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

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ASES Solar 2007 Cleveland, OH

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Research Toward Zero Energy Homes

Have you seen this picture?

The Background

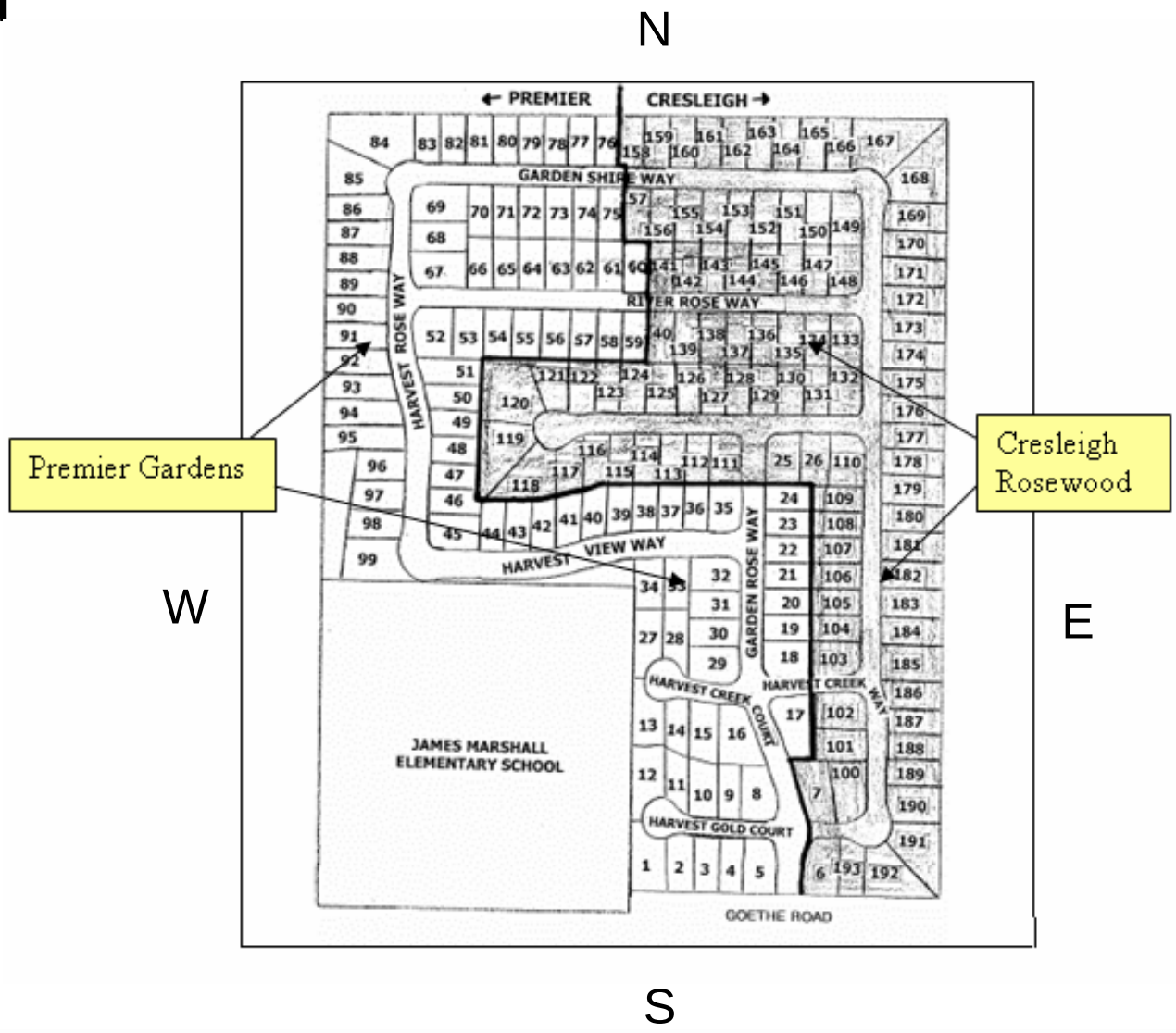
The Premier Gardens case study is one of the most valuable and visible community-scale case studies of near-Zero Energy Homes in the country

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



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The Design

Community	Premier Gardens	Cresleigh Rosewood
Energy Program	ComfortWise	SMUD Advantage
Square Footage of Each House Plan	2,248 1,846 1,625 1,503 1,285	2,384 2,024 2,000 1,850 1,720 1,610
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

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The Scope of Analysis

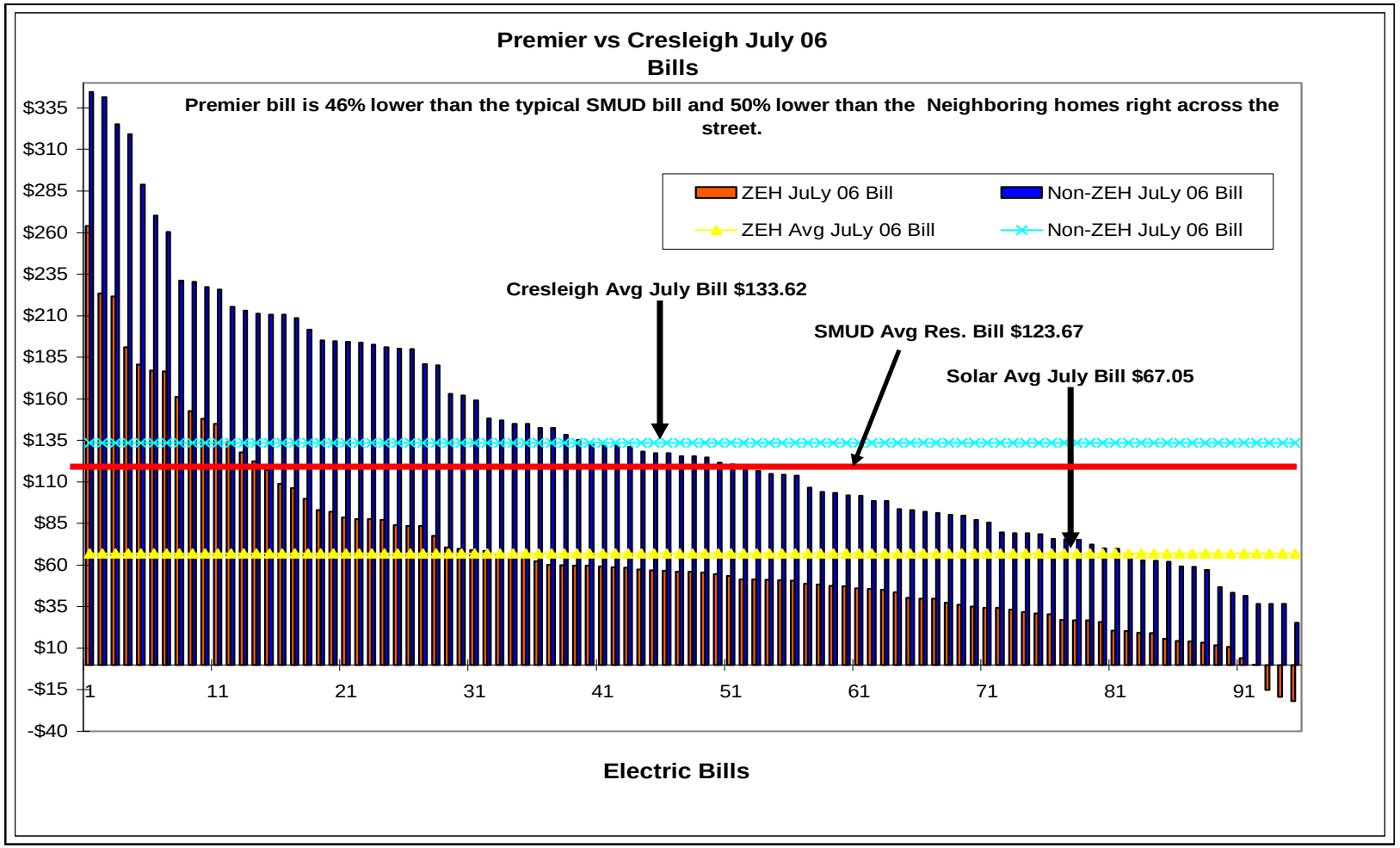
- Over 3 years of Electricity Data for occupied homes in each community (SMUD)
- 1 year of Gas Data for occupied homes in each community (PG&E)
- Over 3 years of 15-minute time-of-use electricity data for 18 occupied homes in each community (SMUD)
- Demographics on Homebuyers (RAND)

Demographics

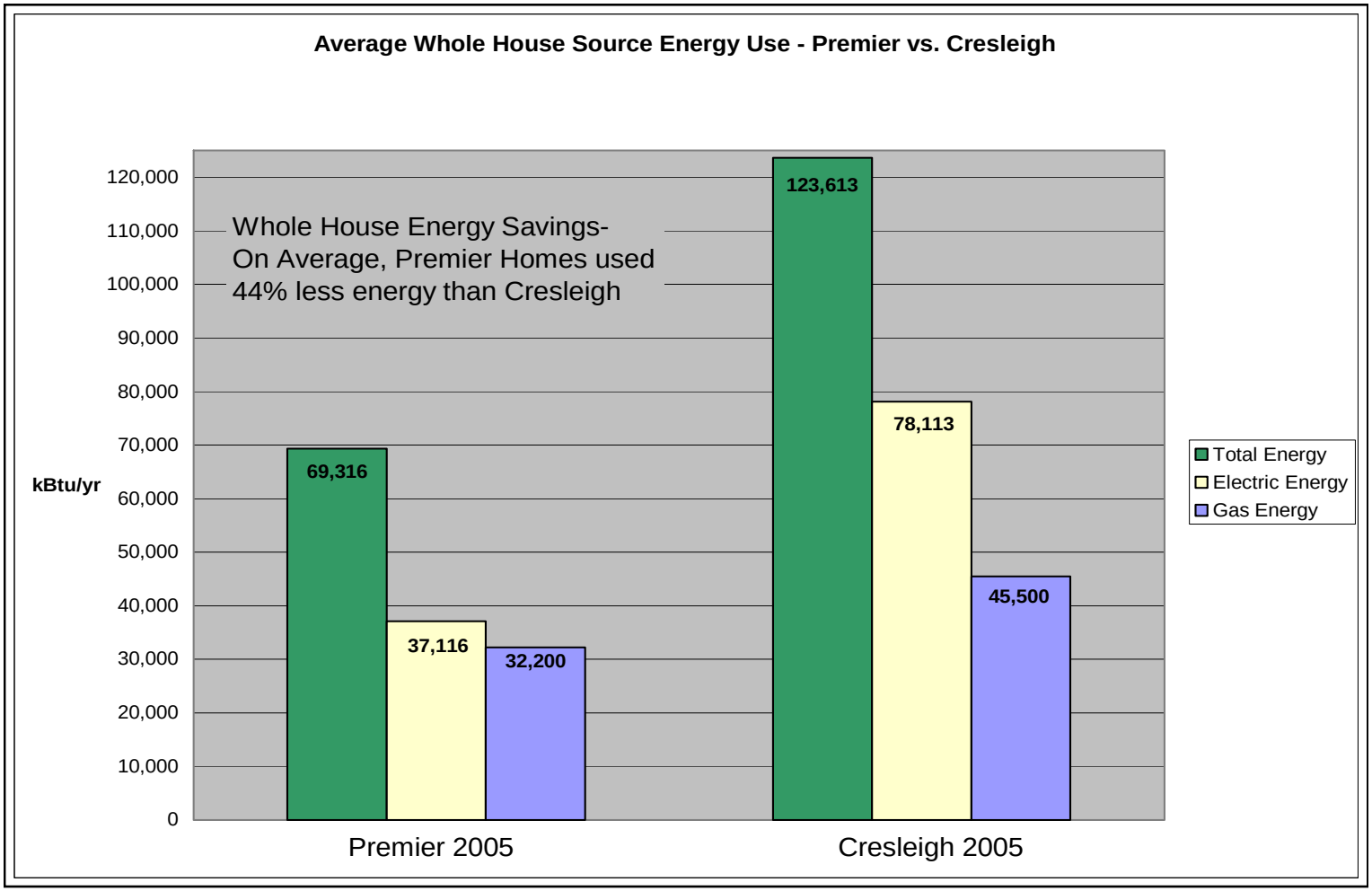
RAND working paper suggested…

- 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)

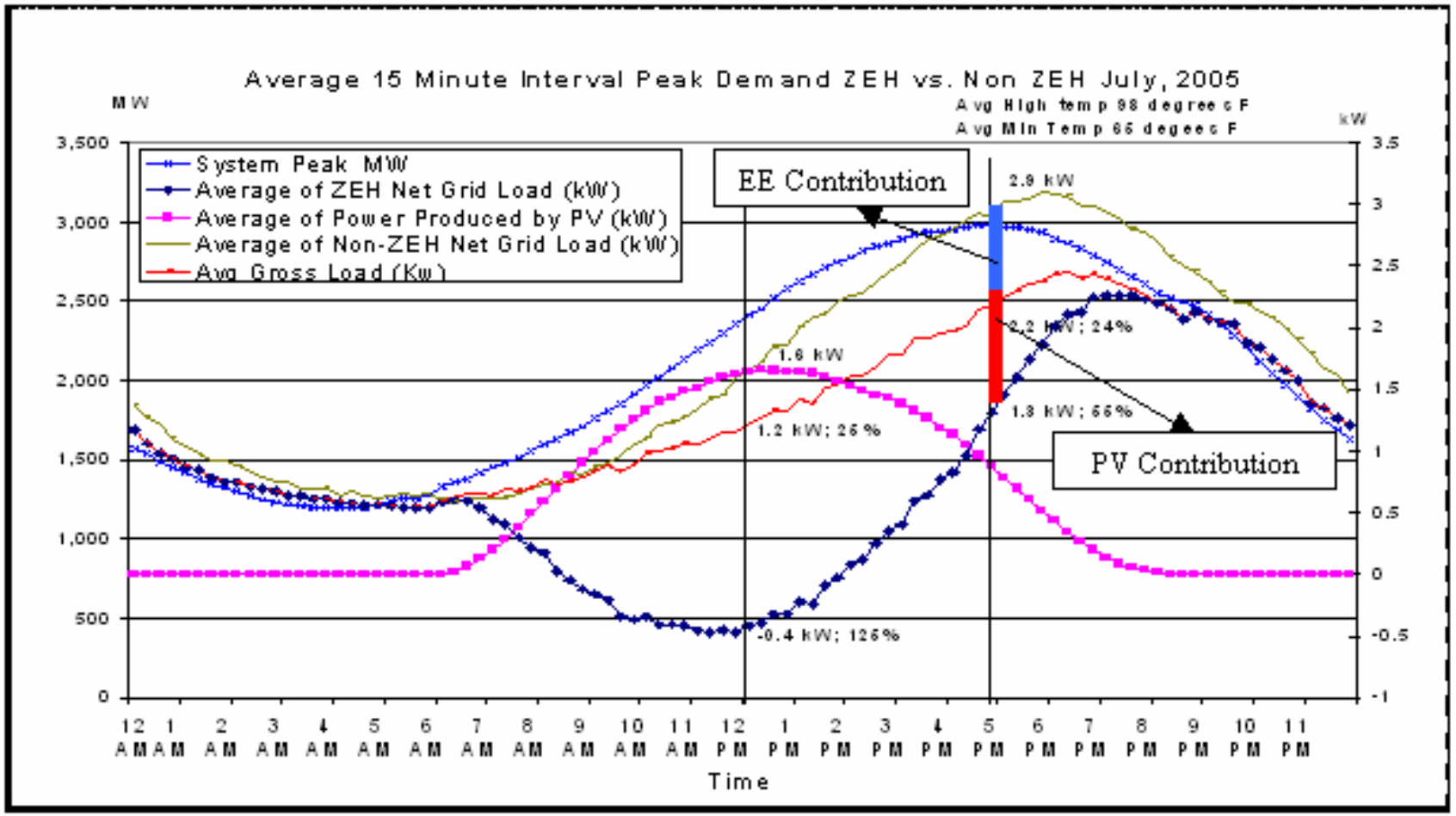
Electricity Use



Whole-House Energy Use



Peak Electricity Use



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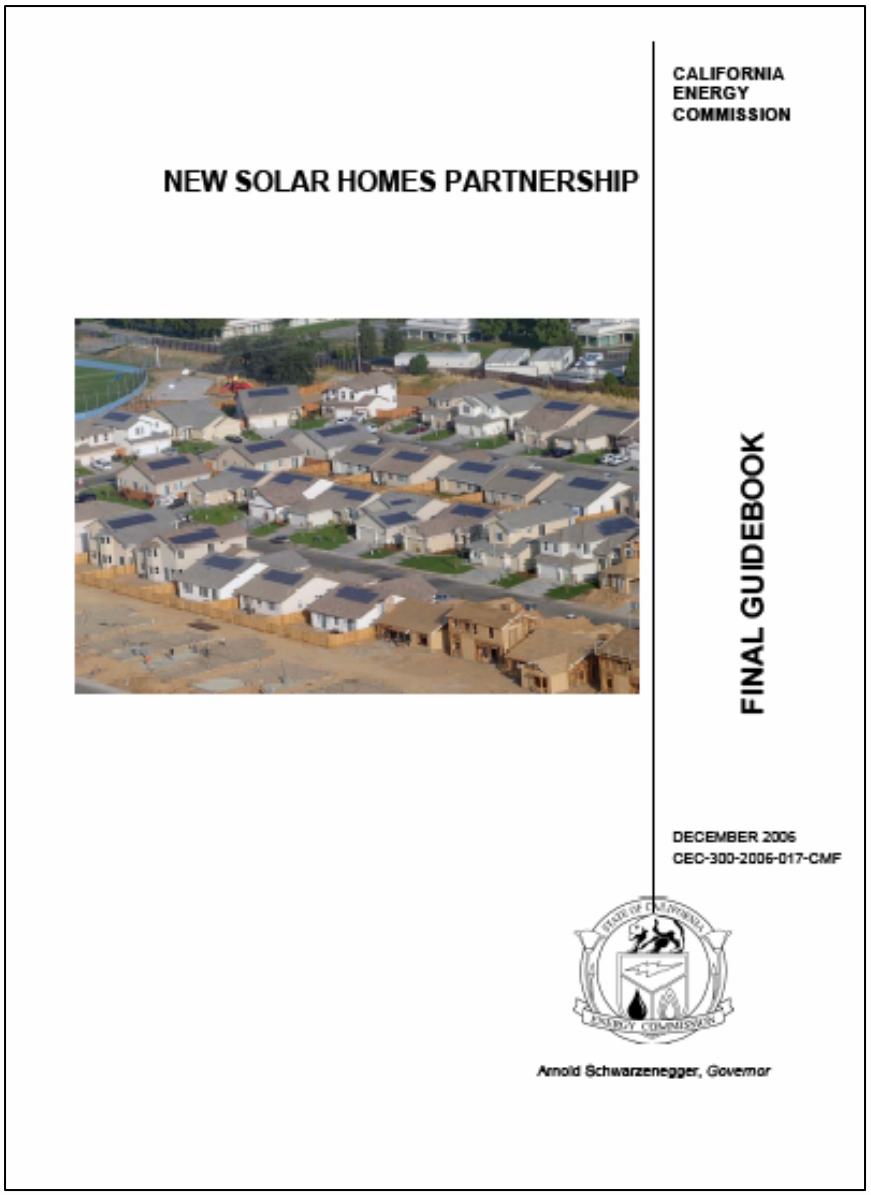
Verifiable Results

- 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



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

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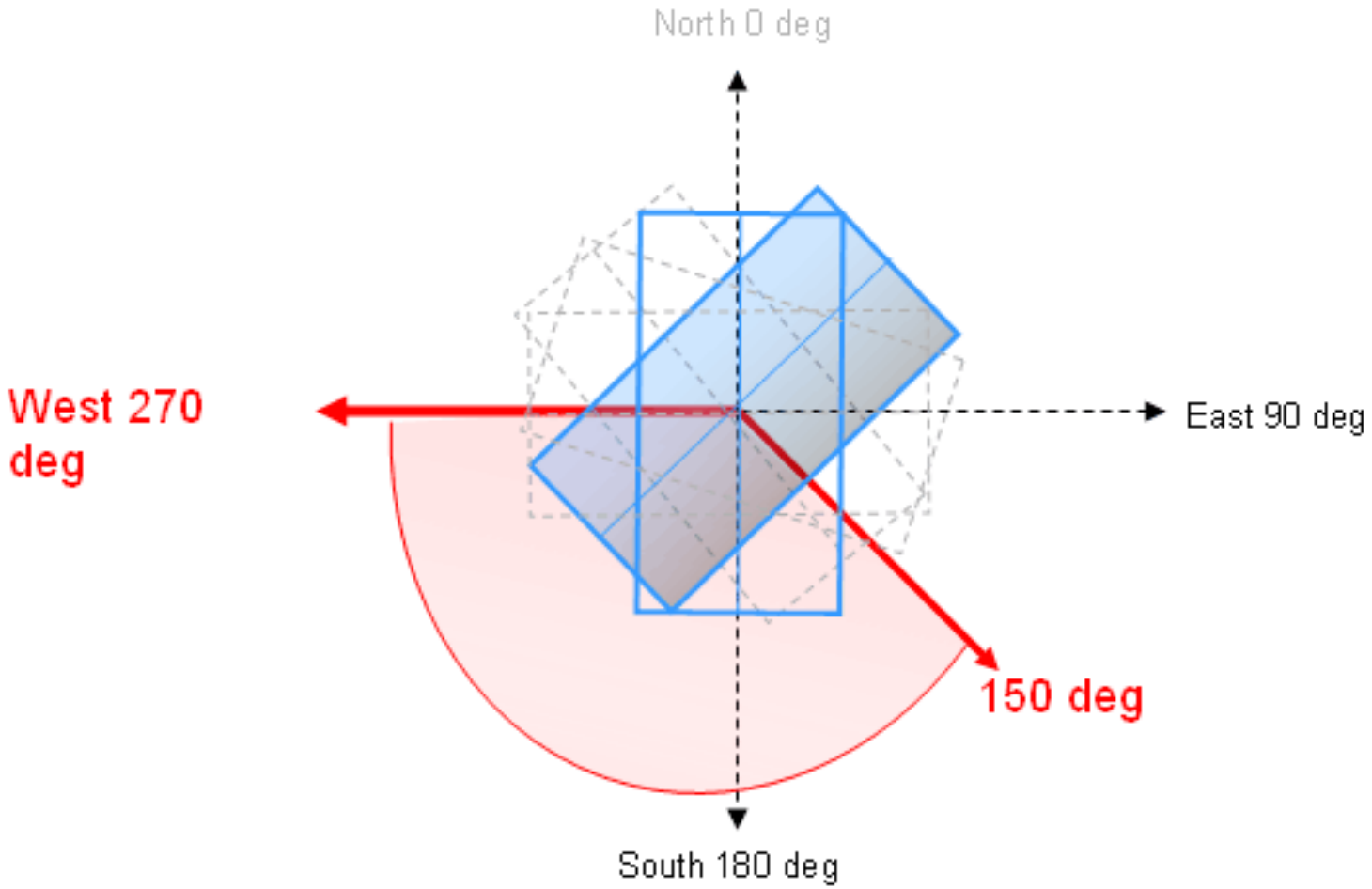
Program Basics:

- 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


North 0 deg
West 270 deg
East 90 deg
150 deg
South 180 deg

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

Sacramento Municipal Utility District

Thanks to Mike Keesee and SMUD for their dedication to the design and execution of this experiment. This case study and the shaping of the New Solar Homes Partnership would not be possible without the bold leadership of SMUD.

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Thank You

Questions

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