Staff Workshop

Solar on New Residential Construction Workshop

California Energy Commission

Hearing Room A

December 5, 2012

9AM – 5PM

Workshop Agenda

9:00 Welcome and Housekeeping

9:30 Panel 1: Market Outlook for PV on New Construction

12:00 Lunch

1:00 Panel 2: Solar Financing Models

2:15 Panel 3: Energy Efficiency

3:30 Break

3:45 Panel 4: Outreach and Marketing, Warranties, Consumer Advocacy/Protection

Purpose of Workshop

Staff is seeking input from experts, stakeholders, and the general public on the market outlook for the solar photovoltaic and new construction industries.

- To gain a better understanding of the issues facing the solar photovoltaic and new construction industries.
- To identify potential revisions to the New Solar Homes Partnership Program (NSHP).

NSHP Background

New Solar Homes Partnership (NSHP)

- Began in 2007
- Goals:
  - Establish a self-sufficient solar industry where solar energy systems are a mainstream viable option for homes by 2016.
  - Achieve 360 megawatts of installed solar electric capacity in California by the end of 2016.
  - Place solar energy systems on 50% of new homes by end of program.
- Eligibility
  - New Residential Construction
  - Electric Customer of PG&E, SCE, SDG&E, or BVES
  - Achieve high levels of energy efficiency
- Expected Performance Based Incentive
- Statistics
  - 32.3 MW Reserved
  - 20.3 MW Installed

Panel 1: Market Outlook for PV on New Construction

Renewable Energy Office
Efficiency & Renewable Energy Division

Le-Quyen Nguyen
December 5, 2012

“State of the PV Market”

Guest Presentation

Joachim Seel

Lawrence Berkeley National Laboratory

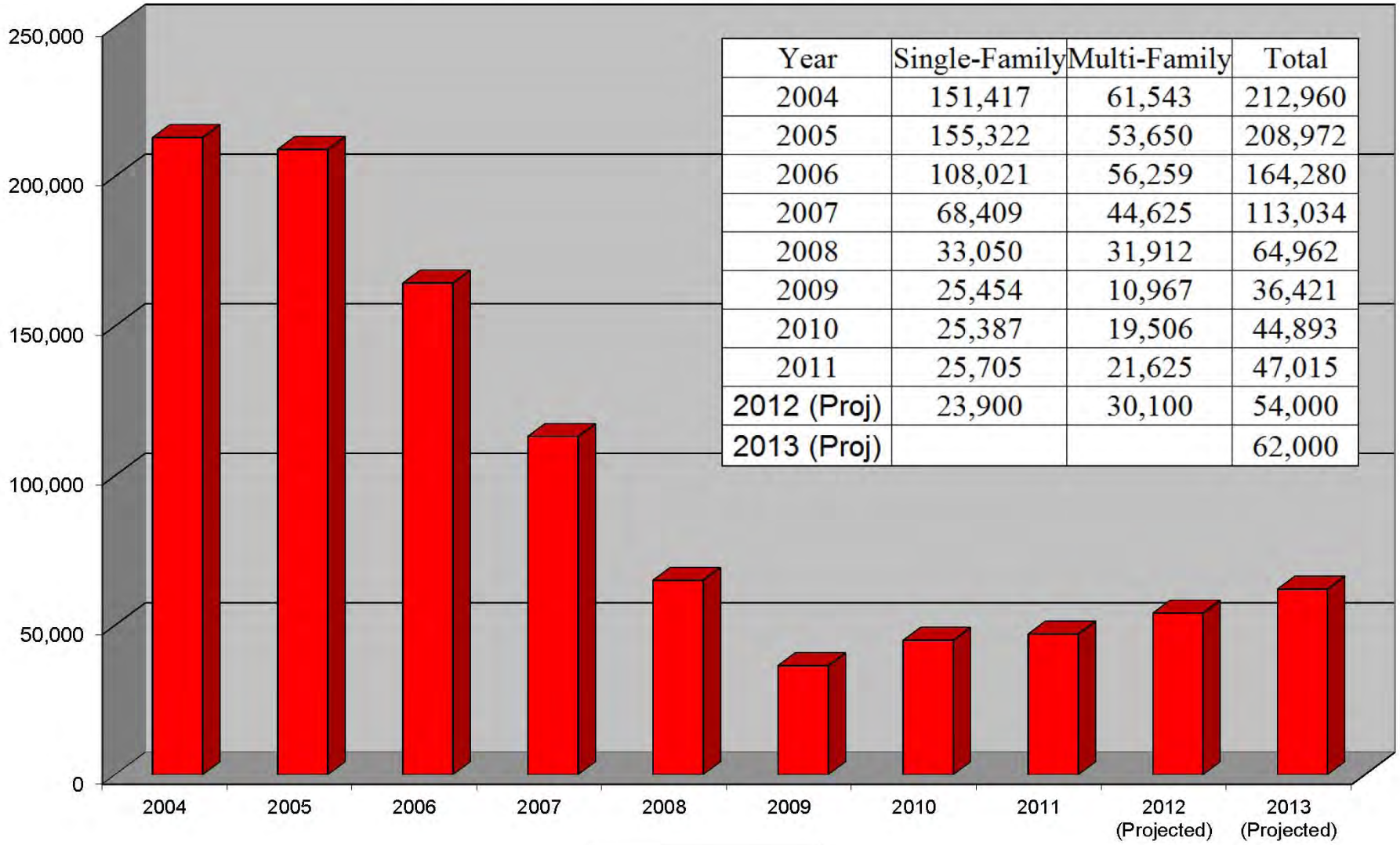
“State of the New Construction Market”

Guest Presentation

Bob Raymer

California Building Industry Association

HOUSING PRODUCTION IN CALIFORNIA 2004-2013 (Proj)



Year	Single-Family	Multi-Family	Total
2004	151,417	61,543	212,960
2005	155,322	53,650	208,972
2006	108,021	56,259	164,280
2007	68,409	44,625	113,034
2008	33,050	31,912	64,962
2009	25,454	10,967	36,421
2010	25,387	19,506	44,893
2011	25,705	21,625	47,015
2012 (Proj)	23,900	30,100	54,000
2013 (Proj)			62,000

10.30.12

Data Provided by: Construction Industry Research Board

Panelists

- Matt Brost, National Residential Sales Director, SunPower
- Bob Raymer, Senior Engineer/Technical Director, California Building Industry Association
- Jacob Atalla, Sr. Director of Sustainability, KB Homes
- Walter Cuculic, National Manager of Home Builder Programs, SolarCity
- Joachim Seel, Electricity Markets and Policy Group, Lawrence Berkeley National Laboratory

Questions

1. Solar PV system costs have significantly decreased in recent years. Have total system costs "bottomed out?" If not, which costs can be expected to decrease in the short and medium terms? How can further cost reductions be encouraged to the point that PV is cost-effective without incentives?
2. Are there any technology types/trends that are expected to come into the market that will decrease costs or increase adoption of PV?
3. What market barriers or inefficiencies (i.e. tariffs, permitting, grid interconnection and integration) are disrupting the PV market from reaching its full potential?
4. How can state solar policies and programs decrease non-module costs for new residential homes?
5. What are the current motivations for builders to include solar on new homes?

Topic 2: Solar Financing Models

Renewable Energy Office
Efficiency & Renewable Energy Division

Eli Harland

December 5, 2012

Overview

1. Financing Needs for Solar on New Homes
2. Residential Solar PV Financing Models
3. Financial Outcomes of the Models
4. Panel Discussion

Financing Needs for Solar on New Homes

- Tax incentives and utility savings spread over the life of the system and capital need is upfront

- Upfront Capital Requirements
  - Average weighted cost $7.76/W and average weighted incentive $2.67/W for NSHP systems 2010-2012
  - Upfront capital requirement $5.09/W

- Assuming a 4 kW system:
  - Cost is $31,040

- How to finance the capital requirement?

Residential Solar PV Financing Models

Purchased System Financing Types

Cash

System owner pays capital requirement with cash on hand and owns the system outright.

Loan

System owner secures a home equity line of credit, refinances mortgage or includes in primary mortgage to cover capital requirement.

Property Taxes

System owner secures loan from public agency to cover capital requirement with loan paid back through property tax bill.

Residential Solar PV Financing Models

<u>Third-party Ownership</u>

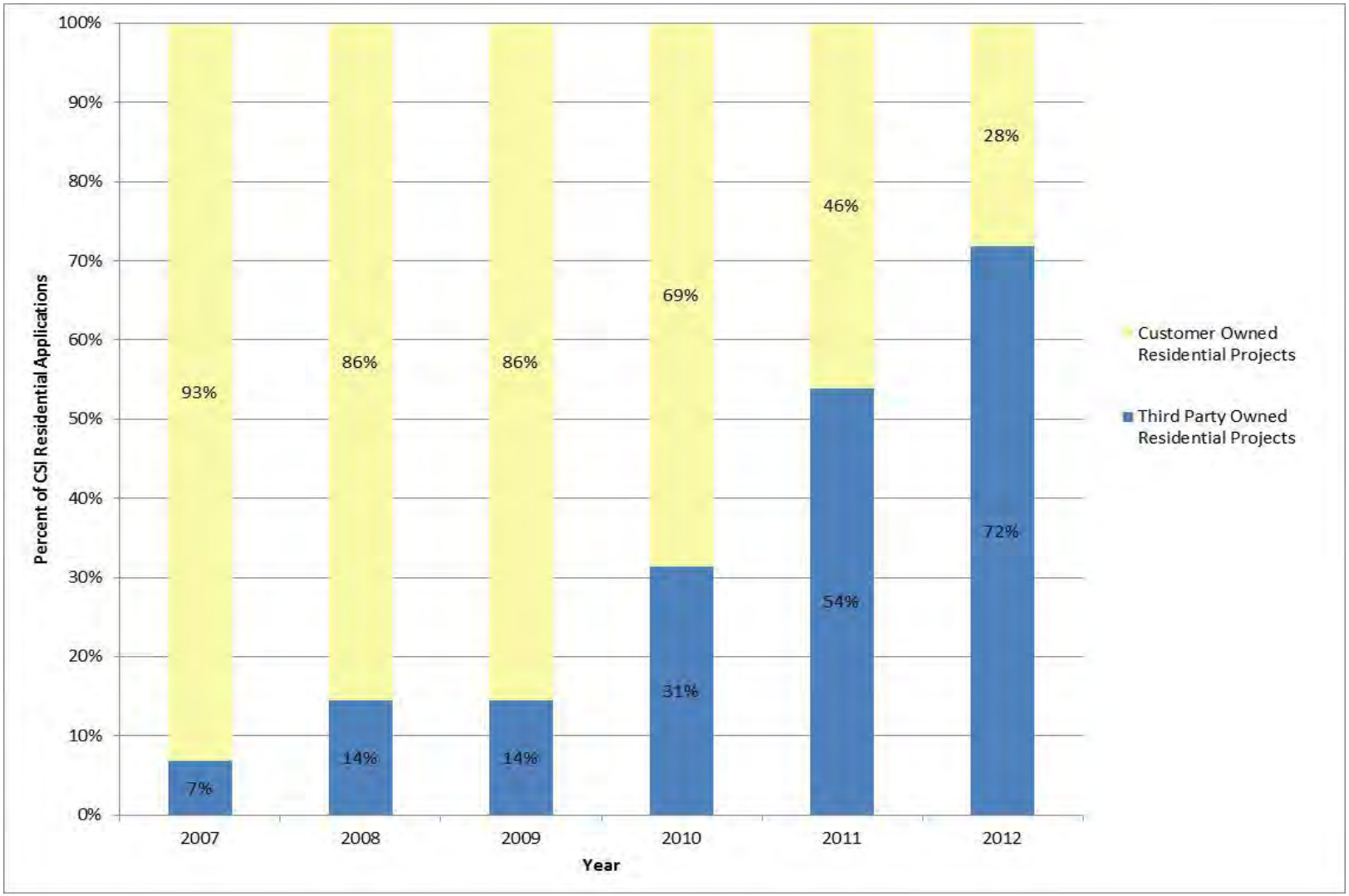
System host makes "operating" payments (i.e. lease) or purchases electricity at a set rate (i.e. PPA) from owner.

- **Lease Agreements-** Third party finances and owns the system and leases the system to customer and customer offsets utility electricity purchases.
- **Power Purchase Agreement (PPA)-** Third party finances and owns the system and sells system power to customer and customer offsets utility electricity purchases.

Strong growth of third-party model since 2008 legislative decision (AB 2863, Leno, 2008). Independent solar energy producer exception from the definition of a corporation (PUC Section 218).

Residential Solar PV Financing Models

CSI experienced rapid increase of third party owned systems



Source: CSI Annual Program Assessment, June 2012

Financial Outcomes of the Models

	Homeowner Purchase	Corporate Property Owner Purchase	Lease ($75/month w/ escalator)
System Price (4kW, $7.76/W)	$31,040	$31,040	$31,040
NSHP Incentive ($1.75/W)	$7,000	$7,000	$7,000
ITC ($24,040 basis)	$7,212	$7,212	$7,212
NPV of Depreciation (MACRS with bonus)	None	$8,059	$8,059
Net System Price	**$16,828**	**$8,769**	**$8,769**
NPV of Utility Savings ($0.156/ kWh)	$12,887	$12,887	$12,887
Net System Owner Cost	**$3,941**	**($4,118)**	**($2,319)***
Net System User Cost	**N/A**	**N/A**	**($1,799)***
Financial Amount	$24,040	$24,040	None

*Lease amount is the NPV of monthly payments for 20 years.

Examples of Current NSHP Projects

Type	System Size (kW)	System Price*	Price per Watt	NSHP Incentive	Final System Price	Final Price per Watt
Lease	5.07	$23,099	$4.56	$11,237	$11,862	$2.34
Lease	3.92	---	---	$10,415	$12,493	$3.19
Lease	2.60	$9,318	$3.58	$5,000	$4,318	$1.66
Purchase	4.71	$31,580	$6.70	$8,060	$23,520	$4.99
Purchase	1.93	$12,075	$6.26	$4,371	$7,704	$3.99
Purchase	6.96	$40,620	$5.84	$17,873	$22,747	$3.27

* System price for lease systems is total lease payments and installation.

Panelists

- Ethan Sprague, Director of Government Affairs, SunRun
- Albert Luu, Director of Structured Finance, SolarCity
- Lew Milford, President of Clean Energy Group, Clean Energy States Alliance
- Sheila Berger, Energy and Sustainability Assistant Program Coordinator, Sonoma County Energy Independence Program

Questions

1. What are the dominant financing arrangements and mechanisms for installing solar on new homes?
2. What are the pros and cons of such arrangements or mechanisms from the perspective of the 1) end-use customer, 2) builder, 3) installer, and 4) ratepayers (who have funded programs to incentivize solar on new homes)?
3. What is the share of financial risk borne by each of the abovementioned parties under different financing arrangements and mechanisms?
4. Are the current NSHP incentive structures, eligibility rules and program administration aligned with the dominant financing arrangements and mechanisms?

Topic 3: Energy Efficiency

High Performance Buildings & Standards Office
Efficiency & Renewable Energy Division

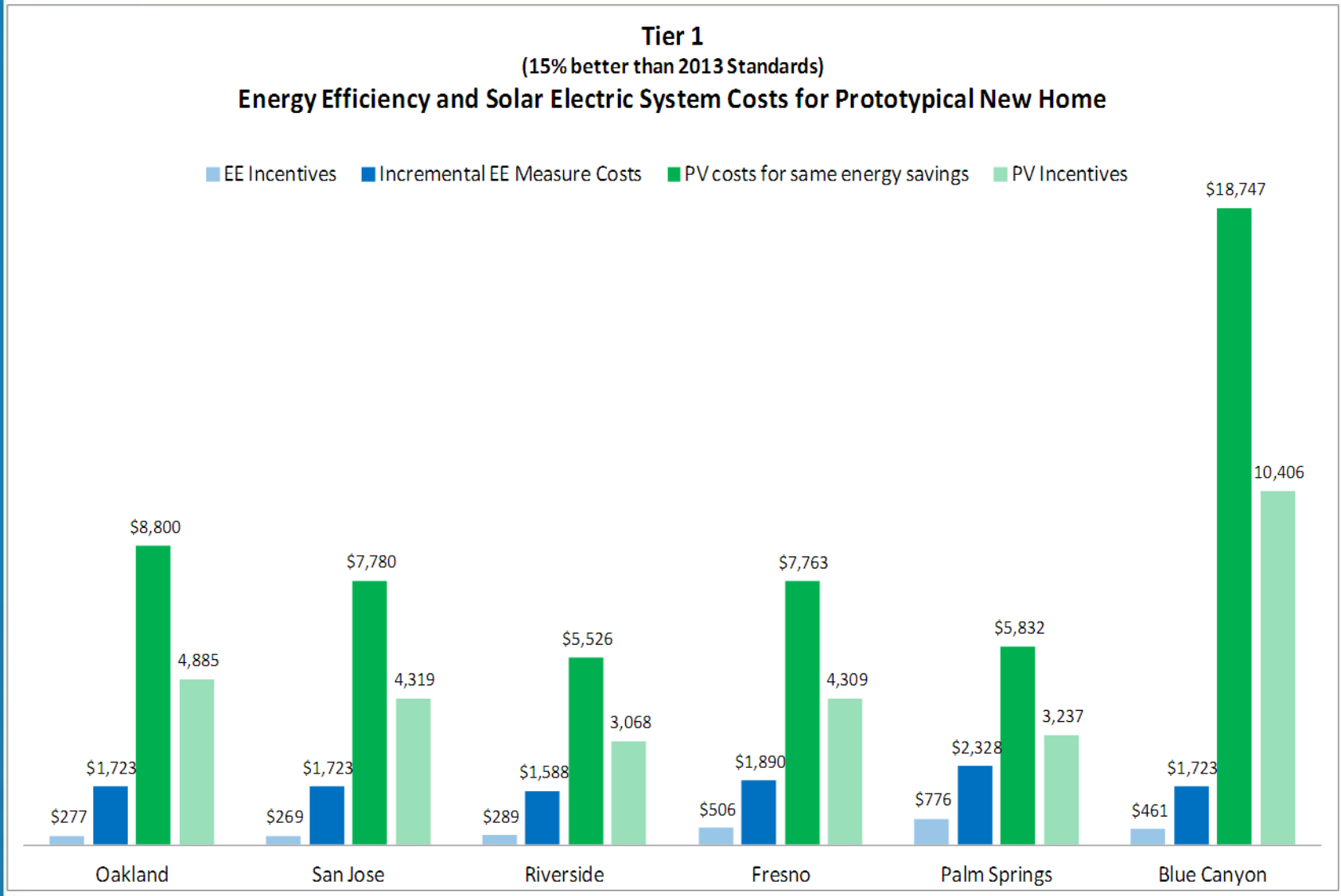
Farakh Nasim

December 5, 2012

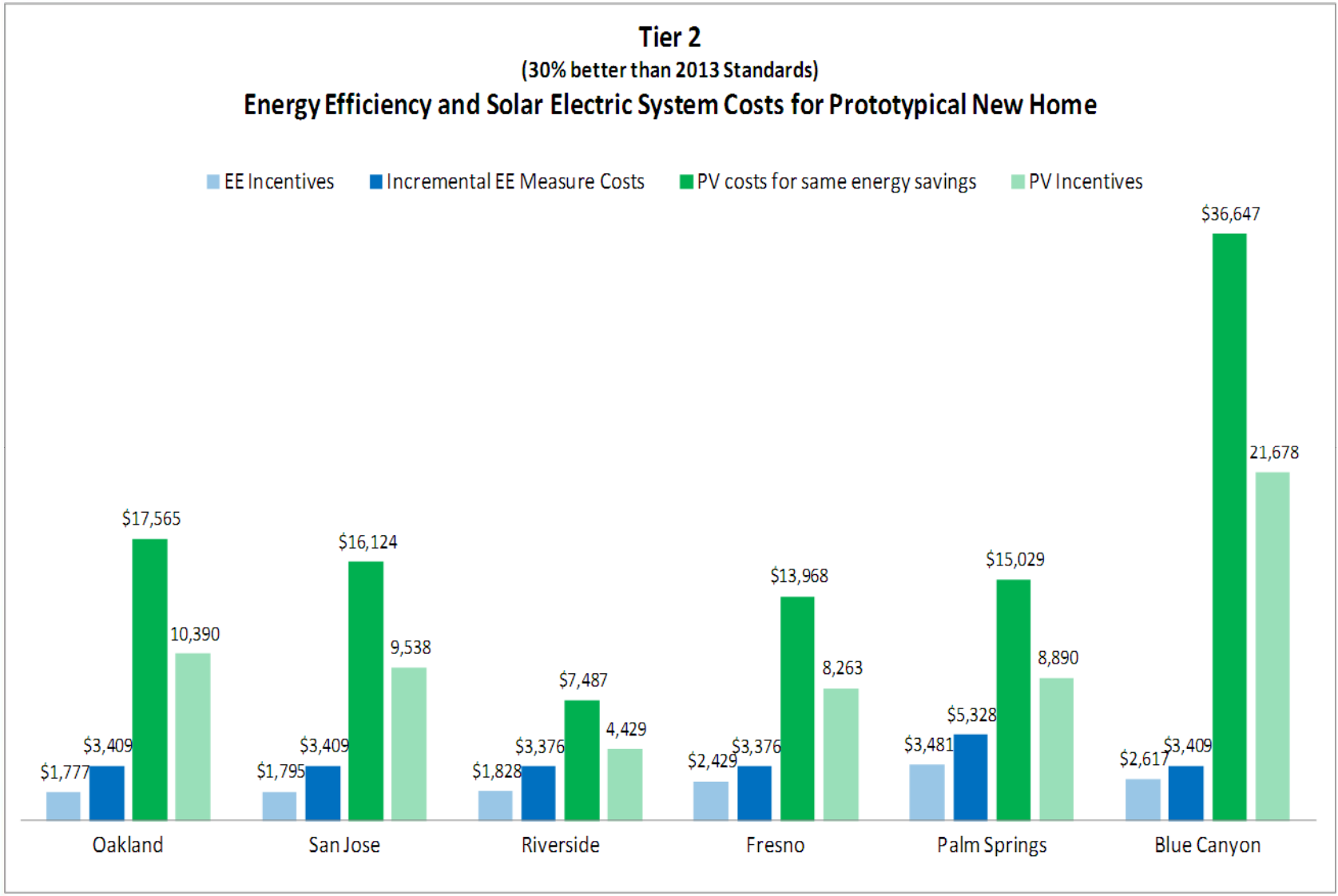
Overview

1. Road to Zero Net Energy by 2020
2. Efficiency and PV Loading Order
3. Past Experience – Guidebook 4th Edition
4. New 2013 Building Efficiency Standards
5. EE cost and $ incentives
6. Panel Discussion

Equivalent Energy Savings: PV & Energy Efficiency



Equivalent Energy Savings: PV & Energy Efficiency



Panelists

- Matt Brost, National Residential Sales Director, SunPower
- Mike Hodgson, President, ConSol
- Bob Raymer, Senior Engineer/Technical Director, California Building Industry Association
- Jacob Atalla, Sr. Director of Sustainability, KB Homes

Questions

1. How does solar combined with energy efficiency help CA achieve its zero net energy goals?
2. What energy efficiency measures should be considered before installing solar on a new home? What are the constraints, if any, that limit options?
3. Many cities and counties have varying energy efficiency policies and programs. How can state agencies take these into consideration to streamline their program requirements, such as for the NSHP?
4. How can the Energy Efficiency incentive programs and the NSHP be streamlined and maximized?
    a. How can these programs be coordinated to help California achieve its zero net energy goals?

Topic 4: Outreach and Marketing, Warranties, Consumer Advocacy/Protection

Renewable Energy Office
Efficiency & Renewables Division

Elizabeth Hutchison

December 5, 2012

Overview

1. Past Outreach and Marketing Efforts
2. Current Outreach and Marketing Efforts
3. Current PV system warranty requirements for solar incentive programs
4. Panel discussion

Past Outreach and Marketing Efforts for NSHP

- Three-year-Public Awareness Campaigns for both builders and consumers
- Consumer Go Solar California Sweepstakes 2008 & 2009 –Grand Prizes included Green Home Makeover and Hybrid Car
- Research reports assessing consumers awareness and attitudes towards solar and energy efficiency
- Stakeholder Partnerships-Contributed more than $1.9 million in added value to campaign
- Municipal Outreach-Step by Step Toolkits for local governments to Go Solar
- Affordable Housing Outreach-Affordable Housing Toolkit to integrate solar and energy efficiency
- Builder Outreach-Active relationships with 23 CA Home Builders
- NSHP Advisory Committee – 2006-2009
- Buying a PV Solar Electric System: A Consumer Guide

Current Outreach & Marketing Efforts for NSHP

- Calculators
  - CECPV Calculator (for New Solar Homes Partnership)
  - Solar Advantage Value Estimator (SAVE)
  - Clean Power Estimator
  - List of Decision-Making Tools from the U.S. Department of Energy

- Informational Material
  - NSHP Guidebook
  - NSHP Reservation and Payment Claim Checklists
  - Brochures

- Training Workshops
  - Public workshops are held to educate consumers on NSHP

Current PV System Warranty Requirements for Solar Incentive Programs

Program	Defects in Materials & Workmanship	Degradation in Power Output	Who provides the warranty
New Solar Homes Partnership (NSHP) - CEC	10 years	10 years if >15% degradation	Manufacturer and/or equipment seller/installer
California Solar Initiative (CSI) - CPUC	10 years	10 years if >15% degradation	Manufacturer and/or installer
PV Incentive Program- SMUD	10 years	10 years if >15% degradation	Manufacturer and/or installer
Solar PV Incentive Program - LADWP	10 years	10 years if >10% degradation 20 years if >20% degradation	Manufacturer and/or installer
New Jersey Clean Energy Program – NJBPU	None	5 years if >10%	Manufacturer and/or installer
New York Solar PV Program Manual –NY SERDA	None	5 years if >10%	Manufacturer and/or installer

Panelists

- Jacob Atalla, Sr. Director of Sustainability, KB Homes
- David Fogt, Enforcement Chief, Contractors State License Board
- Lew Milford, President of Clean Energy Group, Clean Energy States Alliance
- Eric Weingarten, Assistant General Counsel-Revenue, Solar City

Questions

1. NSHP has a goal of installing solar on 50% of new housing by the end of the program. What level and types of outreach, marketing, and technical support are needed to achieve that goal?
2. Given potential consolidation of the solar industry, what are the impacts to customer support and system warranties? Are there lessons to be learned from other technologies, such as solar thermal?
3. What information is needed to help consumers decide if solar is appropriate for their home?
    a. What information is provided to a customer when they're considering installing solar?
    b. What information is needed to help consumers decide on the appropriate financing model for them?

Next Steps

- Please submit comments by 4 PM on December 19, 2012
- **Email** to: docket@energy.ca.gov AND

  Le-Quyen.Nguyen@energy.ca.gov

  Please include the docket number 06-NSHP-1 and indicate *Staff Workshop on Solar on New Residential Construction* in the subject line.
- **Mail** to: California Energy Commission

  Dockets Office, MS-4

  Re: Docket No. 06-NSHP-01

  1516 Ninth Street

  Sacramento, CA 95814-5512