Better Buildings Residential Network Peer Exchange Call: *Combining Solar and Home Performance Services*

December 11th, 2014

Call Slides and Discussion Summary

Agenda

- Introductory Polls
- Residential Network and Peer Exchange Call Overview
- Polls on Solar and Home Performance Topics
- Featured Speakers
  - Ria Langheim, Center for Sustainable Energy
  - Tim Harvey, Austin Energy
- Discussion
  - What are the benefits of pursuing solar and home performance goals simultaneously? Disadvantages?
  - What are some examples of solar and home performance programs integrating effectively?
  - What are the challenges to integrating solar and home performance in your local market?
  - What strategies are there for strengthening the relationship between solar partners and home performance partners?
- Closing Poll

Call Participants

- 401(e) Home Energy Service
- Arizona Public Service
- Arlington County, VA
- Athens County, VA
- Austin Energy
- Building Performance Center, Inc.
- Building Sustainable Solutions
- CalCERTS, Inc.
- California Center for Sustainable Energy
- City of Anacortes
- City of Charlottesville
- City of Chula Vista
- City of Kansas City, MO
- City of Palo Alto
- City of Takoma Park
- Civic Works
- Clean Energy Durham
- Clean Energy Works
- Community Power Works
- Connecticut Green Bank
- Community Office for Resource Efficiency
- Corvallis Environmental Center
- Craft3
- Davis Energy Group
- Denver Energy Challenge
- Duke Carbon Offsets Initiative
- Ecolibrium3
- Energy Efficiency Specialists NY
- Elevate Energy
- Empower Efficiency
- Energy Smart Colorado
- Efficiency Nova Scotia
- Metropolitan Washington Council of Governments
- NY State Energy Research & Development Authority
- Phoenix Energy & Construction
- PosiGen
- Greater Cincinnati Energy Alliance
- green | spaces
- Kaysinger Basin Regional Planning Commission
- Massachusetts Department of Energy Resources
- PUSH Buffalo
- Rural Ulster Preservation Co.
- Solar & Energy Loan Fund
- Teton County Government
- The California Housing Partnership Corp.
- The Environmental Center
- The Oberlin Project
- The Plumbing Professionals
- Town of Blacksburg
- Wisconsin Energy Conservation Corporation
- West Michigan Environmental Action Council

Opening Poll #1 Results

- **Are you a member of the Better Buildings Residential Network?**
  - Yes – **77%**
  - No – **23%**

Opening Poll #2 Results

- **Which of the following categories best describes your role/affiliation? (Pick one)**
  - Home performance or solar program administrator – **49%**
  - Other **– 34%** *Other affiliations included local governments, local energy efficiency partners, and energy efficiency program volunteers.*
  - Contractor – **6%**
  - Utility – **6%**
  - Financial institution – **4%**

Better Buildings Residential Network

- **Better Buildings Residential Network**: Connects energy efficiency programs and partners to share best practices to increase the number of American homes that are energy efficient.
  - Membership: Open to organizations committed to accelerating the pace of existing residential upgrades. Commit to providing DOE with annual number of residential upgrades, and information about benefits associated with them.
  - Benefits:
    - Peer Exchange Calls
    - Tools, templates, & resources
    - Newsletter updates on trends
    - Recognition: Media, materials
    - Optional benchmarking
    - Residential Solution Center

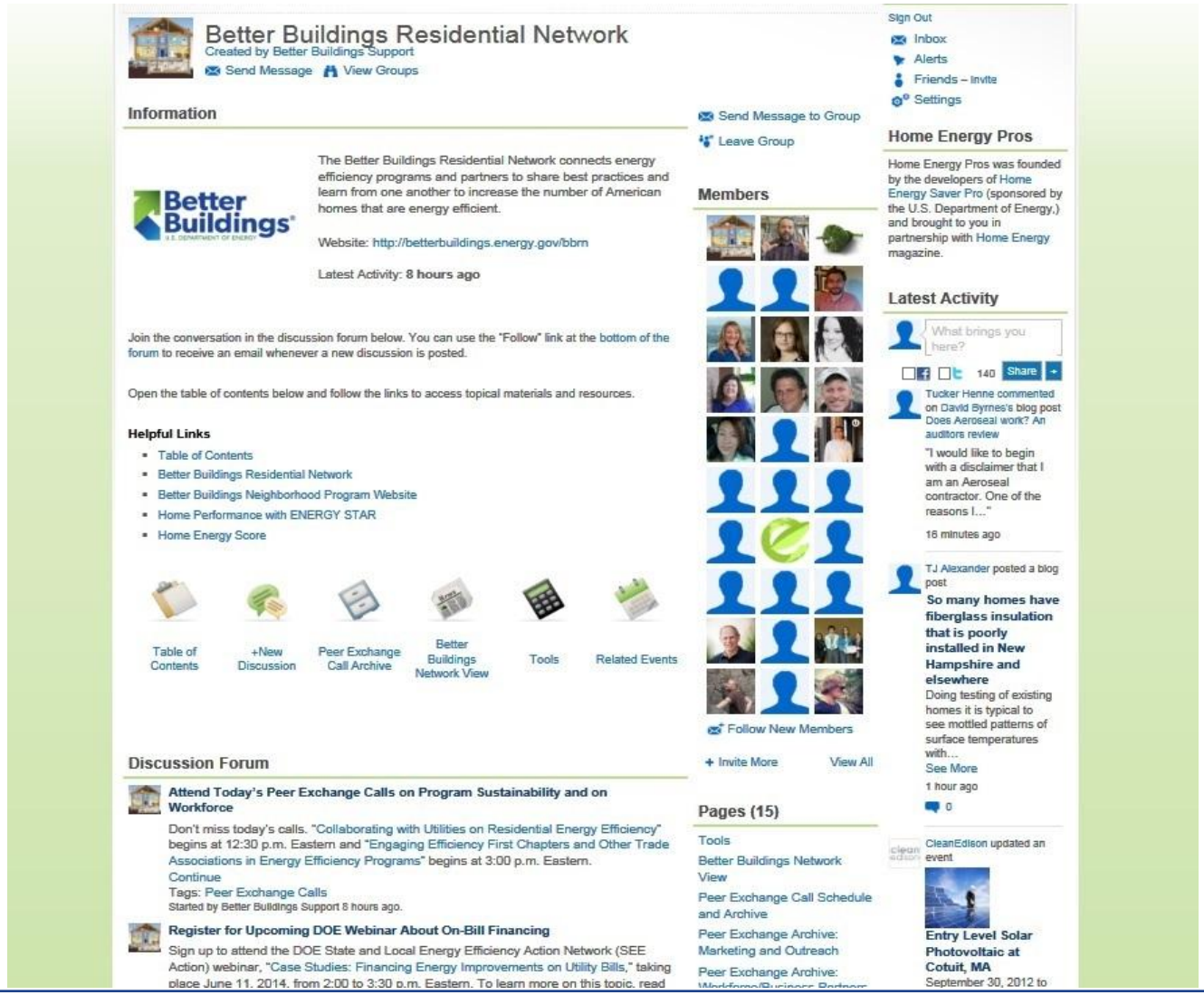
For more information & to join, email bbresidentialnetwork@ee.doe.gov.

- **Better Buildings Residential Network Group on Home Energy Pros**

  Join to access:
  - Peer exchange call summaries and calendar
  - Discussion threads with energy efficiency programs and partners
  - Resources and documents for energy efficiency programs and partners

http://homeenergypros.lbl.gov/group/better-buildings-residential-network

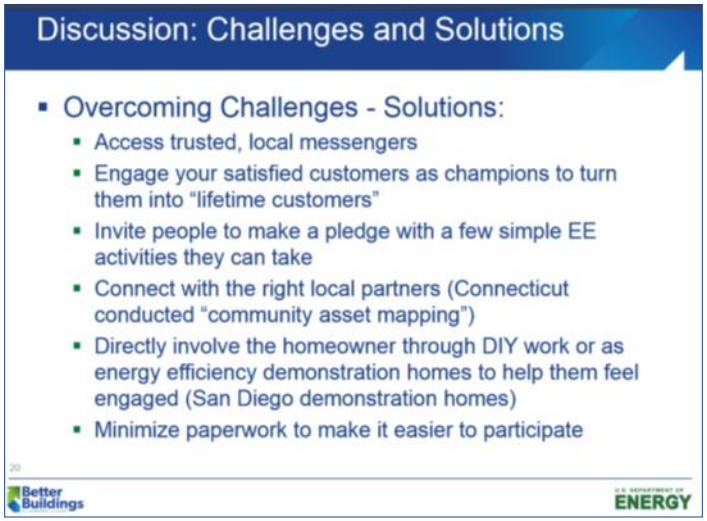
Better Buildings Residential Network Group on Home Energy Pros Website

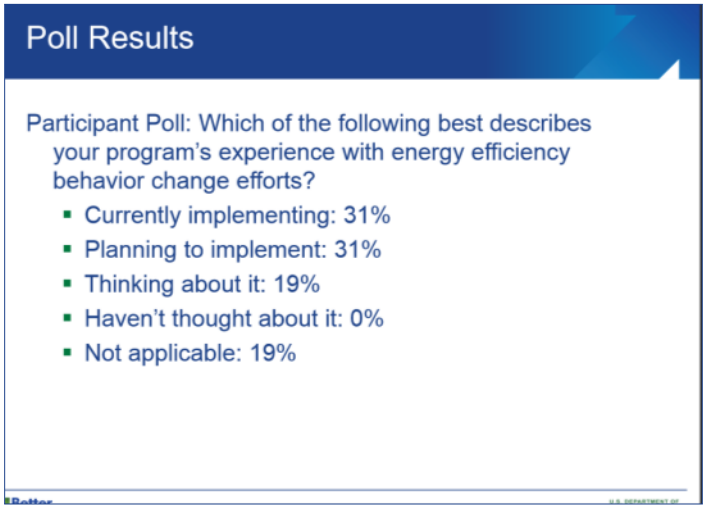


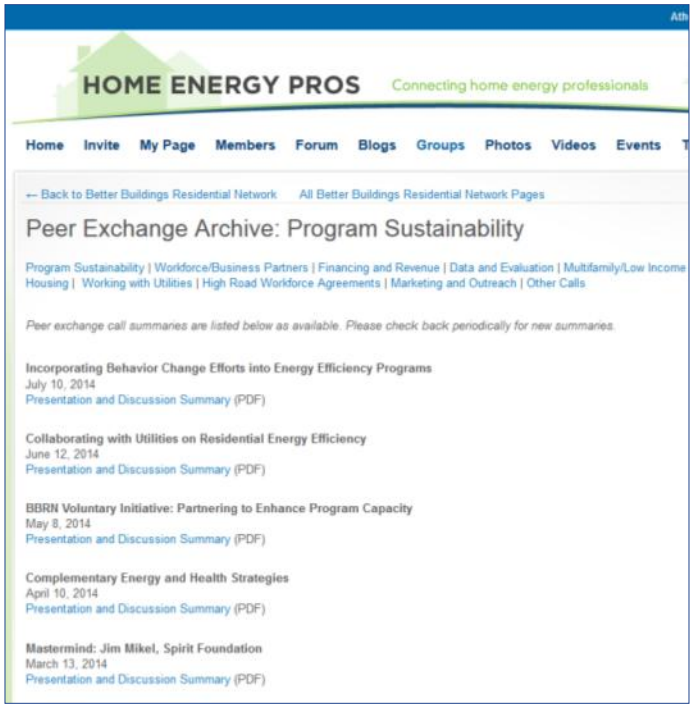
Peer Exchange Call Series

- Calls are held the 2nd and 4th Thursday of every month at 12:30 and 3:00 ET
- Calls cover a range of topics, including financing & revenue, data & evaluation, business partners, multifamily housing, and marketing & outreach for all stages of program development and implementation
- Send call topic ideas or requests to be added to additional call series distribution lists to peerexchange@rossstrategic.com.

Peer Exchange Call Summaries







How do you eat an elephant? One bite at a time. A slight shift in perspective goes a long way.

Understanding how EE can solve a financial, public relation, or customer service problem for the utility is the right place to start.

Residential Program Solution Center

Web portal of residential EE upgrade program resources, & lessons learned to plan better, avoid reinventing the wheel.

- BB Neighborhood Program, Home Performance with ENERGY STAR Sponsors+
- Provides:
  - Step-by-step guidance
  - Examples
  - Tools
  - Templates
  - Lessons learned
  - Best practices
  - Tips
- Continually add content to support residential EE upgrade programs—member ideas wanted!

https://bbnp.pnnl.gov/

Opening Poll #3 Results

- **Which of the following best describes your experience with combining solar and home performance services? (Pick one)**
  - Currently doing it – **31%**
  - Thinking about it – **24%**
  - Planning to do it – **16%**
  - Just learning about it today – **16%**
  - Other– **13%** *Other experience included:*
    - *Advocating dual approach to workforce*
    - *Running a solar bulk-buy program with community power network*
    - *A combined solar and HP program soft-launched on the day of the call*
    - *Facilitating others' installations.*

Opening Poll #4 Results

- **Of the following potential barriers to integrating home performance and solar services, which have you experienced or anticipate to be the most significant? (Pick one)**
  - Challenges aligning home performance and solar program services – **31%**
  - Lack of collaboration between home performance and solar contractors – **24%**
  - Lack of customer understanding and/or interest – **21%**
  - Insufficient financing options to cover combined projects – **17%**
  - Other – **7%** *Other barriers included homeowner confusion and prioritizing solar installations over home performance.*

Energy Efficiency Motivations and Actions of California Solar Homeowners

December 11, 2014

Ria Langheim, Research Analyst
CSE

Accelerating the transition to a sustainable world powered by clean energy

Center for Sustainable Energy™

Information Resource & Expert Implementation Partner

Energy Programs

Technical Assistance

Training & Education

Center for Sustainable Energy™

Areas of Expertise

Building Performance

Clean Transportation

Distributed Generation

Energy Efficiency

Energy Storage

Renewable Energy

Center for Sustainable Energy™

Background

- Research into EE and PV
  - Better understand the connection between the joint adoption of residential PV and EE
- CA's Long Term Energy Efficiency Strategic Plan
  - Reduce energy consumption in residential buildings 40% by 2020
- CA's energy "loading order"
  - Required energy audit in the California Solar Initiative Program

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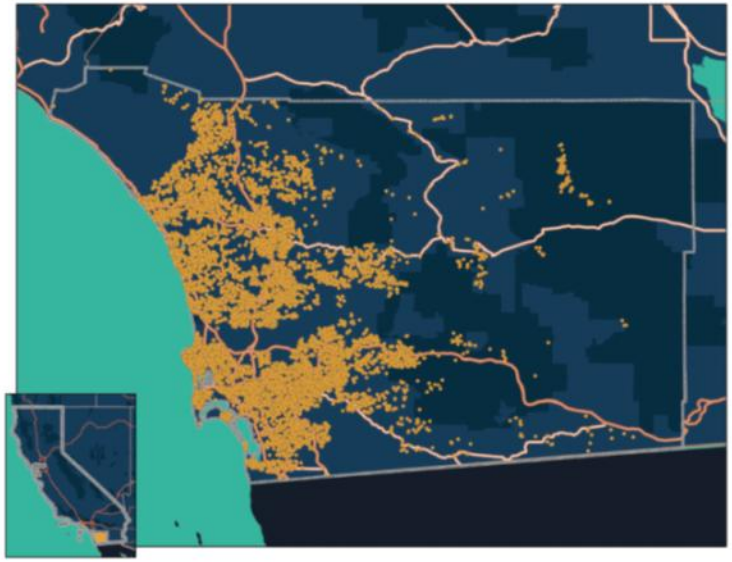
Survey Methodology



Residential PV Installations in San Diego County

- Administered survey via email in July 2012 to CSI solar home owners in San Diego County
- 2,354 CSI participants completed survey (response rate ~30%)
- Survey responses were combined with information on PV system size and location of installation

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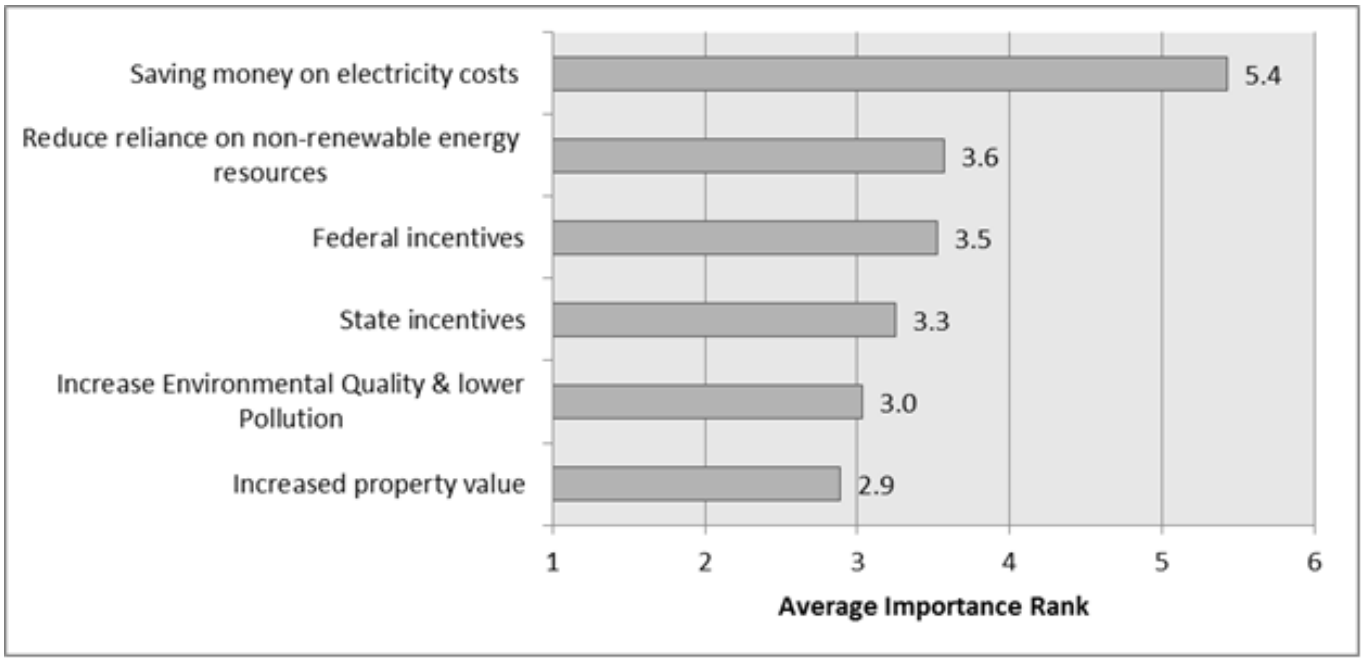
Motivations for Installing Solar

Respondents ranked a preset list of six motivations in order of most to least importance, if they were a part of the decision-making process (6 refers to most important).



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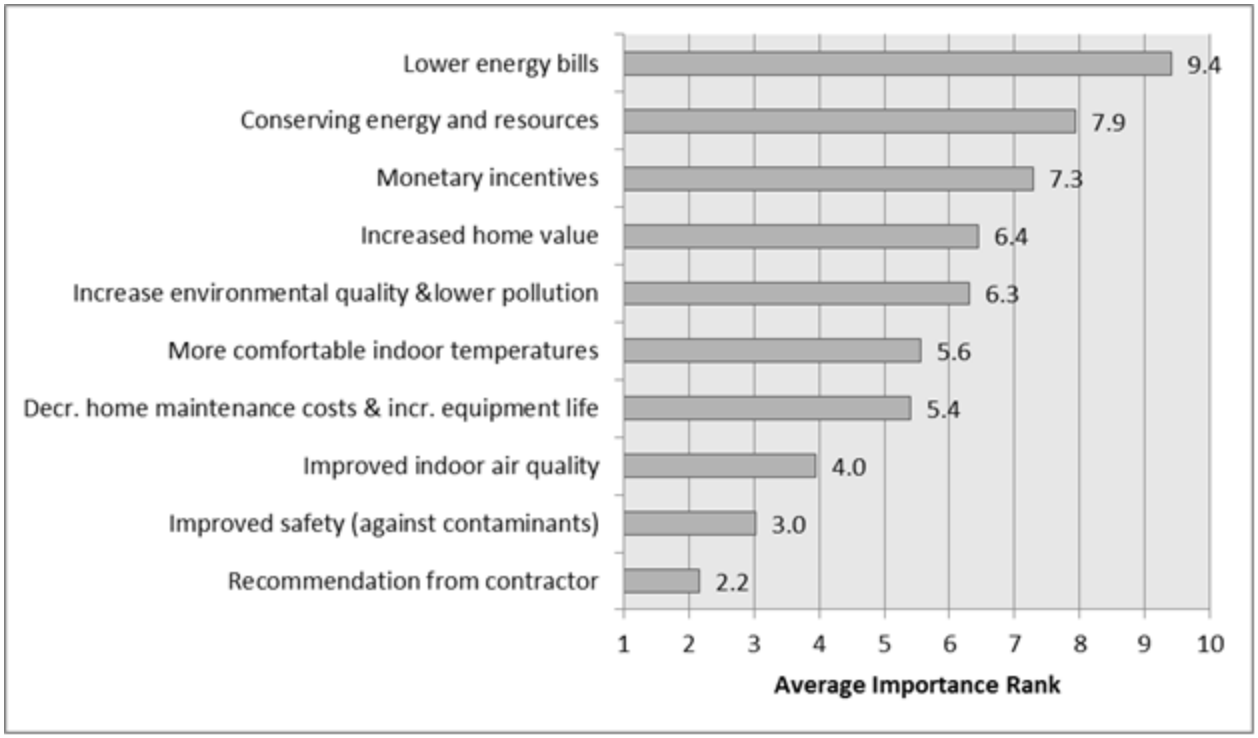
Motivations for performing Energy Efficiency upgrades

Respondents ranked a preset list of 10 motivations in order of most to least importance, if they were a part of the decision-making process, (10 refers to most important).



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Comfort, Health and Safety

- People mentioned that they are concerned about comfort, health and safety
  - 52% report hot/cold zones in their homes
  - 42% indicate that someone in the household suffers asthma or allergies
  - 21% are concerned about mold in their homes

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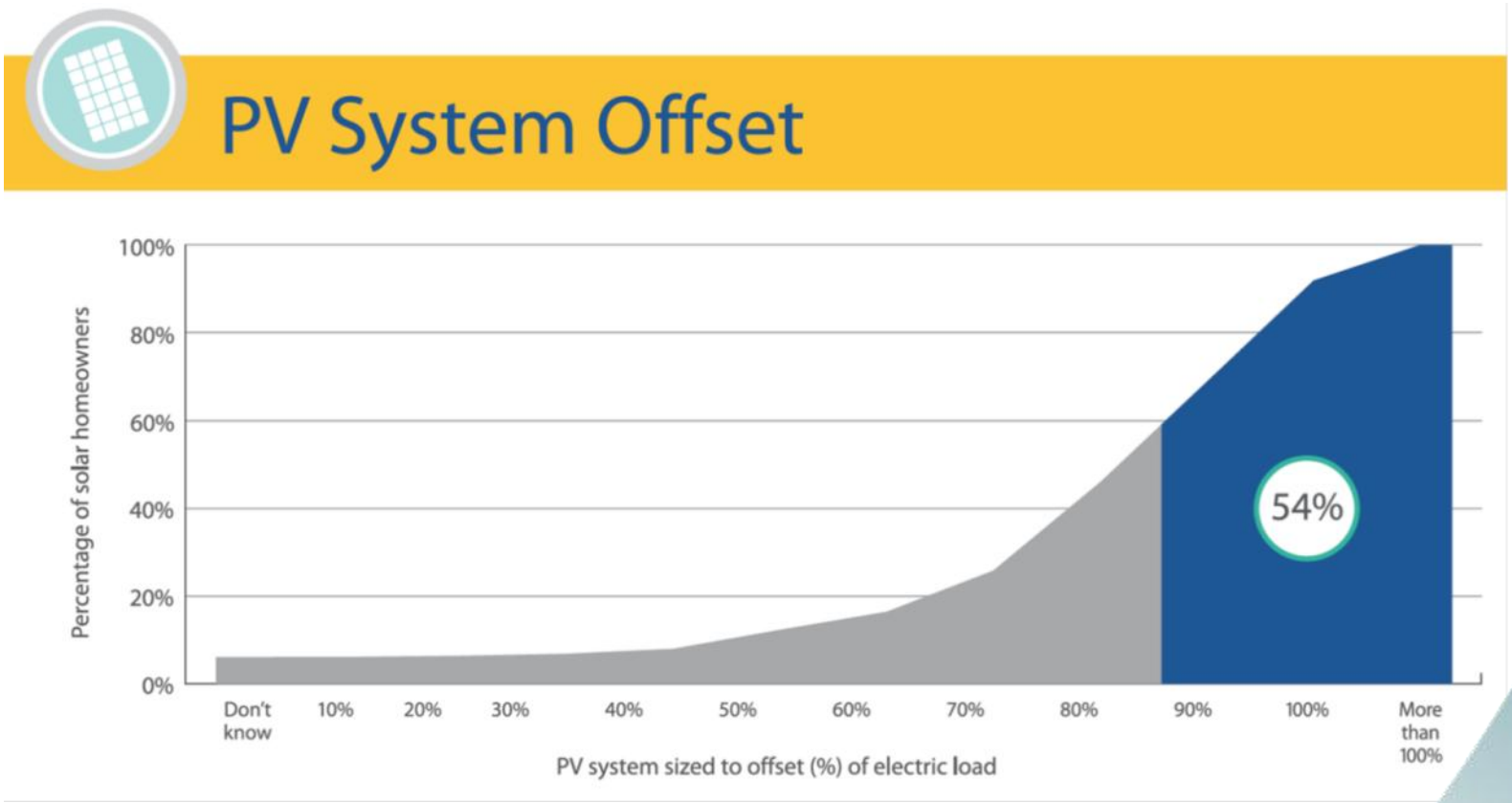
PV System Offset



54% sized their systems to offset more than the recommended 80% of their electric load

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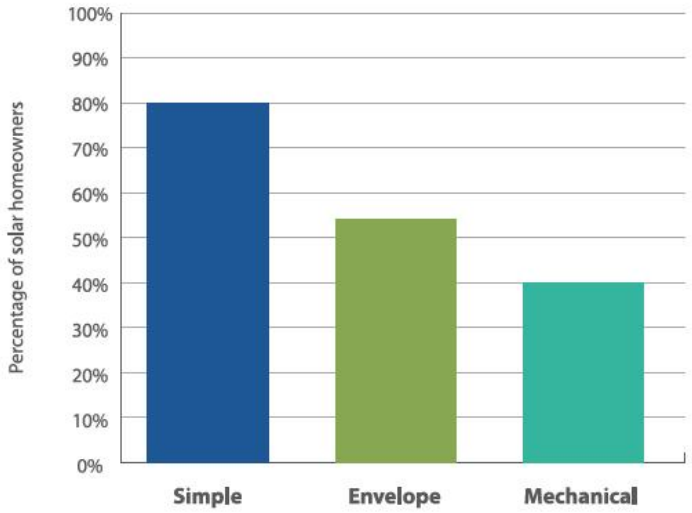
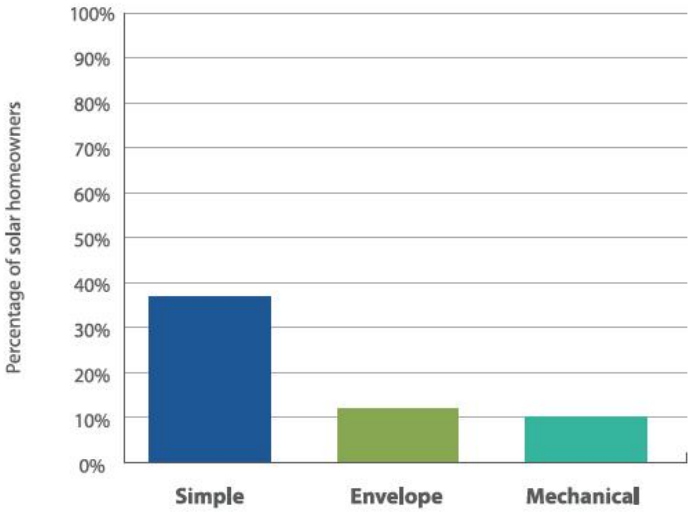
Timing of Energy Efficiency upgrades

Energy Efficiency Upgrades
Before or with PV Installation



Energy Efficiency Upgrades
After PV Installation



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Installed Energy Efficiency measures

	Energy efficiency measures installed	Preinstallation	Postinstallation
Simple	Lighting (i.e. CFLs, LEDs, motion sensors)	**56%**	28%
Simple	Low-flow shower heads and fixtures	**44%**	5%
Simple	Ceiling fans	**46%**	5%
Simple	Attic fans	24%	3%
Simple	Energy-efficient appliance (must be ENERGY STAR®)	**52%**	12%
Envelope	Windows	**44%**	6%
Envelope	Doors	20%	4%
Envelope	Air sealing	10%	2%
Envelope	Insulation (weather stripping/sealing ducts)	27%	5%
Envelope	Cool roof	3%	2%
Mechanical	Duct/seal/replacement	12%	2%
Mechanical	Solar water heater	7%	1%
Mechanical	Tankless/high-efficiency water heater	13%	3%
Mechanical	High-efficiency furnace	21%	4%
Mechanical	High-efficiency air conditioner	20%	4%
	None	13%	**52%**

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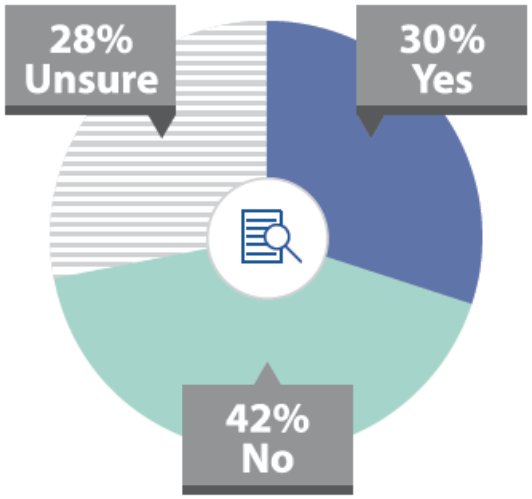
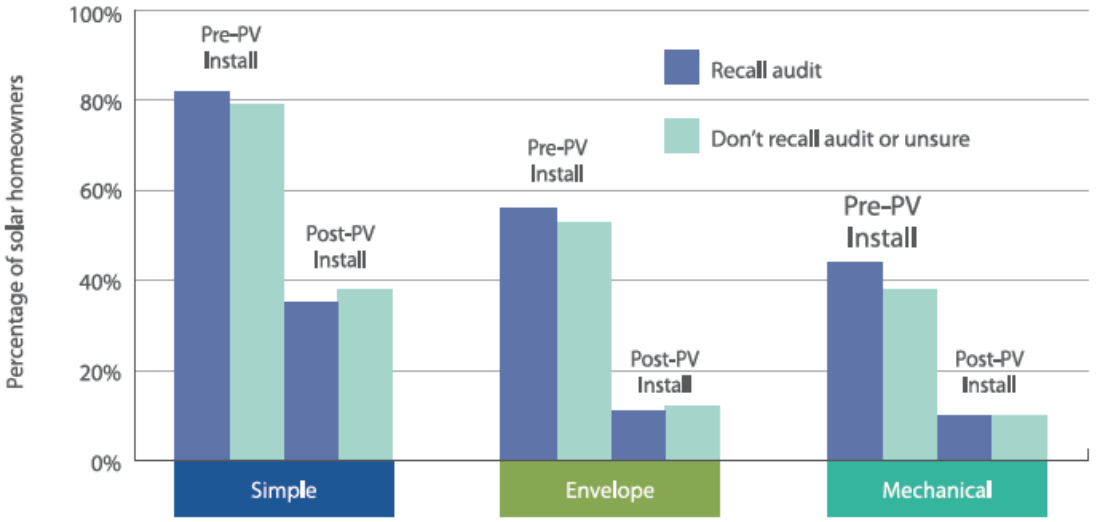
Awareness of the Audit required by the CSI program

- We tested the awareness as a measure of effectiveness of the CSI audit

Homeowners Recalling the CSI Audit



Impact of CSI Energy Audits on Upgrades



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Discussion

- Potential missed opportunities for adopting EE measures among residential solar adopters in San Diego.

- How can we increase the awareness about whole house energy upgrades to homeowners who want to install solar?
  - Integrating solar as a measure of whole house energy upgrade program?
  - Facilitate better crossover between solar and EE contractors?

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Study from the Center for Sustainable Energy take-aways: *Poll results on motivation and integration*

The Center for Sustainable Energy conducted a poll of homeowners who installed solar PV through the California Solar Initiative program.

- The poll showed that **saving money was the most important motivator** to both installing solar and EE measures.
  - The second most important motivator was an interest in reducing energy and energy reliance.
  - While no specific poll question asked about home comfort and health (mold, air quality), 50% of those polled mentioned it in other questions.
- **The connection between solar and energy efficiency (EE):**
  - Homeowners' likelihood of installing EE measures dramatically decreased after installing solar PV.
  - Very few people who installed solar PV also installed efficient mechanical systems, which can provide immense energy savings and can result in requiring a smaller PV system.

Visit www.energycenter.org for the full report.

Home energy audits in solar programs: *Effective or not?*

- A home energy audit was required for the California solar program, but the audit scope ranged from a short, computer-based audit to a deep, home-inspection audit. Solar contractors determined which type of audit was performed.
  - The majority of audits were performed online, and some solar contractors completed the audit on behalf of the homeowner. The online audit was viewed as a formality, and not a learning tool.
  - Most homeowners who installed PV couldn't remember that they had received an audit. Audit awareness (or lack thereof), did not result in significant EE upgrades.
  - Some solar contractors who also specialized in EE performed whole-home audits, and these customers were much more informed on EE.
  - **Lesson learned: there are different approaches to energy audits, and some are more effective. Solar programs that require a prerequisite energy audit should consider requiring a more in-depth audit to motivate EE upgrades.**

Austin: the [Solar] Capital of Texas

December 11, 2014

Solar Capital of Texas

- Texas had 140 MW-dc solar installed (2012)
- Austin had ~55 MW end 2012, now 62 MW-dc

  → over 1/3 of all TX solar!

2014 Council Resolution 157

65%

Meet 50% of energy by renewable resources by 2020, and 65% by 2025

800 MW

800 MW of savings from energy efficiency and demand response

950 MW

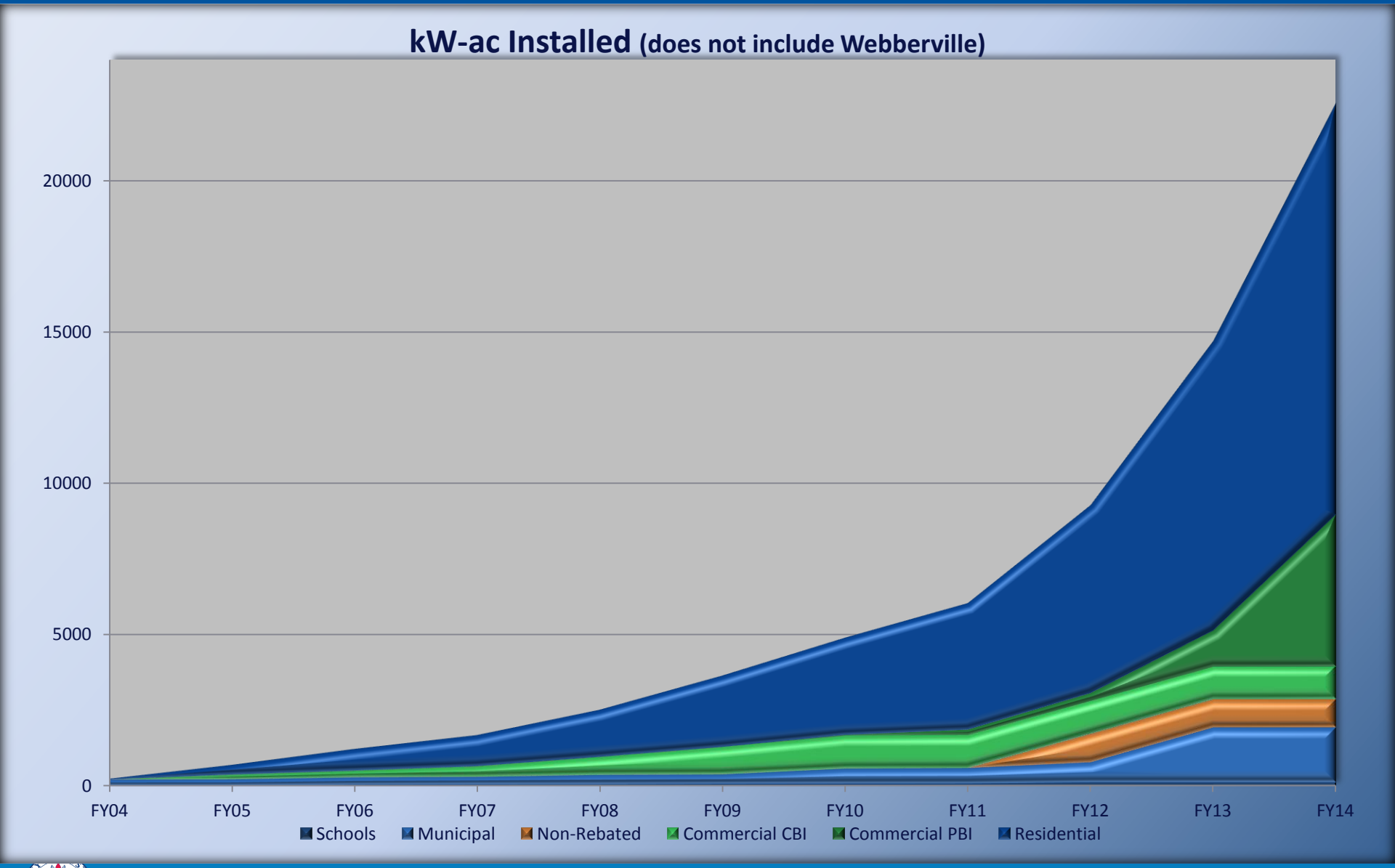
Replace Decker with 600 MW utility solar by 2017 + 150 MW existing PPA. Local solar increases to 200 MW by 2020, including 100 MW customer-sited

200 MW

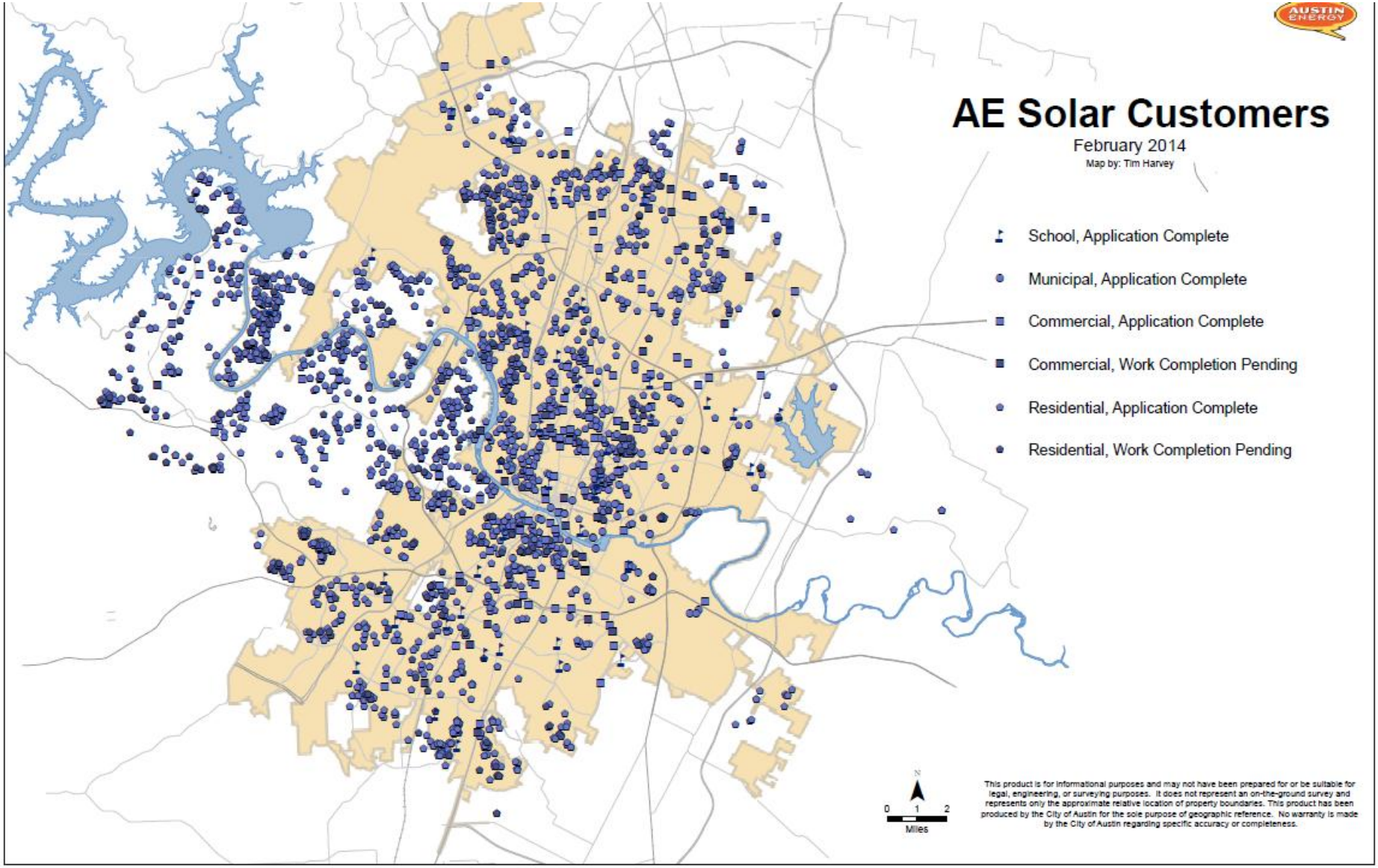
Target of 200 MW of fast response storage by 2024

Reduce CO2 emissions from all generation to zero by 2030

Customer-Sited Solar 2004-2014



Customer-Sited Solar



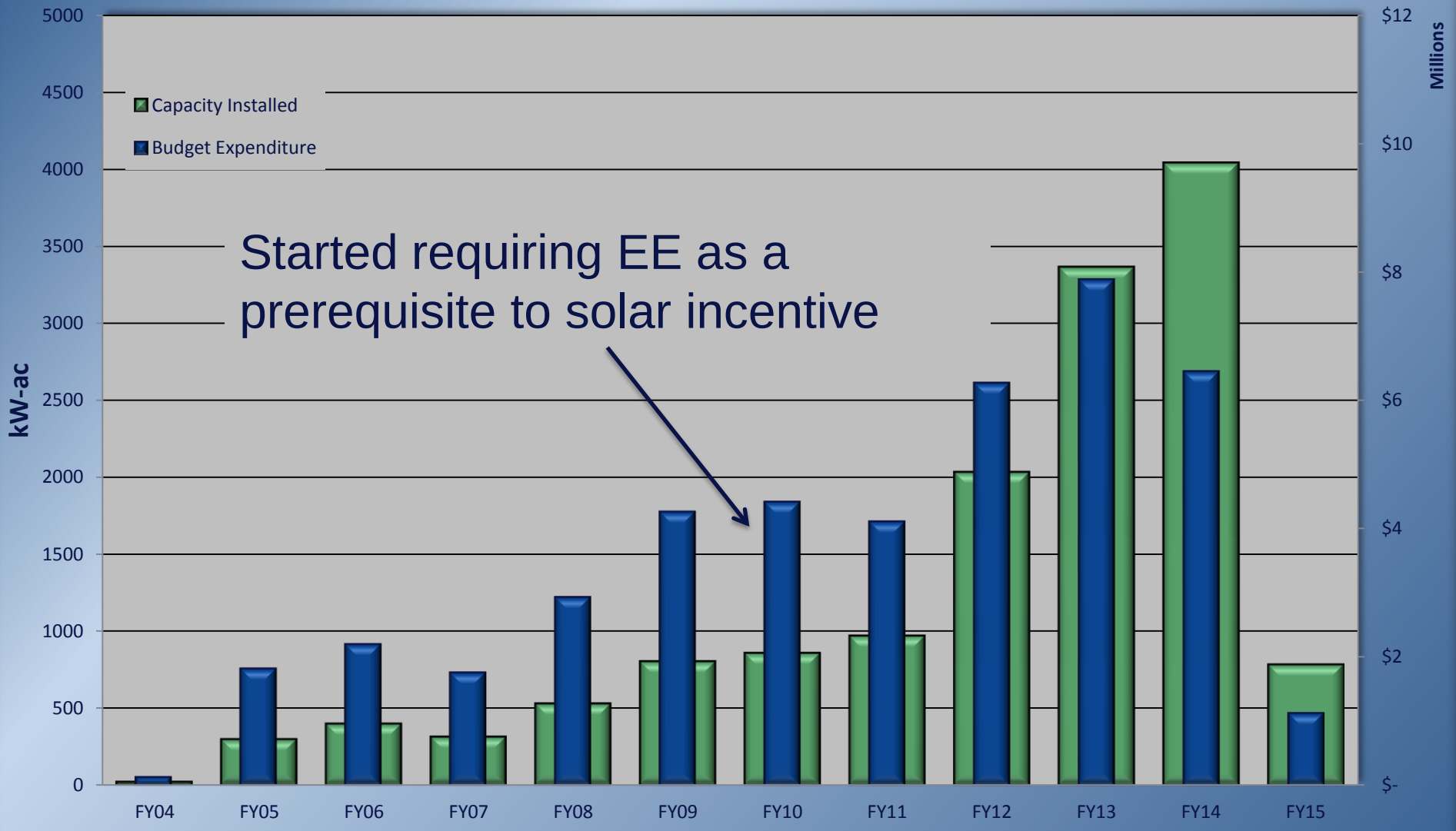
Energy Efficiency Prerequisites for Solar Incentives

- AE started requiring EE as a prerequisite to residential solar incentives in November of 2009
  - Aligned with Home Performance with Energy Star (HPwES) Program participation Requirements
    - Minimum of R22 attic insulation
    - Maximum of 10% duct leakage
    - Solar screens on windows with sun exposure
    - Maximum indoor/outdoor air exchange (removed)
    - Solar Water Heating for 3+ bedroom homes with existing electric water heater(removed)
  - If minimum requirements are not met, customer is encouraged to participate in HPwES, and must demonstrate that the home meets or exceeds minimum requirements before solar Letter of Intent (LOI) is issued
  - If minimum requirements are met, or customer is otherwise ineligible to participate in HPwES, solar application receives a LOI.

Application Process

- Installer submits solar application on customer's behalf through web based application processing tool
- Contractor indicates on application whether or not the customer meets minimum requirements
  - Home is less than ten years old
  - Home has previously participated in EE program
  - Home is green star rated
  - Home requires upgrades
- Application is reviewed for accuracy and solar access and proceeds to the EE verification step
- AE solar staff verifies home age.
  - If home is less than ten years old no EE is required
- AE EE staff verifies past EE participation and pushes application forward or places application on hold if requirements are not met.
  - Application Processing tool automatically pulls all historical records
    - EE staff evaluates past EE activity to assure minimum requirements are met (pass, hold)
  - Application processing tool links current EE applications with Solar applications
    - Once current EE application is verified the solar application proceeds to the next step (LOI)

Residential Capacity Installed vs. Incentives Paid



The Customer's Perspective

- Solar customers tend to be well educated
- They typically understand value propositions
- EE before Solar makes financial sense
- Relatively no customer push back to the EE requirements (many solar customers were doing EE measures before the solar install before the EE requirements)
- Coupling EE with Solar typically increases customer satisfaction

Contractor's Perspective

- Solar Contractors
  - Cons
    - Causes time delays if EE measures are required
    - Adds another level of complication to the process
    - Confines market
  - Pros
    - Increased overall customer satisfaction
    - Market opportunity if they expand operations to include EE
    - Collaboration and cross marketing opportunity
- EE Contractors
  - Increased demand

Intended and Unintended Results

- Solar contractors target newer neighborhoods to avoid EE requirements.
- Participation in EE programs increased
- Solar homes are more efficient
  - Smaller PV systems required to meet load
  - Incentive dollars reach more customers
- Solar contractors align with EE contractors
- Solar contractors begin to offer EE services
- Customer satisfaction is high

City of Austin - Austin Energy
Customer Energy Solutions
Tim Harvey
Solar Program Coordinator

Twitter

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Facebook

facebook.com/austinenergy

Questions?

Key Take-Aways from Austin Energy: *Customer satisfaction & results*

The Austin Energy solar program requires homeowners to meet minimum energy efficiency measures before accessing solar incentives. To date 3,500 homeowners have installed solar, 3,000 of whom also installed energy efficient upgrades.

- The program has not experienced any customer push-back to the EE requirement, and the introduction of the EE requirement did not produce any decrease in solar PV installations. The number of solar PV installations in Austin has increased annually.
- Overall customer satisfaction with the Austin Energy programs has improved since launching the EE requirement.
- Homeowners who did not meet the minimum EE requirement entered the Home Performance with ENERGYSTAR program. Once in that program, most installed upgrades well beyond the minimums required for the solar program.
  - For example, to qualify for HP ENERGYSTAR attic insulation incentives homeowners must install R38, while the minimum requirements in the solar program is only R22.

Key Take-Aways from Austin Energy: *The need to right-size solar PV systems*

- Energy efficiency measures were shown to result in a decrease in PV system size. This is a major motivation to connecting solar and EE for both homeowners and utilities.
  - Oversized PV systems require additional and more expensive upkeep, e.g. more inverters needing replacement.
  - Oversized systems could result in future issues with the utility's grid (overproduction) once homeowners made efficient upgrades.
  - Austin Energy was concerned about wise investment of public funds and didn't want to incentivize large systems if the units were not efficiently heating/cooling homes.

Discussion Highlight | Connecting Solar and Home Performance Contractors: *The private advantage of integration*

- Home Performance contractors that integrate solar (or visa versa) into their portfolios and their consulting processes effectively expand their markets.
- Because of the complexity, portions of Home Performance and Solar projects are often performed by subcontractors or referred to other contractors. HP and solar contractors that team up can help each other by sharing leads and subcontracting work.
  - In the Austin Energy Program, some solar contractors have created alliances with EE contractors or have brought EE in house.
- Whole-house energy upgrades have not gained a lot of traction in the private market. If EE was integrated into solar programs by piggy-backing on solar PV projects, this could promote more crossover between solar and EE contractors, creating a more integrated process and augmenting the private EE market.

Closing Poll Results

- **Which of the following solutions do you think could be most effective in promoting integrated solar and energy efficiency? [Choose one]**
  - Programmatic changes that directly link solar and home performance – **34%**
  - Alignment of incentives and financing services, e.g. tiered Incentives, higher loan maximums – **34%**
  - Contractor partnerships and/or cross training – **14%**
  - Integrating solar and home performance into marketing and outreach materials – **9%**
  - Other – **9%**

Thank you!