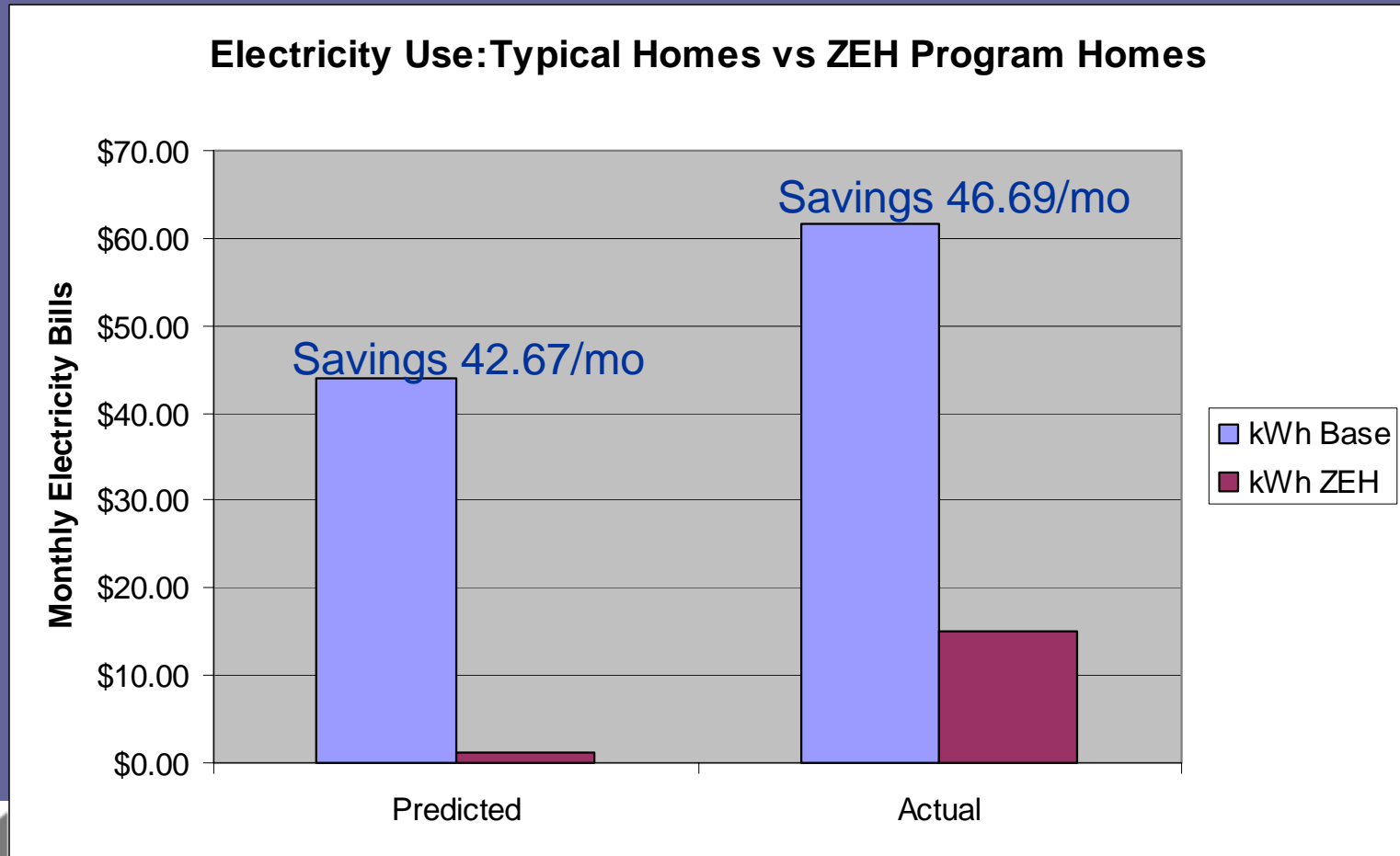
Premier vs Neighbor Sept 04 Electric Bills



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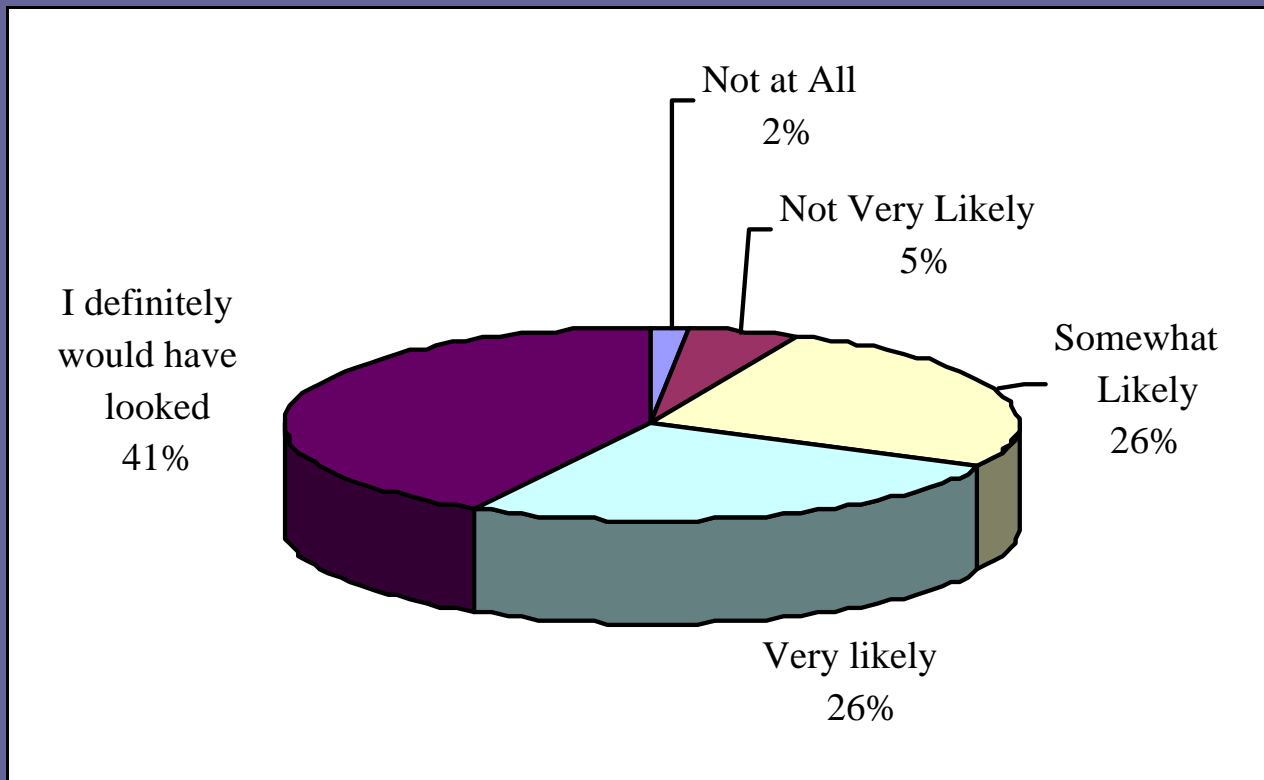


Predicted vs. Actual



What Do Buyers Say?

“What is the likelihood that you would have considered buying a house that costs \$8,000 more but that generates 40% of its own energy?”



Key Elements

- Well Designed Efficiency Package
 - Heating, Cooling, Water Heating: High Efficiency
 - Lighting: Fluorescent
 - Appliances: EnergyStar
- State or Utility Buy-Down of PV
- Utility Time-of-Use Rate
 - Not essential, but helpful
 - Positive cash-flow



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Work Needed

- Energy-efficiency technologies
 - New, better, less expensive
 - Building America, Solar programs
- Integration of Solar
- Market Analysis
 - What will buyers buy? Why? How Market?
- Community Impacts of Distributed Generation



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ZEH Summary

- Huge Energy and Emissions Savings
 - Good for the U.S.
- Margins Are Sustained
- More Expensive Product
- Sells As Well or Better than Energy Star
- ComfortWise Sells Faster than Standard



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