

Commercial Market Share Tracking Study and Findings

April 2014



Agenda

- Overview of Commercial Saturation and Market Share Tracking Studies
 - > Objectives
 - > Data Collection
- In-depth Review of Data Collection Methods
 - > Telephone survey
 - > On-site survey
 - > Contractor telephone survey
- CMST Findings
- Conclusions and Recommendations

Commercial Market Share Tracking (CMST)

- Investigated newly installed measures (2009-2012) in non-residential buildings
 - > Linear Fluorescents, TVs, and Small Packaged HVAC
- Conducted surveys of non-residential customers in the CA Electric IOU service territories
 - > Phone and on-site surveys with non-residential customers
- Conducted telephone surveys of Market Actors
 - > Lighting and HVAC contractors
- Produced market shares of recent purchase efficiency levels by IOU, Customer Size, and Program Participant (2009-12 EE)
- Produce estimate of the quantity of technologies purchased from 2009-2012

Commercial Saturation Survey (CSS)

- Investigated measures currently installed in commercial buildings
 - > Food/Liquor, Health Medical (excluding Hospitals), Offices, Restaurant, Retail, Schools, Warehouse, Misc
- Conducted surveys of commercial customers in the CA electric IOU service territories
 - > Telephone and on-site surveys
- Produced results by IOU, business type, customer size, and participant flag (2009-12 EE)
 - > Whole building energy intensity (EI)
 - > Saturation of measures
 - Lighting, Small HVAC, Refrigeration, TVs, Office Equipment, EMS

CMST & CSS Study Comparison

■ CMST

- > Joint phone survey
- > Non-residential
- > Customer on-sites and contractor telephone surveys
- > Recent purchases
 - Linears, TV, HVAC
 - Efficiency distributions for Linears, TV, HVAC
- > Disaggregate by participation, size, IOU, building type

■ CSS

- > Joint phone survey
- > Select commercial
- > Customer on-sites
- > Existing baseline
 - Lighting, HVAC, Refrigeration, TV, Office equipment, EMS, and DG
 - Efficiency distributions for lighting, TV, HVAC
- > Disaggregate by participation, size, IOU, building type

CSS & CMST Study Findings

- These studies have produced three reports
- CSS/CMST Telephone Survey Report
 - > Draft report
 - > Previous webinar with IOUs
- CMST Report (focus of today's discussion)
 - > Draft report
- CSS Report
 - > Draft report
 - > Future webinar
 - > Web site in development

Objectives and Data Collection Methods

CMST

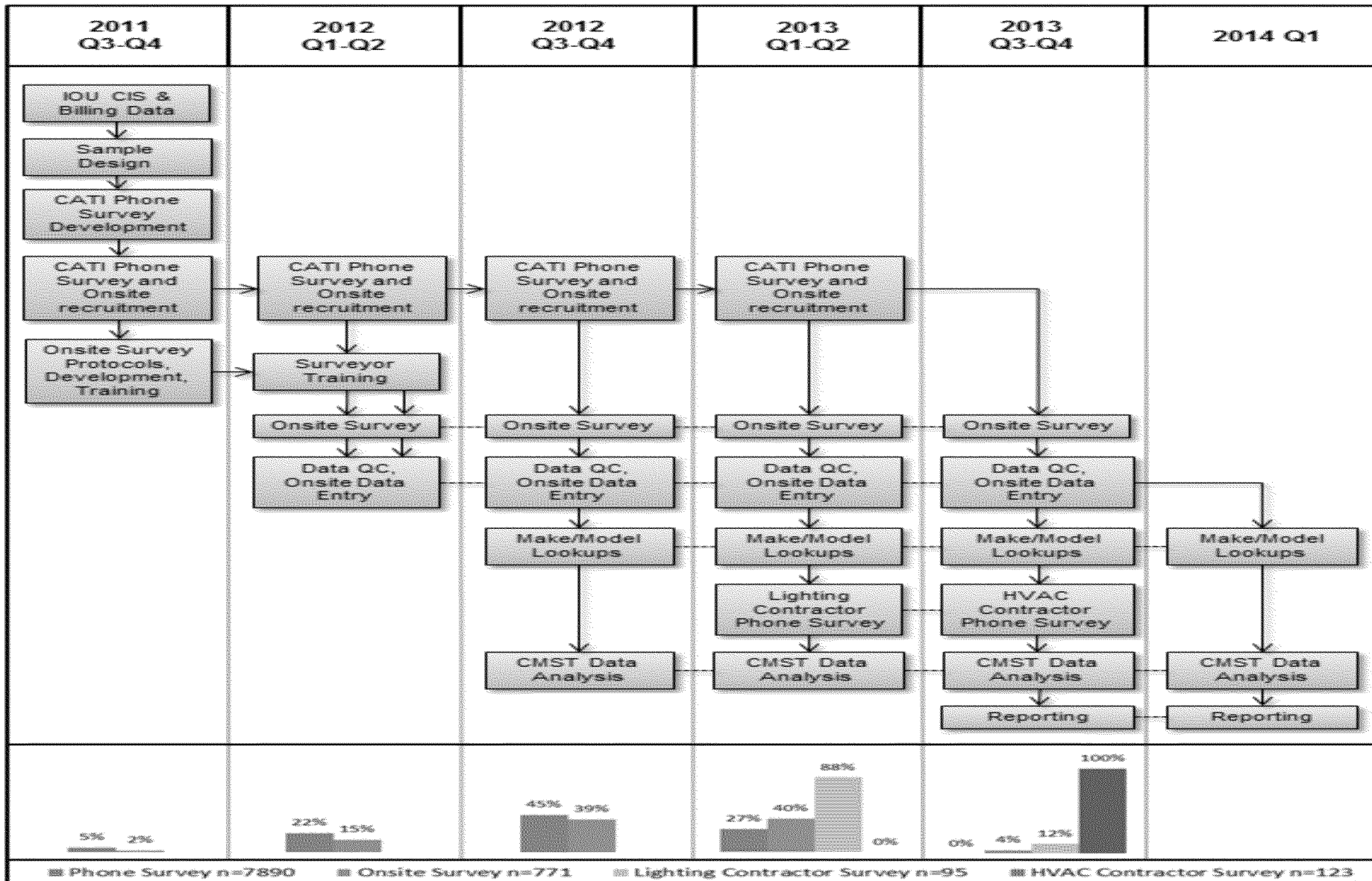
CMST Objectives

- CMST primary objective was to describe the recent purchase market for high priority measures
 - > Linear Technologies
 - > TVs
 - > Small Packaged HVAC

- What is the efficiency distribution of non-residential purchases of these items?
- What is the efficiency distribution of purchases for customers participating in EE programs and for non-participants?
- What is the efficiency distribution of purchases by customer size?

CMST Data Gathering

- Telephone Surveys of non-residential customers
 - > 7,890 surveys
- On-site surveys with non-residential customers who have purchased a high-priority measure from 2009 to 2012
 - > 772 on-site surveys
 - 568 on-site surveys with customers installing Linear Technologies
 - 485 on-site surveys with customers installing TVs
 - 197 on-site surveys with customers installing packaged HVAC
- Telephone surveys with contractors
 - > 95 surveys with Lighting contractors
 - > 123 surveys with HVAC contractors



CMST Telephone Survey

- Non-residential population based survey

- > Sample frame based on electric customers in the IOU non-residential frame. Based on the Customer Information Systems.

- > Business Types In Telephone Survey

- Colleges

- Health Care

- Hotel/Motel

- Miscellaneous

- Property Manager

- Retail

- Unknown

- Food/Liquor/Grocery

- Hospitals

- Industrial

- Offices

- Restaurant

- School

- Warehouse

CMST Telephone Survey Objectives

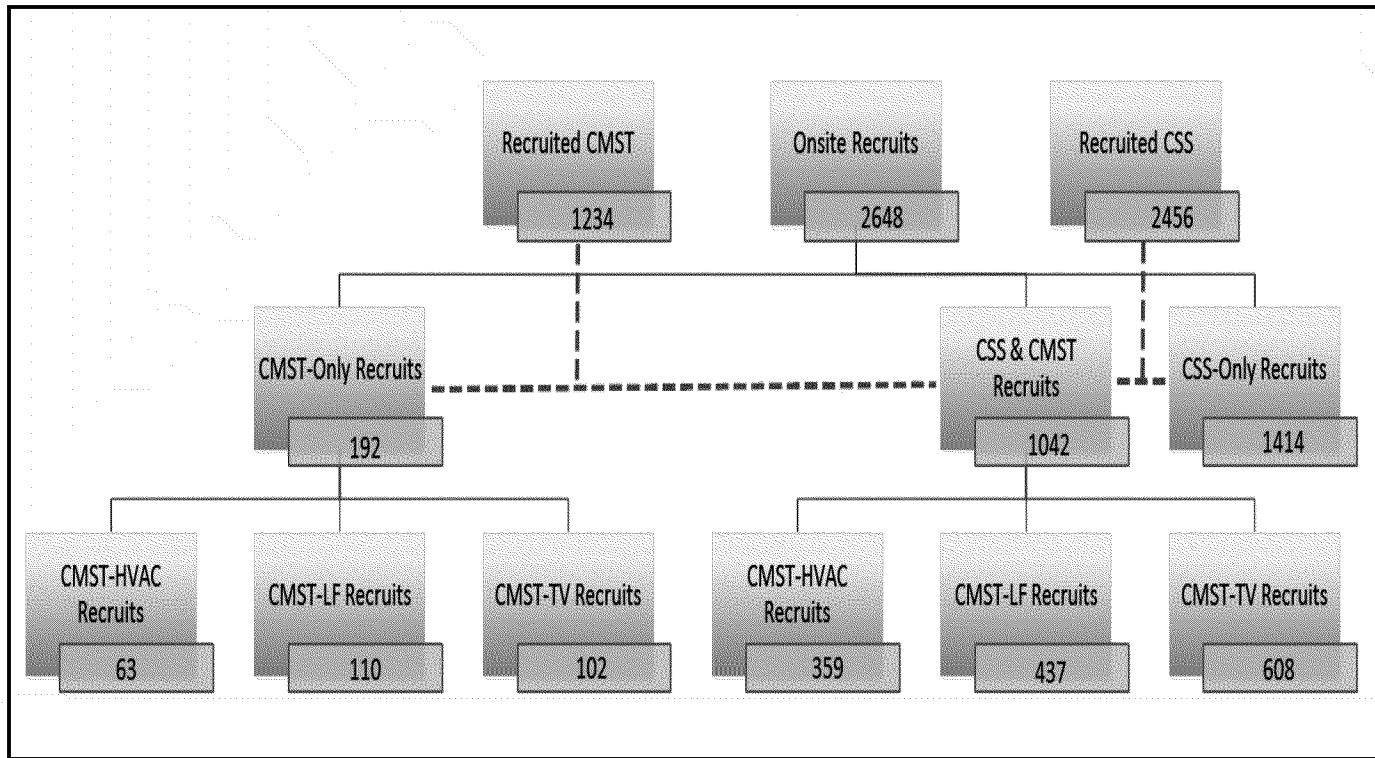
- **Collect self-reported information for businesses purchasing Linear Technologies, TVs, and packaged HVAC units since 2009.**
- Develop a better understanding of the business activity undertaken by the customer to update the business type.
- Collect self-reported information on customer size, customer knowledge, and equipment at the customer site.
- **Recruit for the CSS and CMST on-site effort.**
- **7,890 telephone survey completes**

Telephone Survey Completes & Recent Purchases

- Distribution of phone survey completes and sites that self-reported recently purchasing high priority measures.

Business Type	Phone Survey	CMST Phone Survey	Share of Phone CMST	CMST Phone Linears	CMST Phone TVs	CMST Phone HVAC
College	29	20	69%	9	9	9
Food/Liquor	486	164	34%	64	82	46
Health/ Medical – Clinic	633	285	45%	99	195	81
Health/ Medical - Hospital	59	37	63%	17	34	13
Hotel	199	144	72%	36	131	25
Industrial	695	327	47%	194	126	114
Miscellaneous	1,637	651	40%	257	387	222
Office	1,314	510	39%	220	262	204
Restaurant	595	254	43%	66	181	52
Retail	1,019	347	34%	149	200	99
School	479	258	54%	134	112	118
Warehouse	745	293	39%	154	147	82
Total	7,890	3,290	42%	1,399	1,866	1,065

Telephone Survey Recruited Sites



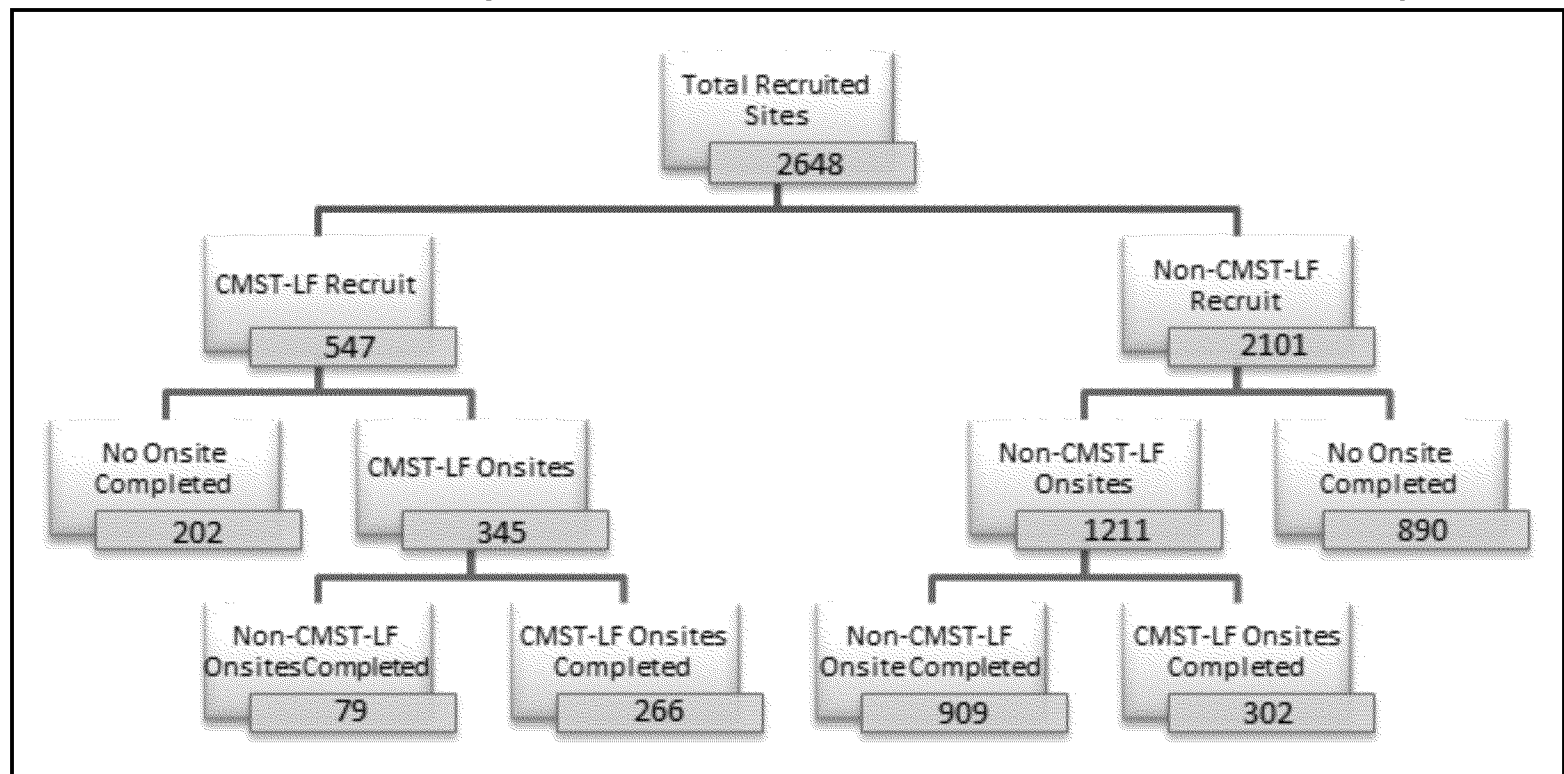
CMST On-Site Data Objectives

- Collect information from businesses on recently purchased high priority measures
 - > Quantity and types of equipment purchased.
 - > Make and model number data to look up and develop information on the efficiency distribution of recent purchases.
 - > Year of purchase

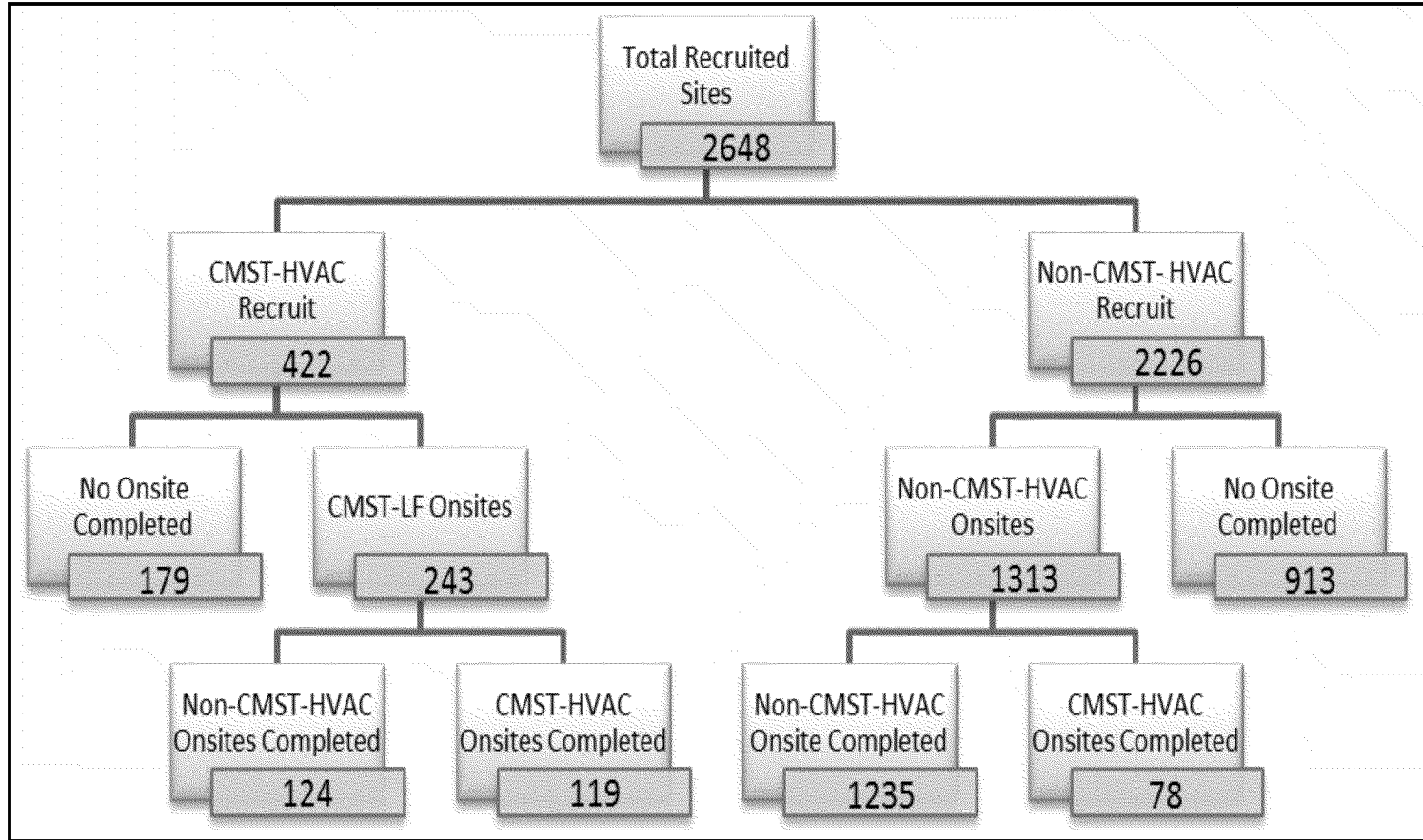
- On-site CMST surveys were undertaken with recruited sites identified during the phone survey as recent purchasers and with CSS sites found to have recently purchased equipment

CMST Linear On-Sites

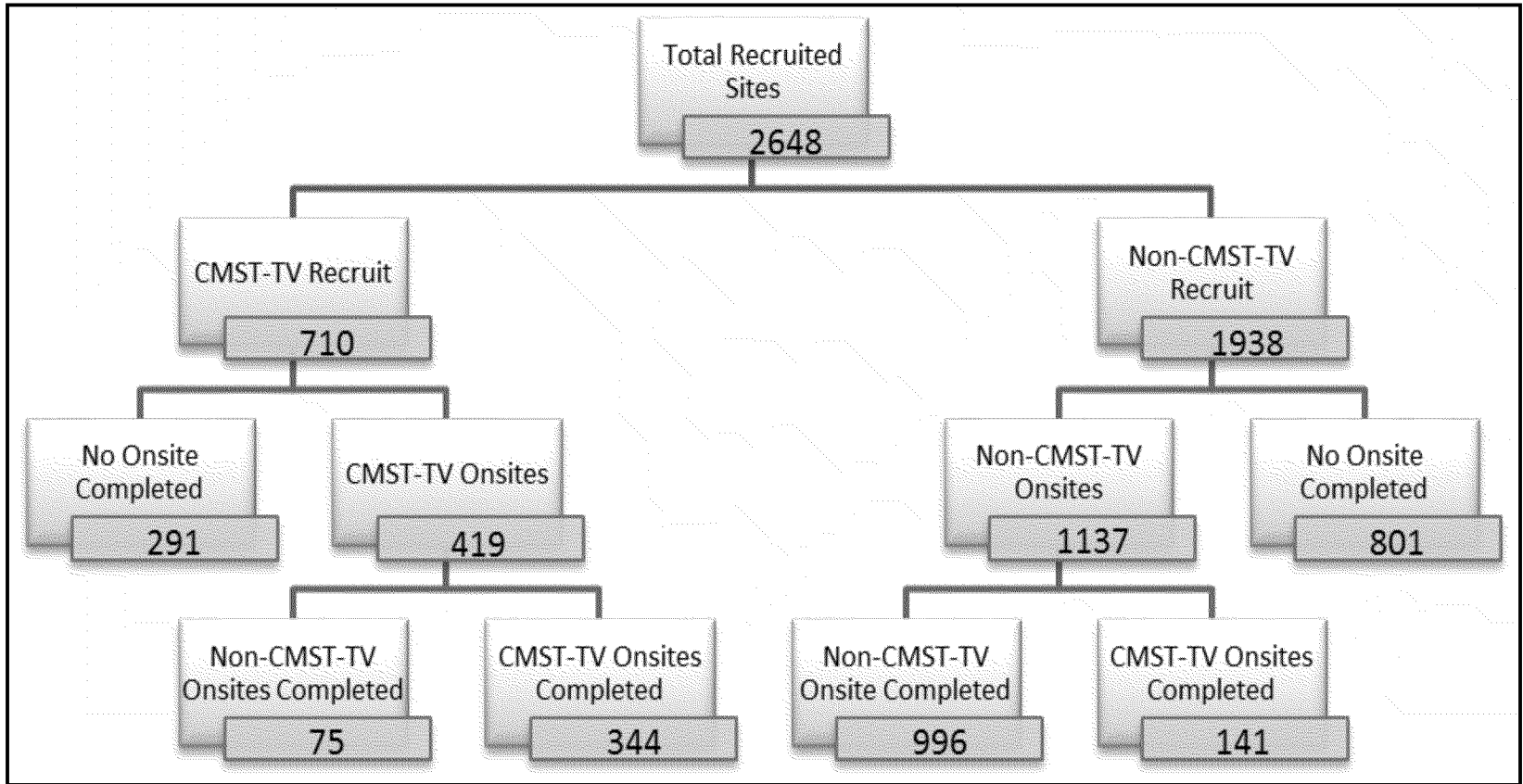
- Sites are derived from businesses that correctly identified recent purchases during the phone survey and CSS sites with recent Linear purchases that did not self identify.



CMST HVAC On-Sites



CMST TV On-Sites



CMST Contractor Objectives

- Collect self-reported telephone survey data from lighting and HVAC contractors to better understand the efficiency distribution of measures installed in non-residential sites from 2011-2012.
 - > Share of contractors installing equipment in the non-residential sector by the equipment efficiency level
 - > Efficiency distribution of installed measures
 - > Efficiency distribution by contractor size.

End User and Contractor Findings

568 End User Surveys

93 Contractor Surveys

CMST LINEAR LIGHTING RESULTS

CMST End User: Estimate of Linear Purchases

- Share of Businesses Installing Linears Relative to the Frame

Utility	Utility Sites in Frame	Estimated Share of Linear Fluorescent Businesses
PG&E	392,294	15%
SCE	462,944	30%
SDG&E	99,495	33%

- Linear Fixtures Installed and Average per Business Installing

Utility	Estimate New Linear Fluorescent Fixtures	Estimate of Average Fixtures per Business
PG&E	6,409,328	111
SCE	8,499,869	60
SDG&E	1,435,647	44

CMST End User Efficiency Analysis

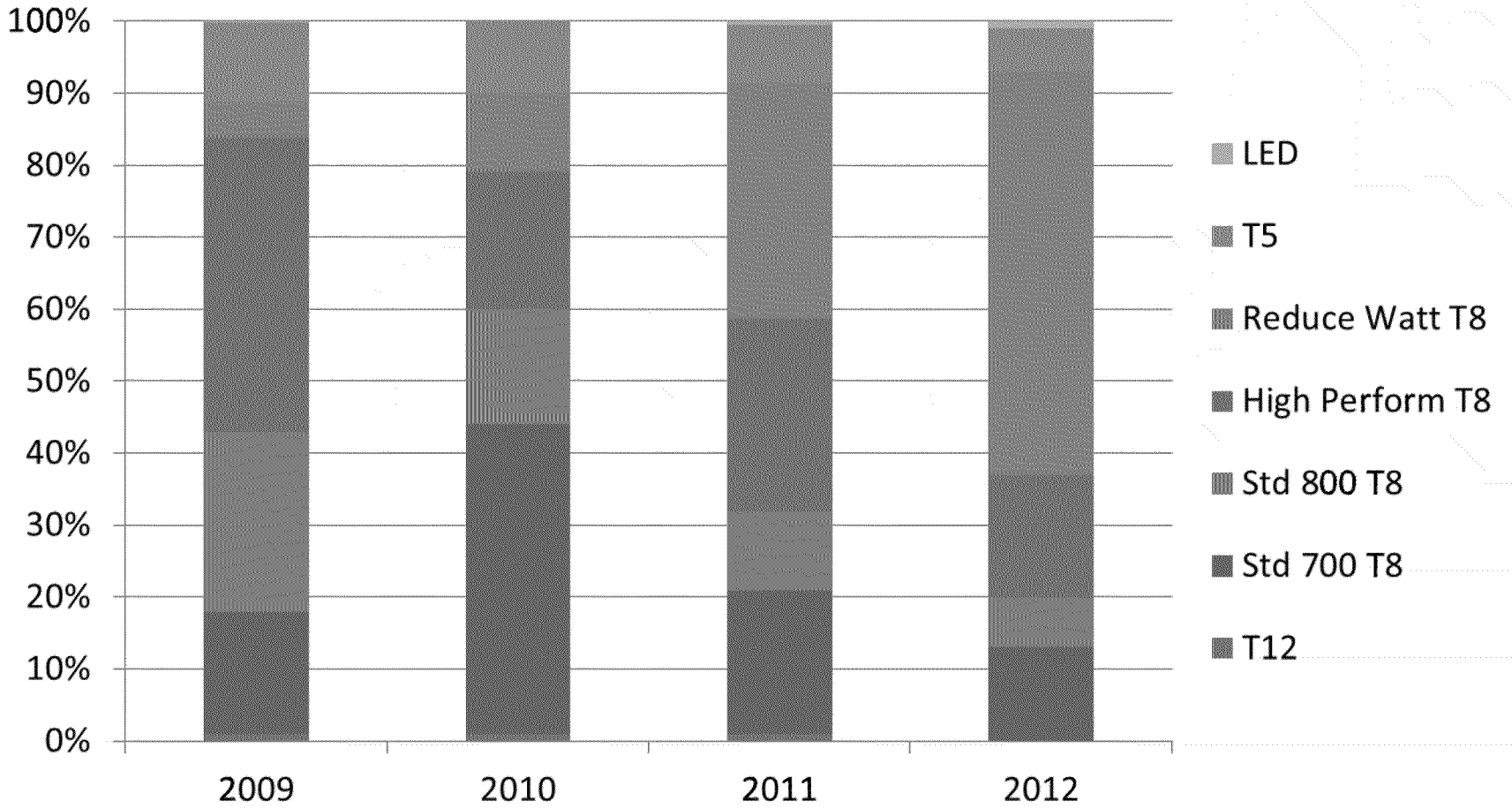
- Make and model numbers were collected on-site and looked up to determine the efficiency of T8 technologies
- High Efficiency Technologies
 - > Linear LEDs
 - > T5
 - > Reduced Wattage T8
 - > High Performance T8
- Base Efficiency Technologies
 - > Standard 800 Series T8
 - > Standard 700 Series T8
 - > T12

CMST End User Linear Installations 2009-2012

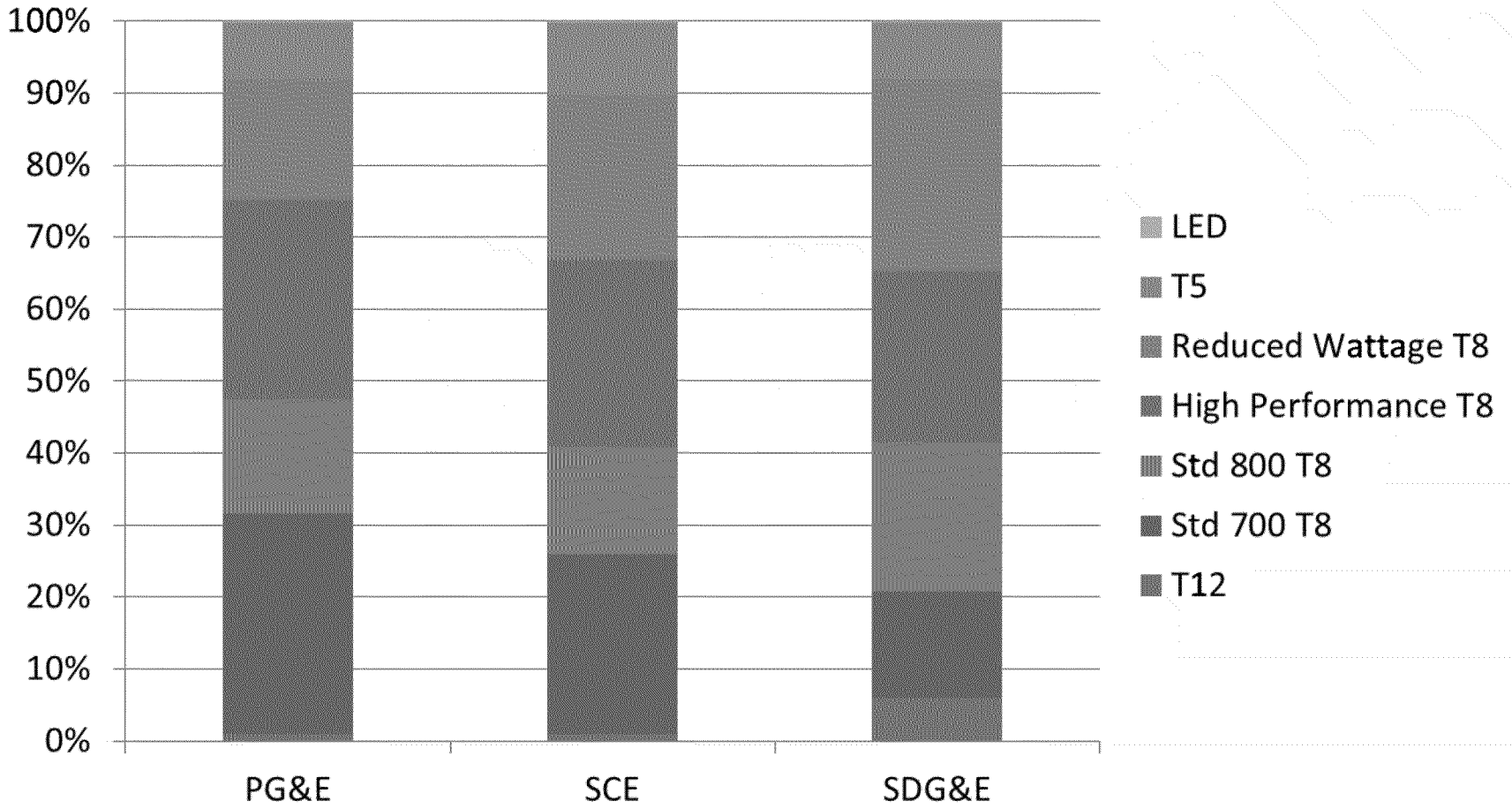
Efficiency Level	Businesses		Fixtures	
	Percent	Relative Precision	Percent	Relative Precision
Base Efficiency	51%	13%	43%	11%
High Efficiency	56%	12%	57%	9%
Base Efficiency Tiers Distribution				
T12	5%		1%	
Std 700 T8	27%		26%	
Std 800 T8	22%		16%	
High Efficiency Tiers Distribution				
High Performance T8	35%		27%	
Reduced Wattage T8	11%		21%	
T5	12%		9%	
LED	<1%		<1%	
<i>n</i>	523		153,049	

More than half of recent purchases are high efficiency

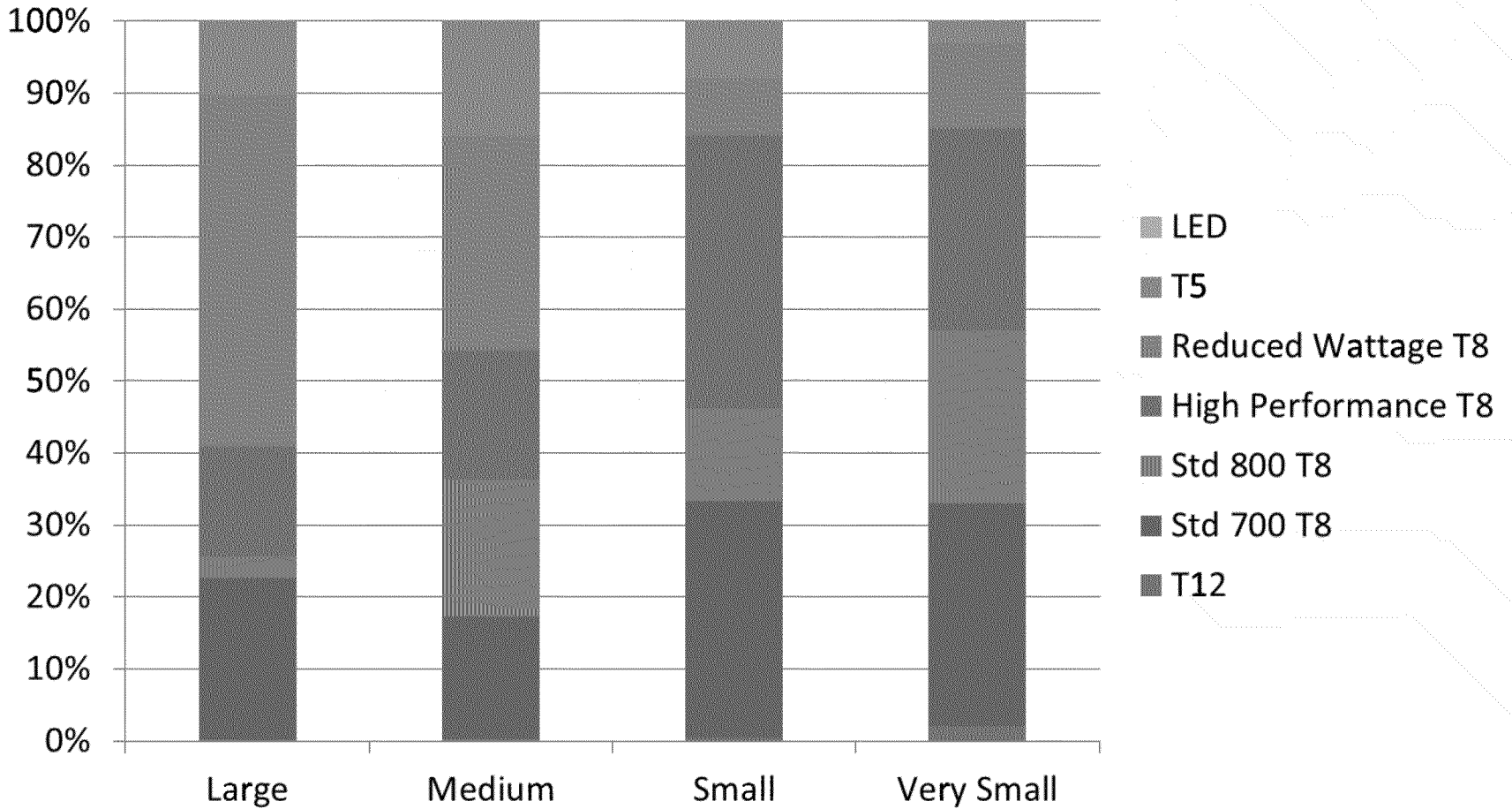
CMST End User Linear Installations by Year of Purchase



CMST End User Linear Installations by IOU

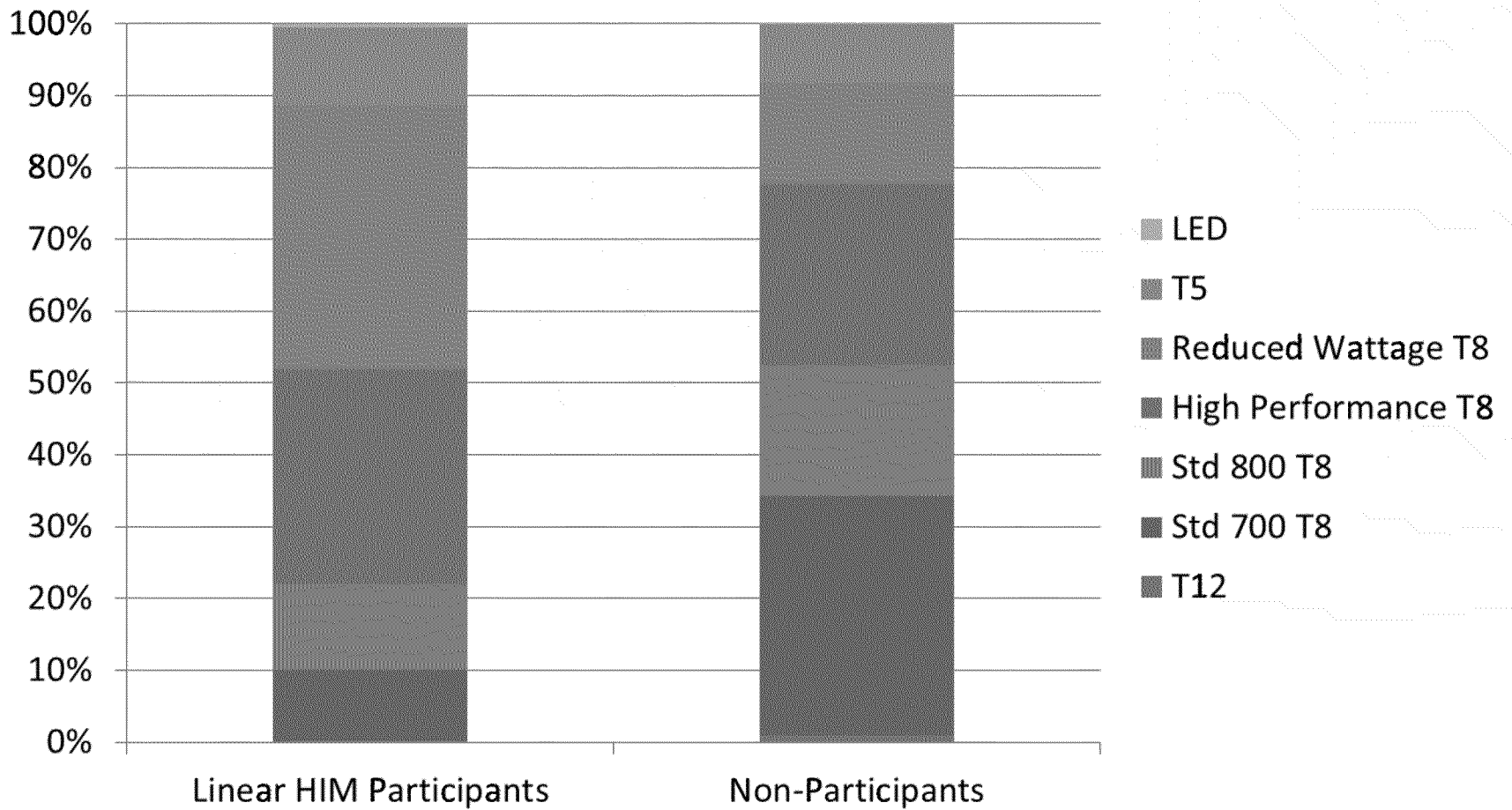


CMST End User Linear Installations by Customer Size

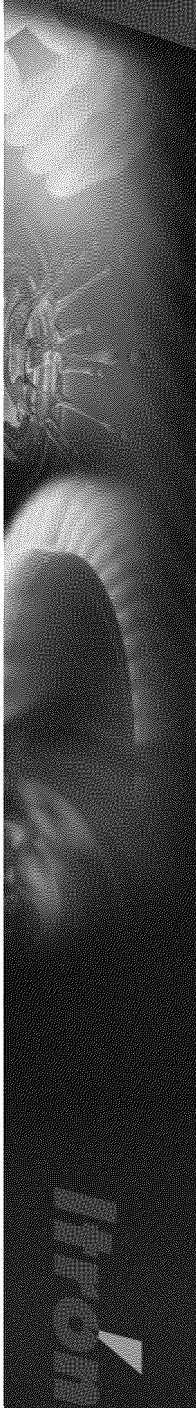


Large and Medium sized customer are purchasing a larger share of high efficiency Linears

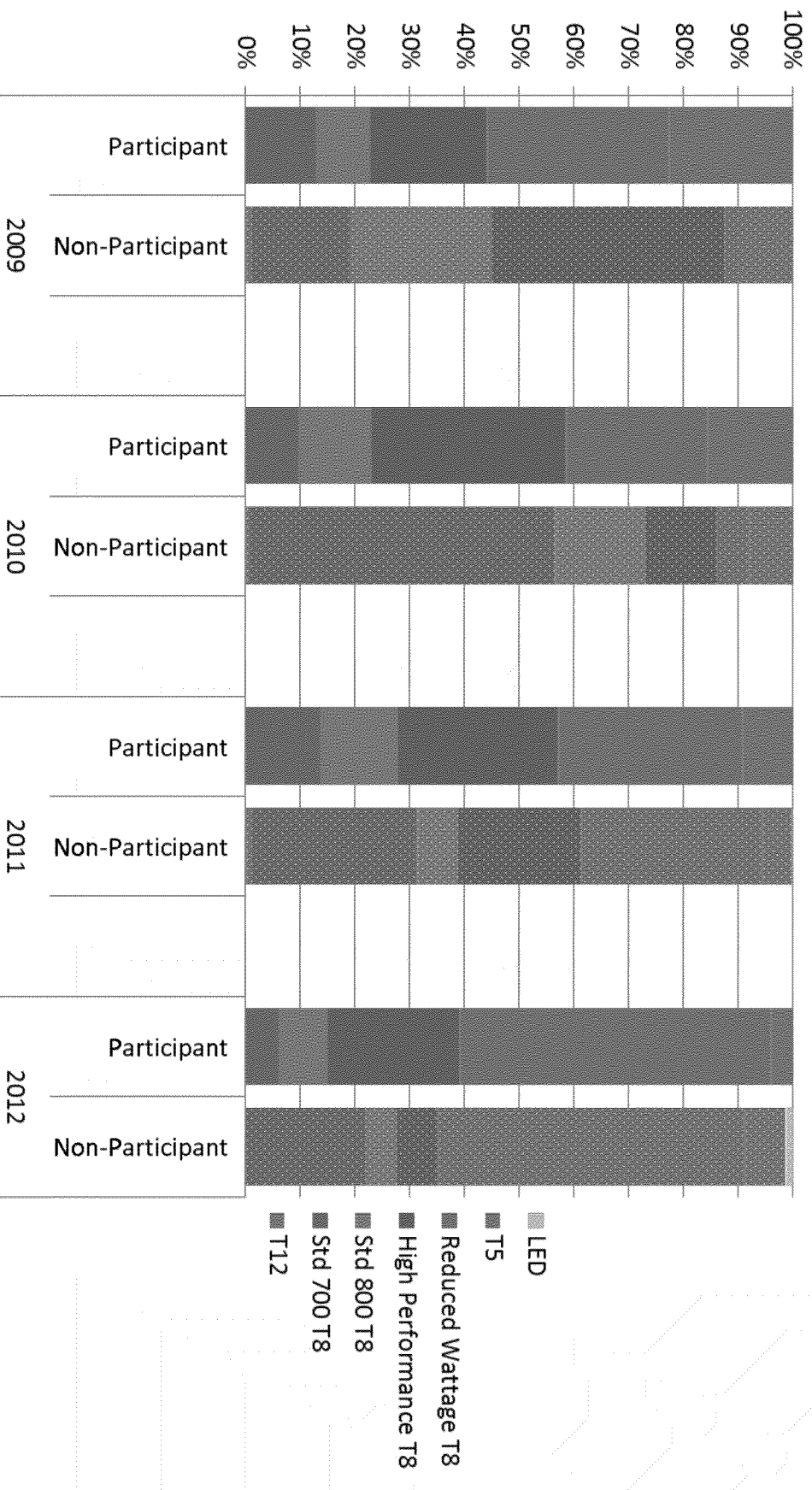
CMST End User Linear Installations by Linear HIM Part.



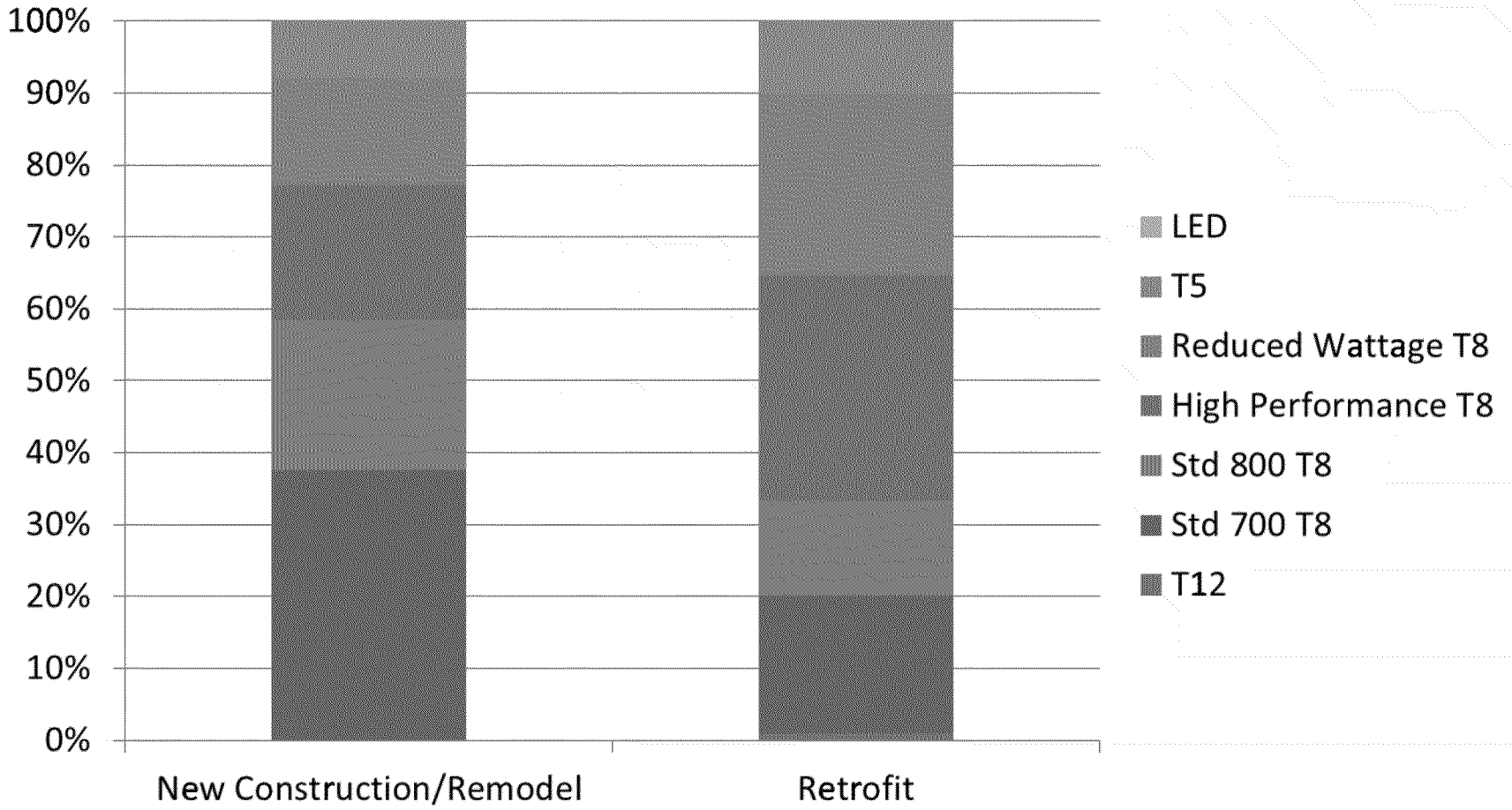
Program participants purchase a larger share of high efficiency linear lighting but participants also purchase base efficiency linear technologies



CMST End User Linear Installations by Year & Participation



CMST End User Linear Efficiency by NC/Remodel vs. Retrofit



Lighting Contractor Survey

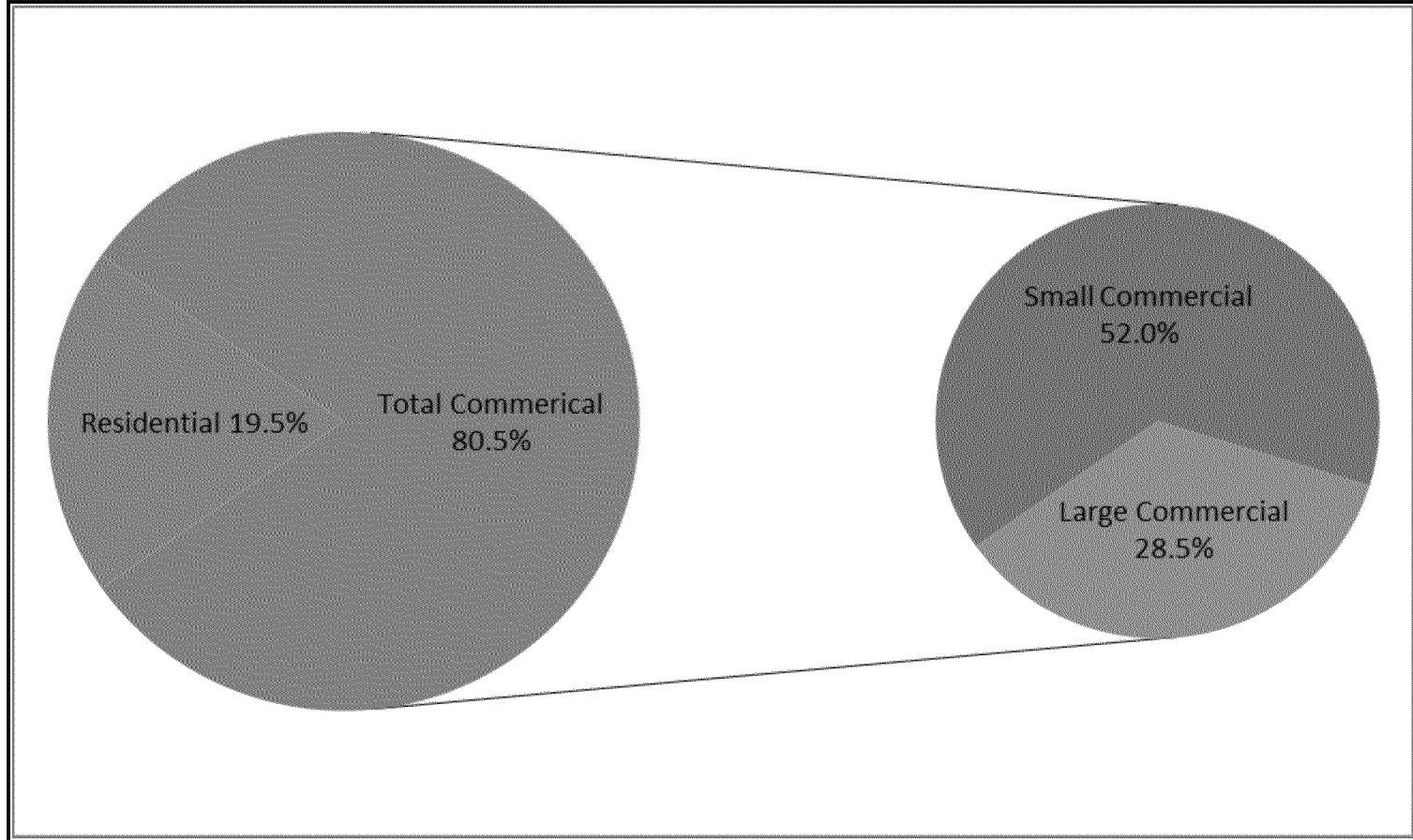
- The Lighting Contractor Survey provides a high level overview of the market for new Linear technologies.
- No readily available lighting contractor frame and no NAICS code for lighting contractors.
- Pull information for electrical contractors.
- Telephone survey electrical contractors where the first battery of questions determines if the contractor sells and/or installs linear lighting for the non-residential sector.
- Lighting Contractor Survey was a joint survey with the Measure Cost Study, Non-Residential Lighting Impact Evaluation, and the LED Market Effects Study.

CMST Lighting Contractor Survey

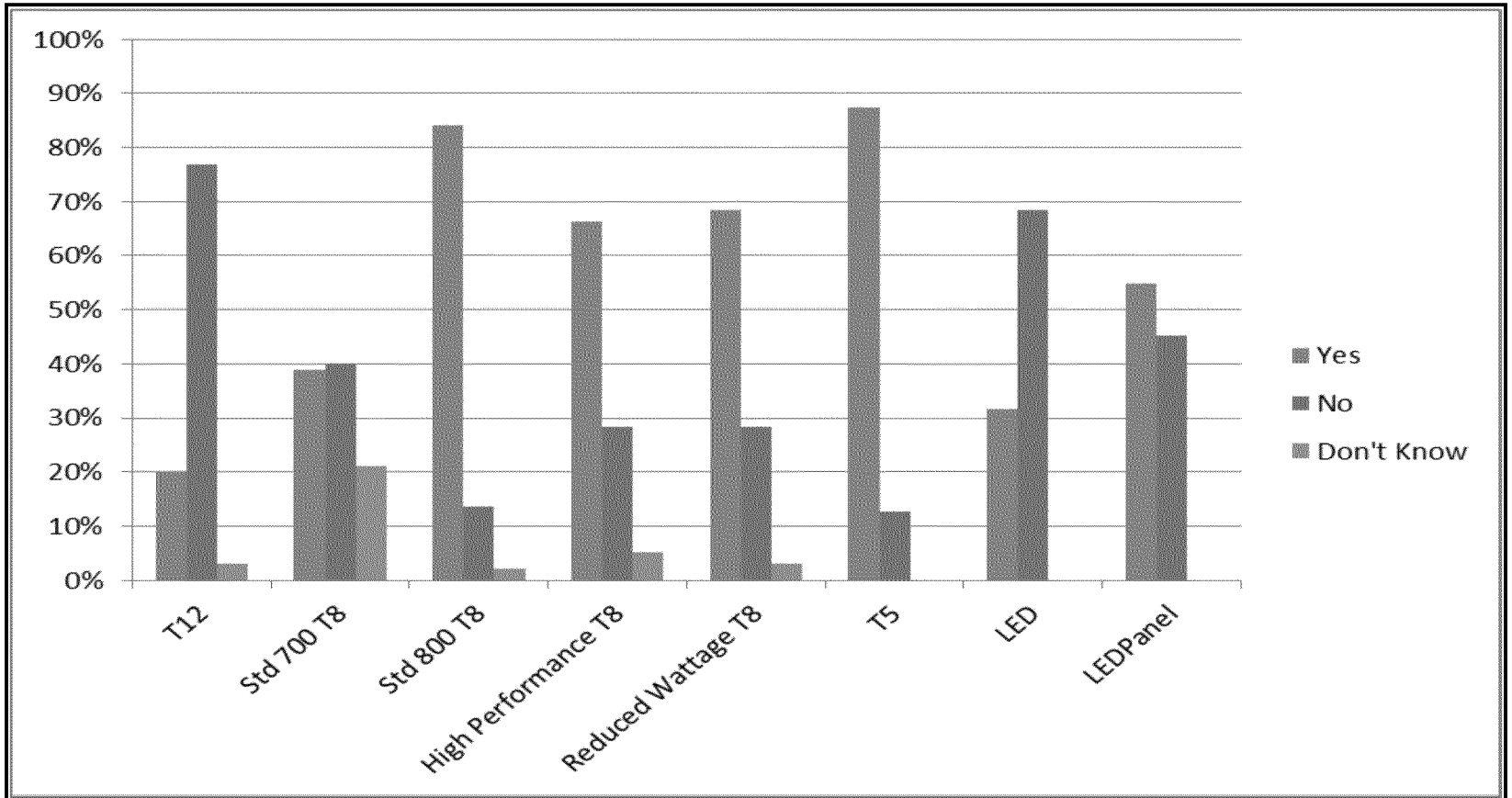
- Distribution of Lighting Contractors Surveyed by Employee Size

Number of Employees	Survey Count	Distribution
3 to 4	18	19%
5 to 9	22	23%
10 to 19	20	21%
20 to 49	22	23%
50 to 99	9	9%
100 to 249	3	3%
>1000	1	1%

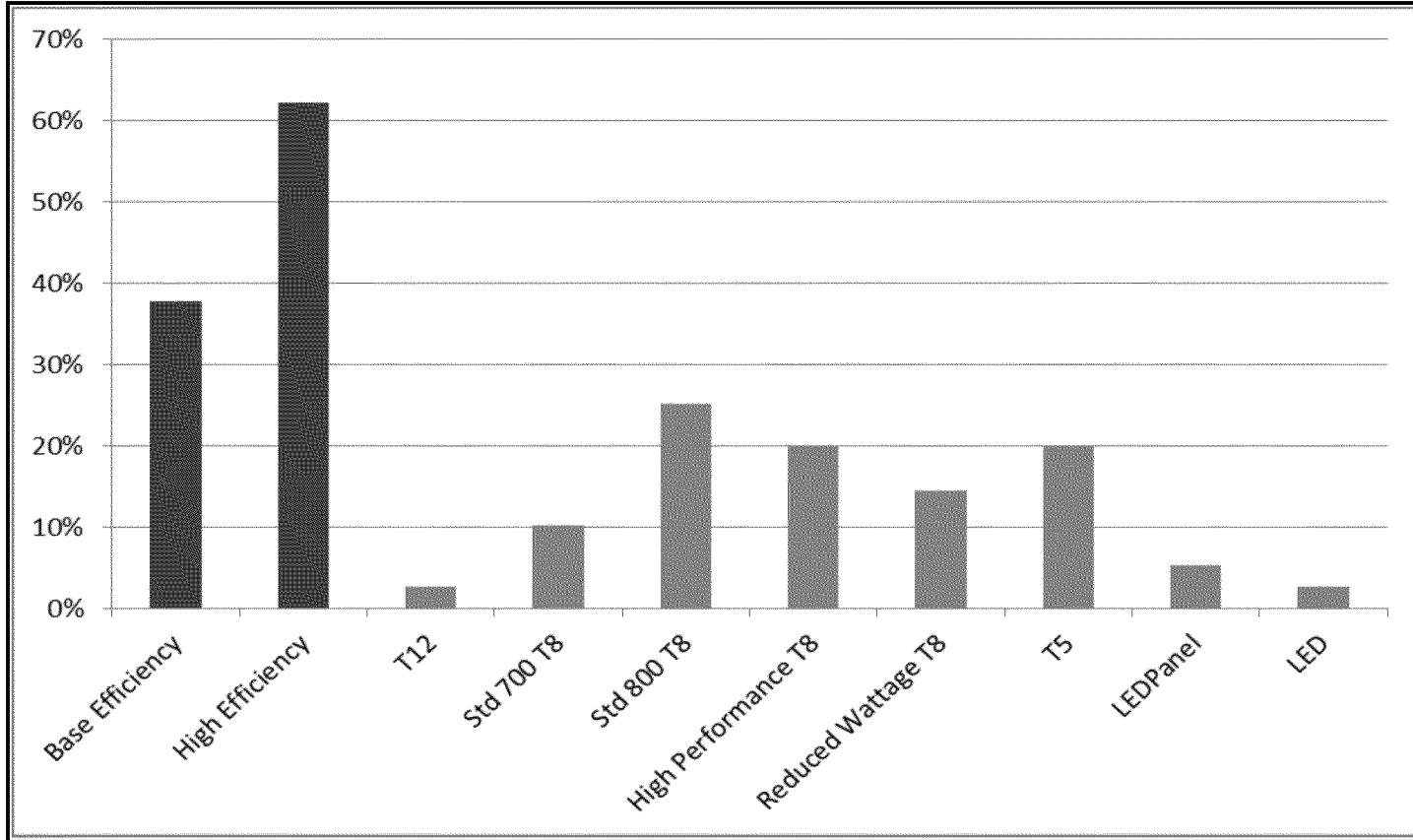
Lighting Contractor Residential and Commercial Sales



Technologies Installed by Contractors 2011-2012

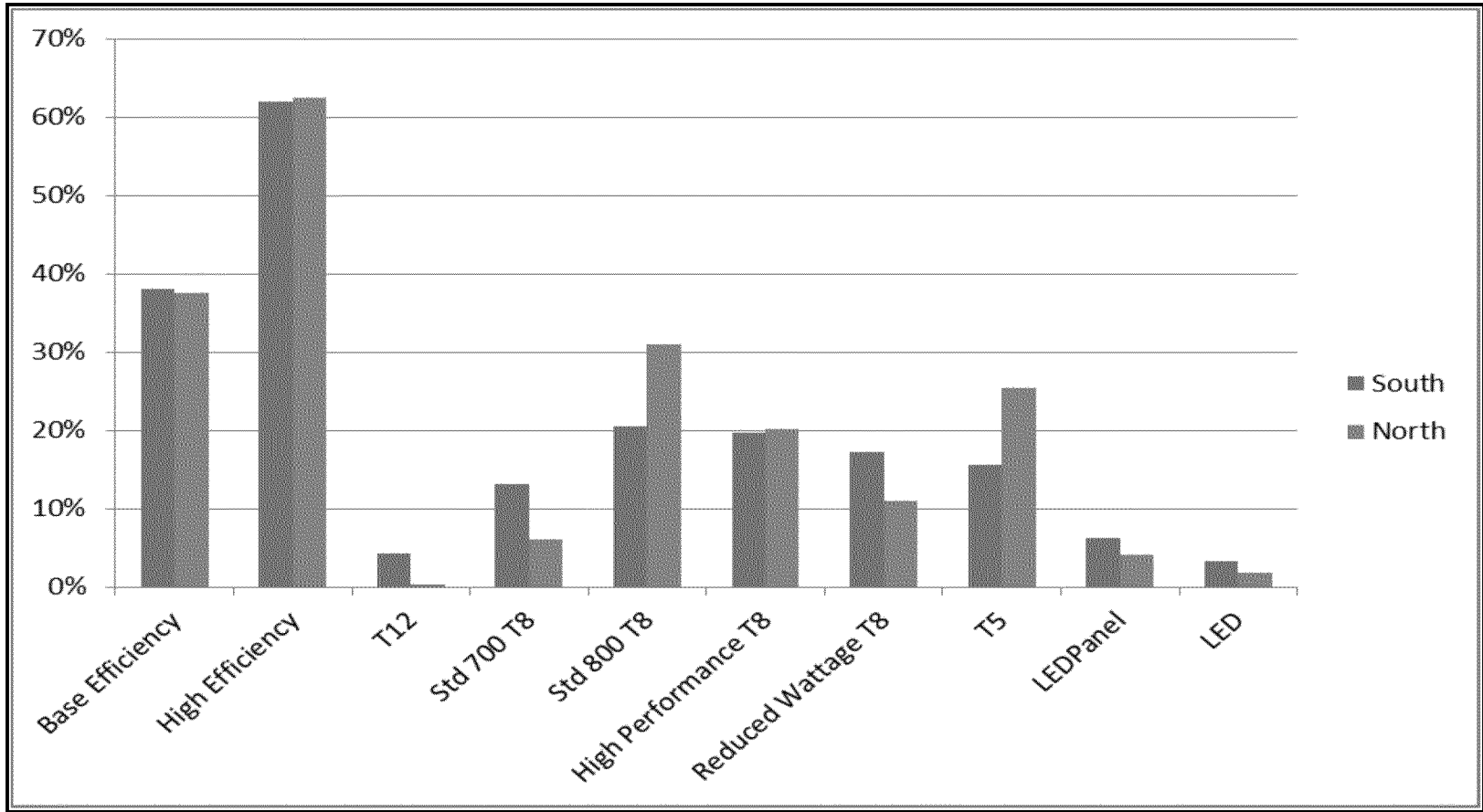


Contractor Linear Efficiency Distribution 2011-2012



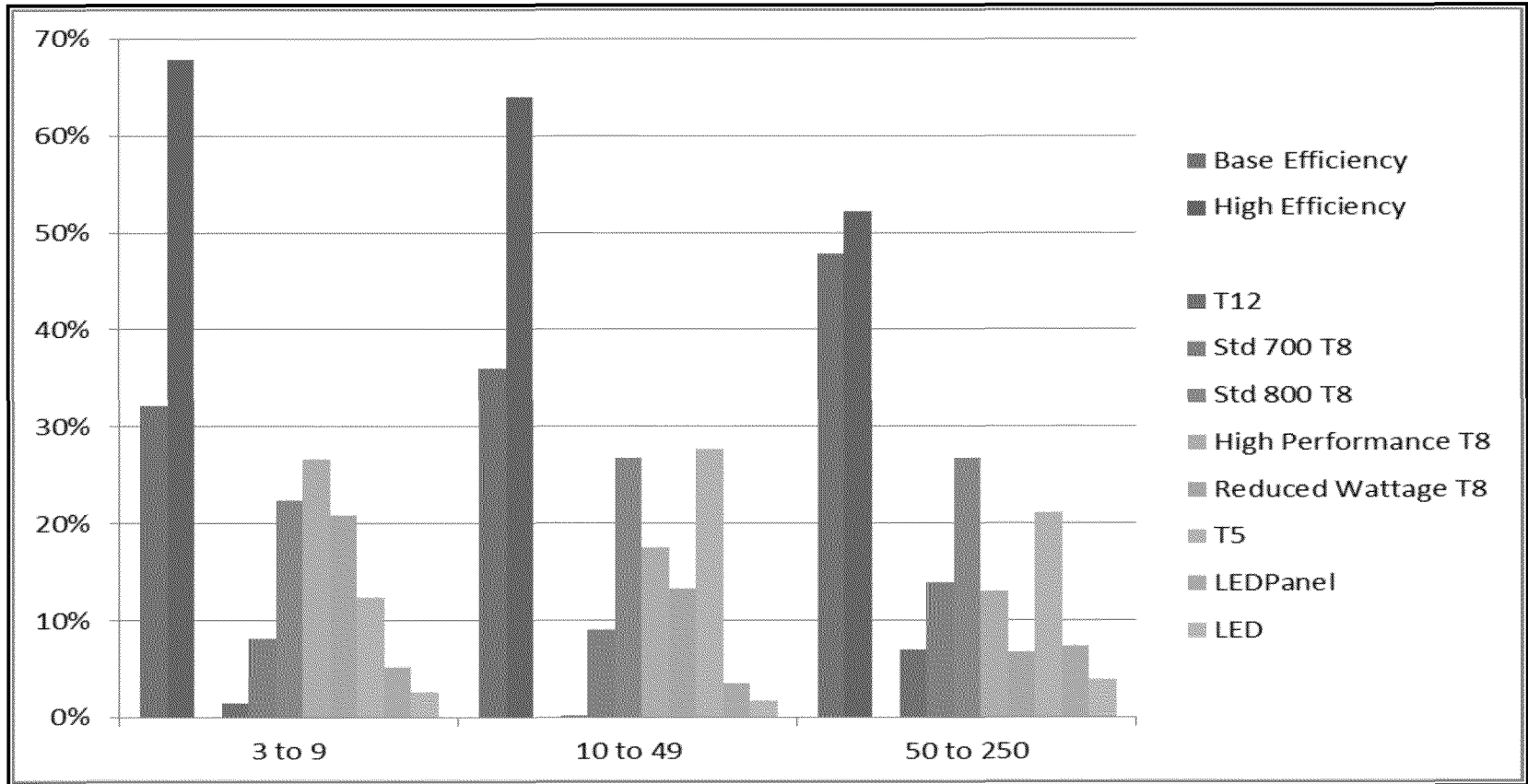
The split between base and high efficiency linear technology installations in derived from the contractor survey is very similar to the end user on-sites.

Contractor Linear Efficiency by North/South



Northern and Southern contractors report installing a similar base/high distribution of linear lighting

Contractor Linear Efficiency by Contractor Size



Small and medium sized contractors are installing a larger share of high efficiency linear lighting as a share of their installations than large contractors

End User and Contractor Findings

197 End User Surveys

123 Contractor Surveys

CMST HVAC RESULTS

CMST End User Equipment

- Small (< 65 kBtuh) Packaged and Split System
- Make and Model Numbers Collected On-Site and Looked Up to Determine the Efficiency Level
 - > Base Efficiency: SEER Level < 14 SEER
 - > Tier 1: SEER Level 14 to 14.99 SEER
 - > Tier 2: SEER Level 15 to 15.99 SEER
 - > Tier 3: SEER Level 16 to 16.99 SEER
 - > Tier 4: SEER Level 17+

CMST End User HVAC Estimated Purchases

- The weighted data imply that 5-9% of sites purchased new small packaged HVAC units

Utility	Sites in Frame	Share of Sites Purchasing HVAC Units
PG&E	392,294	5%
SCE	462,944	9%
SDG&E	99,495	9%

CMST End User HVAC Unit Characteristics

- The Make and Model Number Look Up also Provide Information on the Capacity or Tonnage of Recent Purchases of Small HVAC Units.

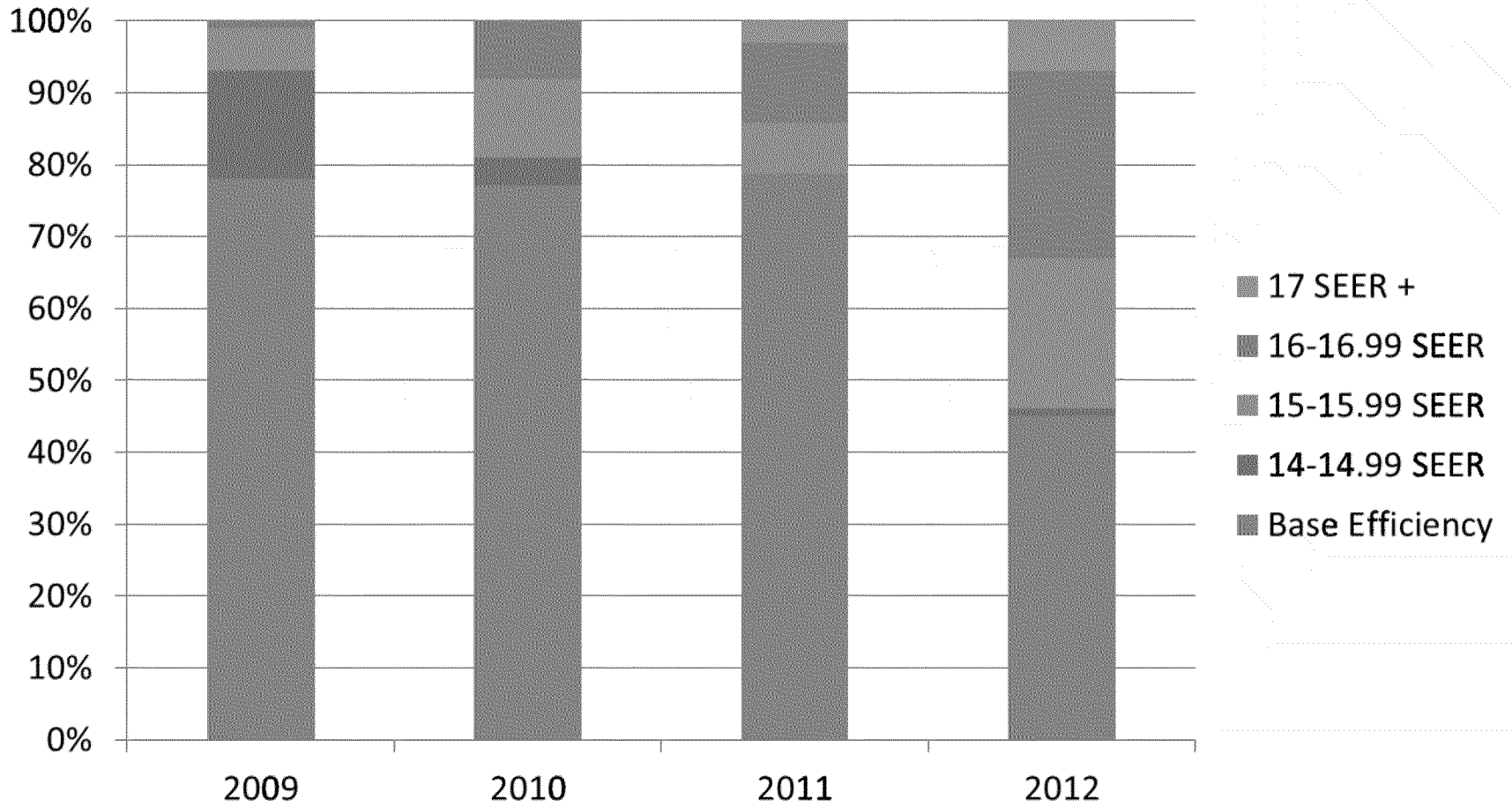
Utility	Estimated HVAC Units Purchased	Average Number of HVAC Units Purchased	Average Tonnage Purchased Per Site	Average Tonnage Per Unit Purchased
PG&E	45,000	2	8	3.5
SCE	110,000	2.5	10	4
SDG&E	25,000	3	10	3.5

CMST End User HVAC Installations 2009-2012

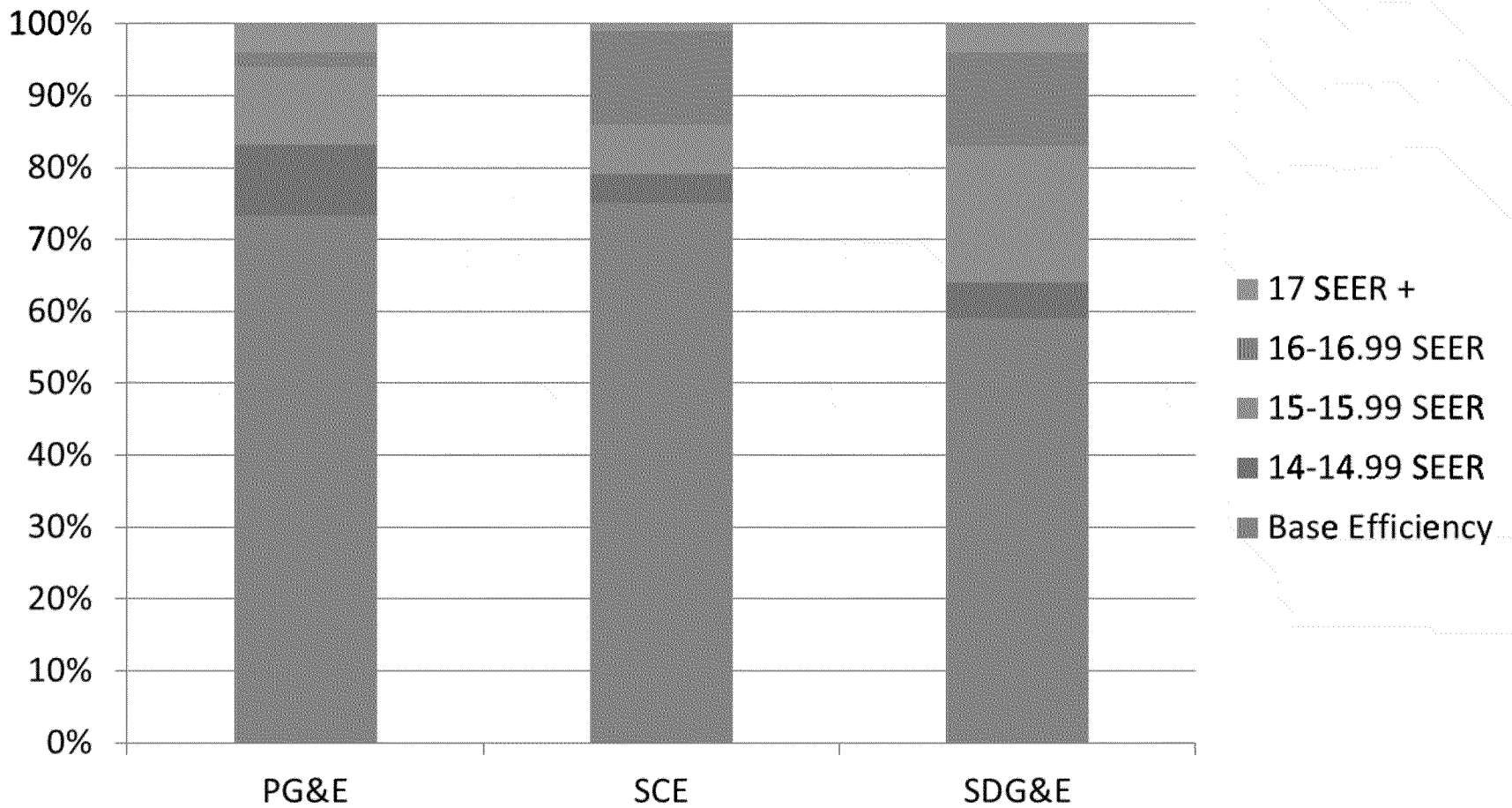
Efficiency Level	HVAC Units		Businesses	
	Percent	Relative Precision	Percent	Relative Precision
Base Efficiency	72%	10%	92%	4%
High Efficiency	28%	27%	16%	47%
High Efficiency Tiers Distribution				
14-14.99 SEER	6%		5%	
15-15.99 SEER	10%		4%	
16-16.99 SEER	10%		5%	
> 17 SEER	2%		2%	
<i>n</i>	879		192	

The majority of new small packaged HVAC units installed are base efficiency.

CMST End User HVAC Installations by Year of Purchase

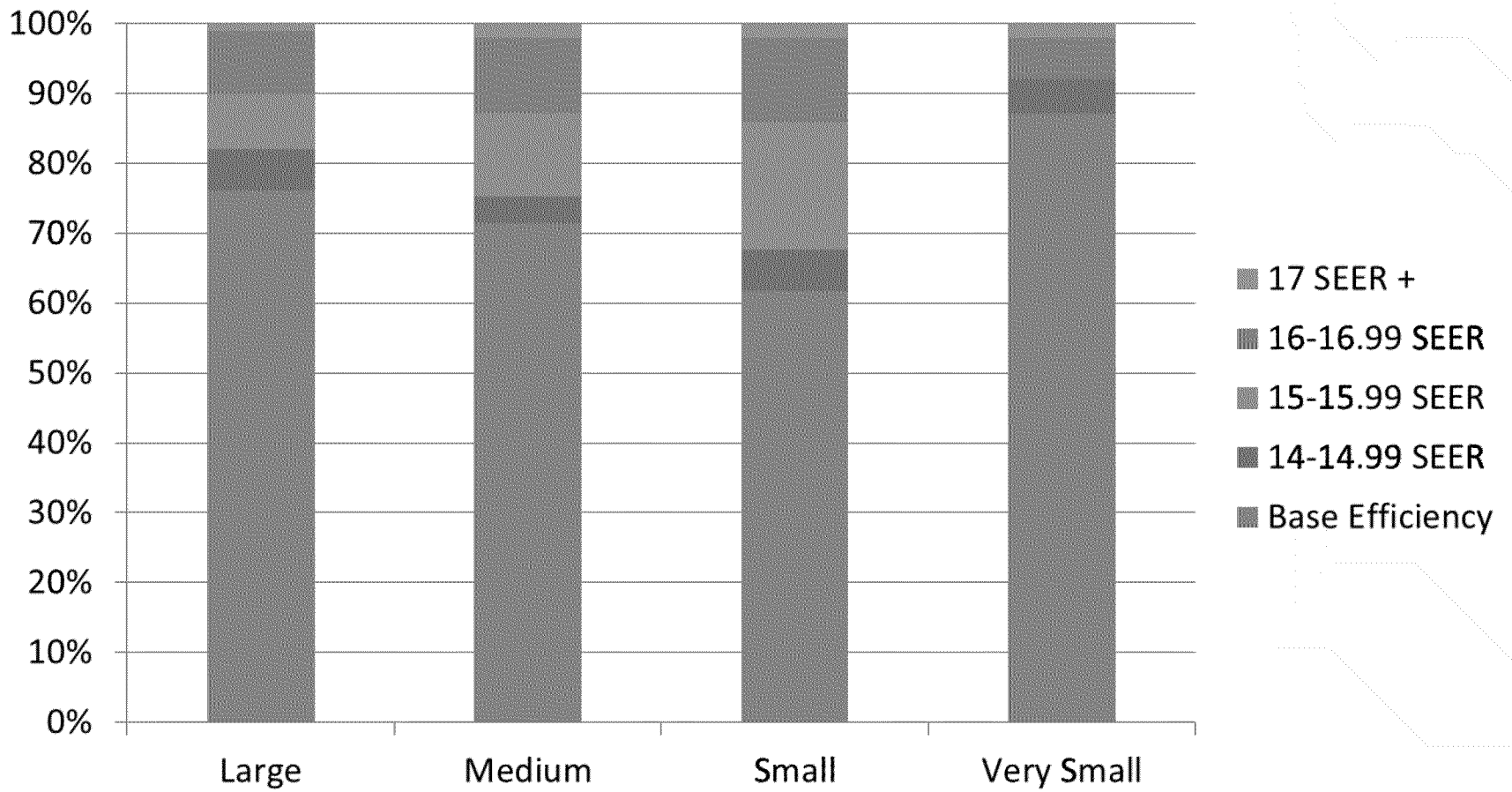


CMST End User HVAC Installations by IOU



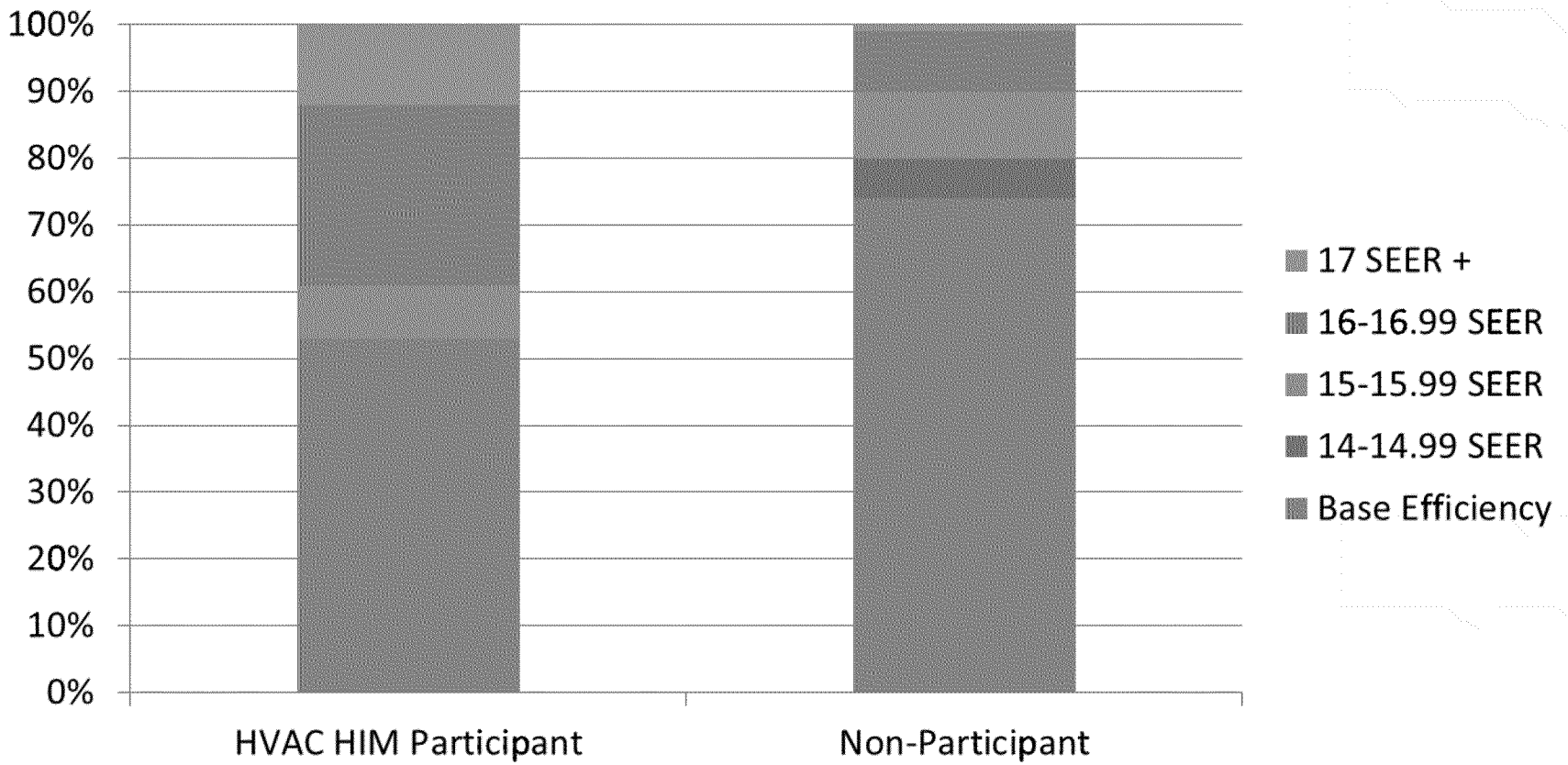
A slightly higher share of HVAC units installed in SDG&E are high efficiency.

CMST End User HVAC Installations by Customer Size



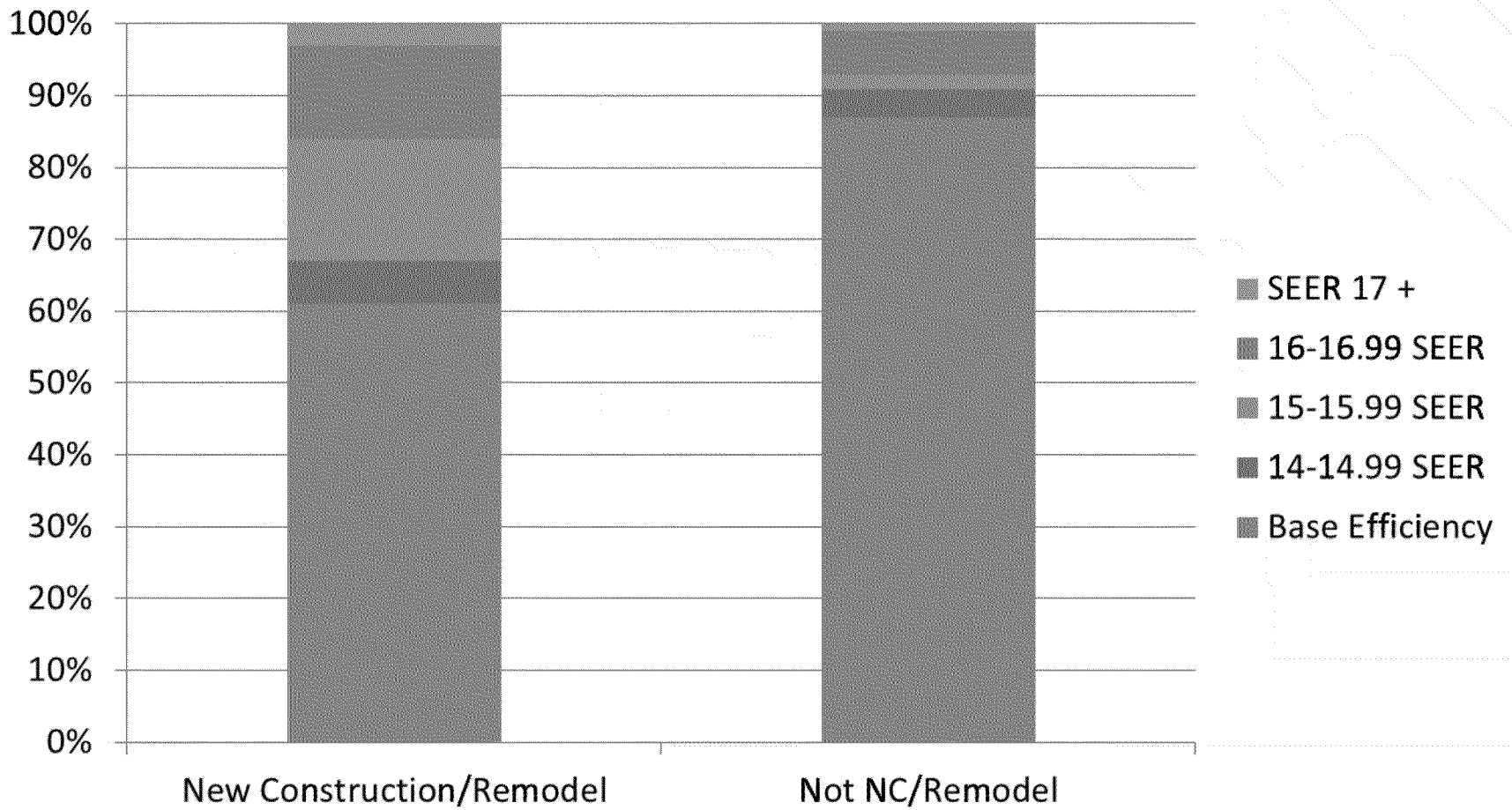
Very Small businesses install a larger share of base efficiency units.

CMST End User HVAC Installations by HVAC HIM Part.



The HVAC HIM Participants received an HVAC rebate. The rebate was for an HVAC measure, but it did not have to be for an HVAC unit.

CMST End User HVAC Installations by NC/Remodel vs. Retrofit



HVAC Contractor Survey

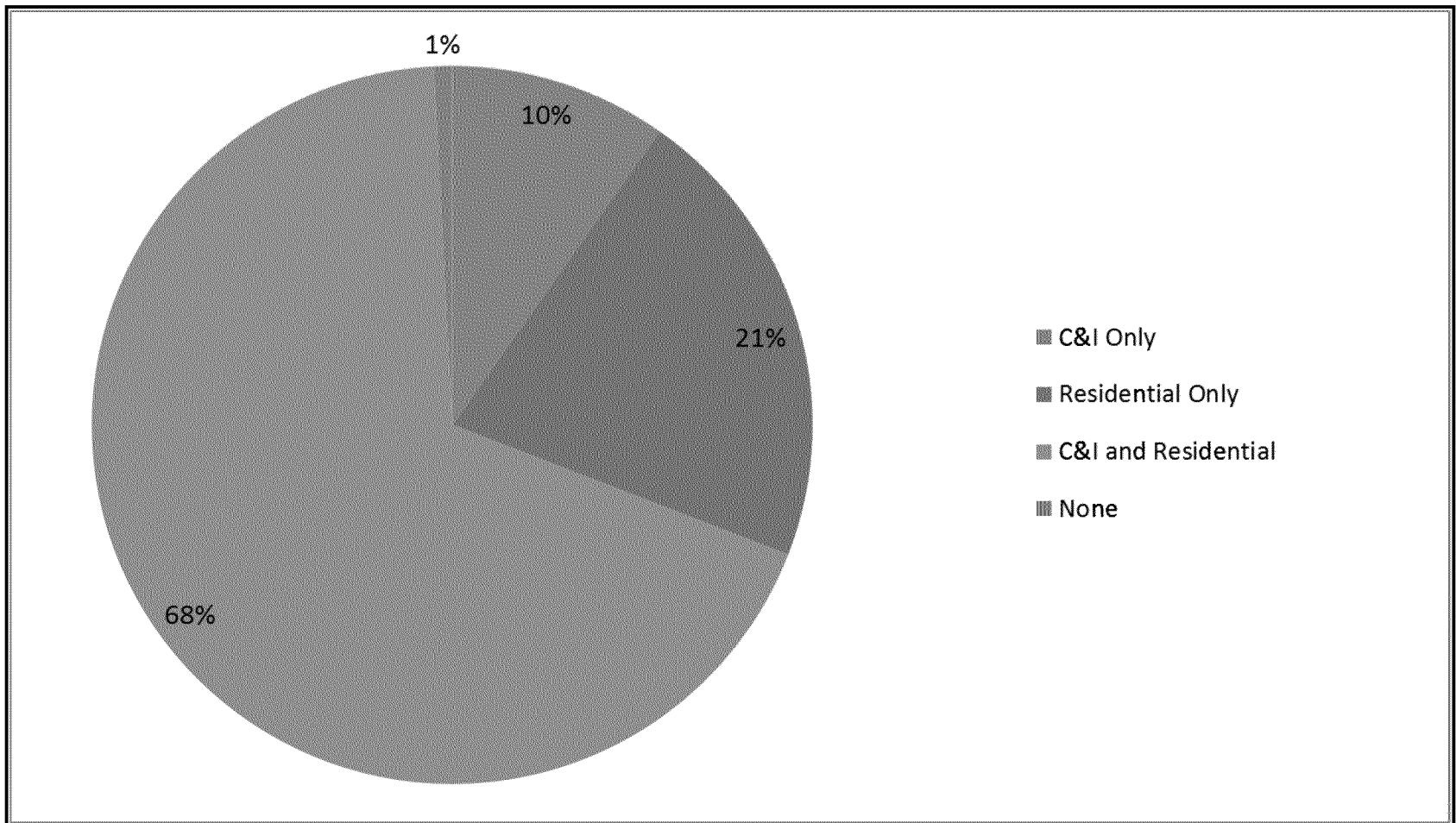
- No readily available HVAC contractor frame with the data needed to develop weight necessary to report on population statistics.
- Merge the C20 HVAC License database with a Info USA pull of HVAC and plumbing contractors. The merge adds the necessary variables to develop weights to the C20 data.
- Battery of questions determined if the contractor installed HVAC units in residential and/or commercial sectors.
- HVAC Contractor survey was a joint survey with the Measure Cost Study, Quality Maintenance and Installation Survey, and Workforce Education and Training Study

HVAC Contractor Size

- The distribution of HVAC contractor survey completes by number of employees.

Number of Employees	Number of Surveys	Share of Surveys
1 to 2	34	28%
3 to 4	31	25%
5 to 9	26	21%
10 to 19	12	10%
20 to 49	10	8%
50 to 99	6	5%
100 to 249	4	3%
Total	123	

HVAC Contractor Residential & Commercial Installations

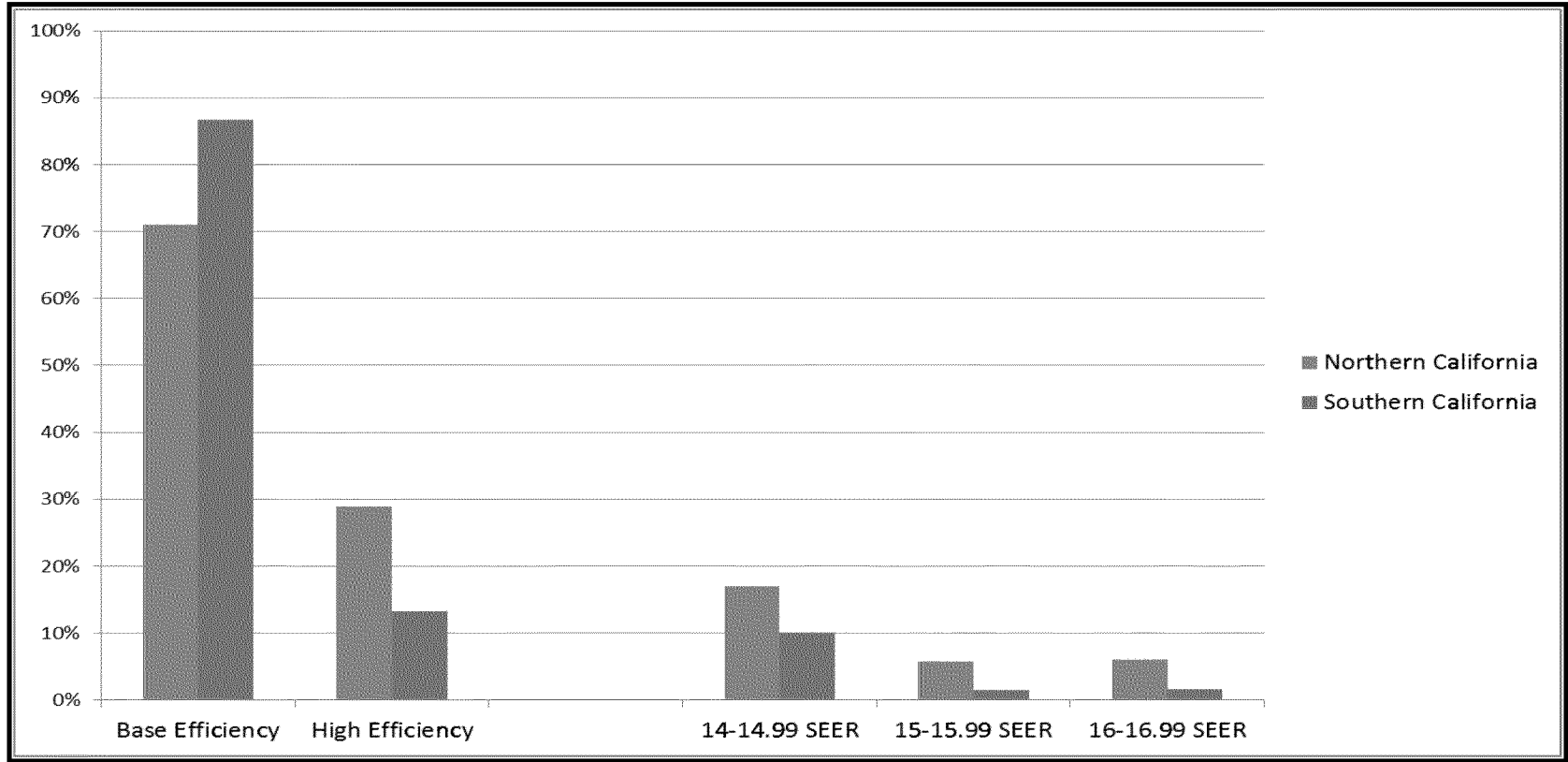


HVAC Contractor Installations Less than 65 kBtuh

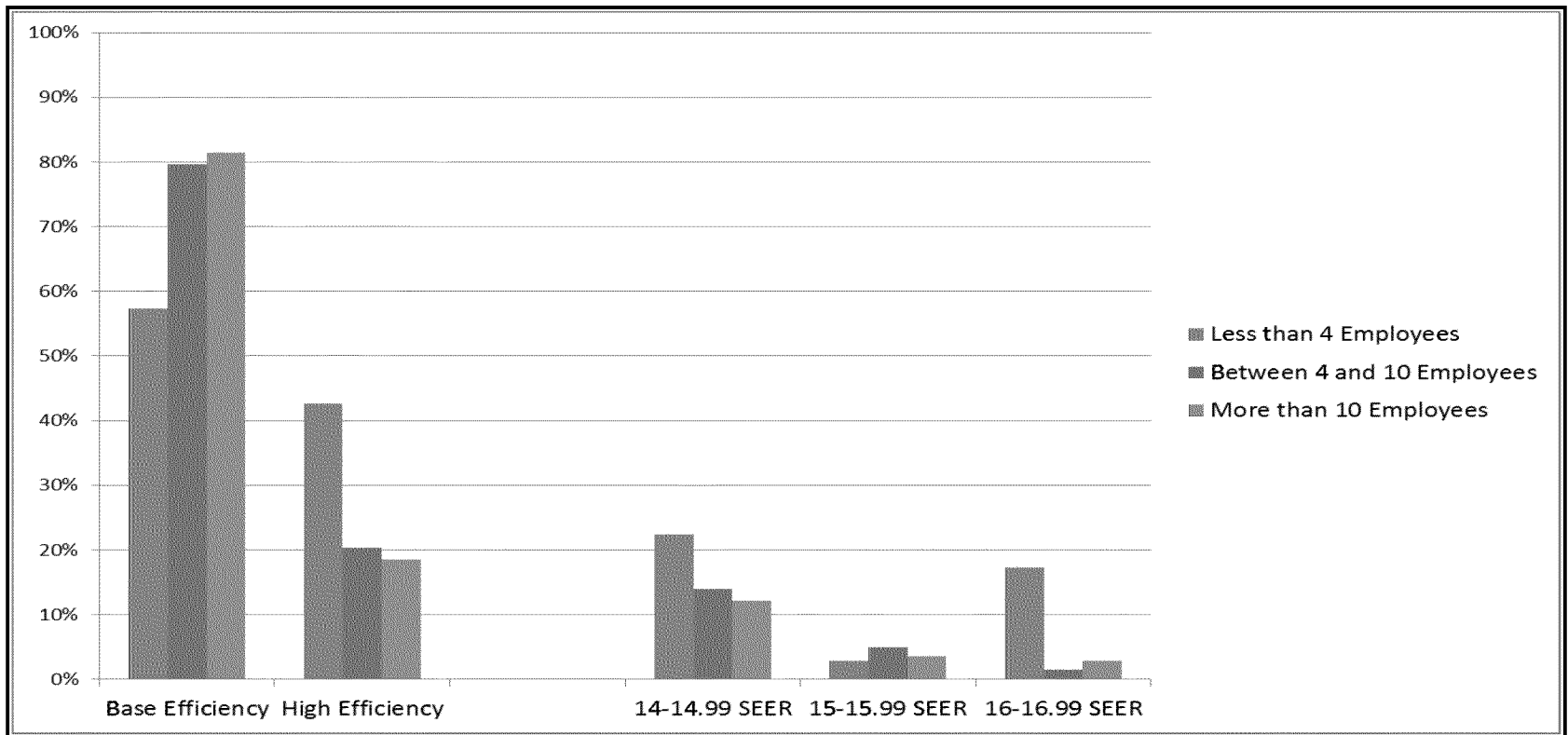
Efficiency Level	Percent	Relative Precision
Base Efficiency	78%	30%
High Efficiency	22%	143%
High Efficiency Tiers Distribution		
14-14.99 SEER	14%	
15-15.99 SEER	4%	
16-16.99 SEER	4%	
<i>n</i>	52	

- The distribution of efficiency for HVAC contractors installing small packaged and split systems in the commercial sector is very similar to the end user surveys.

HVAC Contractor Installations North/South



HVAC Contractor Efficiency of Installations by Size



Smaller sized contractors report installing a higher share of high efficiency units than medium and large contractors.

End User Findings

481 End User Surveys

CMST TV RESULTS

CMST TV Efficiency Development

- During the on-site surveys, make and model numbers were collected and looked up.
- Energy Star provided Itron with the make and model number product lists for Energy Star TVs from 2009-2012.
- Itron also did a web search of remaining make and model numbers.
- Energy Version Number Details

ENERGY STAR	Start Date	End Date	High Efficiency Years for Study
Version 3.0	October 2008	April 2010	2009, 2010
Version 4.1	April 2010	September 2011	2009, 2010, 2011
Version 5.3	September 2011	June 2013	2009, 2010, 2011, 2012

CMST TVs, Estimate of New Purchases

- Nearly a quarter of non-residential sites purchased a TV between 2009-2012

Utility	Sites in Frame	Share of Sites Purchasing TVs
PG&E	390,294	26%
SCE	462,944	25%
SDG&E	99,495	22%

- The weighted data imply that approximately 740,000 TVs were purchased by California non-residential customers from 2009 to 2012

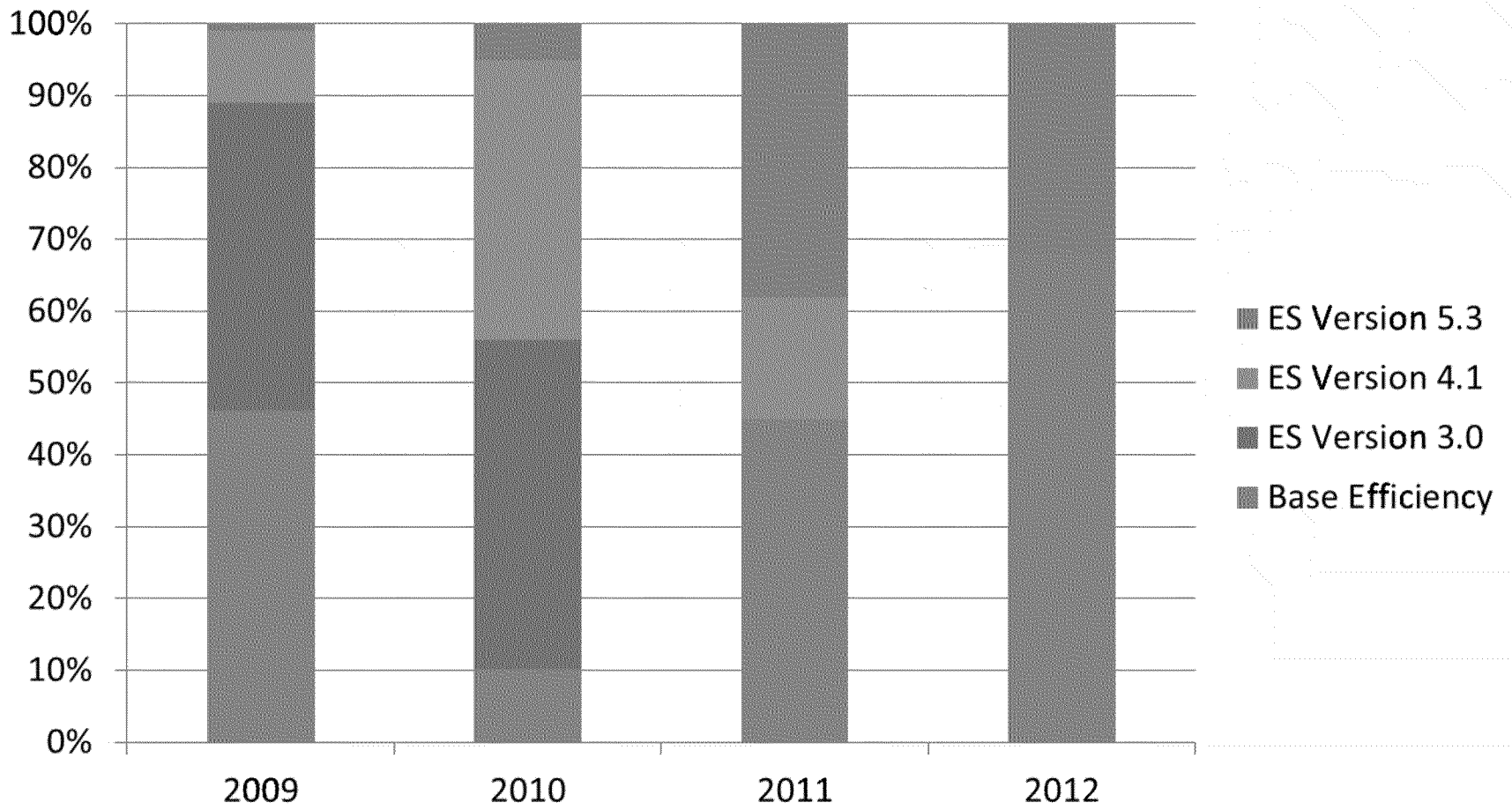
Utility	Estimated Number of TVs Purchased	Number of TVs Purchased per Businesses
PG&E	255,000	2.5
SCE	395,000	3
SDG&E	90,000	4

CMST TV Efficiency Distribution

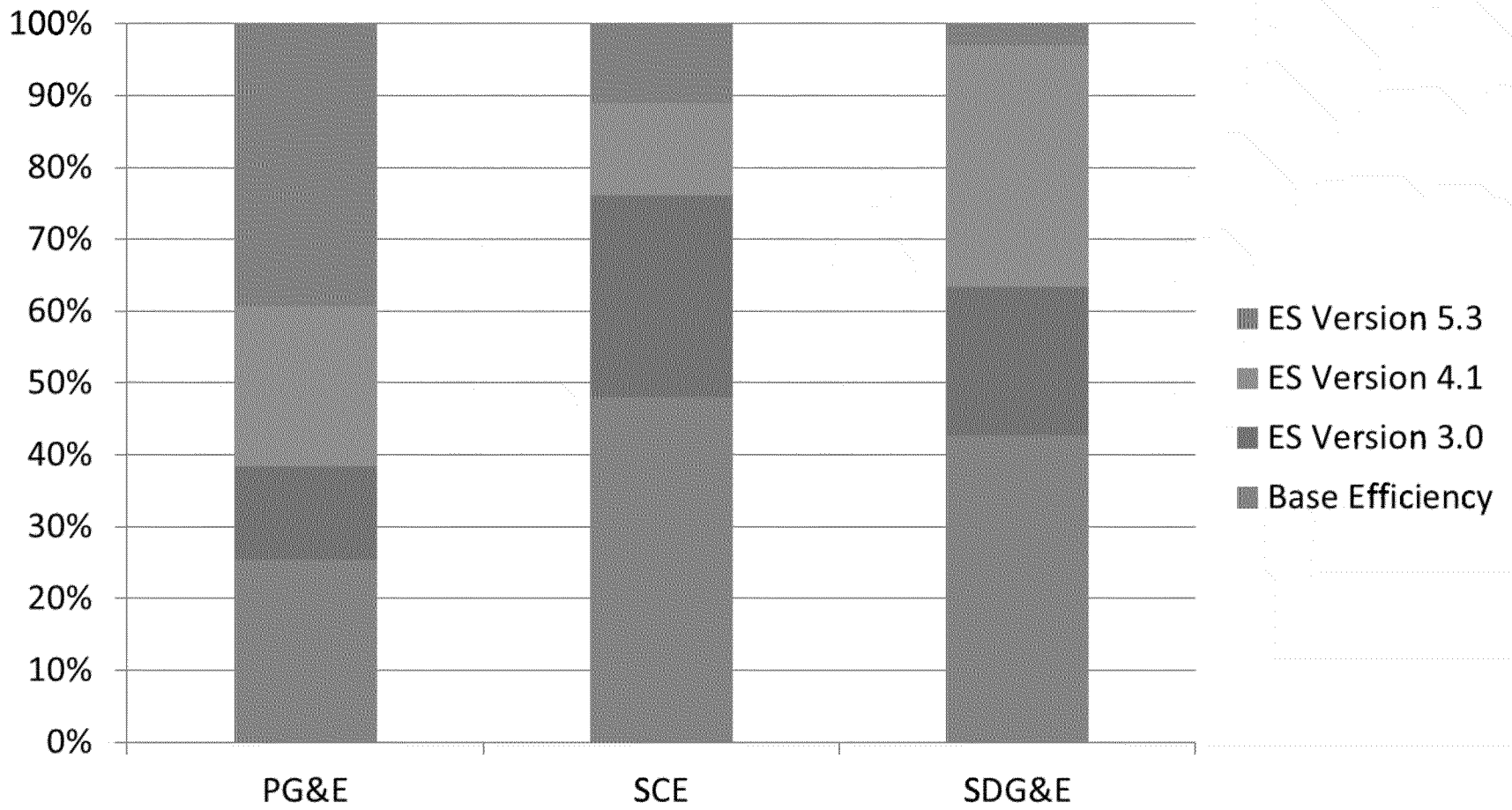
- Over half of recently installed TVs are high efficiency

Efficiency Level	TVs		Businesses	
	Percent	Relative Precision	Percent	Relative Precision
Base Efficiency	40%	27%	27%	26%
High Efficiency	60%	18%	85%	7%
High Efficiency ENERGY STAR Distribution				
ES Version 3.0	22%		29%	
ES Version 4.1	18%		32%	
ES Version 5.3	20%		24%	
<i>n</i>	4,627		362	

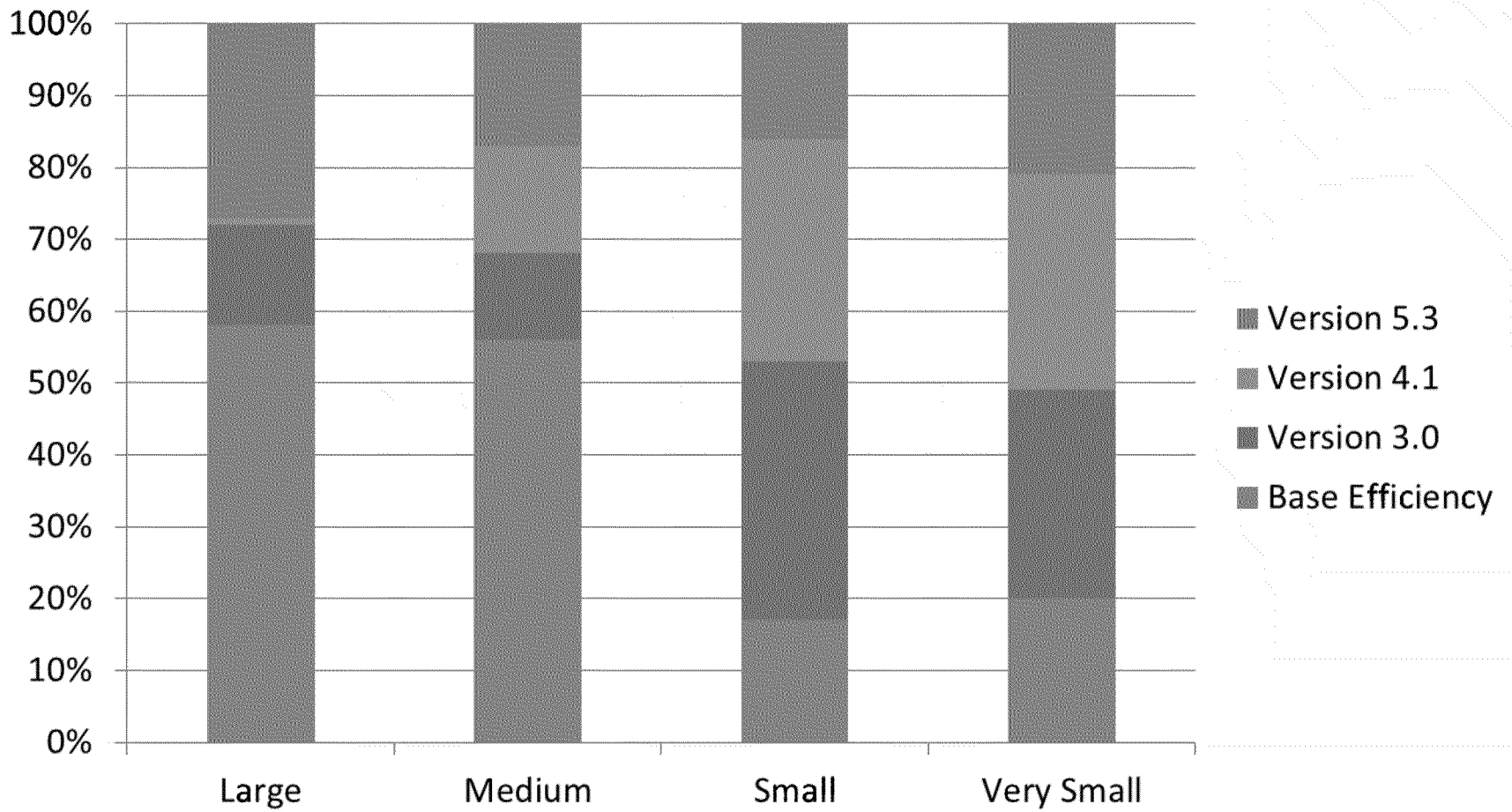
CMST TV Efficiency Distribution by Year of Purchase



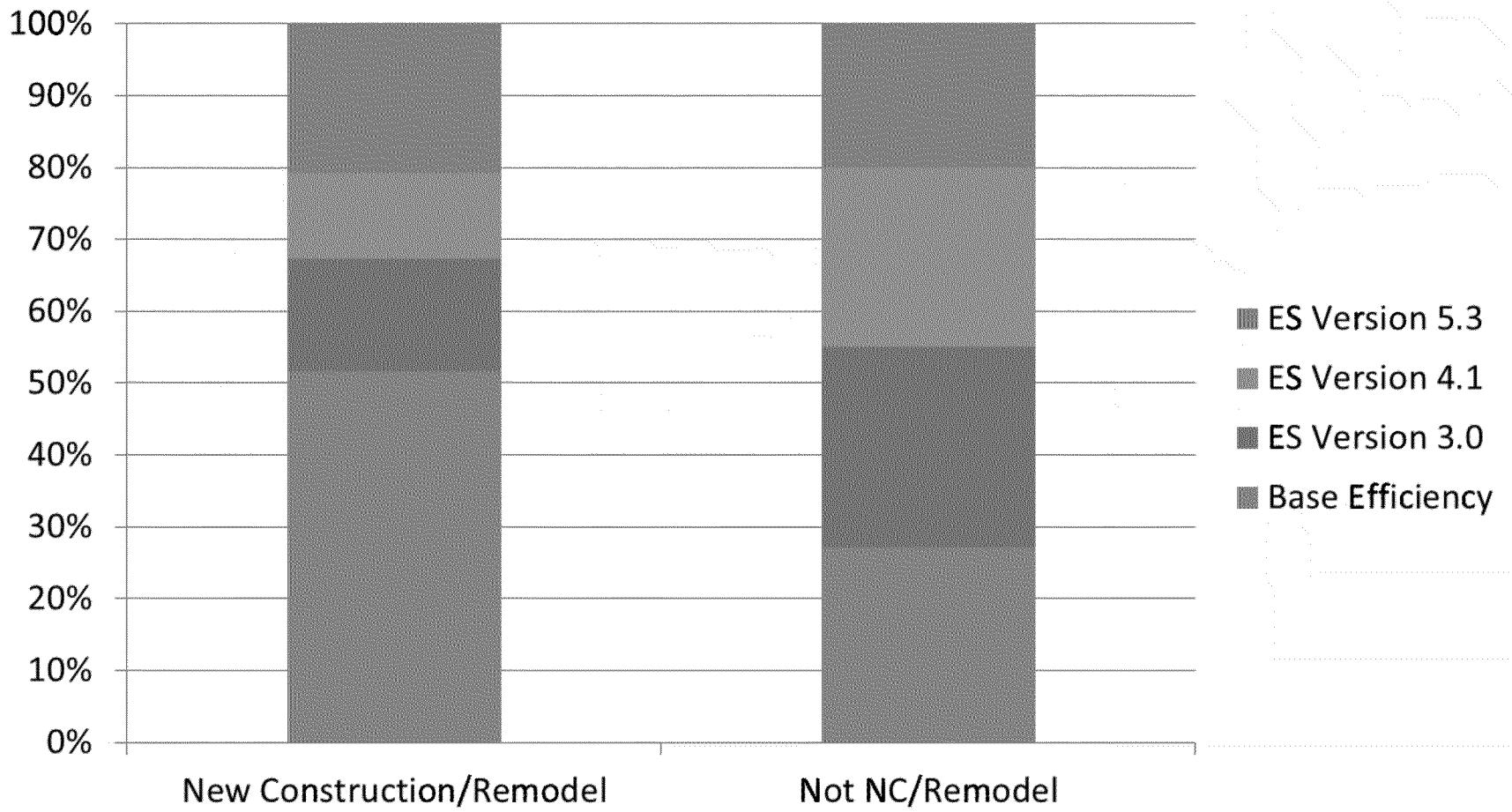
CMST TV Efficiency Distribution by IOU



CMST TV Efficiency Distribution by Customer Size



CMST TVs in NC/Remodel vs. Other Installations



CONCLUSIONS & RECOMMENDATIONS

Lighting Conclusions & Recommendations

- From 2009 to 2012 there was a substantial increase in the share of high efficiency Linear Technologies installed.
 - > Decline in the share of least efficient T8s
 - > Increase in the share of most efficient T8s
- EE Participants installed a larger share of high efficiency lighting than non-participants.
- The high efficiency share for non-participants exceeded 50% in 2011 and 2012.
 - > Program planners, DEER, and evaluators should consider the CMST non-participant shares when establishing baselines for measure savings.

Lighting Conclusions & Recommendation

- Linear lighting installed in new construction and remodel are less efficient than those installed during retrofits.
 - > Review new construction programs and develop additional ways to increase the awareness and knowledge of lighting designers and contractors
- Small and Very Small businesses are installing a smaller share of high efficiency linear technologies than Medium and Large businesses.
 - > Consider reinstating a hard-to-reach goal in EE programs to improve the efficiency installations for smaller businesses

Lighting Conclusions and Recommendations

- **Using End Use On-site Surveys and Contractor Phone Survey to Establish Market Shares for Linear Lighting**
- The high level efficiency distributions from the End User and Lighting Contractor Surveys were similar.
- The speed of market change in the non-residential linear technology market, leads to the need for annual to bi-annual data collection efforts to help maintain an up to date understanding of market trends are needed.
 - > Lighting contractor surveys will provide substantial information on market share to the regulator and evaluation community
- Combining the CMST end user data collection with large commercial saturation survey provides significant additional information and achieves economies of scale.
 - > Continuing the implementation of CMST lighting end user data collection provides the evaluation community with a unique time series of information on recent lighting purchases that can be disaggregated by areas of interest.

HVAC Conclusions and Recommendations

- The data from both the CMST End User and Contractor Surveys both show that approximately 75% of recent installations of small packaged HVAC units are base efficiency.
 - > There is substantial potential for improving the efficiency of HVAC installations.
 - > Need to determine if (and where) high efficiency HVAC are cost effective in the commercial sector.
 - If high efficiency HVAC are cost effective, programs need to increase contractor and customer knowledge and awareness of the cost effectiveness.
 - > Modify existing commercial HVAC programs to encourage more businesses to install high efficiency HVAC units.

HVAC Conclusions and Recommendations

- **Using End User On-site versus Contractor Phone Surveys to Establish Market Share for HVAC**
- The high level efficiency distributions from the End User and HVAC Contractor Surveys were similar.
- The HVAC market appears to be changing slowly but is of high importance, data collection efforts every two to three years are needed to maintain an understanding of market trends.
- Combining the CMST HVAC end user data collection with large commercial saturation survey provides significant information and economies of scale.
 - > Continuing the implementation of CMST HVAC end user data collection provides the CPUC and evaluation community with a unique time series of information on recent HVAC purchases that can be disaggregated by areas of interest.

TV Conclusion

- The incidence of TVs in businesses is growing.
 - > 60% of recently purchased TVs represented new, not replacement, TVs.
- The high efficiency share of TV purchases depends substantially on the timing of Energy Star TV updates.
- Small and Very Small customers install a higher share of efficient TVs than Medium and Large customers.

Questions

