



BUILDING INDUSTRY RESEARCH ALLIANCE

Moving Energy Efficiency to the Mainstream: A Model for Production Builders

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ConSol/BIRA

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Energy Efficiency Symposium

San Francisco, CA



What is Building America?

- The U.S. Department of Energy's Building America program aims to achieve **marketable**, cost-effective net-Zero Energy Homes by 2020.
- Today's near-Zero Energy Homes are built using advanced energy efficiency and solar energy technologies to reach utility bill reductions of at least 60% relative to a local code home

What is Building America?

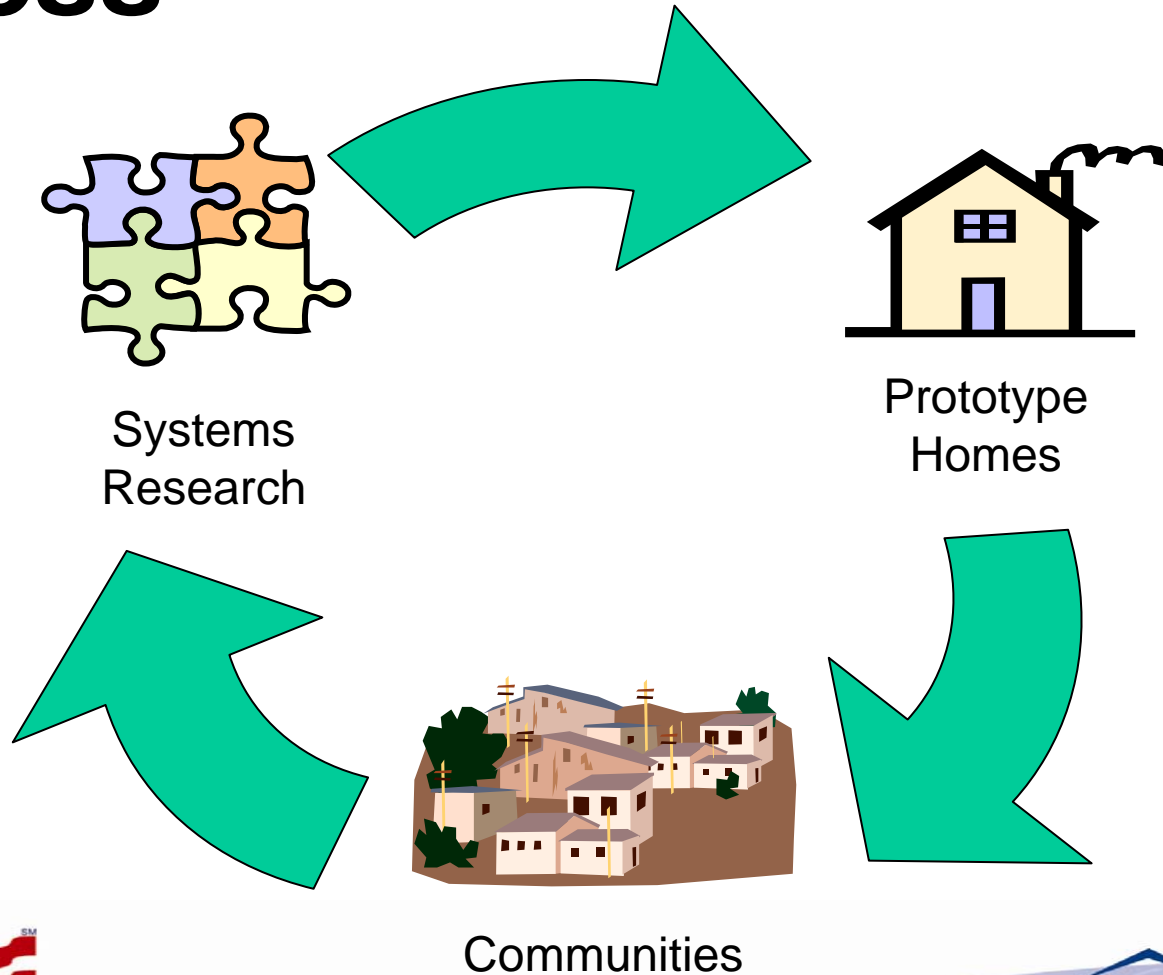
- **National Program**
- **BIRA**
 - **Building Industry Research Alliance**
 - **Collaborative Team; Over 100 Industry Partners**
 - **Run by ConSol**
- **Only West-Coast Team**
- **Only Team That is Part of Building Industry**

Objectives:

40% - 70% Whole-House Savings Zero Net-Energy Homes

- **Systems Research**
- **Prototype Homes**
- **Communities**
- **Best-Practices Builder Guides**

Building America Research Process



The Big Picture:

Community Scale



Premier Gardens & Cresleigh Rosewood: A Zero Energy Community Case Study



The Background

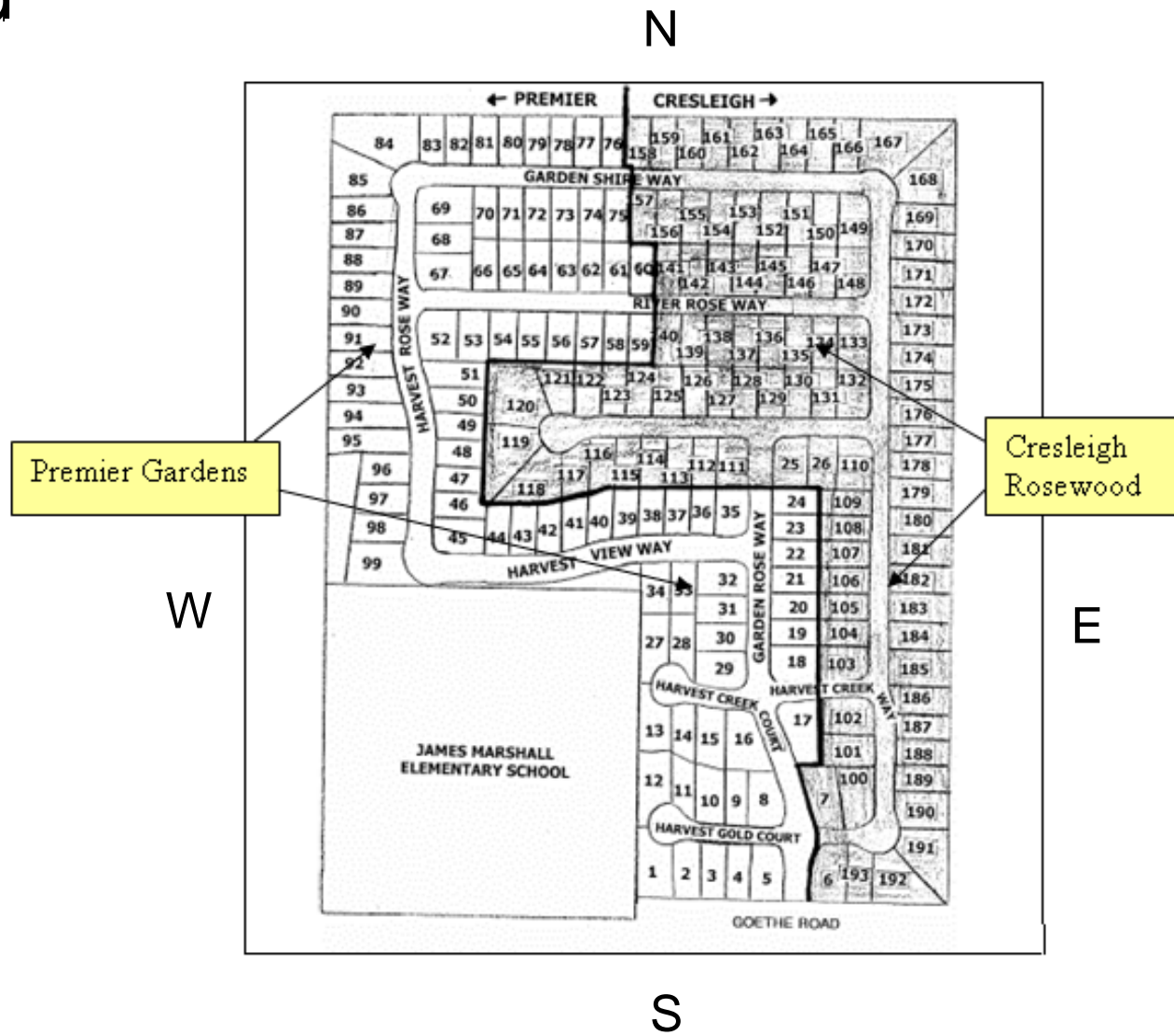
The Premier Gardens case study is one of the most valuable and visible community-scale case studies of near-Zero Energy Homes in the country

Why?

- ✓ Premier Gardens was one of the first ZEH communities
- ✓ Tremendous data collection effort
- ✓ Verified utility bill reductions with combination of efficiency and solar (both gas + electric)
- ✓ Demonstrated unexpected peak savings
- ✓ Displays “proof of concept”

The Background

- Rancho Cordova, CA
- Hot/Dry Climate
- Builders divided plot of land to build 2 different communities (2004/05)
- 98 homes at Cresleigh Rosewood
- 95 homes at Premier Gardens



The Design

Community	Premier Gardens	Cresleigh Rosewood
Energy Program	ComfortWise	SMUD Advantage
Square Footage of Each House Plan	2,248	2,384
	1,846	2,024
	1,625	2,000
	1,503	1,850
	1,285	1,720
PV	2kW AC GE	None
AC	14 SEER	10 SEER
Heating	92% AFUE	80% AFUE
Water Heating	Tankless 0.82EF	40 Gallon 0.60EF
Ceiling	R-38	R-30
Walls	R-13 + 1in foam w/Stucco	
Windows	Vinyl Low E	
Lighting	Fluorescent	Incandescent
Ducts	Sealed, Tested, Buried	Sealed, Tested



In addition to being BA homes, Premier Gardens' homes were part of SMUD's Pilot ZEH program, now called Solar Smart



The Scope of Analysis

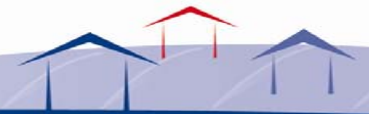
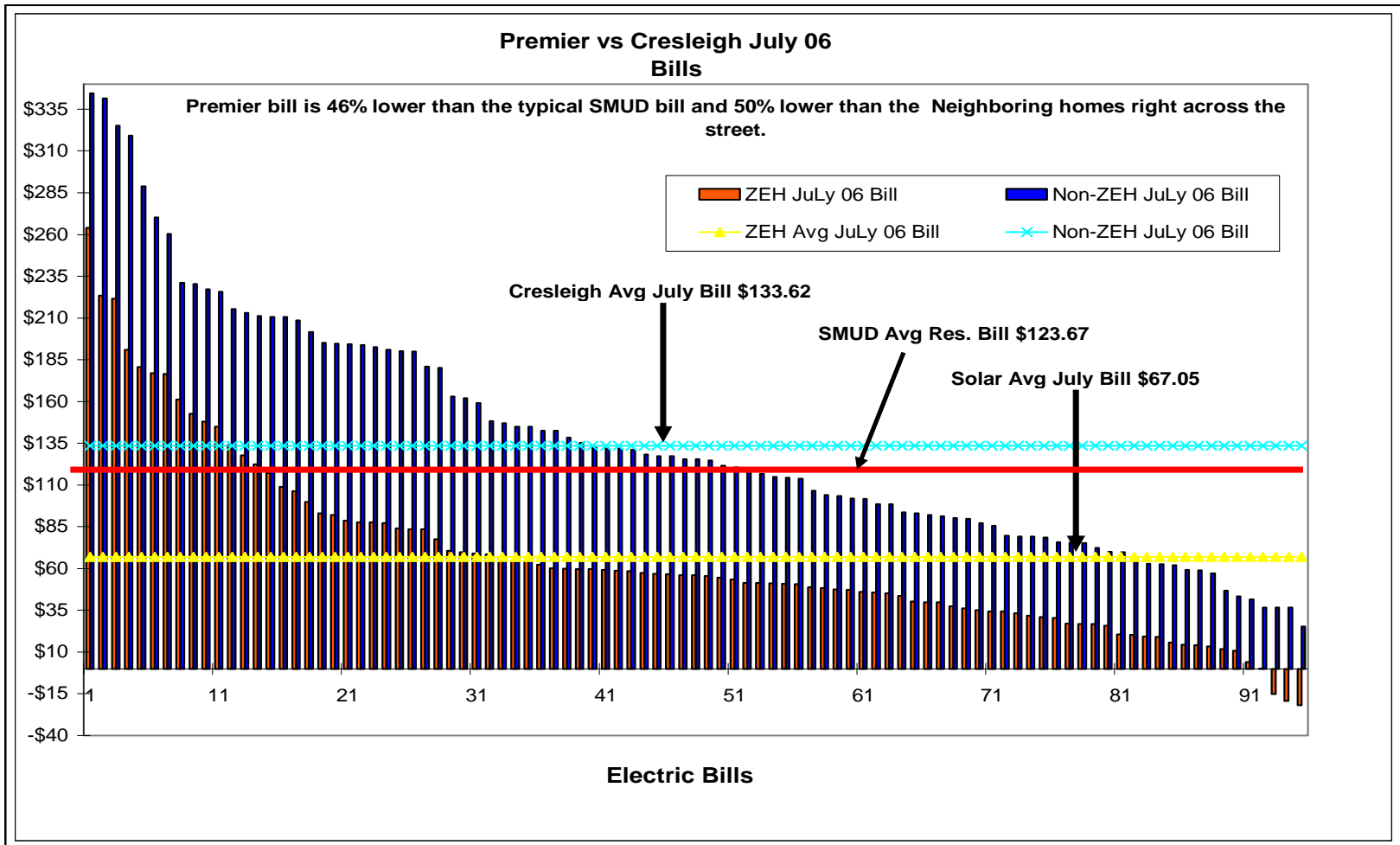
- Over 3 years of Electricity Data for occupied homes in each community (SMUD)
- 1 year of Gas Data for occupied homes in each community (PG&E)
- Over 3 years of 15-minute time-of-use electricity data for 18 occupied homes in each community (SMUD)
- Demographics on Homebuyers (RAND)

Demographics

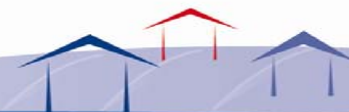
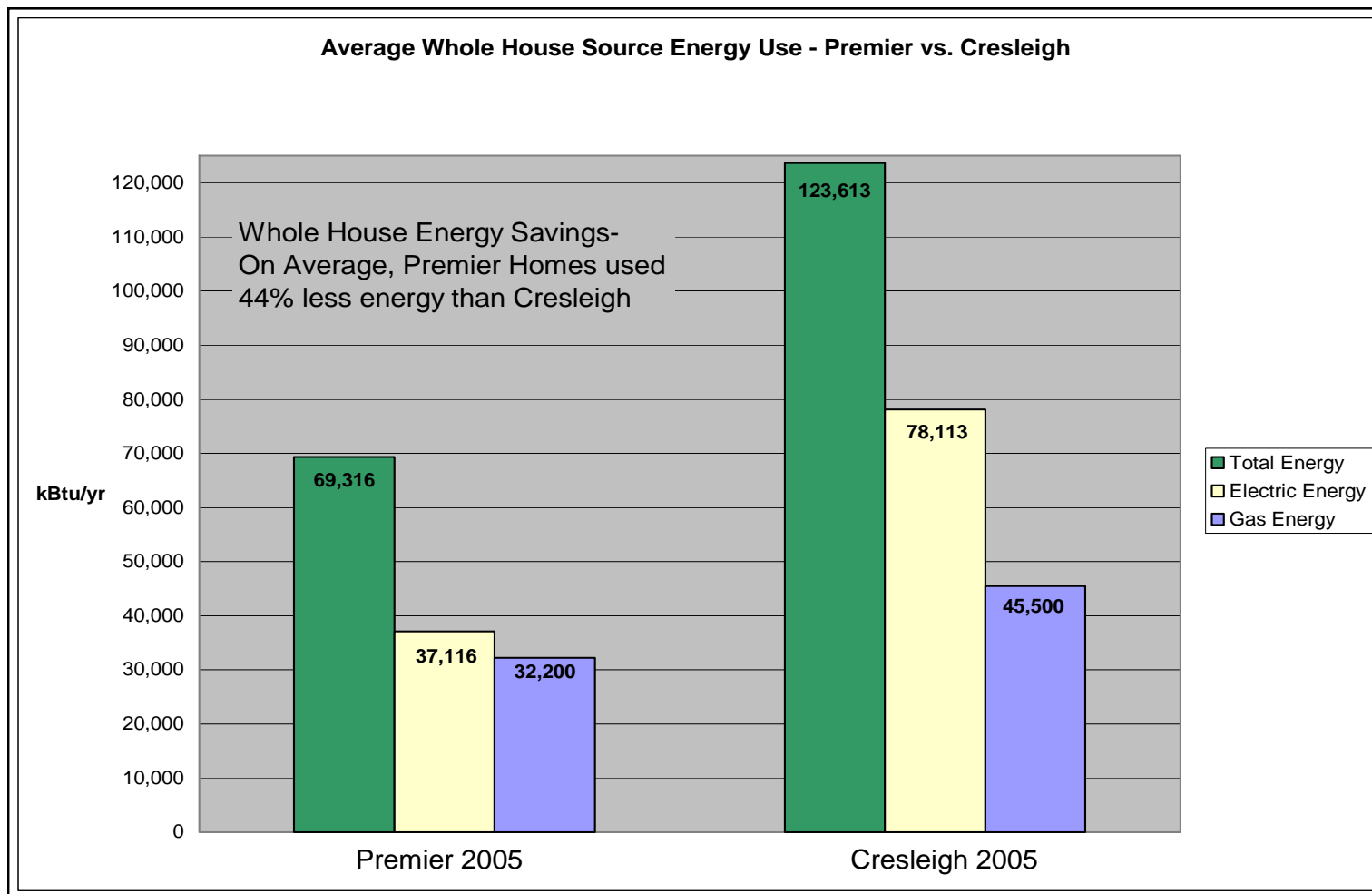
RAND working paper suggested...

- Near-ZEH homebuyers are younger
- Near-ZEH homebuyers earn less household income
- Near-ZEH homebuyers are more educated (2:1 hold advanced degrees)
- Near-ZEH homebuyers viewed more homes before purchasing (more than 2:1)

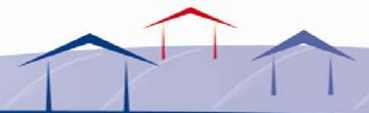
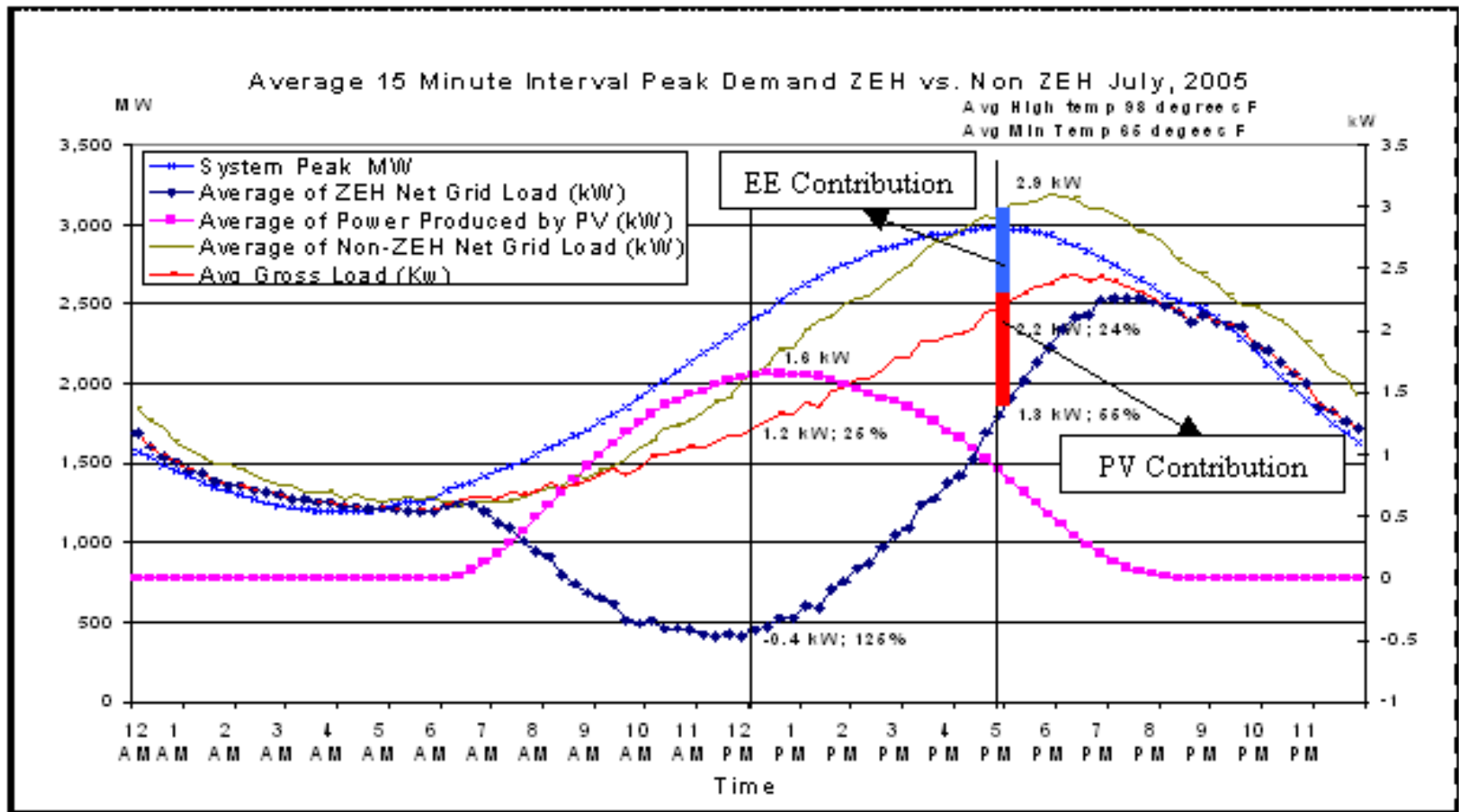
Electricity Use



Whole-House Energy Use



Peak Electricity Use



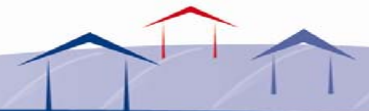
Verifiable Results

- Arguably, the most important aspect of the Premier Gardens case study has been the ability of the building industry at large to prove the validity of the Zero Energy Home concept
- Until this project, ZEH advocates relied on computer simulation and small samples of homes to display large-scale impacts of ZEHs
- With almost 200 homes' electric and gas bills, the Premier Gardens case study has helped convince builders, buyers, utilities, and public-decision makers of the value of energy efficiency and solar in new home construction

New Solar Homes Partnership

Incentives for Solar Generation

Combining Energy Efficiency and Solar in New Homes



CALIFORNIA
ENERGY
COMMISSION

NEW SOLAR HOMES PARTNERSHIP



FINAL GUIDEBOOK

DECEMBER 2006
CEC-300-2006-017-CMF



Arnold Schwarzenegger, Governor

Goal:

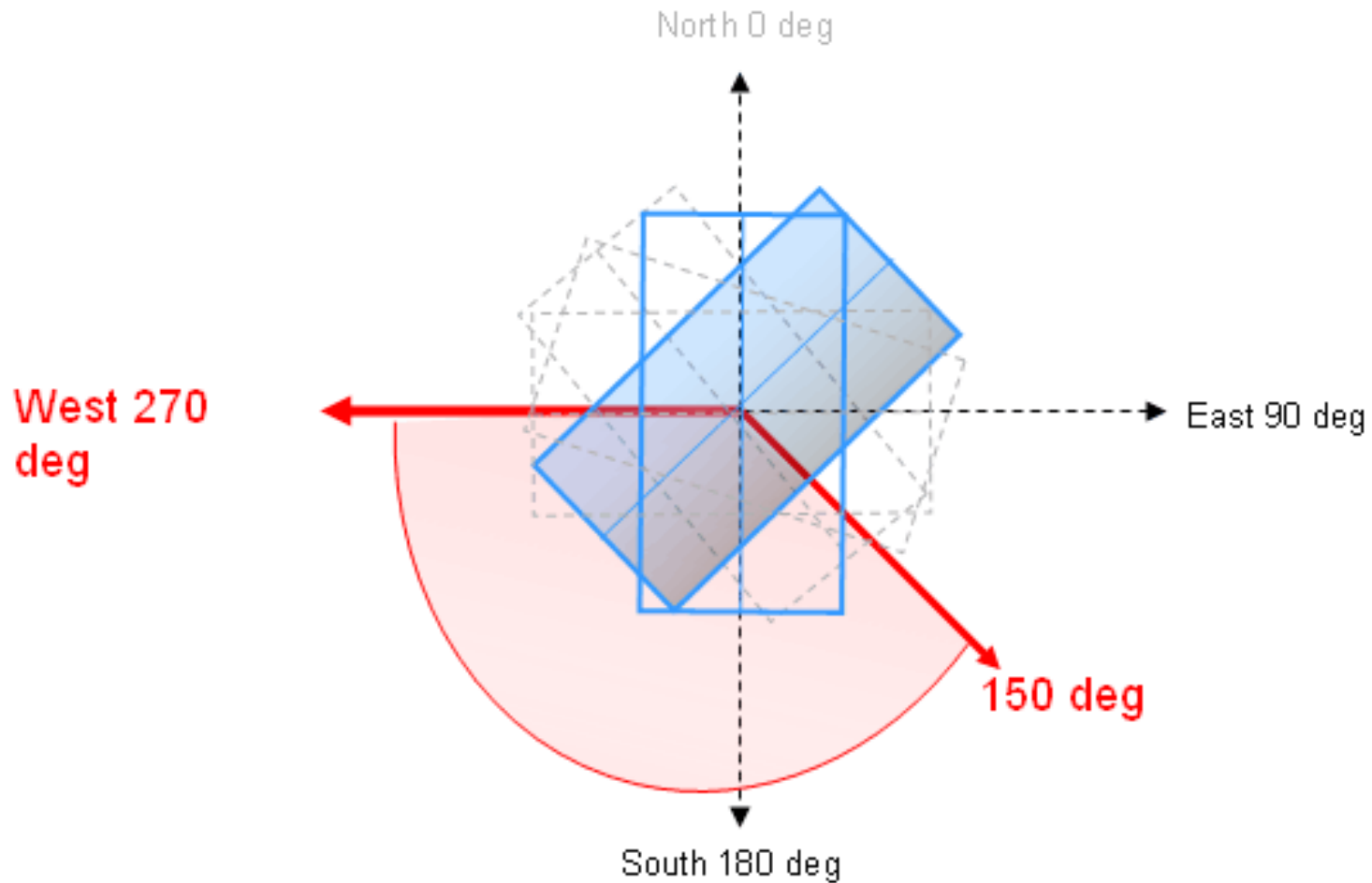
50% of all new homes
built in California will
incorporate solar energy
by 2020

Overview:

“Go Solar Initiative”

CEC managed \$350 million
program

Dictates terms of solar
incentives in all ISO areas



Program Basics:

- Tier I
 - \$2.50/watt (+\$0.10/watt if >50% of homes)
 - 15% incentive (Utility programs: \$500 typical)
 - Basic marketing support (logo)
- Tier II
 - \$2.50/watt (+\$0.10/watt if >50% of homes)
 - Efficiency incentive (est. \$2,000, new utility program)
 - Local jurisdictional support
 - Program logo (enhanced)
 - Local marketing support

Transferring Lessons Learned

- Cost-effectiveness and value for homebuyer of efficiency first and solar second
- Practicality for production builders to construct and market near-Zero Energy Homes that are cost-effective for builders and homeowners
- Ability of near-Zero Energy Homes to reduce gas and electric bills
- Ability of near-Zero Energy Homes to substantially cut peak and orient PVs from southeast to west





Thank You

Questions

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