



Energy-Saving

HOMES, BUILDINGS,
& MANUFACTURING

U.S. DEPARTMENT OF
ENERGY | Energy Efficiency &
Renewable Energy



Overview of Home Performance with ENERGY STAR Results

Ely Jacobsohn, DOE, HPwES Program Manager

Courtney Moriarta, SRA, Technical Lead

Gannate Khowailed, SRA, Data Lead

2013 HPwES Annual Report

- In December 2013, DOE issued our 2nd Annual Report Data Call to HPwES Sponsors requesting:
 - Final overall CY 2013 results; and
 - Program plans for CY 2014
- 49 active HPwES Sponsors completed their annual reports (95% Response Rate)
- On average Sponsors responded to 70% of questions
- 7,000 data points were collected, QC'd, and analyzed
- Disclaimer: *this analysis is offered in “as is” condition with the accuracy of the underlying data set being the sole responsibility of the organizations furnishing such data to DOE. In its analysis, DOE identified: variance in respondents’ interpretations of questions posed and variations in methods and tracking systems used to capture the source data.*

Annual Report for Home Performance with ENERGY STAR Program Sponsor

As a Home Performance with ENERGY STAR (HPwES) Sponsor, one of your partnership commitments is to provide an annual update on program activities. The U.S. Department of Energy (DOE) is interested in gathering information on C2013 results as well as plans for C2014. Data analysis, from this report, will help support program development and growth on the local, regional, and national levels.

Please answer the following questions based on the data you normally collect and information that is readily accessible. If your program does not have the data to respond to specific questions, answers may be left blank. We understand programs track data and budgets in a variety of ways. If our questions do not align precisely with accessible data, note discrepancies in the "General Comments" section. Further clarification and supporting definition are provided for questions marked with *. The definition will be displayed by hovering over the underlined, dark blue text. A complete list of all the definitions is also provided in [section 4](#). Please direct any questions or feedback to your HPwES account manager.

Please complete this form by Friday, February 14, 2014, and submit it by email to zpage_khowald@eere.com.

I. GENERAL PROGRAM AND CONTACT INFORMATION

Sponsor Organization Information			
Sponsor's Official Organization Name <small>(as listed on HPwES Partnership Agreement)</small>			
Program Name <small>(i.e. public name associated with HPwES platform. Note: program name will be listed on the energistar.gov/house "Connect" map)</small>			
Program administrator Type Electric Utility Company (IOU, Muni, Co-op) Financial Institution Gas and Electric Utility Company (IOU, Muni, Co-op) Gas Utility Company (IOU, Muni, Co-op) Municipal Program Administrator Non-Profit or State Trust Administrator State or Federal Authority Administrator State or Local Nonprofit/Trust State Program Administrator Other, please specify:			
Sponsor's Mailing Address		Address Line 1	
		Address Line 2	
		City	
		State	
		Zip	
Implementation Contractor's Mailing Address		Address Line 1	
		Address Line 2	
		City	
		State	
		Zip	
Contact Information (list all that apply)			
1st Administrative POC	First name	Last name	
	Email	Phone	
2nd Administrative POC	First name	Last name	
	Email	Phone	
Implementation POC	First name	Last name	
	Email	Phone	

January 2013 1

QC Issues & Problematic Questions

- Reported savings and budgets sometimes included programs other than HPwES

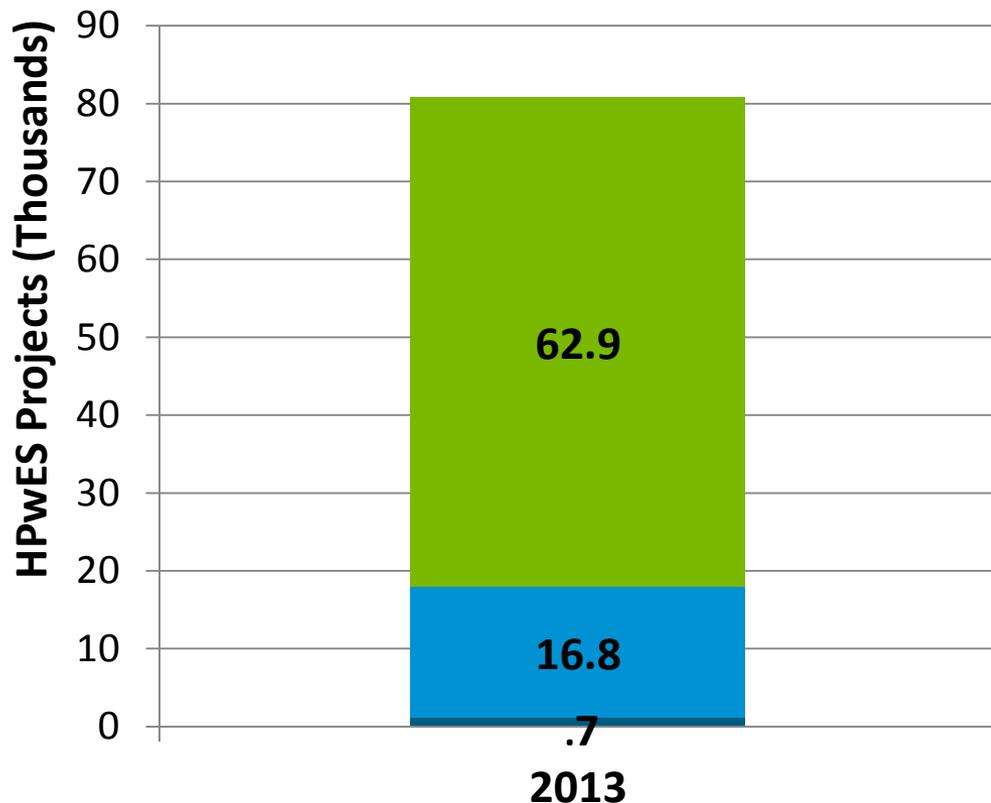
IV. CY 2013 HPwES PROGRAM DESIGN and RESULTS

17. Could you estimate the percentage /number of the projects completed in 2013 that included each of the following measures? *Please use the drop down menu to choose if your responses are in percentages or project numbers.* (Note: If you choose to provide project numbers, a project including more than one measure should be counted in multiple categories. If you choose to provide percentages, it will add up to more than 100% if projects involved more than one measure.)

Shell/Envelope	%	▼
HVAC	%	▼
Water Heating	%	▼
Lighting	%	▼
Appliances	%	▼
Other, please specify	%	▼

commonly understood

More than 80,000 HPwES Projects Completed in 2013



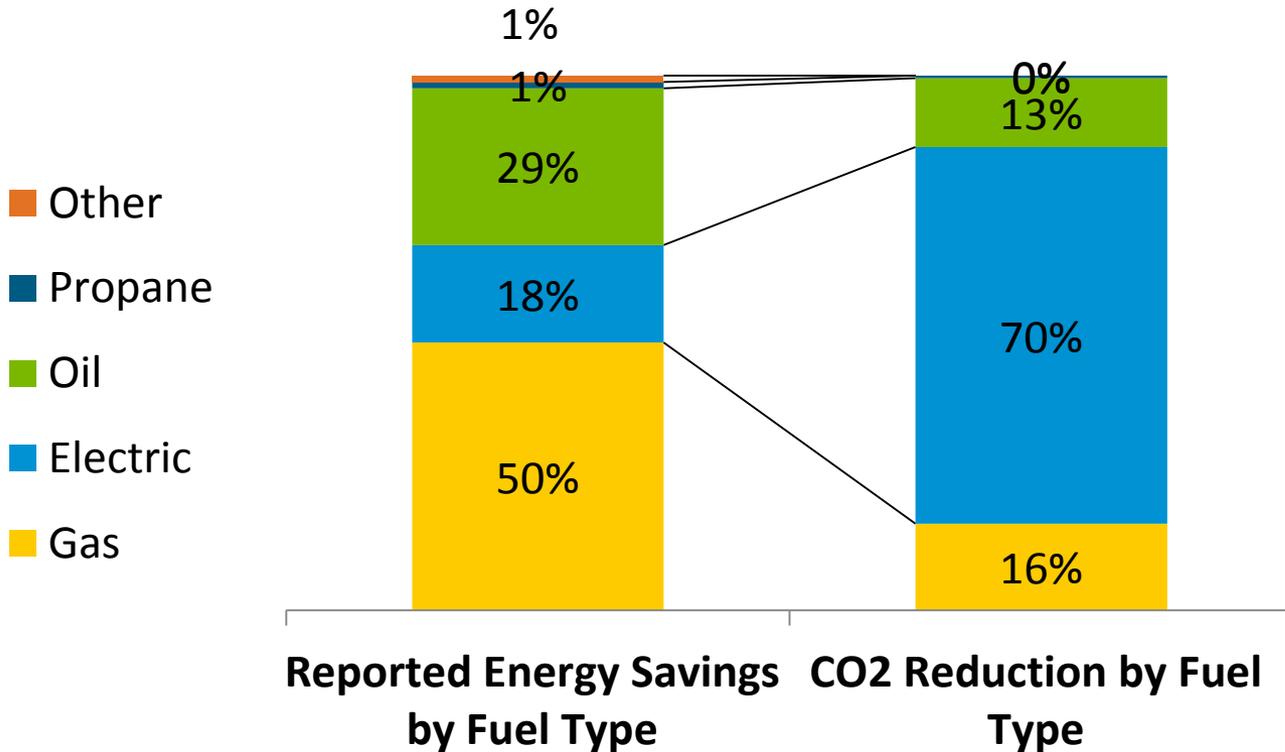
- **High-Volume Sponsors**
 - Share: 78%
 - Active Sponsors: 10
 - Growth relative to 2012: 2.5%
- **Mid-Volume Sponsors**
 - Share: 20%
 - Active Sponsors: 20
 - Growth relative to 2012: 18%
- **Low-Volume Sponsors**
 - Share: <1%
 - Active Sponsors: 22
 - Growth relative to 2012: -35%

❖ HPwES project completions in 2013 grew by **3%** relative to the 78,000 projects completed in 2012

Energy and Environmental Impact of HPwES in 2013

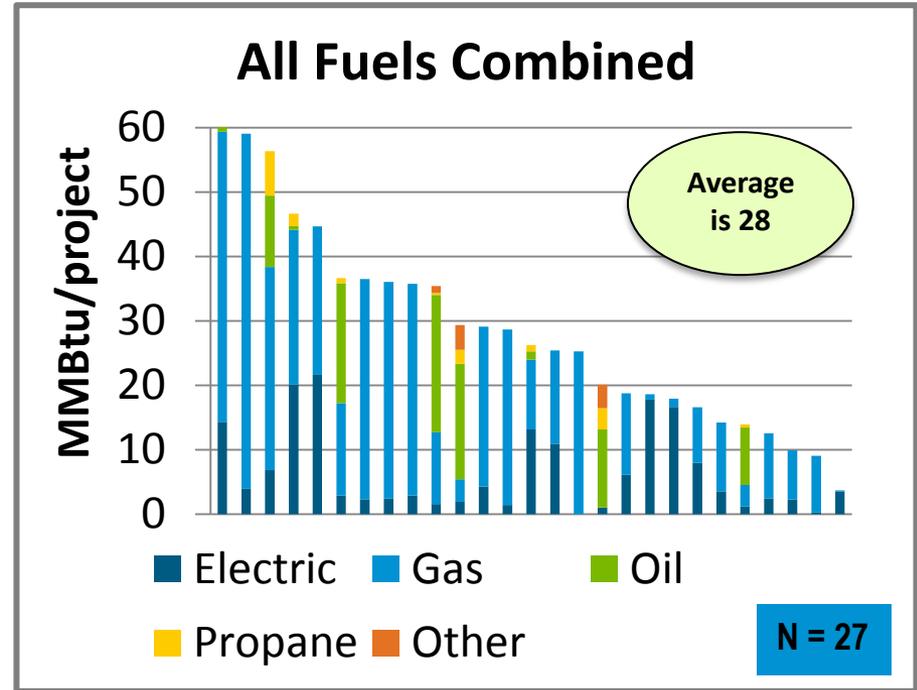
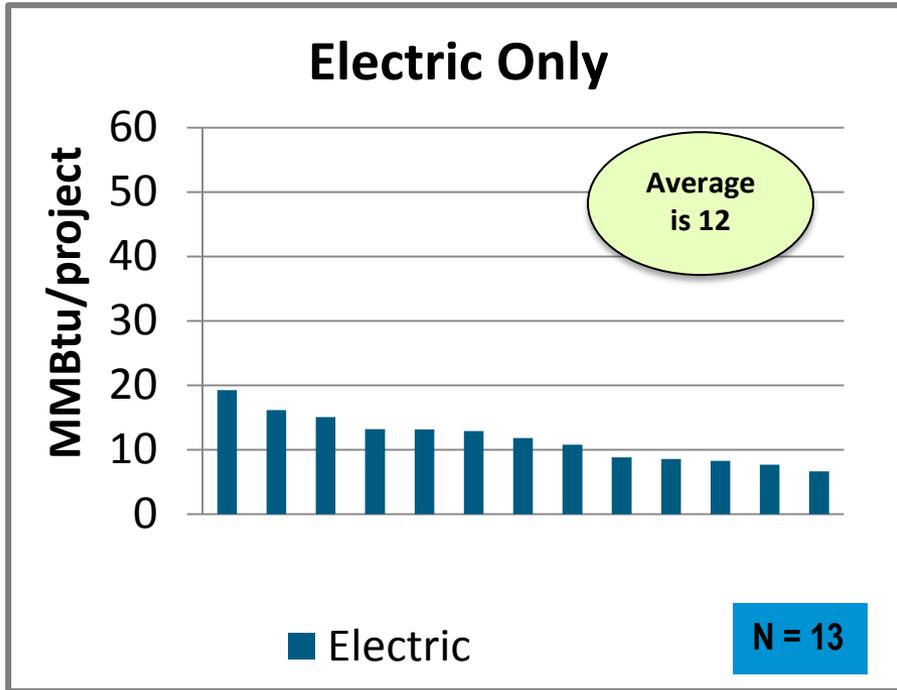
Estimated Site Energy Savings (All Fuels Combined)= 1.8 Trillion Btu's

CO₂ Reduction (All Fuels Combined)= 328,000 Metric Tons



- ❖ 41 Sponsors reported energy savings of 1.7 TBtu
- ❖ Accordingly, the Program saved an estimated 1.8 TBtu and reduced annual emissions by an estimated 328,000 Metric Tons of CO₂ in 2013 across its 50 programs
- ❖ 87% of reported savings, were evaluated by a third party.
- ❖ 8 Programs estimated reducing demand by 6.7 MW 2013

Average Annual Energy Savings per Project by Sponsor and Fuel Type



- ❖ Programs tracking only electricity savings capture 57% lower per project energy savings in comparison to programs tracking multiple fuels
- ❖ In 2013, for the entire set of 41 Sponsors the average energy savings is **23** MMBtu.

Correlation! Smart people eat more chocolate.

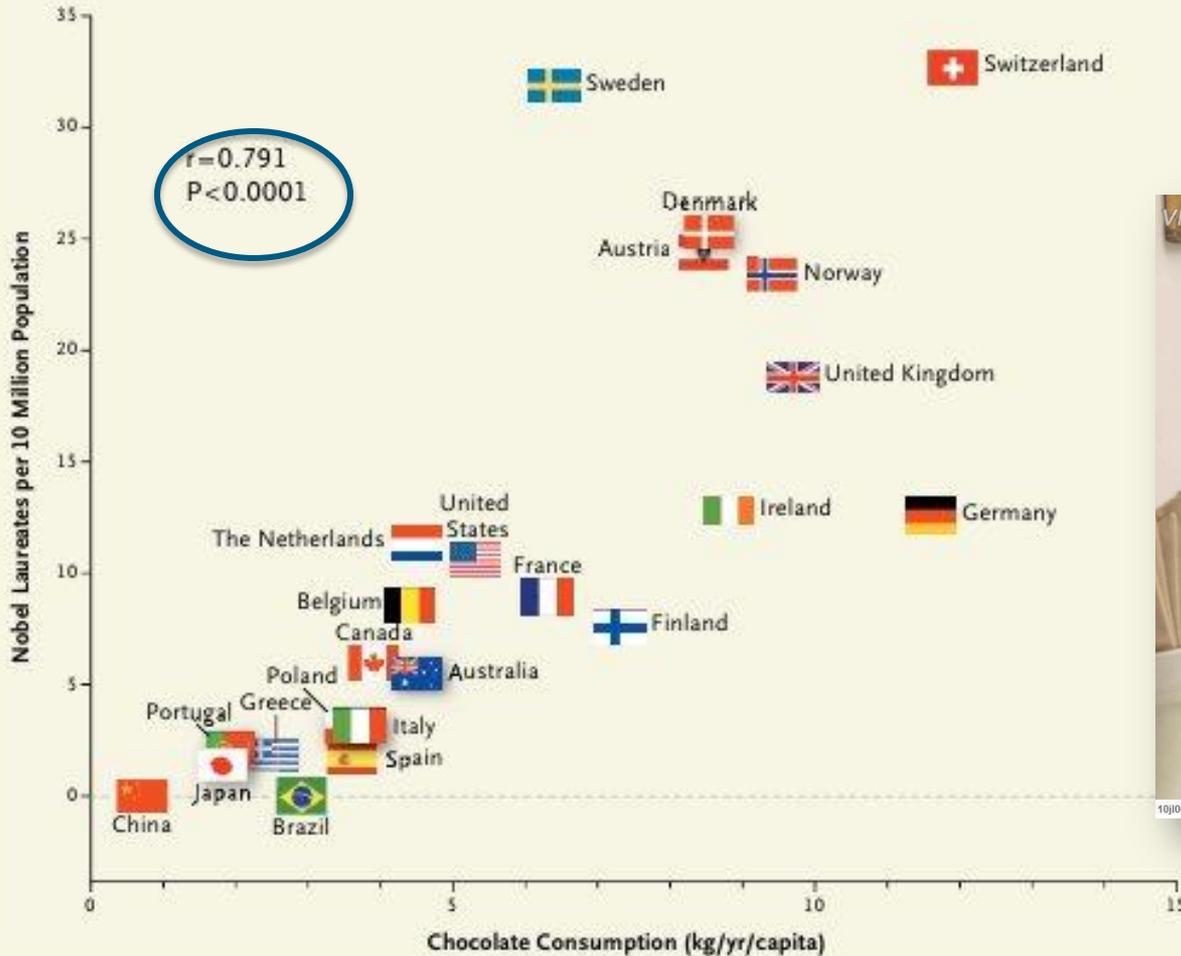
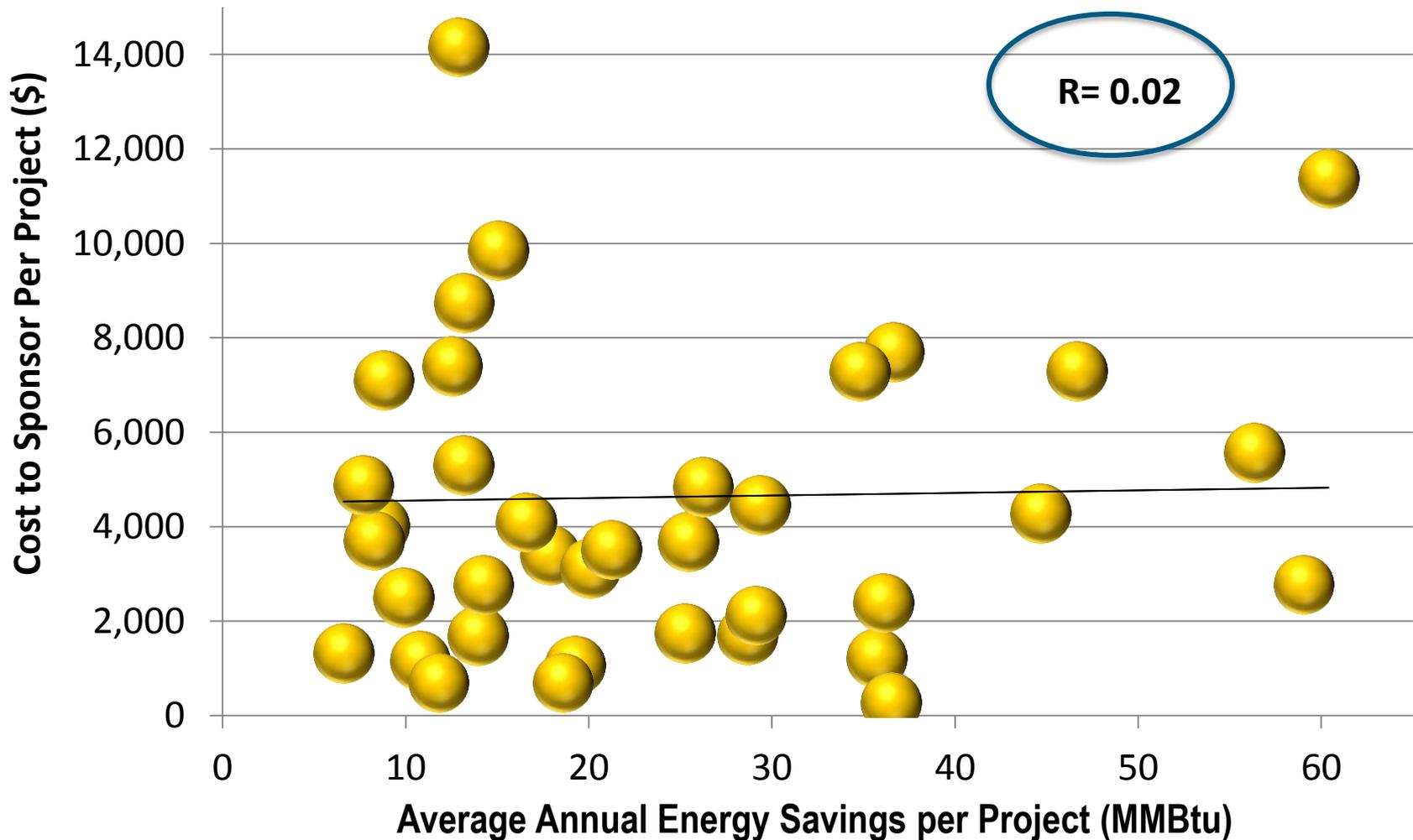


Figure 1. Correlation between Countries' Annual Per Capita Chocolate Consumption and the Number of Nobel Laureates per 10 Million Population.

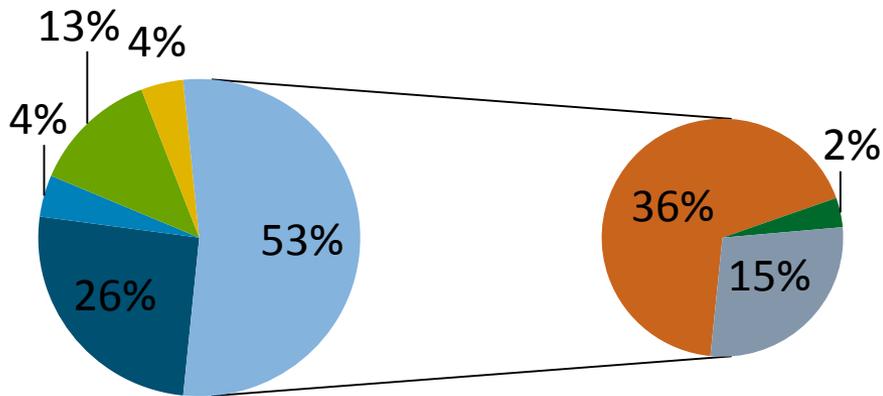
Source: *The New England Journal of Medicine* (Franz H. Messerli, M.D.)

Per Project Energy Savings & Cost to Sponsor

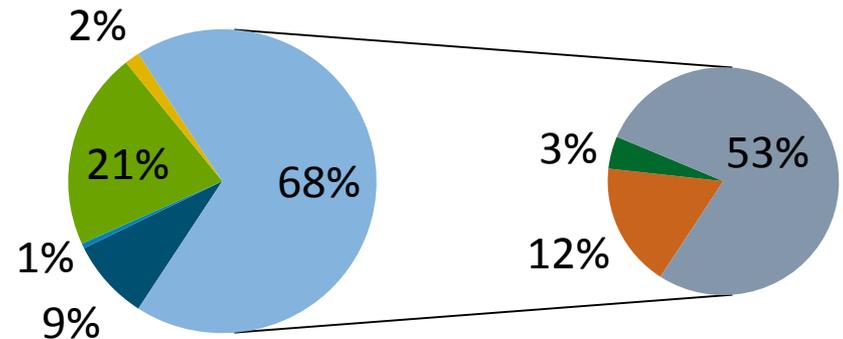


HPwES Activity by Sponsor Type

Distribution of Sponsors by Type



Project Share by Sponsor Type

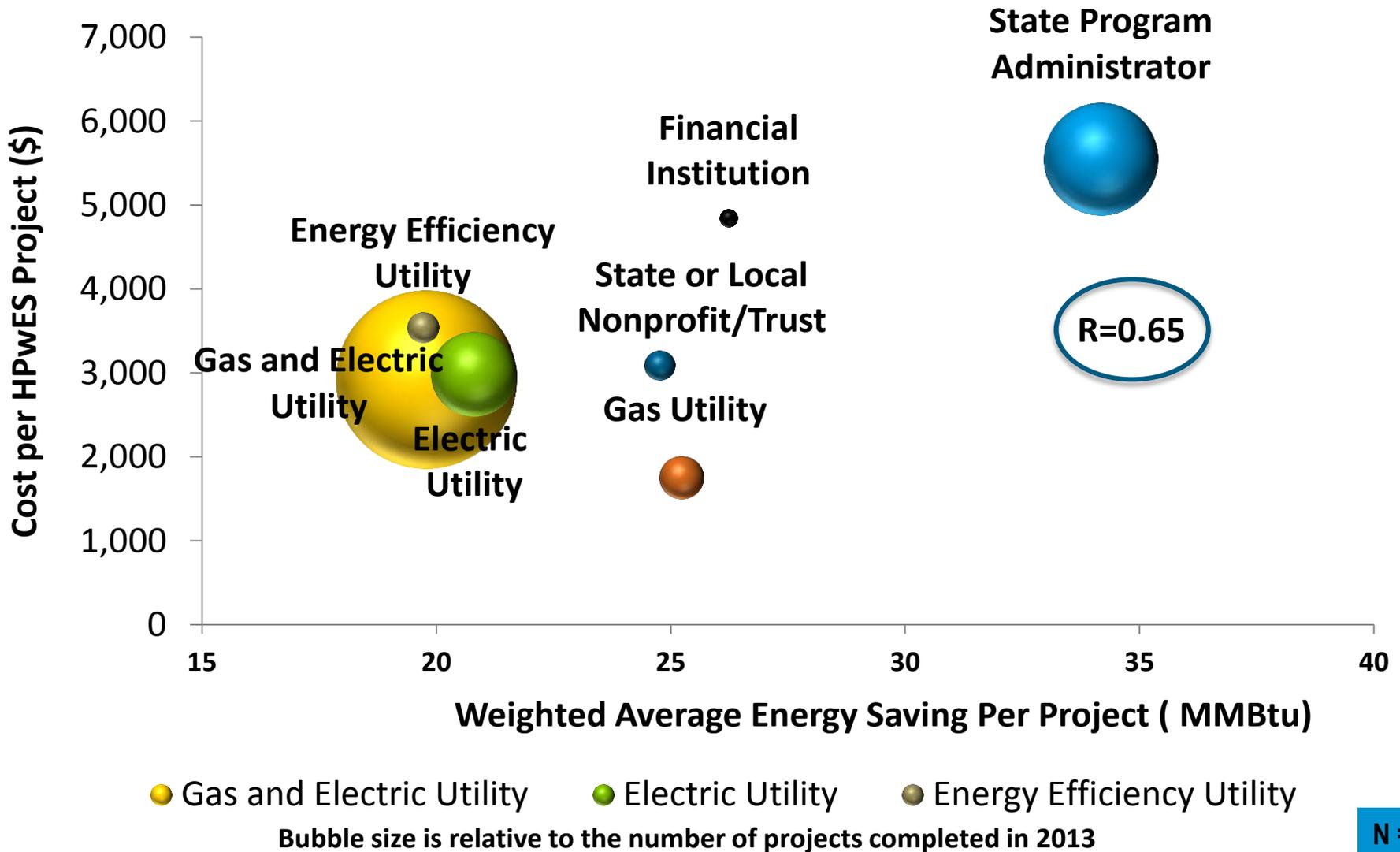


- State or Local Nonprofit/Trust
- State Program Administrator
- Electric Utility
- Gas and Electric Utility

- Financial Institution
- Energy Efficiency Utility
- Gas Utility

N = 47

Program Cost/Savings Correlation by Program Type



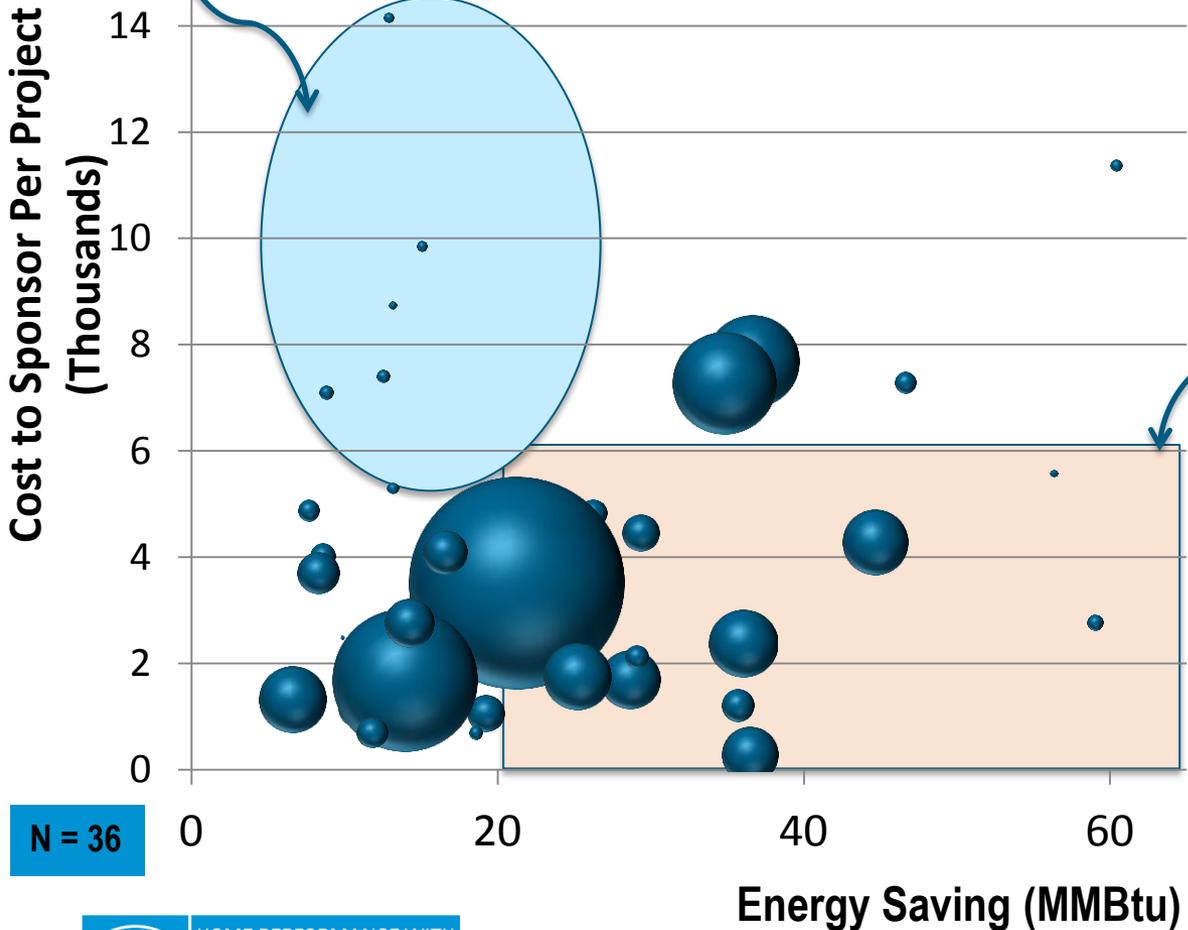
N = 38

Per Project Energy Savings & Cost to Sponsor

❖ Economies of scale create an obvious advantage in bringing Sponsor cost per project down.

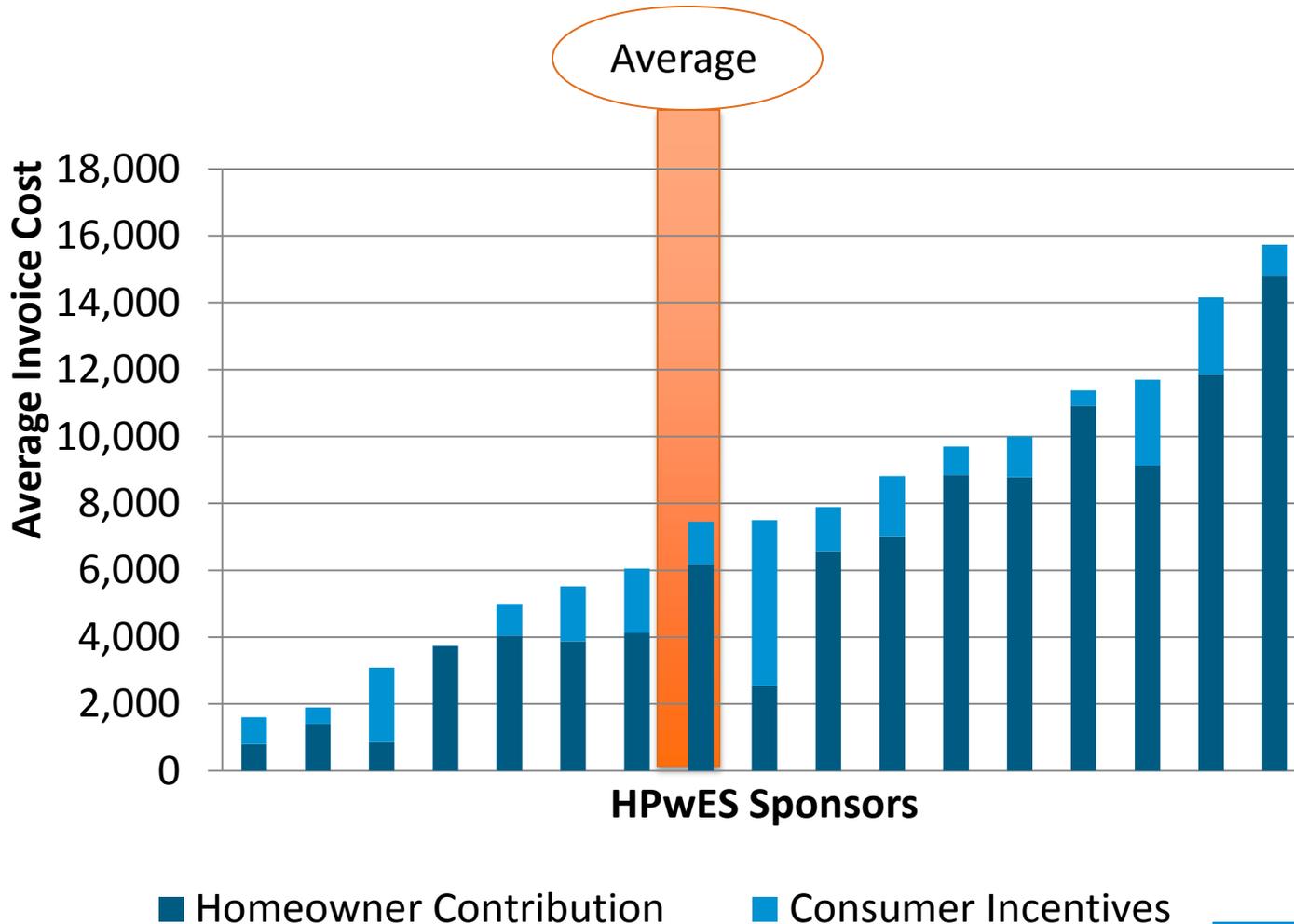
Common Features:

- ❖ Avg 35% higher number of measures per project
- ❖ 15% higher avg project invoice cost
- ❖ Smaller admin budgets and bigger consumer/contractor incentives
- ❖ Measure based incentives, free energy assessment and low-interest financing is more prevalent
- ❖ Contractor incentives more prevalent, especially subsidized training and software and contractor production incentives.
- ❖ Whole building energy modelling is more prevalent
- ❖ N=15



Bubble size refers to number of projects completed in 2013

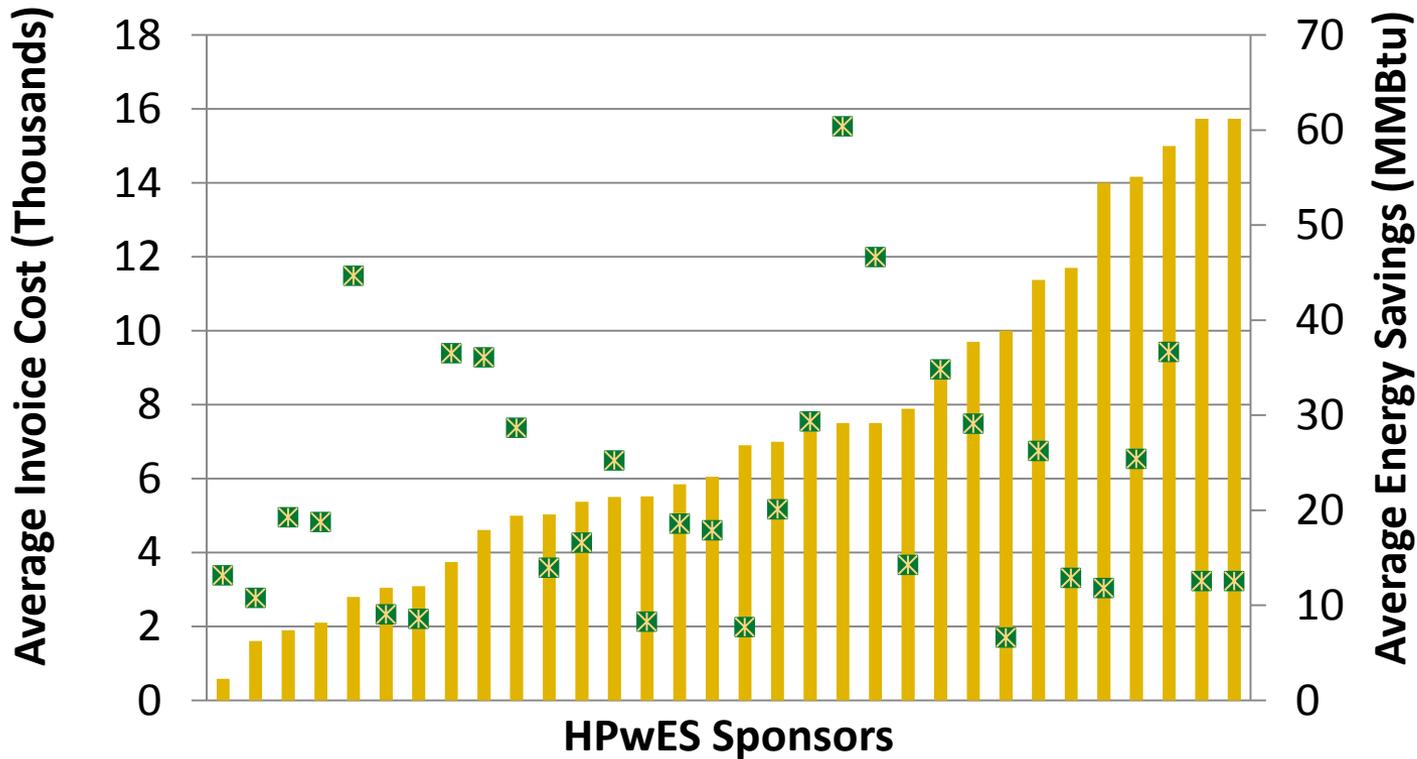
Average Invoice cost per Project



- ❖ Average invoice cost per project is \$7,500
- ❖ On average 82% is paid by the homeowner. The remaining 18% is incentives & rebates.

N = 16

Average Reported Invoice Cost & Energy Savings

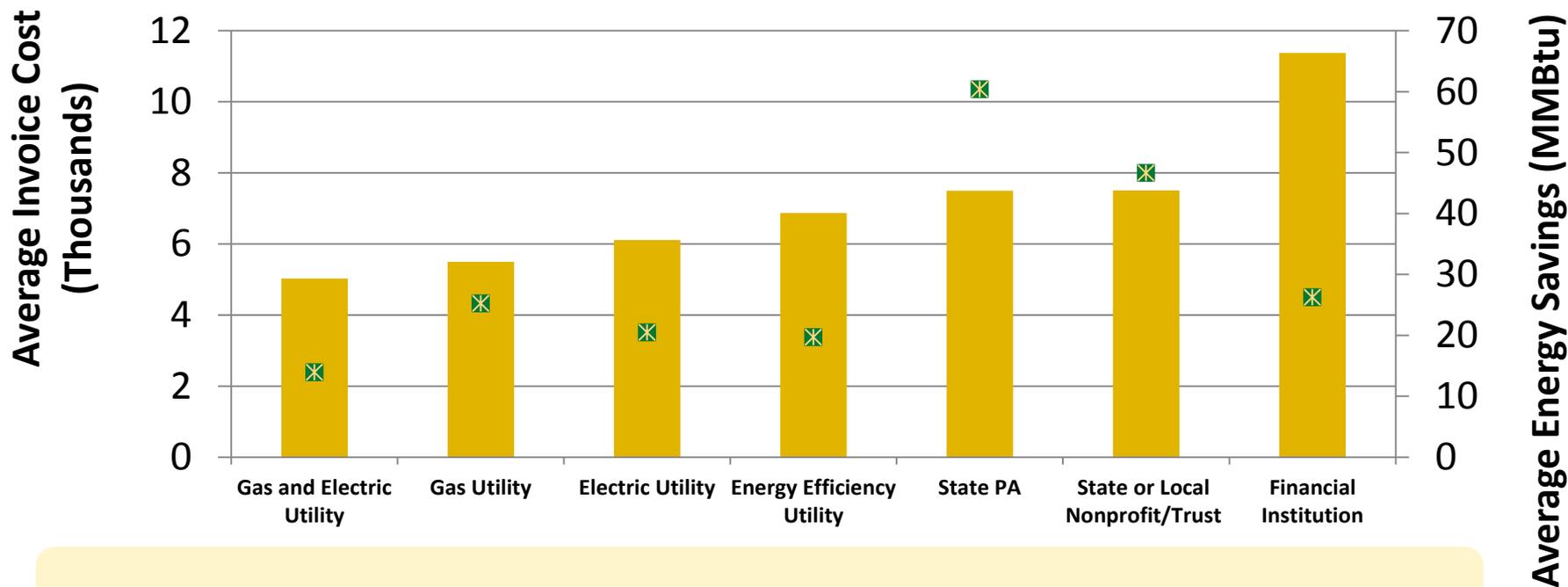


❖ No correlation between Sponsor's average invoice cost and average energy savings per project

■ Average Invoice Cost ❖ Average Energy Saving/Project

N = 32

Average Reported Invoice Cost & Energy Savings by Program Type

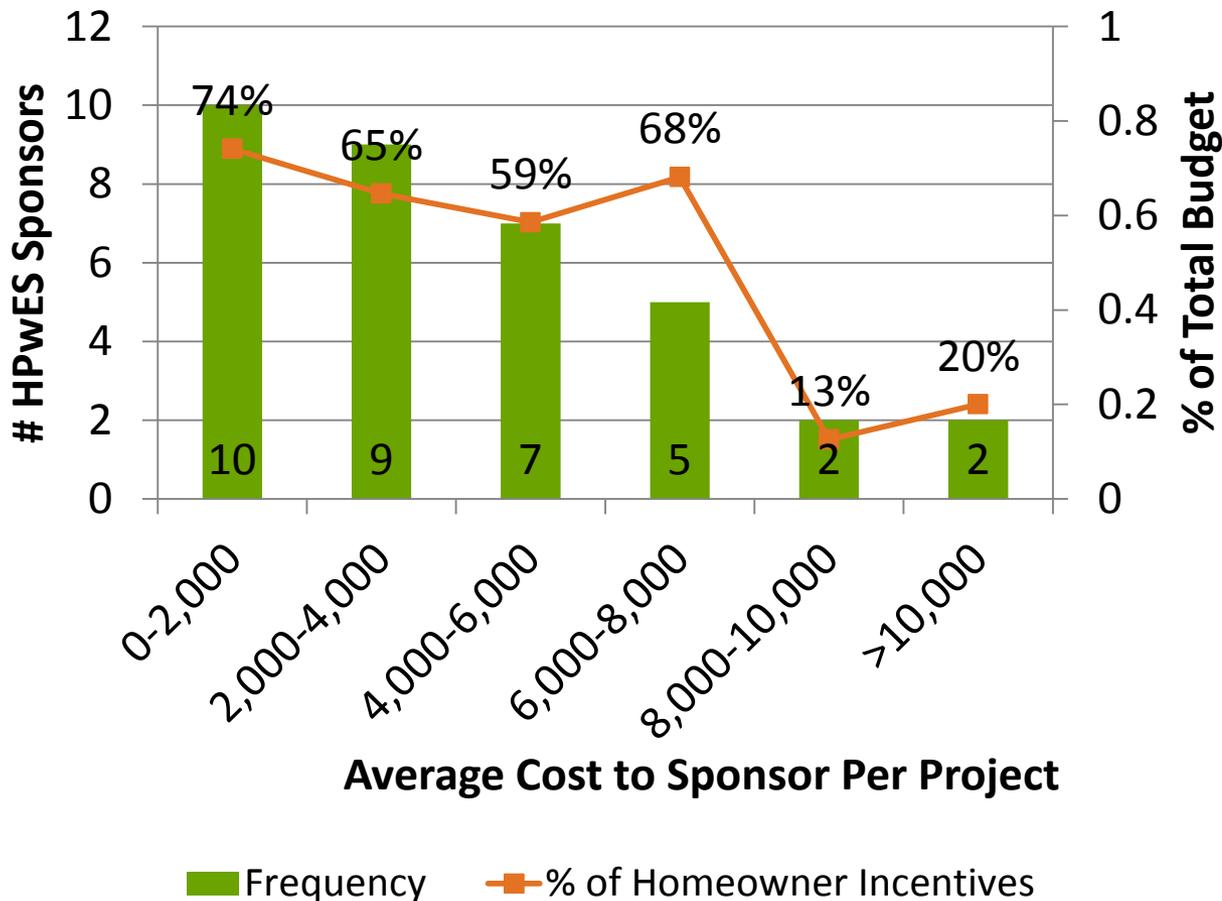


❖ However, grouping by program type improves the correlation to 0.4 between average invoice cost and average energy saving per project. Grouping helps eliminated outliers.

❖ Average invoice cost per HPwES project is \$7,500.

N = 32

Average Sponsor Cost Per Project

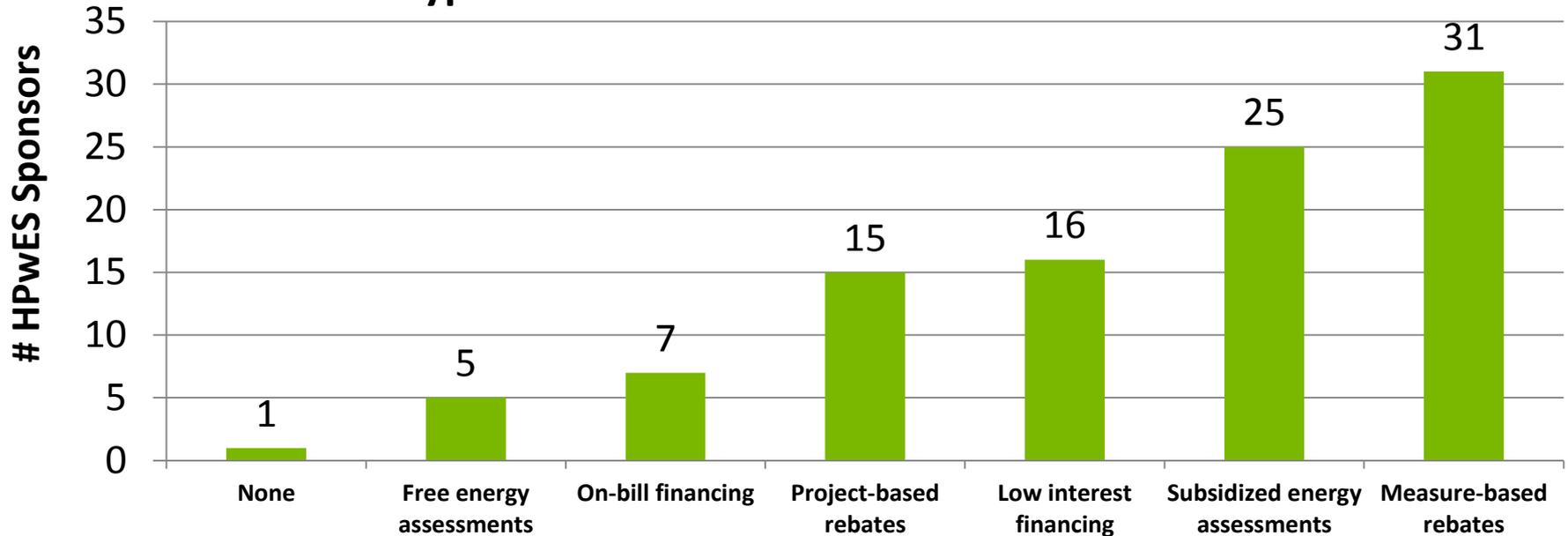


- ❖ Average cost to Sponsor per project in CY2013 is **\$4,500**
- ❖ Weighted Average cost to Sponsor per project is **\$3,500**
- ❖ Median cost to Sponsor per project is **\$1,717**
- ❖ Increase in homeowner incentives amount only justifies a small portion of increased average cost per project

N = 37

Homeowner Incentives

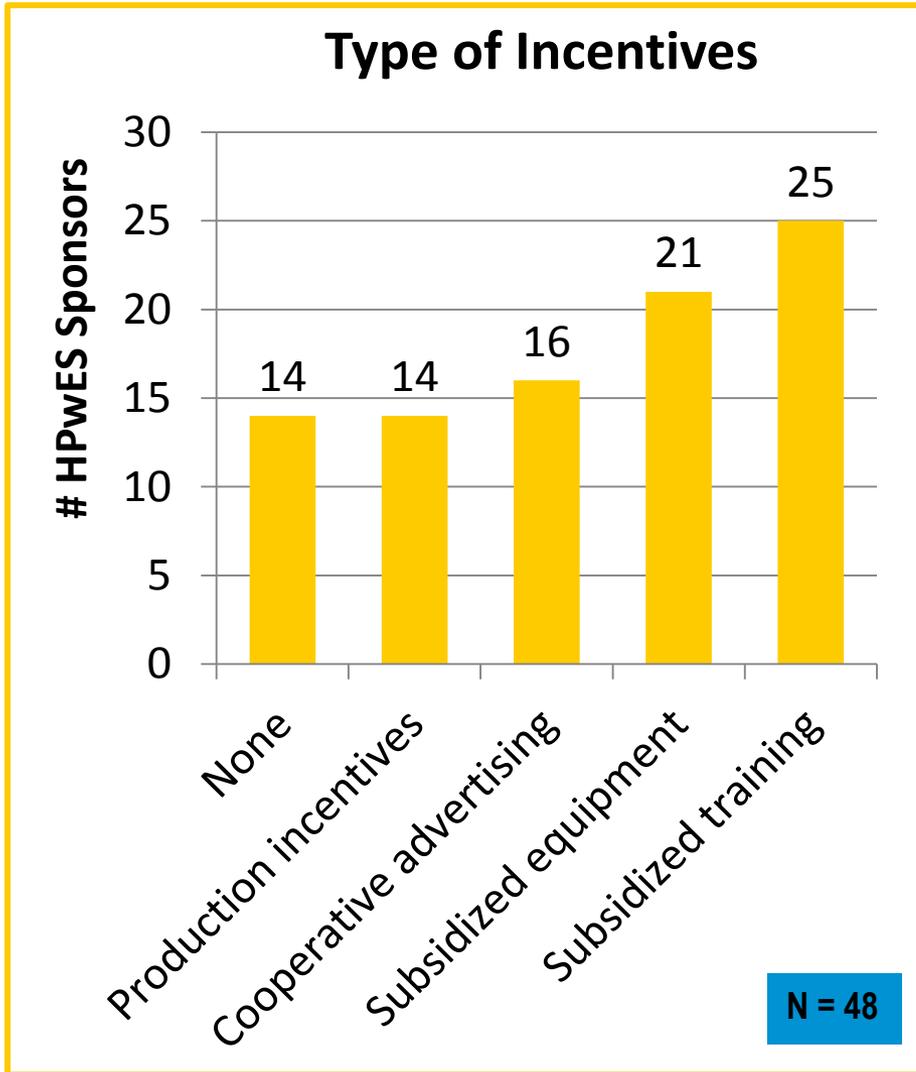
Type of Homeowner Incentives Offered



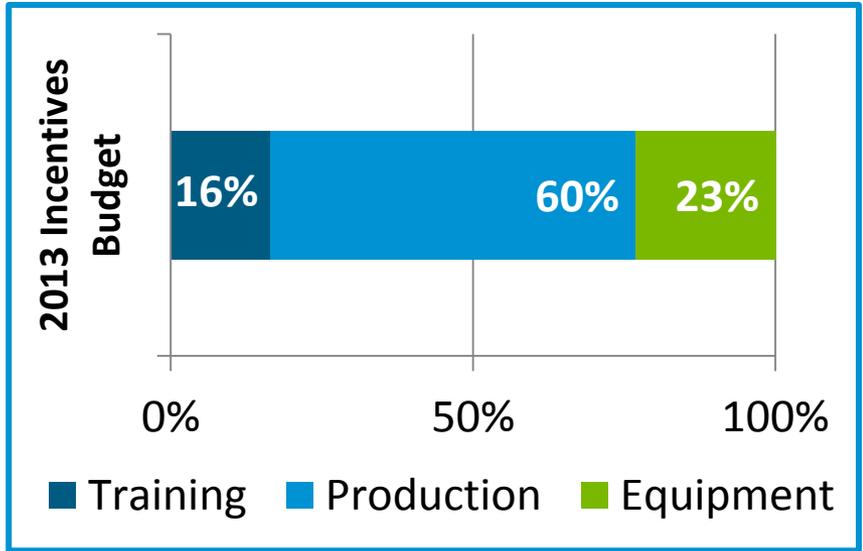
- ❖ 35 programs reported 2013 budget details for homeowner incentives. 2014 budget for homeowner incentives projects 25% growth for these 35 programs
- ❖ The average consumer incentive per completed HPwES project is \$1,800 and the weighted average is \$1,900.
- ❖ The Sponsor average consumer incentive per project ranged between \$300 and \$5,500.

N = 49

Mid-Stream Incentives

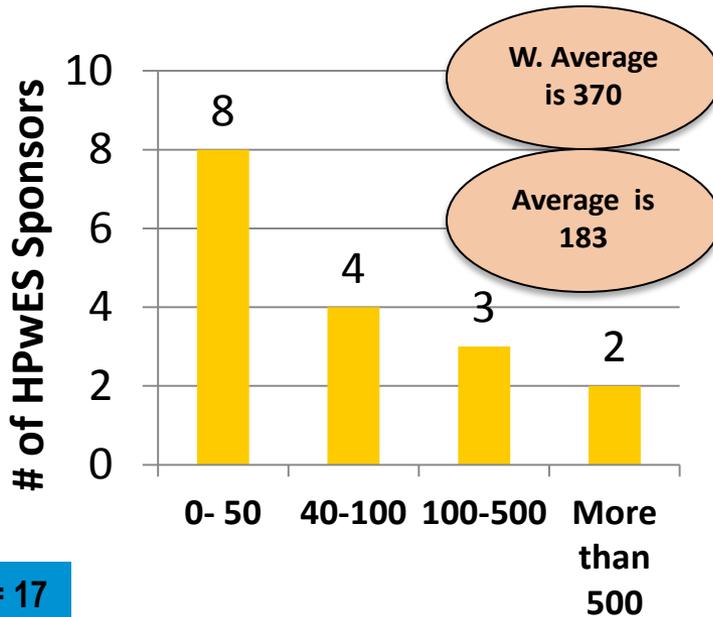


- ❖ 20 Sponsors reported their contractor incentive budget for 2013 and 2014, projecting a **5%** growth in budget.
- ❖ 25 Sponsors reported their contractor incentive budget for 2013. Per project average contractor incentive is \$670, the weighted average is \$460 with a wide range of \$4 to \$3,400.



Direct Install (DI)

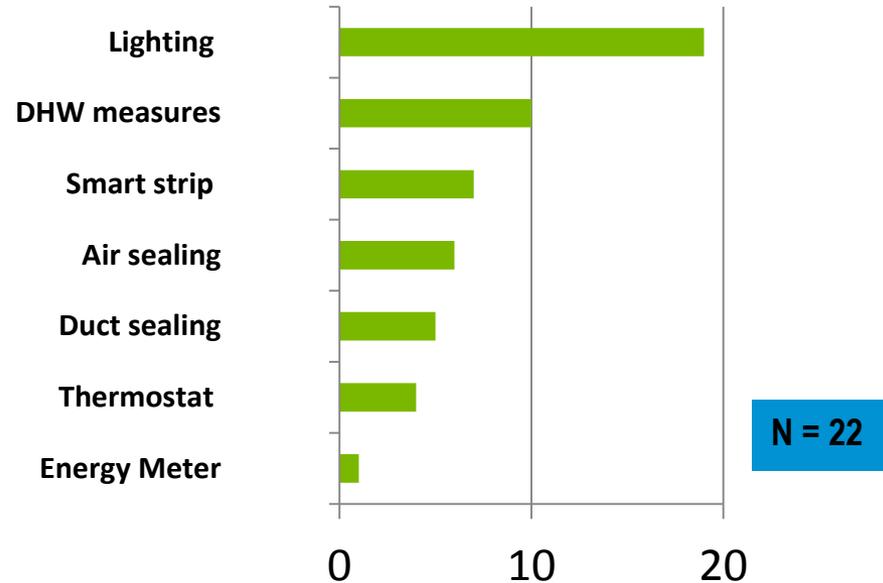
DI Cost per Project



N = 17

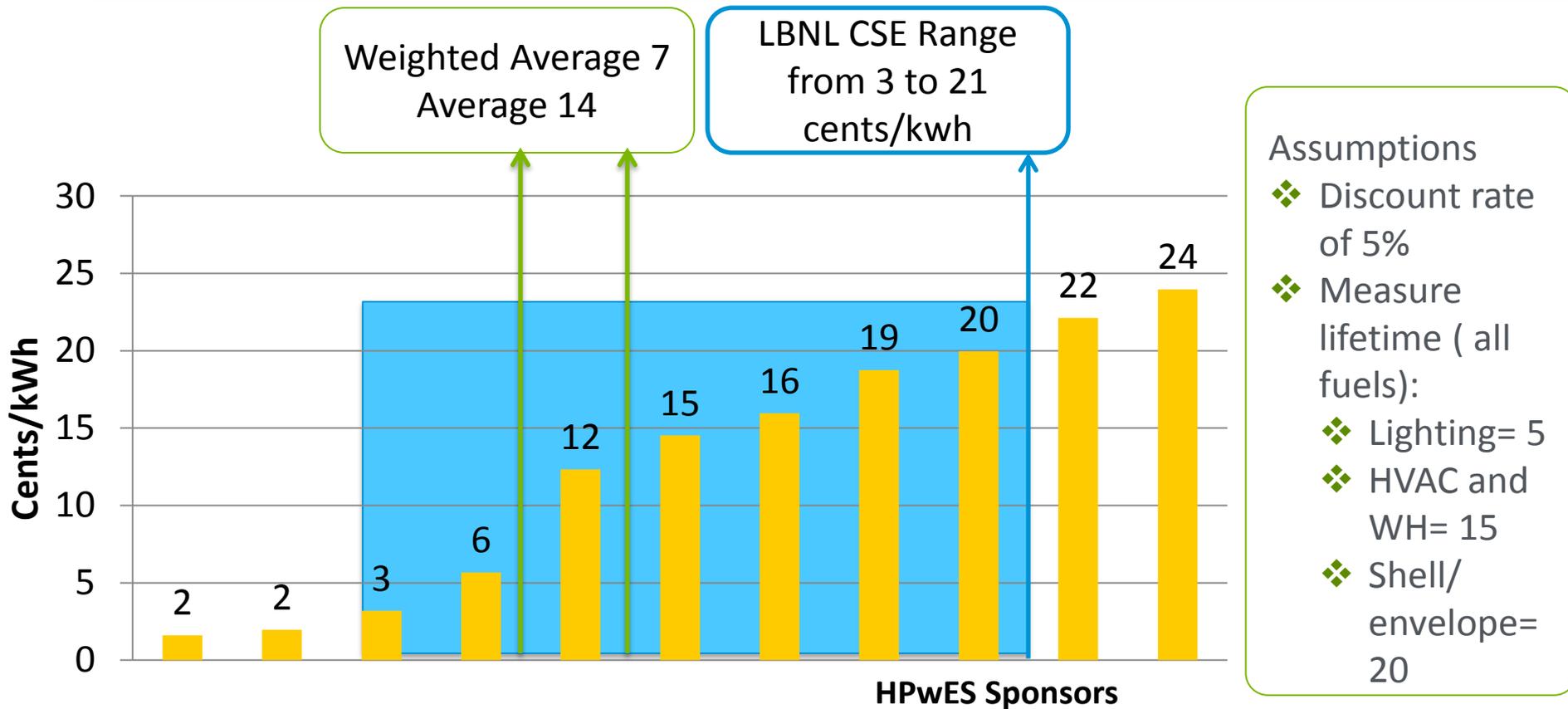
A huge range for the average DI cost per project (\$15 to \$1,100) is attributable to variations in the DI approach for example base load only vs. air and duct sealing

DI Measures Offered



Lighting and DHW measures are the most popular among DI programs with 90% and 50% of Sponsors offering these measures respectively. On average Sponsors offer 2.4 DI measures

Levelized Cost of Saved Energy (Electric Only)

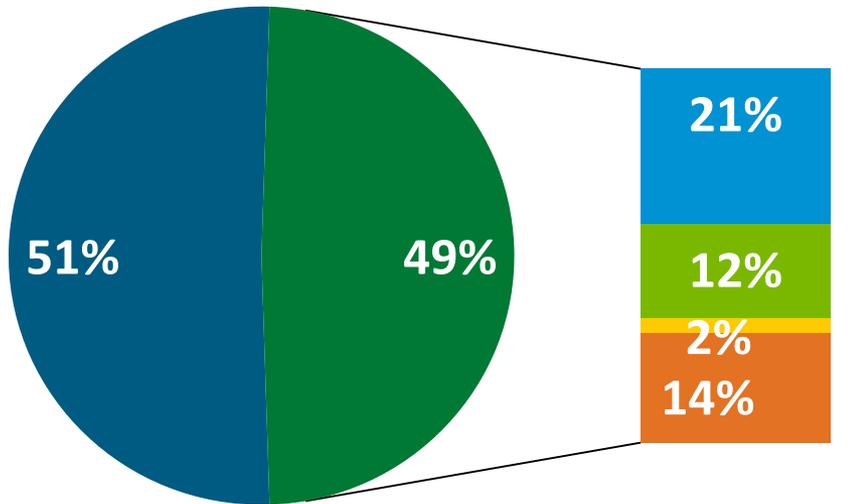


According to LBNL report, entitled "The Program Administrator Cost of Saved Energy for Utility Customer-Funded Energy Efficiency Programs". A comparable CSE for whole house programs range from 3 to 21 cents/kwh. A large range to reflect the variety of measures included in these programs

N = 12

Financing

Credit Enhancements/ Financing Buy Downs

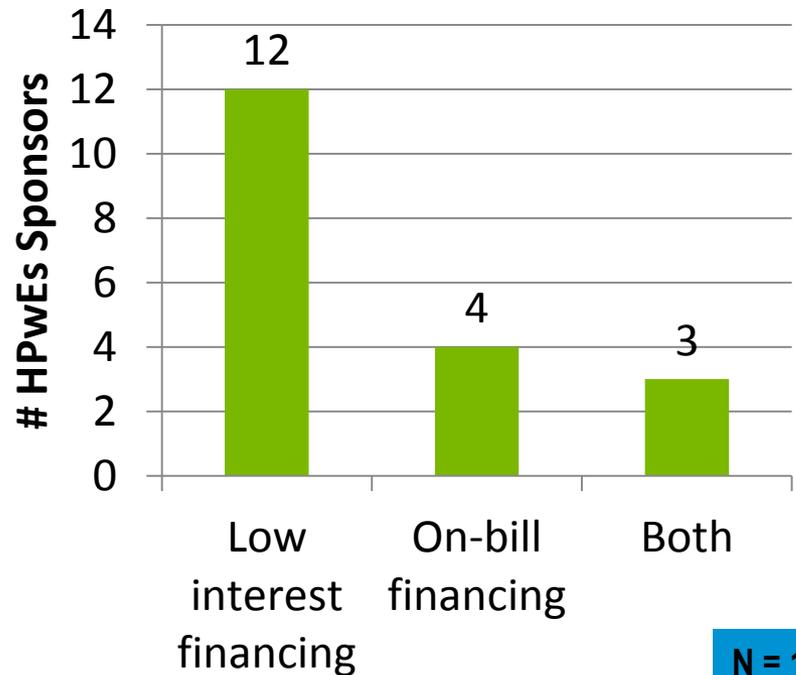


- None
- Interest-rate buy down
- Loan-loss reserve
- Program loan insurance
- Revolving loan fund

N = 48

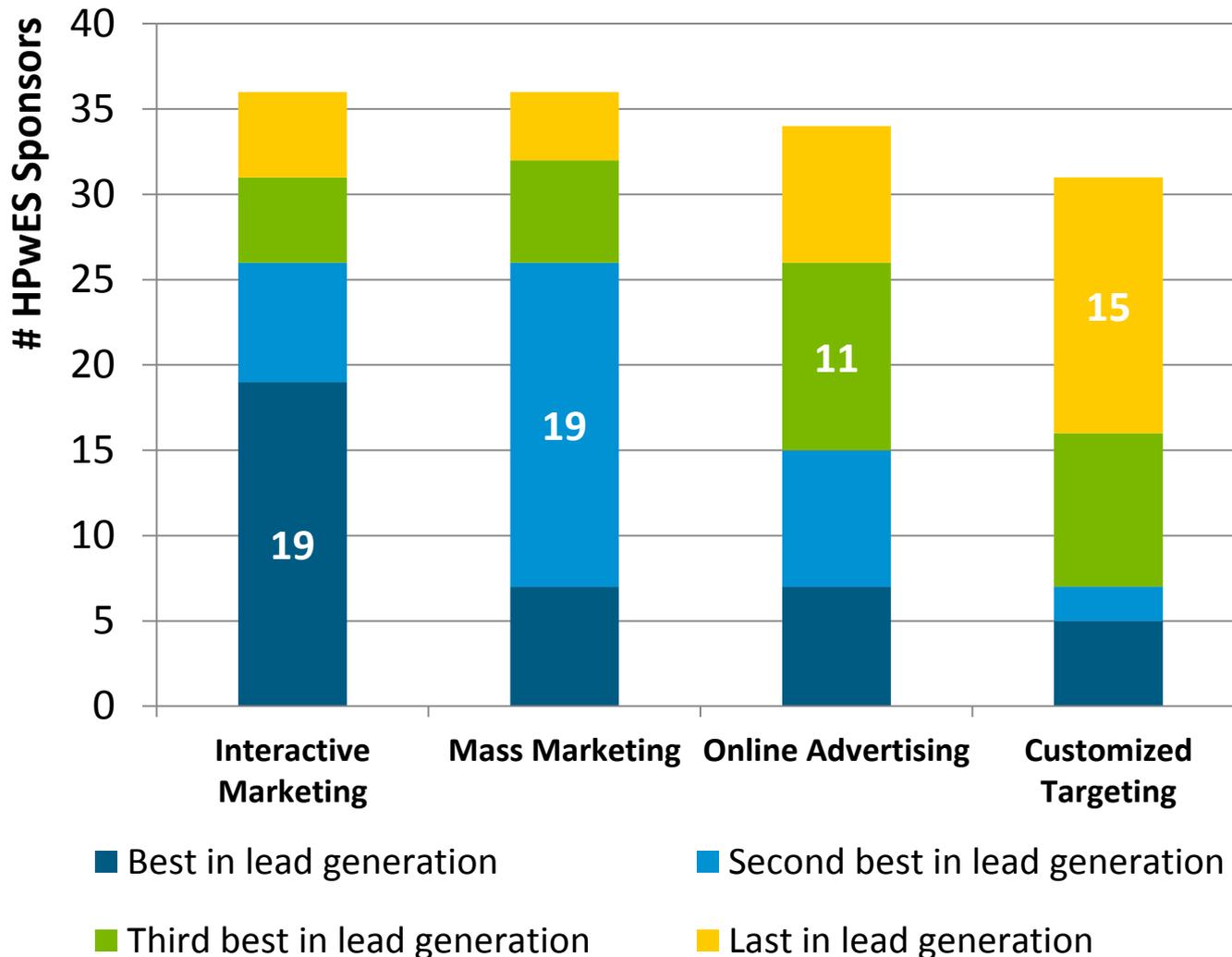
❖ 16 HPwES Sponsors reported completing 17,000 projects using financing in 2013.

Homeowner Incentives



N = 19

Marketing Strategies

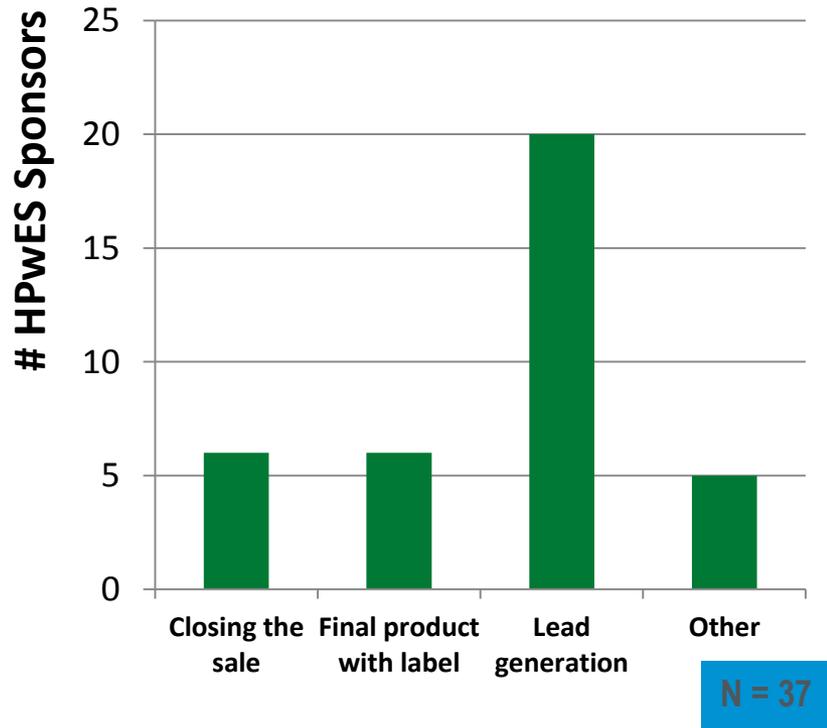


Strategies that ranked highest in lead generation did not necessarily receive the largest portion of the marketing budget. Marketing budget allocation across Sponsors varied greatly.

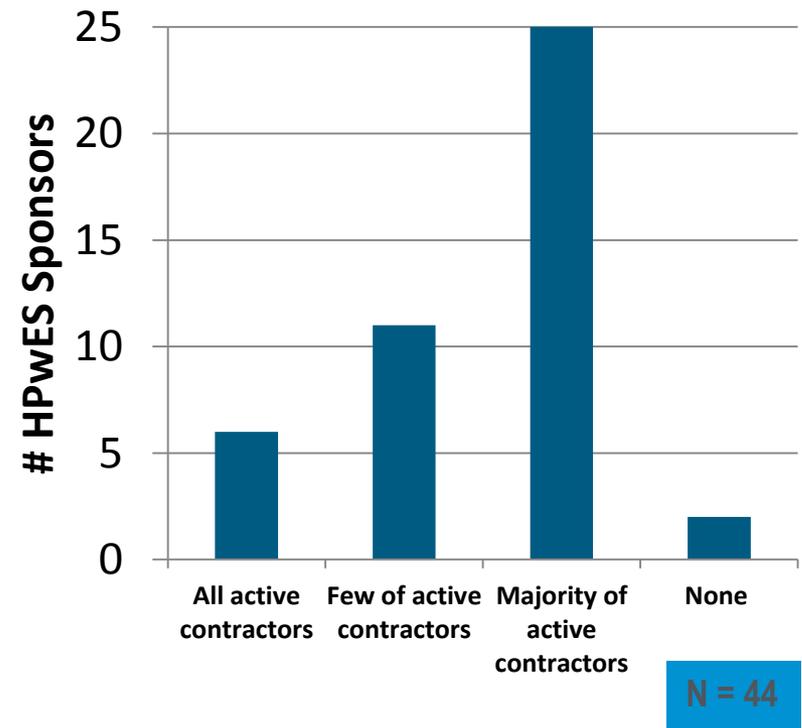
N = 38

The Value of the HPwES Brand

During the Project Cycle

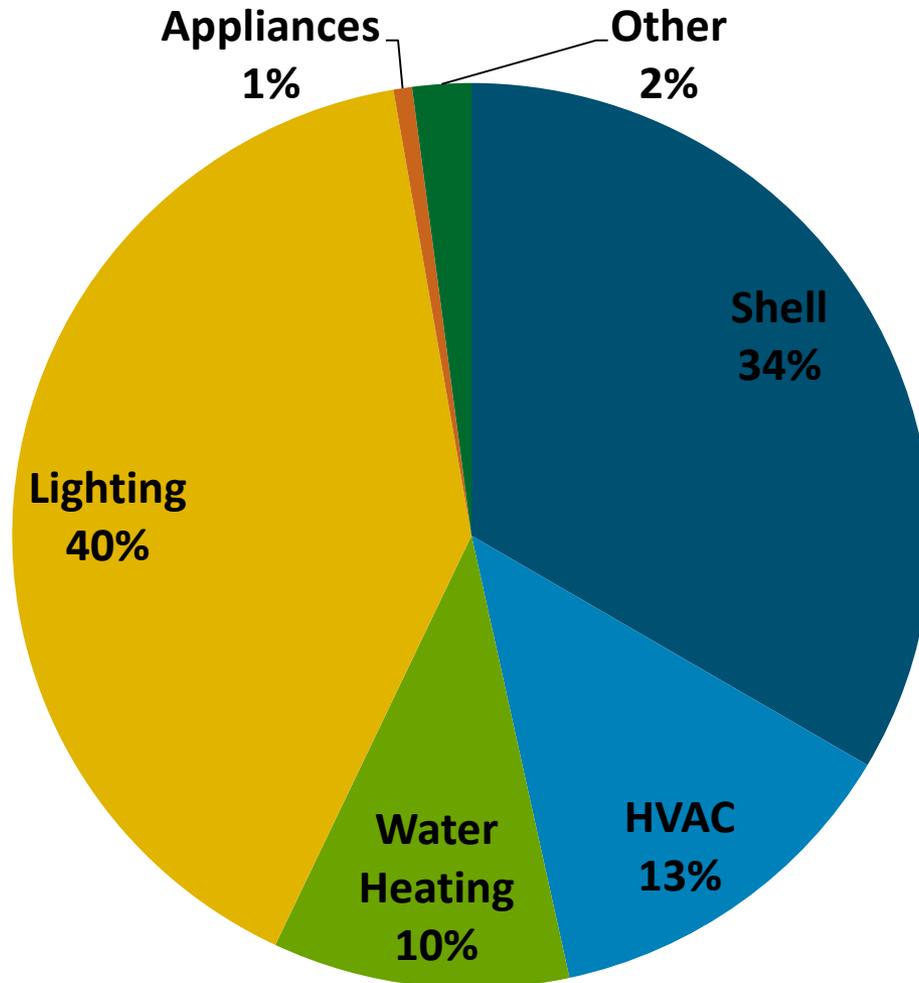


Contractors Adoption



37 Sponsors (84% of respondents) reported that they use HPwES as the primary brand or equally co-branded with the local brand in the program's marketing efforts.

Measures Breakdown



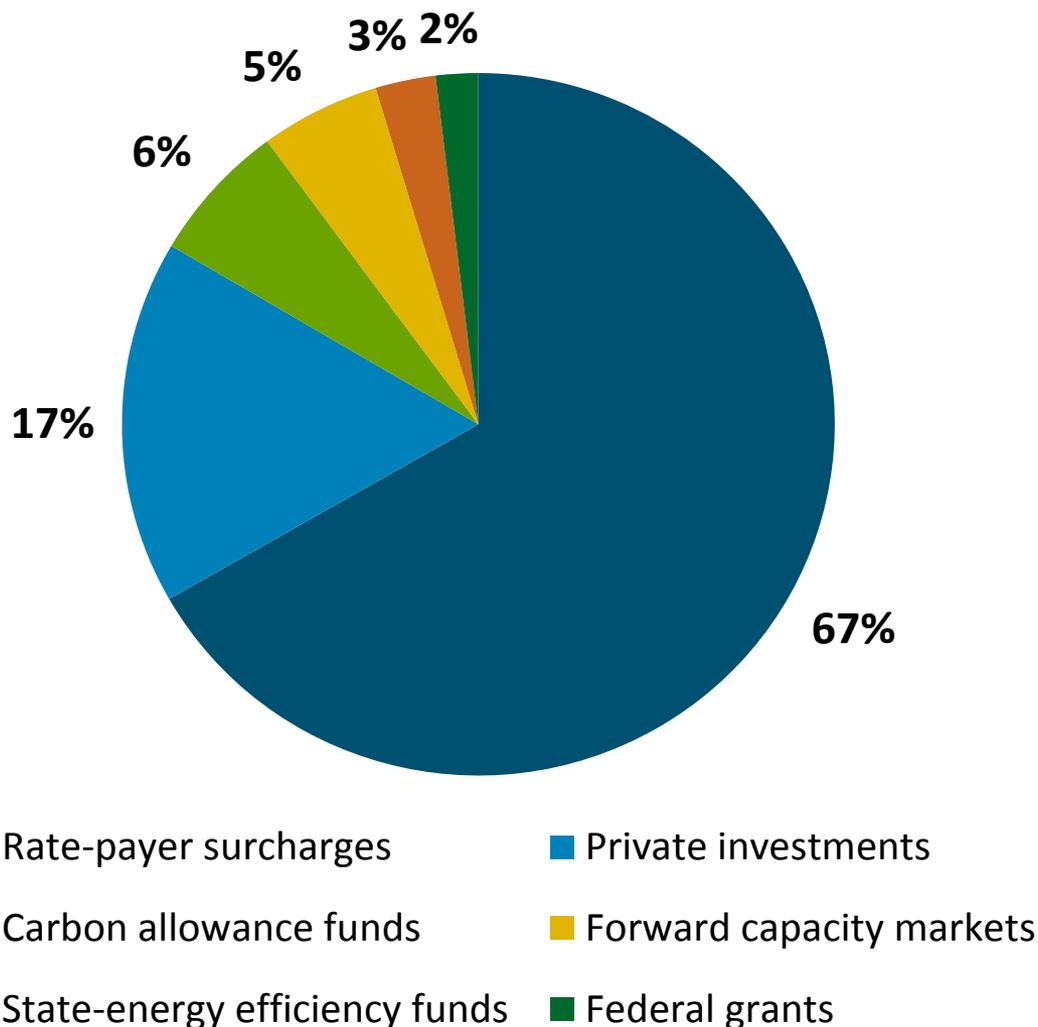
❖ 43 Sponsors (73,500 Projects) reported on average completing **2.5 measures per Project**

❖ “Other” includes windows, doors, solar shading, pool pumps, ECM’s, thermostats, and H&S measures

N = 43

Sources of Program Funding

Percentage of Total Reported Budget



Rate-payer surcharges dominate, but not for everyone!

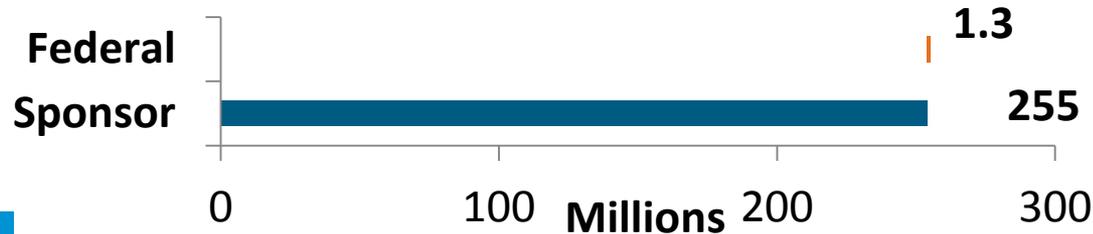
- ❖ 22 Programs rely solely on rate-payer surcharges for program funding. 10 programs don't use rate-payer surcharges

Many programs combine partial funding sources:

- ❖ 4 programs use private investments
- ❖ 3 programs use carbon allowance funds
- ❖ 6 programs use forward capacity market revenues
- ❖ 10 programs use state energy efficiency funds
- ❖ 6 programs use federal grants

N = 45

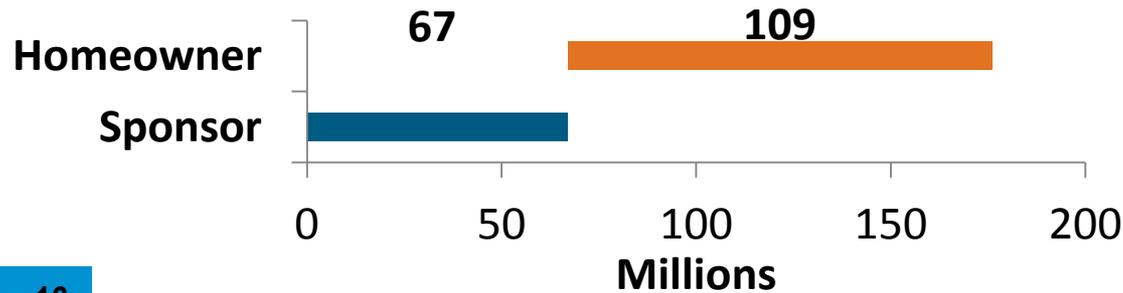
2013 HPwES Public Spending Leveraging



N = 43

43 HPwES Sponsors, representing 96% of projects completed reported a total program budget of \$255 Millions

1: 196



N = 16

16 HPwES Sponsors, representing 22% of projects completed reported a total program budget of \$67 Millions. The homeowners contribution for these projects were estimated at \$109 Millions

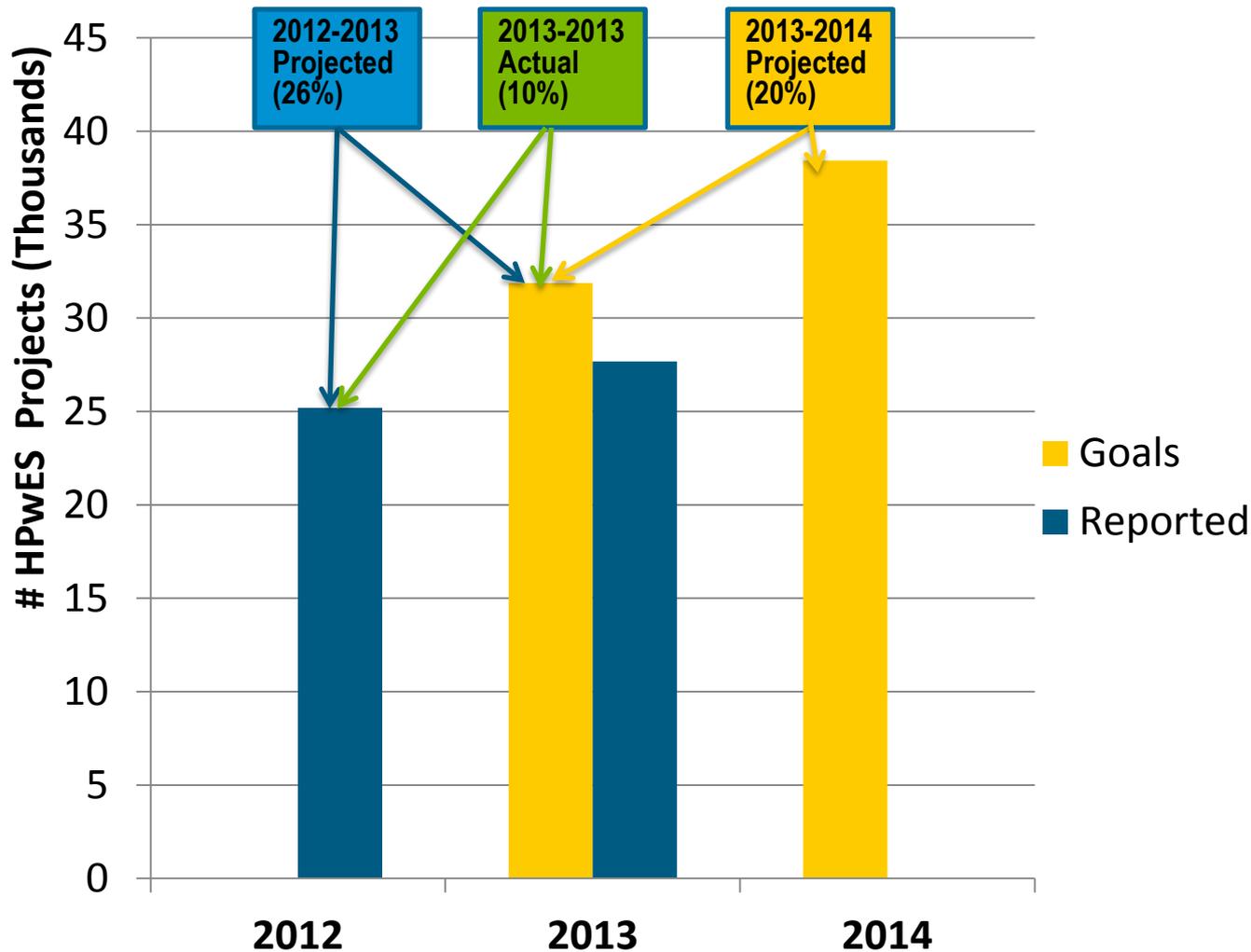
1: 162

Accordingly it's estimated that a \$670 Million cumulative investment supported more than 80,000 projects. For every \$1 spent by the federal government, Sponsors invested \$196 and homeowners invested \$317.

1: 196: 317

Federal: Sponsor: Homeowner

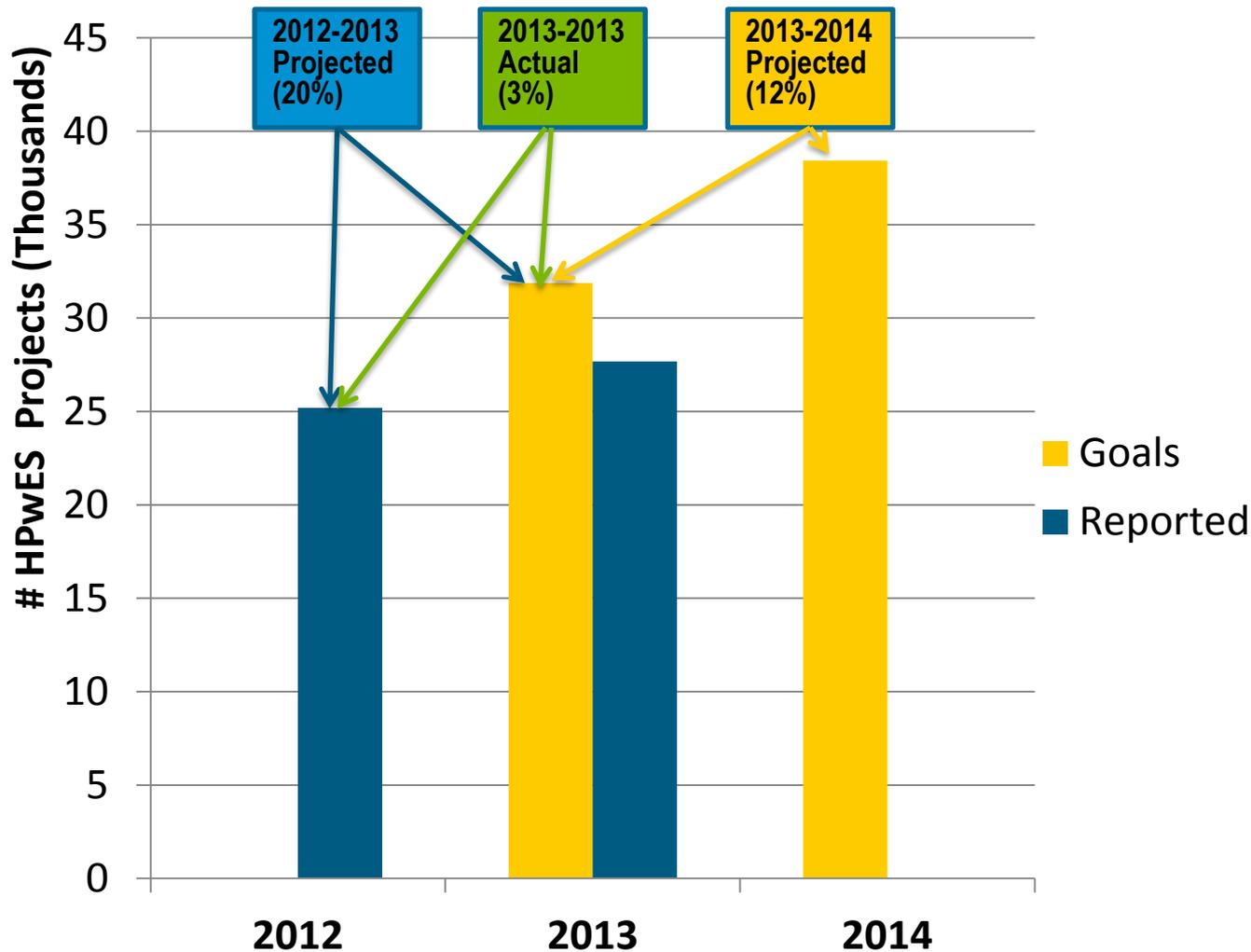
Project Goals Versus Reported (2012-2014)



- ❖ In 2012, 26 Sponsors projected 26% growth for 2013 and achieved an actual growth rate of 10%
- ❖ In 2014, the same group of Sponsors projects 20% growth in project completions for 2014

N = 26

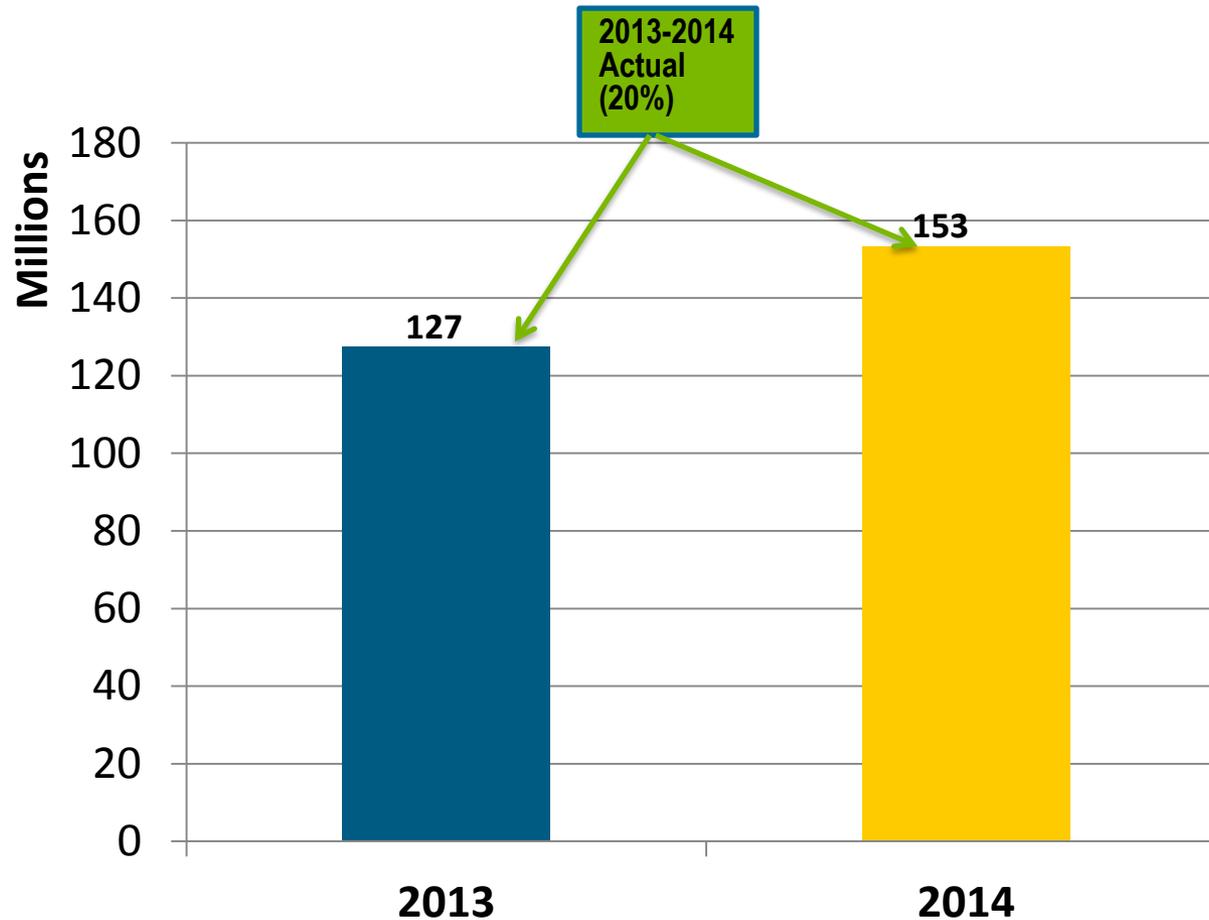
Energy Saving Estimates and Goals (2012-2014)



- ❖ 20 Sponsors projected **20%** growth in energy savings for 2013. Reported savings showed a **3%** growth.
- ❖ For 2014, the same group of Sponsors project 12% growth in energy savings relative to 2013.

N = 20

HPwES Program Budgets for 2013 and 2014



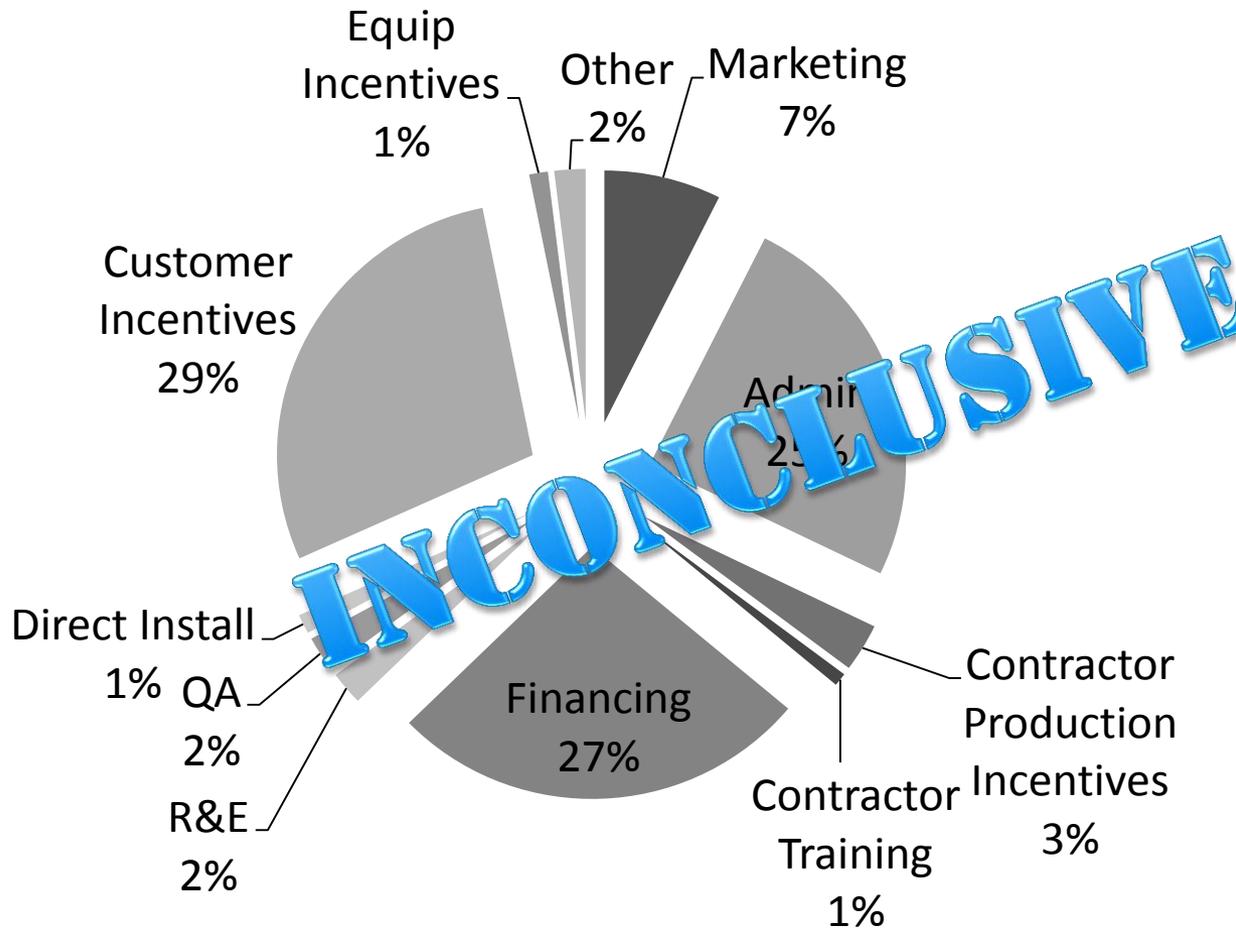
- ❖ 22 Sponsors project growing budgets. 7 Sponsors with significant budget growth (>100%)
- ❖ 16 Sponsors reported a budget decline
- ❖ 2 Sponsors with stable budgets
- ❖ No correlation between project production volume and budget growth

N = 40

Questions?



Program Cost to Sponsors in 2013

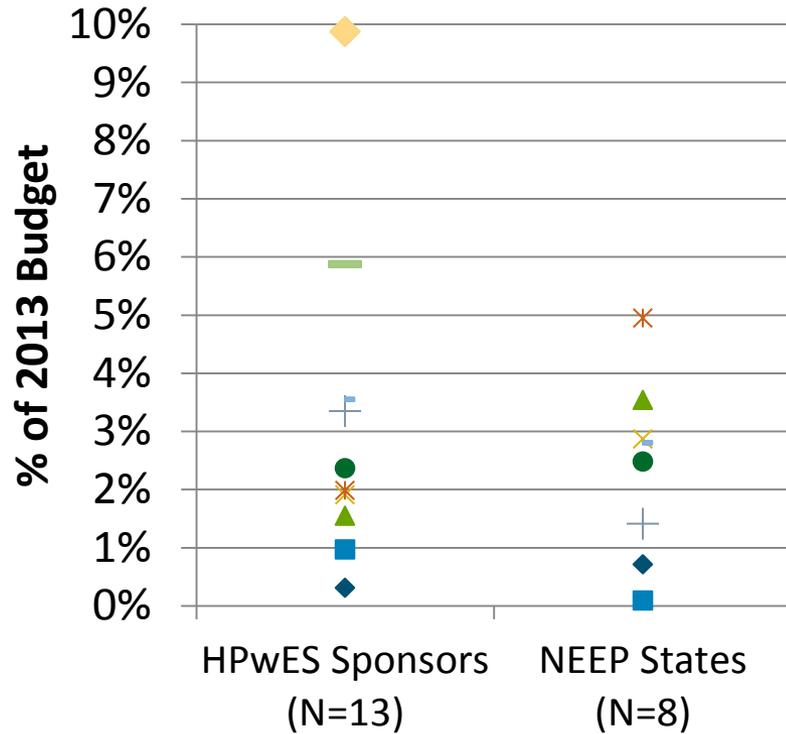


- ❖ Limited and inconsistent details reported on budget breakdown
- ❖ Budget breakdown is inconsistent across programs
- ❖ 43 Sponsors reported a total program cost of \$254 Million for CY 2013.

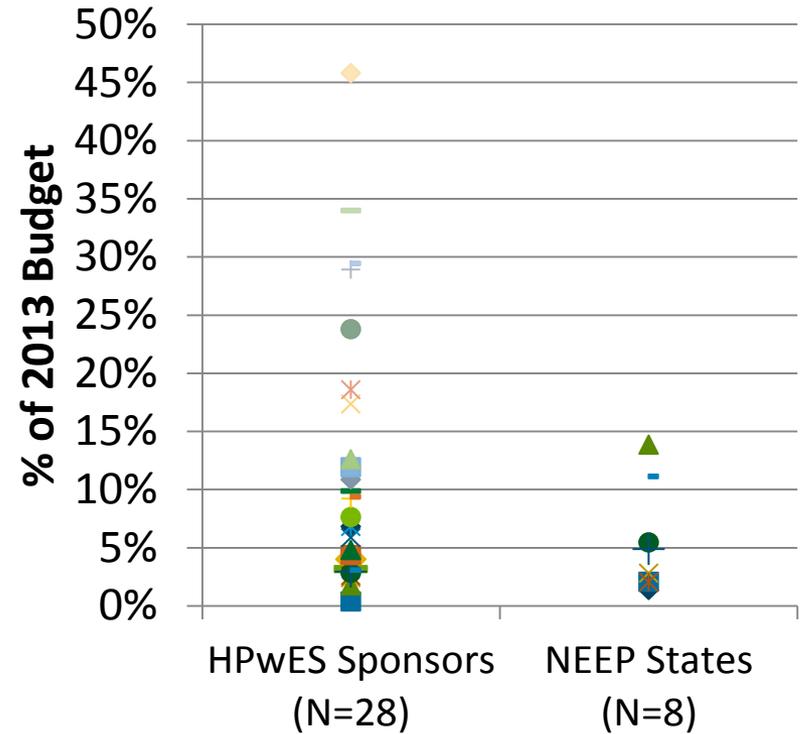
*Only reflecting Sponsors that reported budget breakdown

2013 Reported HPwES Budgets Compared to NEEP

Research & Evaluation



Marketing



- ❖ Stronger variation in the HPwES programs budget breakdown relative to NEEP's states(all programs included)
- ❖ On average a HPwES program allocates 11% of budget for marketing and 3% for Research and Evaluation

Budget Question

6. What is the annual program budget for each of the following categories? (*The total rows will auto-sum based on responses to the sub-categories. If you opt to provide only a total or a sub-total, please check the boxes next to the categories included in the total.*)

Option 1:
Give us the details

Program Administration			
<input type="checkbox"/>	Marketing, Outreach and Customer Acquisition	\$	\$
<input type="checkbox"/>	Program Administration	\$	\$
<input type="checkbox"/>	Quality Assurance	\$	\$
<input type="checkbox"/>	Research & Evaluation	\$	\$
Total Program Administration		\$	\$
Customer Incentives			
<input type="checkbox"/>	Costs of Direct Install Measures	\$	\$
<input type="checkbox"/>	Other Customer Incentives & Rebates	\$	\$
<input type="checkbox"/>	Other	\$	\$
<input type="checkbox"/>	Other	\$	\$
<input type="checkbox"/>	Contractor Training & Certification	\$	\$
<input type="checkbox"/>	Contractor Production/Reporting Incentives	\$	\$
<input type="checkbox"/>	Contractor Equipment Incentives and other Business Development Support	\$	\$
Total Contractors Incentives		\$	\$
Other, please specify:		\$	\$
Total		\$	\$

Budget Question

6. What is the annual program budget for each of the following categories? *(The total rows will auto-sum based on responses to the sub-categories. If you opt to provide only a total or a sub-total, please check the boxes next to the categories included in the total.)*

Option 2:
Give us the big buckets

Program Administration			
<input type="checkbox"/>	Marketing, Outreach and Customer Acquisition	\$	\$
<input type="checkbox"/>	Program Administration	\$	\$
<input type="checkbox"/>	Quality Assurance	\$	\$
<input type="checkbox"/>	Research & Evaluation	\$	\$
Total Program Administration		\$	\$
Customer Incentives			
<input type="checkbox"/>	Costs of Direct Install Measures	\$	\$
<input type="checkbox"/>	Other Customer Incentives & Rebates	\$	\$
<input type="checkbox"/>	Marketing Costs	\$	\$
<input type="checkbox"/>	Other Incentives	\$	\$
Total Customer Incentives		\$	\$
<input type="checkbox"/>	Contractor Training & Certification	\$	\$
<input type="checkbox"/>	Contractor Production/Reporting Incentives	\$	\$
<input type="checkbox"/>	Contractor Equipment Incentives and other Business Development Support	\$	\$
Total Contractors Incentives		\$	\$
Other, please specify:		\$	\$
Total		\$	\$

Budget Question

6. What is the annual program budget for each of the following categories? (*The total rows will auto-sum based on responses to the sub-categories. If you opt to provide only a total or a sub-total, please check the boxes next to the categories included in the total.*)

Option 3:
Give us the big number

Program Administration			
<input type="checkbox"/>	Marketing, Outreach and Customer Acquisition	\$	\$
<input type="checkbox"/>	Program Administration	\$	\$
<input type="checkbox"/>	Quality Assurance	\$	\$
<input type="checkbox"/>	Research & Evaluation	\$	\$
Total Program Administration		\$	\$
Customer Incentives			
<input type="checkbox"/>	Costs of Direct Install Measures	\$	\$
<input type="checkbox"/>	Other Customer Incentives & Rebates	\$	\$
<input type="checkbox"/>	Other	\$	\$
<input type="checkbox"/>	Other	\$	\$
<input type="checkbox"/>	Contractor Training & Certification	\$	\$
<input type="checkbox"/>	Contractor Production/Reporting Incentives	\$	\$
<input type="checkbox"/>	Contractor Equipment Incentives and other Business Development Support	\$	\$
Total Contractors Incentives		\$	\$
Other, please specify:		\$	\$
Total		\$	\$

What would we do differently?

Our Thoughts

Data Ideas:

- Consistent budget details
- Focus on depth rather than breadth
- Verified energy savings
- Direct Install impact on program
- Cost efficiency of program delivery

How we request data:

- Improved data collection tool
- Automate part of the QC check
- Training and support resources
- Align with DOE's new program benchmarking tools (in development)

Your Thoughts

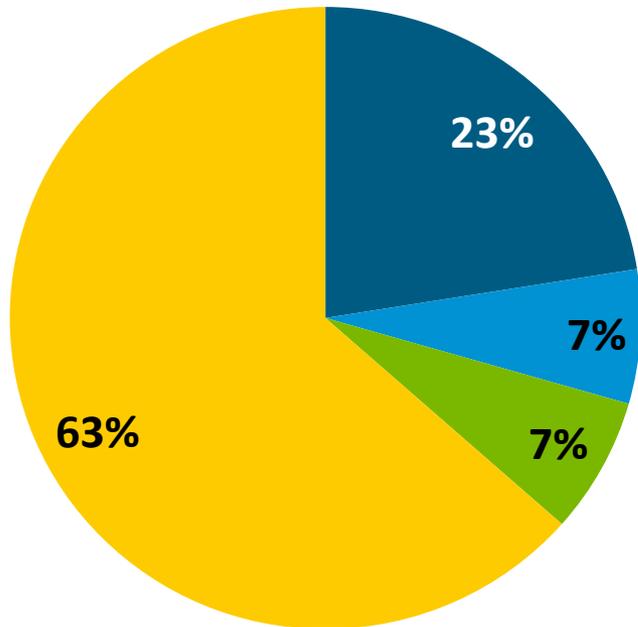


Next Steps

- Incorporate feedback, finalize analysis, hold a public webinar early summer
- Finalize Sponsor Profiles with indication on like type group performance for major metrics. Share Sponsor Profiles with individual Sponsors mid-summer
- Prep for the 2014 annual report;
 - Data collection mechanism
 - Sponsor's input on future direction

Reported Admin Cost for 2013

Average Admin Cost per Project
is \$950



■ Marketing ■ Research & Eval.
■ QA ■ Admin

N = 21 Sponsors = 31,000 Projects

- ❖ Total reported admin cost by 35 Sponsors in 2013 is \$37.5 Million.
- ❖ Only 21 Sponsors reported admin cost breakdown for at least 2 sub-categories and actively completed projects in 2013
- ❖ Admin cost per project ranges across Sponsors between \$200 to \$12,000

Reported Homeowners Incentives for 2013

Average homeowner incentive per project is \$1,900

N = 25 Sponsors =
18,000 Projects

N = 24 Sponsors =
13,000 Projects

2%

47%

51%

12%

6%

82%

■ Direct Install

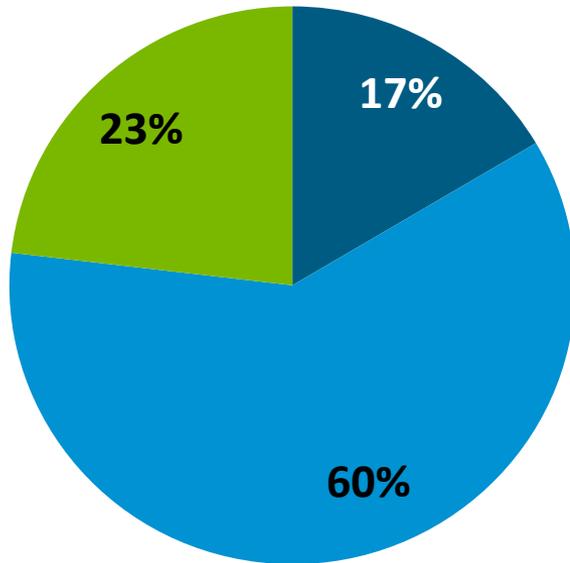
■ Other Customer Incentives

■ Financing

- ❖ Total reported homeowner incentives by 35 Sponsors in 2013 is \$69.5 Million.
- ❖ 25 Sponsors reported admin cost breakdown actively completed projects in 2013
- ❖ Homeowner incentive per project ranges across Sponsors between \$300 to \$5,500

Reported Contractor Incentives for 2013

Average Admin Cost per Project
is \$400



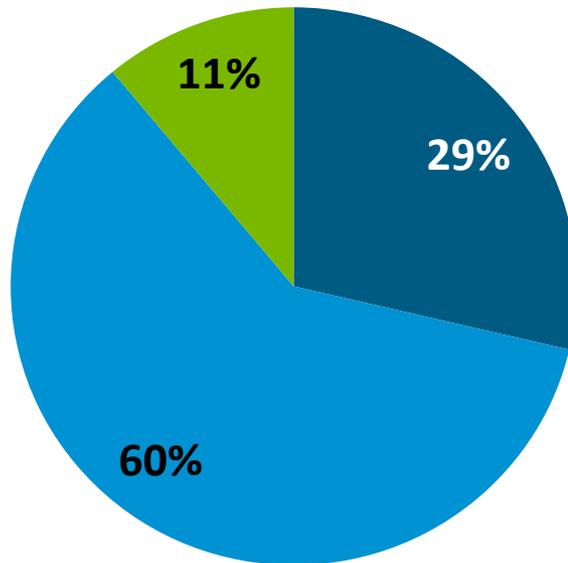
- Training
- Production Incentives
- Equip Incentives

N = 18 Sponsors = 10,000 Projects

- ❖ Total reported contractor incentives by 25 Sponsors in 2013 is \$8.8 Million.
- ❖ Only 18 Sponsors reported contractor incentives breakdown and actively completed projects in 2013

Total Budget Breakdown

Average cost to Sponsor per Project is \$3,500



- Admin
- Homeowner Incentives
- Contractor Incentives

N = 23 Sponsors = 20,100 Projects = 78

- ❖ Total program cost by 43 Sponsors in 2013 is \$245 Million.
- ❖ Only 23 Sponsors reported breakdown and actively completed projects in 2013. These 23 Sponsors reported a budget of 78 Million
- ❖ Sponsor cost per project ranges across Sponsors between \$200 to \$15,000

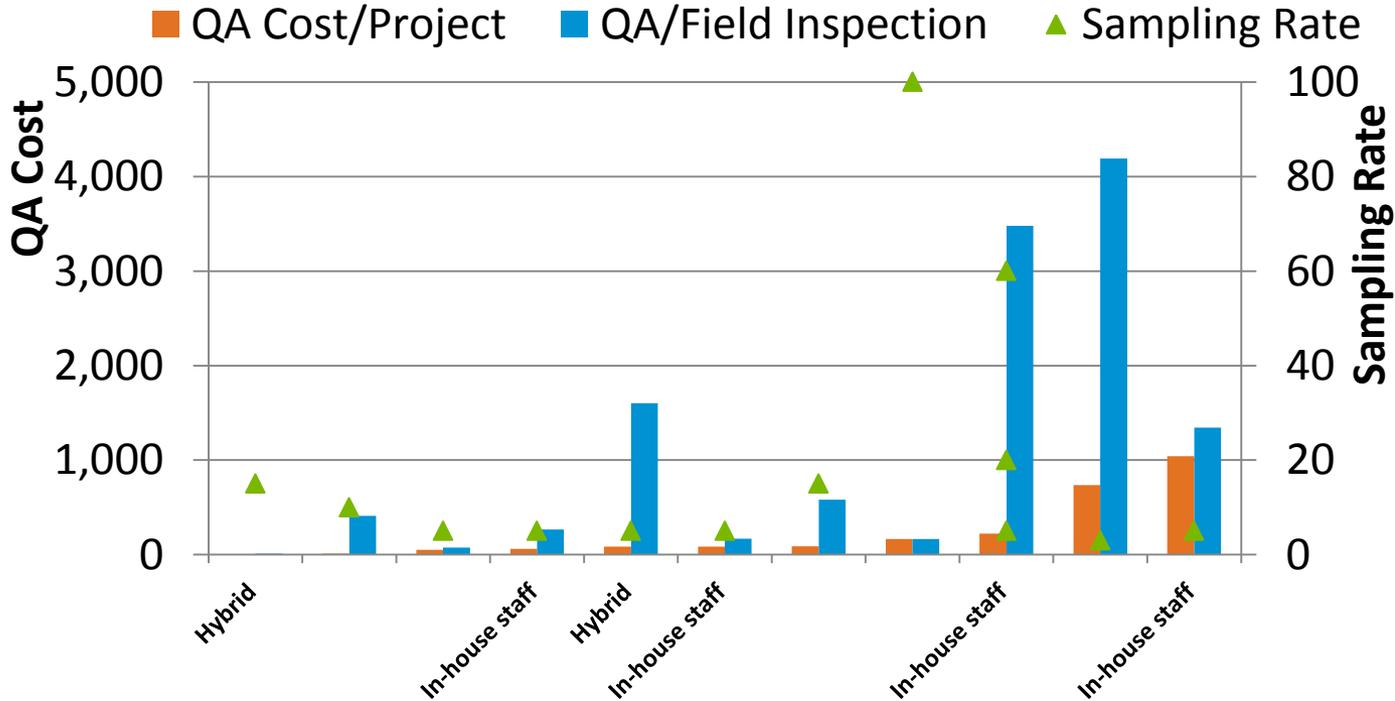
For more information



- **Ely Jacobsohn**, DOE, HPwES Program Manager – Ely.Jacobsohn@ee.doe.gov
- **Courtney Moriarta**, SRA, Technical Lead – Courtney_Moriarta@sra.com
- **Gannate Khowailed**, SRA, Data Lead – Gannate_Khowailed@sra.com

<http://www.energystar.gov/homeperformance>

Quality Assurance



- ❖ Limited data availability (N=11)
- ❖ Wide range in reported values by programs
- ❖ Inconsistent trends across QA implementation models
- ❖ Reported data on quality assurance is inconclusive

	QA/ Project	QA/Field Inspection
Average	\$232	\$1,118
Weighted Average	\$81	\$773

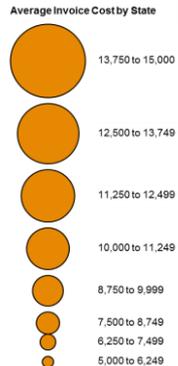
N = 11

HPwES Sponsors Segmentation

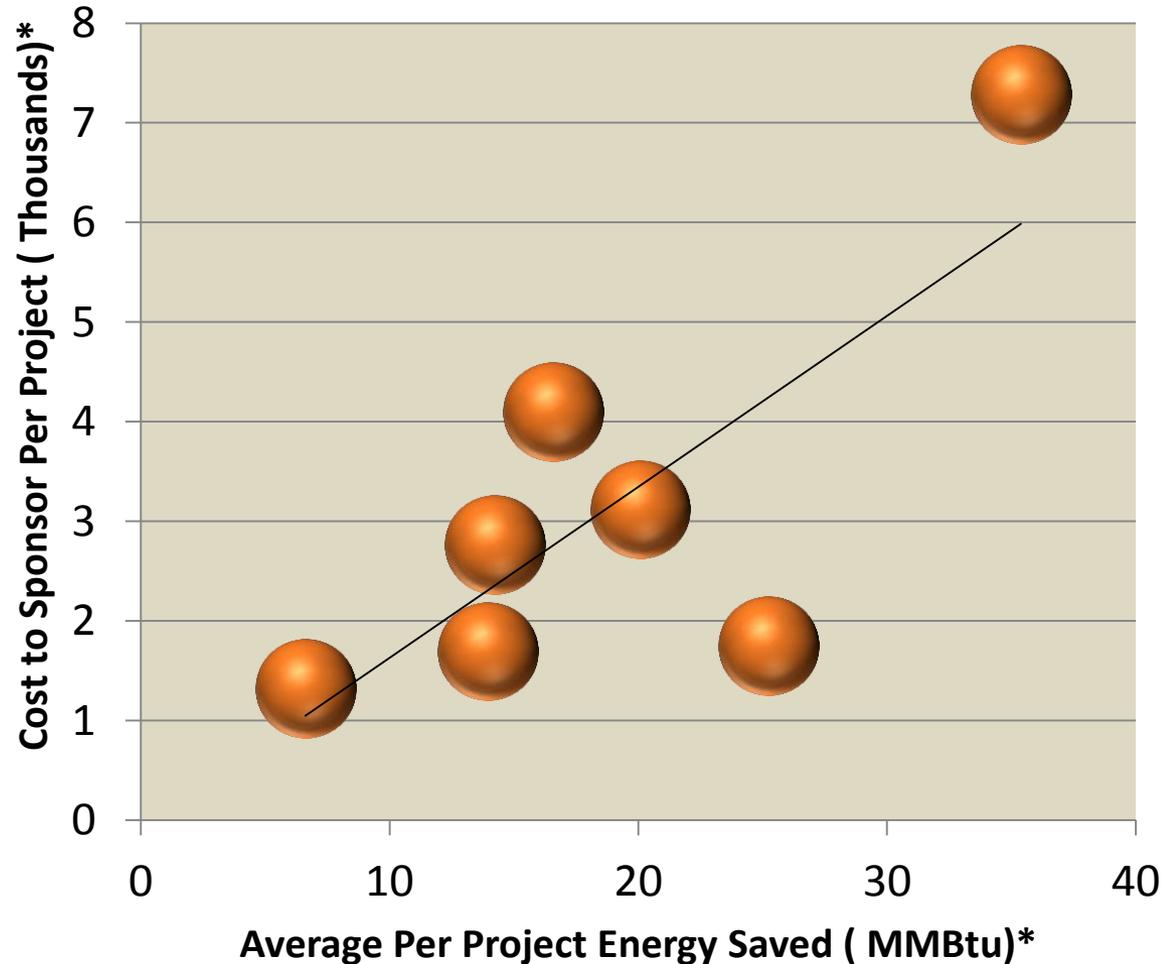
Attempting to divide customers into groups of similar characteristics, to allow for more viable benchmarking

Example: The Big Players

- Projects Count : More than 1,000 Per Year
- Budget: Greater than \$3 million
- Average Invoice Cost: Greater than \$ 5,000
- N: 8 Sponsors (limited by data availability)



The Big Players: Per Project Energy Savings & Cost to Sponsor- Conceptual



*Size of the bubble, refers to number of HPwES projects completed in CY2013

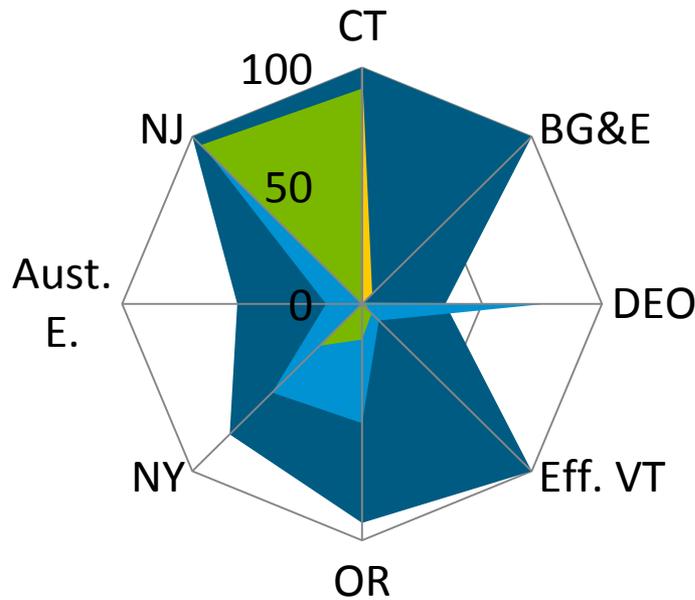
The Big Players

- The average per project cost to Sponsor is \$3,150.
- The average energy saving per project is 20 MMBtu (All fuels)
- N: 7 Sponsors (limited by data availability)

N = 6

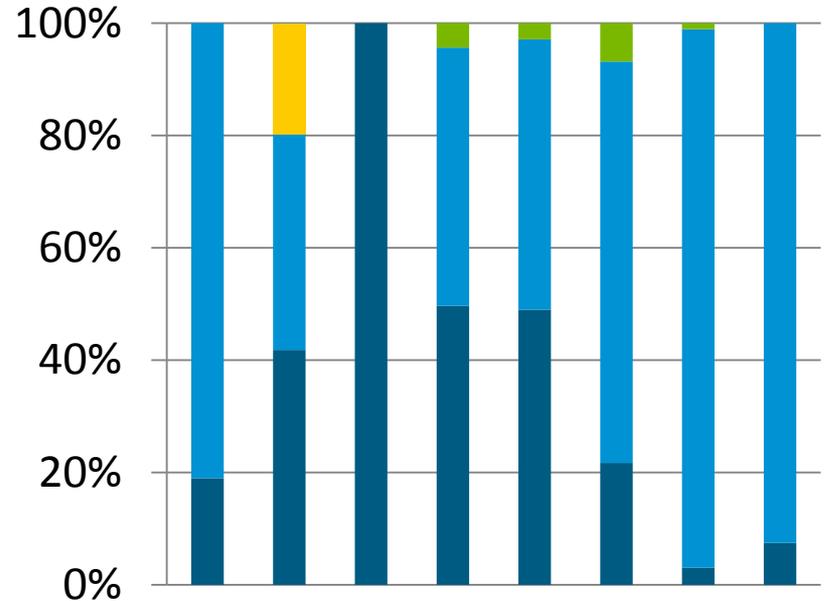
The Big Players: Measures Completed & Budget Allocation

Measures Completed



- Shell
- HVAC
- Water Heating
- Lighting
- Appliances

Budget Allocation



HPwES Sponsors

- Other
- Contractor Incentives
- Customer Incentives
- Admin

N = 8

Homeowner Contribution Ratio

- ❖ 19 HPwES Sponsors provided the average invoice cost per project and the budget breakdown to calculate homeowner incentives per project excluding financing cost
- ❖ Using these 2 values, we calculated the avg homeowner contribution per project:

Homeowner Contribution =

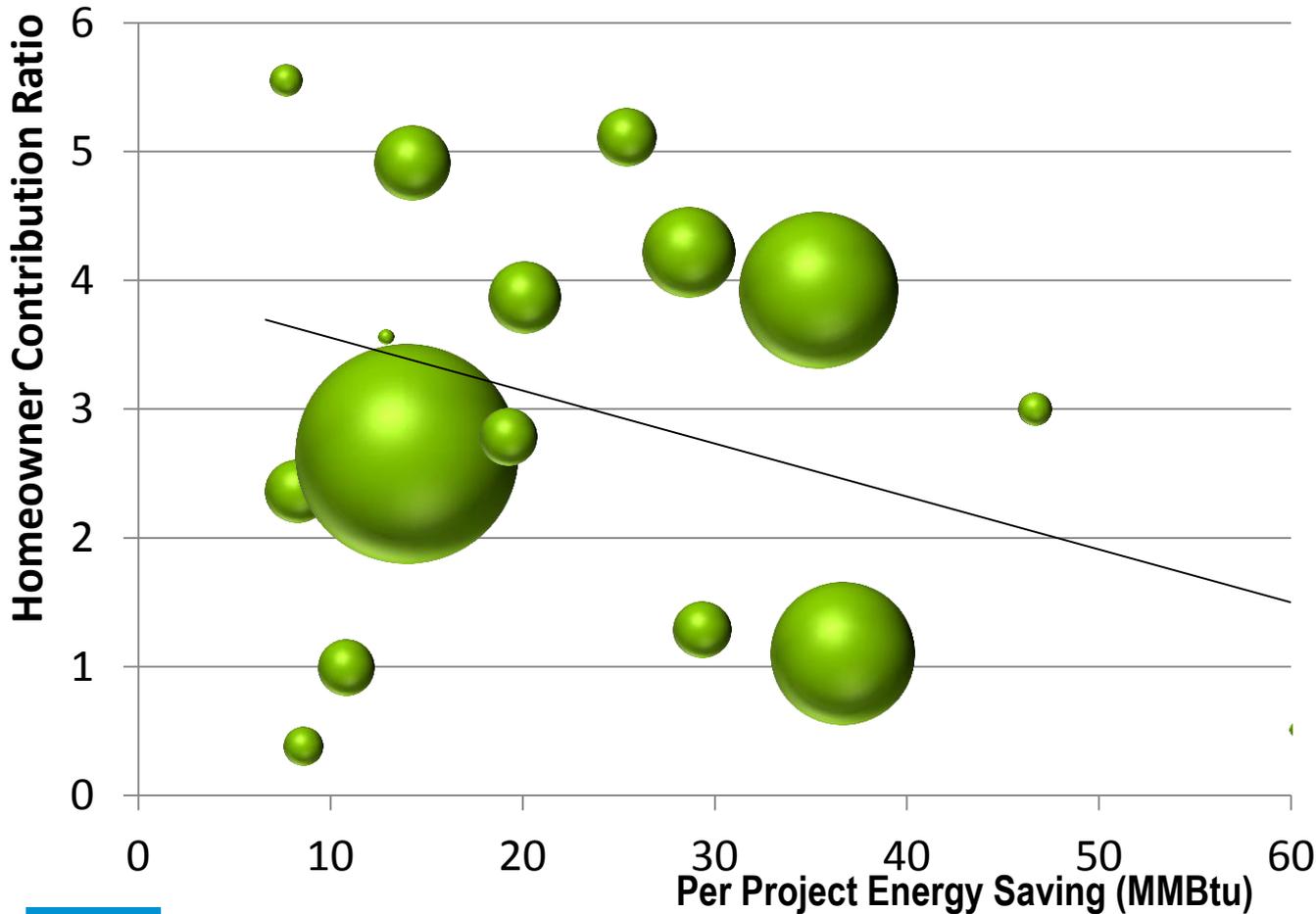
avg total invoice cost - avg incentive

- ❖ Homeowner contribution ratio, refers to the homeowner contribution per project divided by incentives, excluding financing costs. (A ratio of 2, indicates that for every \$1 of incentives, homeowners invest another \$2 dollars.)

Homeowner Contribution Ratio =

Homeowner Contribution : Incentives

Energy Saving & Homeowner Contribution Ratio



N = 19

Bubble size refers to number of projects completed in 2013

- ❖ Deep energy savings per project correlates with lower homeowner contribution ratio. Especially with large volume sponsors. A statistical correlation of negative 0.3 was noticed after eliminating outliers.
- ❖ Strong positive correlation between incentives amount and energy savings per project
- ❖ Weak correlation between homeowner contribution and energy saving