Itron

Knowledge to Shape Your Future

Electric | Gas | Water

information collection, analysis and application

Commercial Saturation and Commercial Market Share Tracking Study Telephone Survey Findings

Prepared for California Public Utilities Commission

Itron, Inc.
11236 El Camino Real
San Diego, California 92130

(858) 724-2620

September 22, 2014

Legal Notice

Table of Contents

Table of Contents ..... **i**

Executive Summary **ES-1**

ES.1 Introduction ES-1
ES.2 Nonresidential Frame and Program Participation ES-2
ES.3 Telephone Survey Overview ES-5
ES.3.1 Business Characteristics *ES-5*
ES.3.2 DSM Awareness *ES-6*
ES.3.3 Lighting *ES-6*
ES.3.4 TVs *ES-7*
ES.3.5 HVAC *ES-7*
ES.3.6 Refrigeration *ES-8*
ES.4 Telephone and On-site Survey Comparison ES-8
ES.5 Phone Survey Findings ES-9
ES.6 Recommendations ES-11

1 **Introduction** **1-1**

2 **CSS and CMST Research Objectives** **2-1**

2.1 Telephone Survey Research Objectives 2-1
2.2 Commercial Market Share Tracking Research Objectives 2-2
2.3 Commercial Saturation Survey Research Objectives 2-3

3 **Nonresidential Frame and Program Participation** **3-1**

3.1 Development of the Nonresidential Frame 3-1
3.1.1 Customer Information System Data *3-1*
3.1.2 Nonresidential Billing Data *3-2*
3.1.3 Energy Efficiency Tracking Data *3-3*
3.1.4 Demand Response Tracking Data *3-3*
3.1.5 Distributed Generation Tracking Data *3-3*
3.1.6 Combining the Data *3-3*
3.2 Nonresidential Frame 3-4
3.3 Program Participation 3-9
3.3.1 Energy Efficiency Program Participation *3-9*
3.3.2 Energy Efficiency Program Participation by Utility *3-15*
3.3.3 Demand Response Program Participation *3-22*
3.3.4 Demand Response by Utility *3-26*
3.3.5 Distributed Generation Program Participation *3-33*
3.3.6 Distributed Generation by Utility *3-37*
3.3.7 Integrated Demand Side Management *3-43*

4 **Telephone Survey Sample Design** **4-1**

4.1 Telephone Survey Sample Design 4-1
4.2 Sample Disposition and Phone Survey Completes 4-9
4.2.1 Phone Survey Completes by CSS Building Type *4-15*
4.3 Weighting Methodology 4-17
4.3.1 Site Weights *4-17*

4.3.2 Usage (kWh) Weights 4-18
4.3.3 Energy Efficiency Response Bias 4-18

5 Telephone Survey Overview 5-1

5.1 Introduction 5-1
5.1.1 Business Type 5-2
5.1.2 Customer Characteristics 5-2
5.1.3 Customer Attitude and Awareness of Energy Efficiency, Distributed Generation, and Demand Response 5-3
5.1.4 Lighting 5-3
5.1.5 Televisions 5-4
5.1.6 Cooling Equipment 5-4
5.1.7 Refrigeration Equipment 5-5
5.1.8 Other Equipment 5-5
5.1.9 Customer Schedules and On-Site Recruitment 5-6

6 Business Characteristics 6-1

6.1 CIS and Telephone Survey Business Type 6-1
6.1.1 Telephone Survey Business Type 6-3
6.1.2 Miscellaneous, Property Manager, and Unknown Business Types 6-13
6.2 Business Size 6-16
6.2.1 Comparison of Phone Survey to On-Site Survey Square Footage 6-18
6.2.2 Business Changes 6-19

7 Attitude and Awareness of DSM and IDSM in the Commercial Population ..7-1

7.1 Current Attitude and Awareness of DSM 7-1
7.2 Distributed Generation Participation 7-11
7.2.1 Comparison of Phone Survey and On-site Distributed Generation Technology 7-12
7.3 Demand Response Participation 7-14
7.3.1 Comparing Demand Response Self-Report and DR Program Tracking Data 7-15
7.4 Integrated Audits 7-18
7.5 Building Benchmarking 7-23

8 Lighting 8-1

8.1 Linear Fluorescents 8-1
8.1.1 Comparison of Phone Survey to On-site Data for Linear Fluorescents 8-2
8.1.2 Linear Fluorescent Technology 8-3
8.1.3 Comparison of Phone Survey and On-site Survey Linear Technology 8-4
8.1.4 Linear Fluorescent Ballasts 8-9
8.2 High Bay Lighting 8-10
8.3 Lighting Purchases 8-14
8.4 Occupancy Sensors 8-18
8.4.1 Comparison of Phone Survey and On-site Occupancy Sensor Technology 8-18
8.4.2 Occupancy Sensor Lighting Share 8-20
8.5 Compact Fluorescents 8-21
8.5.1 Comparison of Phone and On-site Survey Findings for Compact Fluorescents 8-22
8.5.2 Compact Fluorescent Types 8-24
8.5.3 Comparison of Phone and On-Site Survey findings of Compact Fluorescent Technology 8-25
8.5.4 Compact Fluorescent Purchases 8-29
8.6 Incandescent Bulbs 8-32
8.7 LEDs 8-32

8.7.1 Comparison of LED Phone Survey to On-Site Survey 8-35
8.7.2 LED Installation Timing 8-36
8.7.3 LEDs, Replaced Technology, and Utility Programs 8-37

***9* Televisions 9-1**

9.1 Saturation of Televisions 9-1
9.2 Comparison of Phone Survey to On-Site Survey Televisions Present 9-2
9.3 Number of Televisions 9-4
9.4 Recent Television Purchases 9-5
9.5 Comparison of Phone Survey to On-Site Survey New Televisions Purchased 9-6
9.6 Number of New TVs Purchased 9-7

***10* Cooling Equipment 10-1**

10.1 Type and Condition of Cooling Equipment 10-1
10.2 Comparison of Phone Survey to On-Site Survey Cooling Present 10-7
10.3 Recent Cooling Purchases 10-8
10.4 HVAC Controls 10-16
10.5 HVAC Maintenance 10-17

***11* Refrigeration 11-1**

11.1 Type of Refrigeration Equipment 11-1
11.2 Refrigeration Purchases 11-4

***12* Other Equipment 12-1**

12.1 Computers 12-1
12.2 Motors 12-3
12.3 Gas Equipment 12-5

***13* Telephone and On-site Survey Comparison 13-1**

13.1 Incidence Analysis 13-2
13.2 Comparison Analysis 13-3
13.2.1 Business Square Footage 13-4
13.2.2 On-site Distributed Generation Technology 13-4
13.2.3 Comparing Demand Response Self-Report and DR Program Tracking Data 13-6
13.2.4 Linear Fluorescent Comparison 13-7
13.2.5 Comparison of Phone and On-site Survey Findings for Compact Fluorescents . 13-12
13.2.6 Comparison of Phone and On-Site Survey findings of Compact Fluorescent Technology 13-13
13.2.7 Comparison of LED Phone Survey to On-Site Survey 13-17
13.2.8 Comparison of Phone Survey to On-Site Survey Televisions Present 13-18
13.2.9 Comparison of Phone Survey to On-Site Survey Cooling Present 13-19

List of Figures

Figure ES-1: Share of Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size ES-4

Figure 3-1: Share Energy Consumption of Telephone Survey Eligible Sites by Business Type 3-7

Figure 3-2: Share of Number Telephone Survey Eligible Sites by Business Type ..3-9

Figure 3-3: Share of Telephone Survey Eligible Consumption Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size 3-14

Figure 3-4: Share of Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size 3-15

Figure 3-5: Share of PG&E Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size.....3-18

Figure 3-6: Share of SCE Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size.....3-20

Figure 3-7: Share of SDG&E Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size 3-22

Figure 3-8: Share of Consumption of Telephone Survey Eligible Sites Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size 3-25

Figure 3-9: Share of Telephone Survey Eligible Sites Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size 3-26

Figure 3-10: Share of Telephone Survey Eligible Sites Signed up for PG&E Demand Response Programs 2009-2012 by Business Type and Size.....3-29

Figure 3-11: Share of Telephone Survey Eligible Sites Signed up for SCE Demand Response Programs 2009-2012 by Business Type and Size.....3-31

Figure 3-12: Share of Telephone Survey Eligible Sites Signed up for SDG&E Demand Response Programs 2009-2012 by Business Type and Size.....3-33

Figure 3-13: Share of Consumption of Telephone Survey Eligible Sites Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size 3-36

Figure 3-14: Share of Telephone Survey Eligible Sites Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size.....3-37

Figure 3-15: Share of Telephone Survey Eligible Sites Signed up for PG&E Distributed Generation Programs 2009-2012 by Business Type and Size.....3-39

Figure 3-16: Share of Telephone Survey Eligible Sites Signed up for SCE Distributed Generation Programs 2009-2012 by Business Type and Size.....3-41

Figure 3-17: Share of Telephone Survey Eligible Sites Signed up for SDG&E Distributed Generation Programs 2009-2012 by Business Type and Size.....3-43

Figure 3-18: Share of Telephone Survey Eligible Sites Participating in DSM by Business Type.....3-45

Figure 3-19: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size 3-48

Figure 3-20: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size 3-51

Figure 3-21: Share of Telephone Survey Eligible Sites Participating in Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size 3-54

Figure 3-22: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency, Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size 3-57

Figure 6-1: Main Business Activity at Facility, kWh Weighted 6-5

Figure 6-2: Main Business Activity at Facility, Site Weighted 6-6

Figure 6-3: Business Outlook over the Past Three Years by Energy Consumption 6-21

Figure 6-4: Business Outlook over the Next Three Years by Energy Consumption 6-22

Figure 6-5: Business Outlook over the Past Three Years by IOU 6-23

Figure 6-6: Business Outlook over the Next Three Years by IOU 6-24

Figure 7-1: Importance of Being Environmentally Conscious by Business Size, kWh Weighted 7-3

Figure 7-2: Organization has a Long-Term Energy Plan by Business Size, Site Weighted 7-6

Figure 7-3: Businesses Aware of Programs or Resources, Site Weighted 7-7

Figure 7-4: Sites Whose Phone Survey Response to the Participation in DR was Verified as Correct by the IOU Tracking Data 7-17

Figure 7-5: Were DG Programs, Technologies, or Opportunities Identified in the Audit Report? Were Demand Response Programs and Opportunities Identified in the Audit Report? By Business Size, Site Weighted 7-20

Figure 8-1: Sites Whose Phone Survey Response to the Presence of T12 Linear Fluorescent Technology was Verified as Correct during the On-site 8-6

Figure 8-2: Sites Whose Phone Survey Response to the Presence of T8 Linear Fluorescent Technology was Verified as Correct during the On-site 8-8

Figure 8-3: Sites Whose Phone Survey Response to the Presence of Occupancy Sensors was Verified as Correct during the On-site 8-20

Figure 8-4: Sites Whose Phone Survey Response to the Presence of Compact Fluorescents was Verified as Correct during the On-site 8-24

Figure 8-5: Sites Whose Phone Survey Response to the Presence of Screw-In Compact Fluorescents was Verified as Correct during the On-site 8-27

Figure 8-6: Sites Whose Phone Survey Response to the Presence of Pin-Based Compact Fluorescents was Verified as Correct during the On-site 8-29

Figure 9-1: Sites Whose Phone Survey Response to the Presence of a TV was Verified as Correct during the On-site 9-4

Figure 10-1: Types of Cooling Equipment, kWh Weighted and Site Weighted Comparison 10-4

Figure 13-1: Sites Whose Phone Survey Response to the Presence of T12 Linear Fluorescent Technology was Verified as Correct during the On-site ... 13-9

Figure 13-2: Sites Whose Phone Survey Response to the Presence of T8 Linear Fluorescent Technology was Verified as Correct during the On-site 13-11

Figure 13-3: Sites Whose Phone Survey Response to the Presence of Compact Fluorescents was Verified as Correct during the On-site 13-13

Figure 13-4: Sites Whose Phone Survey Response to the Presence of Screw-In Compact Fluorescents was Verified as Correct during the On-site 13-15

Figure 13-5: Sites Whose Phone Survey Response to the Presence of Pin-Based Compact Fluorescents was Verified as Correct during the On-site ... 13-17

Figure 13-6: Sites Whose Phone Survey Response to the Presence of a TV was Verified as Correct during the On-site 13-19

List of Tables

Table ES-1: Nonresidential Electric Frame by Business Type ES-3

Table ES-2: Incendence of Measures from the Telephone and On-Site Surveys ES-9

Table 3-1: Nonresidential Population by Business Type 3-5

Table 3-2: Energy Consumption (MWh) of Telephone Survey Eligible Sites by Business Type and Size 3-6

Table 3-3: Number of Telephone Survey Eligible Sites by Business Type and Size 3-8

Table 3-4: Share of Telephone Survey Eligible Consumption Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size 3-12

Table 3-5: Share of Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size 3-13

Table 3-6: Share of Consumption Participating in Energy Efficiency Programs by IOU and Size 3-16

Table 3-7: Share of Sites Participating in Energy Efficiency Programs by IOU and Size 3-16

Table 3-8: Share of PG&E Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size.....3-17

Table 3-9: Share of SCE Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size.....3-19

Table 3-10: Share of SDG&E Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size 3-21

Table 3-11: Share of Consumption of Telephone Survey Eligible Sites Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size 3-23

Table 3-12: Share of Telephone Survey Eligible Sites Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size.....3-24

Table 3-13: Share of Consumption Signed Up for Demand Response Programs by IOU and Size 3-27

Table 3-14: Share of Sites Signed Up for Demand Response Programs by IOU and Size 3-27

Table 3-15: Share of Telephone Survey Eligible Sites Signed up for PG&E Demand Response Programs 2009-2012 by Business Type and Size.....3-28

Table 3-16: Share of Telephone Survey Eligible Sites Signed up for SCE Demand Response Programs 2009-2012 by Business Type and Size.....3-30

Table 3-17: Share of Telephone Survey Eligible Sites Signed up for SDG&E's Demand Response Programs 2009-2012 by Business Type and Size.....3-32

Table 3-18: Share of Consumption of Telephone Survey Eligible Sites Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size 3-34

Table 3-19: Share of Telephone Survey Eligible Sites Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size.....3-35

Table 3-20: Share of Consumption Signed Up for Distributed Generation by IOU and Size 3-37

Table 3-21: Share of Sites Signed Up for Distributed Generation by IOU and Size 3-38

Table 3-22: Share of Telephone Survey Eligible Sites Signed up for PG&E Distributed Generation Programs 2009-2012 by Business Type and Size.....3-38

Table 3-23: Share of Telephone Survey Eligible Sites Signed up for SCE Distributed Generation Programs 2009-2012 by Business Type and Size.....3-40

Table 3-24: Share of Telephone Survey Eligible Sites Signed up for SDG&E's Distributed Generation Programs 2009-2012 by Business Type and Size.....3-42

Table 3-25: Share of Telephone Survey Eligible Sites Participating in DSM by Business Type.....3-44

Table 3-26: Share of Consumption of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Demand Response Programs 2009-2012 by IOU and Size 3-46

Table 3-27: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Demand Response Programs 2009-2012 by IOU and Size 3-46

Table 3-28: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size 3-47

Table 3-29: Share of Consumption of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size 3-49

Table 3-30: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size 3-49

Table 3-31: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size 3-50

Table 3-32: Share of Consumption of Telephone Survey Eligible Sites Participating in Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size 3-52

Table 3-33: Share of Telephone Survey Eligible Sites Participating in Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size 3-52

Table 3-34: Share of Telephone Survey Eligible Sites Participating in Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size 3-53

Table 3-35: Share of Consumption of Telephone Survey Eligible Sites Participating in Energy Efficiency, Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size 3-55

Table 3-36: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency, Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size 3-55

Table 3-37: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency, Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size 3-56

Table 4-1: PG&E Telephone Survey Sample Design 4-3

Table 4-2: SCE Telephone Survey Sample Design 4-5

Table 4-3: SDG&E Telephone Survey Sample Design 4-7

Table 4-4: PG&E Telephone Survey Sample Design and Disposition 4-10

Table 4-5: SCE Telephone Survey Sample Design and Disposition 4-12

Table 4-6: SDG&E Telephone Survey Sample Design and Disposition 4-14

Table 4-7: Telephone Survey Quota and Completes by Business Type 4-16

Table 4-8: Response Rate by IOU EE Program Participation 4-19

Table 6-1: Percent of Energy and Sites in the IOU CIS Mapped to Property Management, Miscellaneous, and Unknown by IOU.....6-2

Table 6-2: Energy and Number of Sites in the IOU CIS Mapped to Property Management, Miscellaneous, and Unknown by IOU.....6-2

Table 6-3: Main Business Activity at Facility By Business Size, kWh Weighted.....6-4

Table 6-4: Main Business Activity at Facility By Business Size, Site Weighted.....6-5

Table 6-5: Main Business Activity at Facility by IOU, kWh Weighted 6-8

Table 6-6: Main Business Activity at Facility by IOU, Site Weighted 6-8

Table 6-7: Main Business Activity at Facility by EE Program Participation, kWh Weighted.....6-10

Table 6-8: Main Business Activity at Facility by EE Program Participation, Site Weighted.....6-10

Table 6-9: Type of Office that Best Describes the Business Activity by Business Size, kWh Weighted.....6-11

Table 6-10: Type of Office Best Describes the Business Activity by Business Size, Site Weighted.....6-12

Table 6-11: Type of Office Best Describes the Business Activity by IOU, kWh Weighted.....6-13

Table 6-12: Telephone Survey Business Types for CIS Miscellaneous Sites 6-14

Table 6-13: Telephone Survey Business Types for CIS Property Management Sites.....6-15

Table 6-14: Telephone Survey Business Types for CIS Unknown Sites.....6-16

Table 6-15: Business Square Footage by Business Electricity Usage, kWh Weighted.....6-17

Table 6-16: Number of Full and Part-time Employees by Business Electricity Usage, kWh Weighted 6-18

Table 6-17: Discrepancy between the Phone and On-site Square Footage.....6-19

Table 6-18: Year of Most Recent Remodel by Business Size, Site Weighted.....6-19

Table 6-19: Year Business was Established at its Current Location by Business Size, Site Weighted.....6-20

Table 7-1: Importance of Being Environmentally Conscious by Business Size, kWh Weighted 7-2

Table 7-2: Importance of Being Environmentally Conscious by Business Size, Site Weighted 7-2

Table 7-3: Importance of Being Environmentally Conscious by EE Participation, kWh Weighted 7-4

Table 7-4: Importance of Being Environmentally Conscious by EE Participation, Site Weighted 7-4

Table 7-5: Organization Highlights their Environmental Consciousness in Marketing Materials by Business Size, kWh Weighted 7-5

Table 7-6: Organization Highlights their Environmental Consciousness in Marketing Materials by Business Size, Site Weighted 7-5

Table 7-7: Organization has Developed a Long-Term Energy Plan by Business Size, Site Weighted 7-6

Table 7-8: Aware of Programs or Resources to Help Reduce Energy Bills by Business Size, Site Weighted 7-7

Table 7-9: Aware of Programs or Resources that are Designed to Reduce Energy Bills by IOU, Site Weighted 7-8

Table 7-10: Aware of Programs or Resources that are Designed to Reduce Energy Bills by EE Program Participation, Site Weighted 7-8

Table 7-11: For DSM Aware Customers, Types of Programs can you Recall by Business Size, kWh Weighted 7-10

Table 7-12: For DSM Aware Customers, Types of Programs can you Recall by Business Size, Site Weighted 7-11

Table 7-13: Facility Has Solar, Wind or Other Energy-Generation Equipment On-Site by Business Size, kWh Weighted 7-12

Table 7-14: Facility Has Solar, Wind or Other Energy-Generation Equipment On-Site by Business Size, Site Weighted 7-12

Table 7-15: Comparison of Solar Present in the Facility Between the Phone and On-site Surveys 7-13

Table 7-16: Comparison of Solar Panels in Facility Between the Phone and On-site Surveys for by Business Size 7-13

Table 7-17: Comparison of Other Types of Distributed Generation in the Facility Between the Phone and On-site Surveys 7-14

Table 7-18: Facility Participates in Utility Demand Response Programs by Business Size, kWh Weighted 7-15

Table 7-19: Facility Participates in Utility Demand Response Programs by Business Size, Site Weighted 7-15

Table 7-20: Comparison of Demand Response Present in the Facility Between the Phone and On-Site Surveys 7-16

Table 7-21: Comparison of Demand Response Participation Between the Phone and IOU Tracking data by Business Size 7-17

Table 7-22: Organization Undertaken an Integrated Audit by Business Size, Site Weighted 7-18

Table 7-23: Organization Knows Where to get an Integrated Online Audit by Business Size, Site Weighted 7-19

Table 7-24: Organization Know Where to get an Integrated On-Site Audit by Business Size, Site Weighted 7-19

Table 7-25: Solar, Wind or Other Self-Generation Programs, Technologies, or Opportunities were Identified in the Audit Report by Business Size, Site Weighted 7-20

Table 7-26: Why Did Your Organization not Adopt the Solar, Wind, or Self-Generation Technologies Recommended? By Business Size, Site Weighted 7-21

Table 7-27: Demand Response Programs, Technologies, or Opportunities were Identified in the Audit Report by Business Size, Site Weighted..... 7-22

Table 7-28: Why Did Your Organization Not Adopt the Demand Response Programs and Technologies Recommended? By Business Size, Site Weighted 7-23

Table 7-29: Aware of Building Benchmarking by Business Size, kWh Weighted . 7-23

Table 7-30: Aware of Building Benchmarking by Business Size, Site Weighted .. 7-24

Table 8-1: Linear Fluorescents by Business Size, kWh Weighted 8-2

Table 8-2: Linear Fluorescents by Business Size, Site Weighted 8-2

Table 8-3: Comparison of Linear Fluorescents Present in the Facility Between the Phone and On-site Surveys 8-3

Table 8-4: Type of Linear Fluorescent Measures by Business Size, kWh Weighted 8-3

Table 8-5: Type of Linear Fluorescent Measures by Business Size, Site Weighted 8-4

Table 8-6: Comparison of Linear Fluorescent T12 Technology Present in the Facility Between the Phone and On-site Surveys 8-5

Table 8-7: Comparison of Linear Fluorescent T12 Technology in Facility Between the Phone and On-site Surveys, by Business Size 8-5

Table 8-8: Comparison of Linear Fluorescent T8 Technology Present in the Facility Between the Phone and On-site Surveys 8-7

Table 8-9: Comparison of Linear Fluorescent T8 Technology in Facility Between the Phone and On-site Surveys, by Business Size 8-7

Table 8-10: Comparison of Linear Fluorescent T5 Technology Present in the Facility Between the Phone and On-site Surveys 8-9

Table 8-11: Electronic or Magnetic Ballasts for your Linear Fluorescents by Business Size, kWh Weighted 8-9

Table 8-12: Electronic or Magnetic Ballasts for your Linear Fluorescents Business Size, Site Weighted 8-10

Table 8-13: Type of High Bay Lighting by Business Size, kWh Weighted.....8-11

Table 8-14: Type of High Bay Lighting by Business Size, Site Weighted.....8-12

Table 8-15: Type of High Bay Lighting by IOU, Site Weighted.....8-13

Table 8-16: Type of High Bay Lighting by EE Program Participation, Site Weighted.....8-14

Table 8-17: Businesses that have Installed New Lighting Systems as Part of a Recent Remodel by Business Size, Site Weighted.....8-15

Table 8-18: Businesses that Have Installed New Lighting Equipment since 2009 without a remodel by Business Size, Site Weighted 8-15

Table 8-19: Type of Lighting that was Purchased by Business Size, kWh Weighted.....8-16

Table 8-20: Type of Lighting that was Purchased by Business Size, Site Weighted.....8-17

Table 8-21: Occupancy Sensors by Business Size, Site Weighted.....8-18

Table 8-22: Occupancy Sensors by EE Participation, Site Weighted.....8-18

Table 8-23: Comparison of Occupancy Sensors Present in the Facility Between the Phone and On-site Surveys 8-19

Table 8-24: Comparison of Occupancy Sensors in Facility Between the Phone and On-site Surveys for by Business Size 8-19

Table 8-25: Share of Your Lighting Controlled by an Occupancy Sensor by Business Size, Site Weighted 8-21

Table 8-26: For CFL Aware Sites, Facility Has CFLs by Business Size, kWh Weighted.....8-22

Table 8-27: For CFL Aware Sites Facility Has CFLs by Business Size, Site Weighted.....8-22

Table 8-28: Comparison of Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys 8-23

Table 8-29: Comparison of Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size 8-23

Table 8-30: Types of CFLs at your Facility by Business Size, Site Weighted 8-25

Table 8-31: Comparison of Screw-in Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys 8-25

Table 8-32: Comparison of Screw-In Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size 8-26

Table 8-33: Comparison of Pin-Based Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys 8-28

Table 8-34: Comparison of Pin-Based Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size 8-28

Table 8-35: For CFL Purchasers, the Number of CFLs Purchased Since January 2009 By Business Size, Site Weighted 8-30

Table 8-36: What Was Replaced When CFLs were Installed by Business Size, kWh Weighted.....8-31

Table 8-37: What Was Replaced When CFLs were Installed by Business Size, Site Weighted.....8-31

Table 8-38: Incandescent Bulbs by Business Size, kWh Weighted 8-32

Table 8-39: Incandescent Bulbs by Business Size, Site Weighted 8-32

Table 8-40: Heard of LED Lighting by Business Size, kWh Weighted 8-33

Table 8-41: Heard of LED Lighting by Business Size, Site Weighted 8-33

Table 8-42: Familiarity with LED Lighting Products by Business Size, kWh Weighted.....8-34

Table 8-43: Familiarity with LED Lighting Products by Business Size, Site Weighted.....8-34

Table 8-44: For Sites Aware of LEDs, Currently Have LEDs by Business Size, kWh Weighted.....8-35

Table 8-45: For Sites Aware of LEDs, Currently Have LEDs by Business Size, Site Weighted.....8-35

Table 8-46: Comparison of LEDs Installed Between the Phone and On-site Surveys 8-36

Table 8-47: LED Installation Years by Business Size, kWh Weighted 8-36

Table 8-48: LED Installation Years by Business Size, Site Weighted 8-37

Table 8-49: Type of Lighting Replaced by LEDs by Business Size, Site Weighted8-37

Table 8-50: Receipt of a Rebate or Financial Incentive for the Installation of the LED Equipment by Business Size, kWh Weighted.....8-38

Table 8-51: Receipt of a Rebate or Financial Incentive for the Installation of the LED Equipment by Business Size, Site Weighted.....8-38

Table 8-52: Reason for Purchasing LED Lighting Equipment by Business Size, Site Weighted.....8-39

Table 9-1: Televisions Present in the Facility by Business Size, kWh Weighted....9-2

Table 9-2: Televisions Present in the Facility by Business Size, Site Count Weighted.....9-2

Table 9-3: Comparison of Televisions Present in the Facility Between the Phone and On-site Surveys.....9-3

Table 9-4: Comparison of Television Present in Facility Between the Phone and On-site Surveys by Business Size 9-3

Table 9-5: Number of Televisions by Business Size, kWh Weighted 9-5

Table 9-6: Number of Televisions by Business Size, Site Count Weighted.....9-5

Table 9-7: Business Purchased a Television since January 2009 by Business Size, kWh Weighted.....9-6

Table 9-8: Business Purchased a Television since January 2009 By Business Size, Site Weighted.....9-6

Table 9-9: Comparison of Television Recent Purchases for the Phone and On-site Surveys.....9-7

Table 9-10: Number of Televisions Purchased since January 2009 by Business Size, kWh Weighted.....9-7

Table 9-11: Number of Televisions Purchased since January 2009 by Business Size, Site Weighted.....9-8

Table 10-1: Types of Cooling Equipment By Business Size, kWh Weighted 10-2

Table 10-2: Types of Cooling Equipment By Business Size, Site Weighted 10-3

Table 10-3: Types of Cooling Equipment by IOU, kWh Weighted.....10-5

Table 10-4: Types of Cooling Equipment by IOU, Site Weighted.....10-6

Table 10-5: Age of the Cooling Equipment by Business Size, Site weighted.....10-7

Table 10-6: Comparison of Cooling Present in the Facility Between the Phone and On-site Surveys.....10-8

Table 10-7: Installation of New Cooling Equipment for Firms Remodeling, by Business Size, kWh Weighted 10-9

Table 10-8: Installation of New Cooling Equipment for Firms Remodeling, by Business Size, Site Weighted 10-9

Table 10-9: Installation of New Cooling Equipment for Firms Not Remodeling, by Business Size, kWh Weighted 10-10

Table 10-10: Installation of New Cooling Equipment for Firms Not Remodeling, by Business Size, Site Weighted.....10-10

Table 10-11: Types of New Cooling Equipment Installed by Electricity Consumption, kWh Weighted.....10-11

Table 10-12: Types of New Cooling Equipment Installed by Business Size, Site Weighted 10-12

Table 10-13: Types of Cooling Equipment Removed and Replaced by the New Equipment by Business Size, kWh Weighted 10-13

Table 10-14: Types of Cooling Equipment Removed and Replaced by the New Equipment by Business Size, Site Weighted 10-14

Table 10-15: Efficiency of New Cooling Equipment by Business Size, Site Weighted 10-15

Table 10-16: Condition of Removed Equipment by Business Size, Site Weighted 10-15

Table 10-17: Plan to Install High Efficiency Cooling Equipment within the Next Year by Business Size, kWh Weighted 10-16

Table 10-18: Plan to Install High Efficiency Cooling Equipment within the Next Year by Business Size, Site Weighted 10-16

Table 10-19: HVAC Controls by Business Size, kWh Weighted 10-17

Table 10-20: HVAC Controls by Business Size, Site Weighted 10-17

Table 10-21: Timing of Last Service Performed on the HVAC System to Improve System Performance by Business Size, kWh Weighted 10-18

Table 10-22: Timing of Last Service Performed on the HVAC System to Improve System Performance by Business Size, Site Weighted 10-19

Table 10-23: On-going Maintenance Agreement by Business Size, Site Weighted 10-20

Table 10-24: Maintenance Part of a Utility Quality Maintenance Program by Business Size, kWh Weighted 10-20

Table 11-1: Type of Refrigeration Equipment by Business Size, kWh Weighted . 11-2

Table 11-2: Type of Refrigeration Equipment by Business Size, Site Weighted .. 11-3

Table 11-3: Purchased New Refrigeration Equipment by Business Size, Site Weighted 11-4

Table 11-4: Types of Refrigeration Equipment Installed by Business Size, Site Weighted 11-5

Table 12-1: Purchased Computers Recently by Business Size, kWh weighted ... 12-1

Table 12-2: Purchased Computers Recently by Business Size, Site Weighted ... 12-2

Table 12-3: For Sites Purchasing Computers, Number of Computers Purchased by Business Size, kWh Weighted 12-2

Table 12-4: For Sites Purchasing Computers, Number of Computers Purchased by Business Size, Site Weighted 12-3

Table 12-5: Motors at this Facility by Business Size, kWh Weighted 12-3

Table 12-6: Motors at this Facility by Business Size, Site Weighted 12-4

Table 12-7: Number of Motors at your Facility by Business Size, kWh Weighted 12-4

Table 12-8: Number of Motors at this Facility by Business Size, Site Weighted .. 12-5

Table 12-9: Natural Gas Equipment at this Facility by Business Size, kWh Weighted 12-6

Table 12-10: Natural Gas Equipment at this Facility by Business Size, Site Weighted 12-7

Table 12-11: Purchased Natural Gas Equipment Recently by Business Size, kWh Weighted 12-8

Table 12-12: Purchased Natural Gas Equipment Recently by Business Size, Site Weighted 12-8

Table 13-1: Incidence for Telephone and On-Site Survey Participants 13-3

Table 13-2: Discrepancy between the Phone and On-site Square Footage..... 13-4

Table 13-3: Comparison of Solar Present in the Facility Between the Phone and On-site Surveys 13-5

Table 13-4: Comparison of Solar Panels in Facility Between the Phone and On-site Surveys for by Business Size 13-5

Table 13-5: Comparison of Other Types of Distributed Generation in the Facility Between the Phone and On-site Surveys 13-6

Table 13-6: Comparison of Demand Response Present in the Facility Between the Phone and On-Site Surveys 13-6

Table 13-7: Comparison of Demand Response Participation Between the Phone and IOU Tracking data by Business Size 13-7

Table 13-8: Comparison of Linear Fluorescents Present in the Facility Between the Phone and On-site Surveys 13-7

Table 13-9: Comparison of Linear Fluorescent T12 Technology Present in the Facility Between the Phone and On-site Surveys 13-8

Table 13-10: Comparison of Linear Fluorescent T12 Technology in Facility Between the Phone and On-site Surveys, by Business Size 13-8

Table 13-11: Comparison of Linear Fluorescent T8 Technology Present in the Facility Between the Phone and On-site Surveys 13-10

Table 13-12: Comparison of Linear Fluorescent T8 Technology in Facility Between the Phone and On-site Surveys, by Business Size 13-10

Table 13-13: Comparison of Linear Fluorescent T5 Technology Present in the Facility Between the Phone and On-site Surveys 13-12

Table 13-14: Comparison of Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys 13-12

Table 13-15: Comparison of Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size 13-13

Table 13-16: Comparison of Screw-in Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys 13-14

Table 13-17: Comparison of Screw-In Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size 13-14

Table 13-18: Comparison of Pin-Based Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys 13-15

Table 13-19: Comparison of Pin-Based Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size 13-16

Table 13-20: Comparison of LEDs Installed Between the Phone and On-site Surveys 13-18

Table 13-21: Comparison of Televisions Present in the Facility Between the Phone and On-site Surveys 13-18

Table 13-22: Comparison of Television Present in Facility Between the Phone and On-site Surveys by Business Size 13-19

Table 13-23: Comparison of Cooling Present in the Facility Between the Phone and On-site Surveys 13-20

Executive Summary

ES.1 Introduction

The Commercial Saturation Survey (CSS) and Commercial Market Share Tracking Survey (CMST) were designed to collect demographic information on California businesses, baseline information on recent purchases by businesses, and data on the current saturation of equipment in commercial buildings. The CMST study collected information on recent purchases of linear fluorescents, televisions, and small packaged HVAC. The CSS study collected baseline information on the characteristics of commercial buildings, the demographics of businesses, and the saturation and efficiency level of energy consuming measures. These studies provide the CPUC, IOUs, and the evaluation community with baseline information on the saturation, density, and efficiency levels of existing and newly purchased equipment. This information illustrates the current distribution of businesses, the current Demand Side Management (DSM) program participation, commercial customer environmental consciousness, the current distribution of equipment in businesses, and recent purchases of high priority technologies.

The studies are collecting information on current baselines and current purchases using four overlapping data collection efforts:

- A joint CSS/CMST telephone survey collected information from 7,880 businesses
- A CMST on-site data collection effort collected data on recent purchases
  - Data was collected at over 500 businesses installing new linear fluorescents
  - Data was collected at over 400 businesses installing new televisions
  - Data was collected at nearly 200 businesses installing new HVAC systems
- A CMST contractor survey collected information on the efficiency of recent sales
  - Data was collected from 95 contractors who install linear fluorescents
  - Data was collected from 123 contractors who install commercial HVAC systems
- A CSS on-site data collection effort
  - Data was collected across more than 1,400 businesses on the lighting, HVAC, refrigeration, televisions, and office equipment employed in commercial businesses

ES.2 Nonresidential Frame and Program Participation

The research team worked with the CPUC and the IOUs to develop the necessary databases. The sample of sites needed for these studies is reliant on the population of electric customers in the Nonresidential Frames (NRF) of Pacific Gas and Electric (PG&E), Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E) (collectively referred to as the IOUs).[1] Two types of IOU data were used to create the NRF from which sites were pulled for the telephone and subsequent on-site CSS and CMST surveys: the Nonresidential Customer Information System Data (CIS) and the Nonresidential Billing data. Additional IOU data used for these studies include the Energy Efficiency (EE), Demand Response (DR) and Distributed Generation (DG) Program Tracking Data.[2] These data were used to characterize program participation and to determine if baseline data gathered during the study differed by program participation.

Using the customer NAICS codes in the CIS, the research team, in collaboration with the CPUC and IOUs, developed business types for sites in the NRF. The business types were used to determine eligibility for the telephone survey. Table ES-1 lists the number of sites and the electricity consumption by business type for businesses in the IOU electric NRF. This table also lists the share of sites and consumption by business type within the electric NRF. The segments with the largest share of sites are the following business types:

- Miscellaneous business types have the most sites in the frame - 25% of all sites[3]
- Unknown business types are second most numerous at 20% of sites

As part of the telephone survey self-reported business type is collected, enabling the Study to update the business activities undertaken at premises. The self-reported business information is critical to updating the nondescript business types of property management and unknown.[4]

The data in Table ES-1 also indicate that the segments with the largest share of consumption are the following business types:

---

1 The reliance on the electric nonresidential frame differs from a typical measurement and evaluation study that draw sites from the program tracking data.

2 For SDG&E, the DG data was the interconnect data instead of the program tracking data. SDG&E does not implement the DG programs in their territory. The interconnect data, however, provided the team with the information needed to determine sites with DG technologies. Going forward, if the CPUC wants to maintain a database listing sites participating in EE, DR, and DG, DG interconnect data may provide the CPUC with information needed for an integrated database. The interconnect data will be available for sites even if the technology does not receive a program rebate.

3 The miscellaneous is comprised of many business types that are identified but too small to group independently.

4 Property management business types represent 8% of the sites in the frame and 9% of the electricity consumption. The property management business type is nondescript as it describes the individual establishing the utility account but does not describe the business activity at the premise.

- Industrial businesses consume the largest share of electricity at 25% of the electricity
- Miscellaneous business types are the second largest at 12% of the consumption

The distribution of sites and consumption indicates that industrial businesses tend to consume a substantial amount of electricity per premise while businesses without NAICs codes in the CIS (unknown business type) usually have less electricity consumption than the average site.[5]

Table ES-1: Nonresidential Electric Frame by Business Type

CSS Building Type	Total Number of Sites	Share of Telephone Eligible Sites	Total Usage 2010, MWh*	Share of Telephone Eligible Usage
College	1,507	0%	1,816,925	2%
Food/Liquor	24,885	3%	6,296,625	7%
Health Care – Care	4,089	0%	3,881,388	4%
Health Care – Hospital	37,119	4%	1,925,107	2%
Hotel	7,157	1%	2,688,164	3%
Industrial	41,363	4%	22,494,451	24%
Miscellaneous	242,726	25%	11,508,821	12%
Office	133,764	14%	9,595,069	10%
Property Managers	72,672	8%	8,025,888	9%
Restaurant	64,732	7%	6,179,456	7%
Retail	79,755	8%	7,877,868	8%
School	11,482	1%	3,391,931	4%
Unknown	193,902	20%	3,376,771	4%
Warehouse	39,580	4%	4,139,725	4%
Not in Study	5,469		1,027,081	
Not in Study - Agriculture	131,051		9,057,951	
Not in Study – Mining	14,946		3,749,954	
Not in Study - Street Light	47,870		536,662	
Not in Study – TCU	99,702		9,895,324	
Total	**1,253,771**		**117,465,161**	
Eligible for Telephone Survey	**954,733**	**76%**	**93,198,189**	**79%**
Eligible for CSS	**867,587**	**69%**	**64,273,542**	**55%**

* The usage is 2010 usage for all sites from the 2010 frame and 2011 usage for the few sites that did not exist in the 2010 frame.

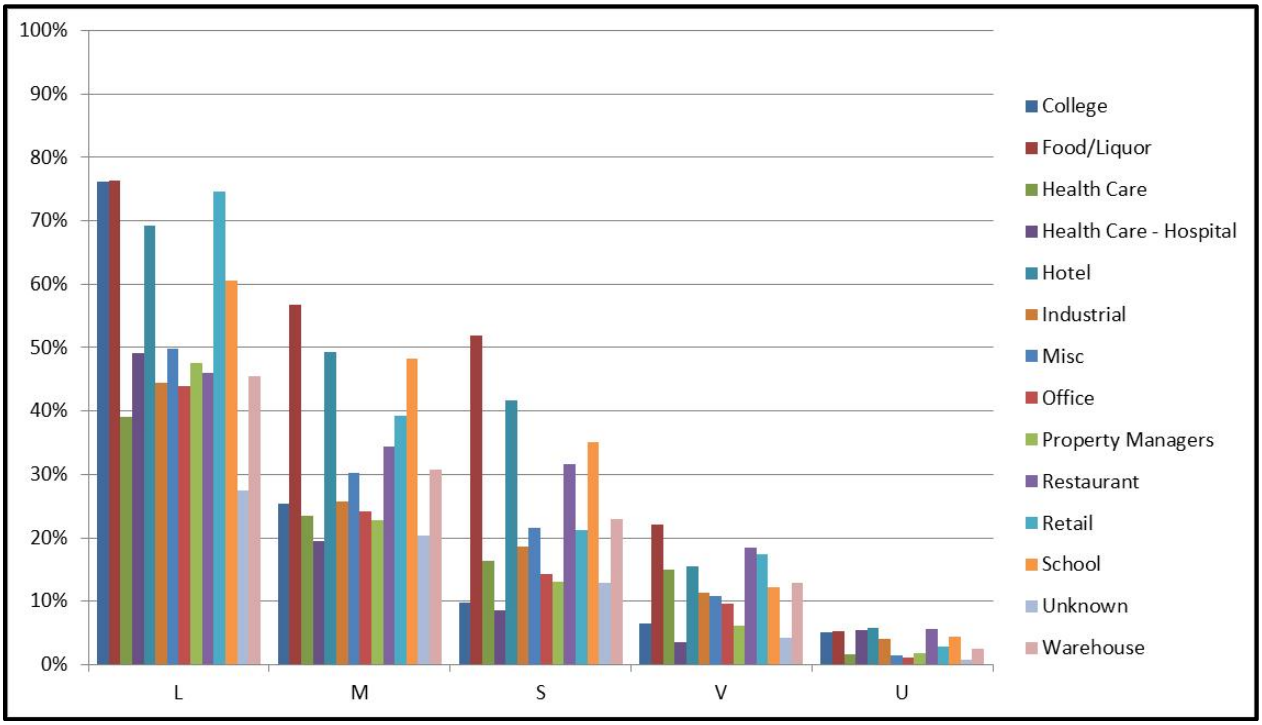
[5] The average annual electricity consumption for an industrial site is 543 MWh, the average for a site with an unknown business type is 17 MWh and the average for sites eligible for the telephone survey is 97 MWh.

The research team incorporated DSM program participation into the Study analyses. Figure ES-1 illustrates the distribution of sites participating in EE programs during 2009-2012 by business type and customer size. Review of the program participation data by customer size and business type reveals the following:

- Large sized sites are significantly more likely to participate in EE, DR, or DG than smaller sites
- Significantly more sites participate in EE than DR or DG
- The share of kWh participating in EE and DR programs is similar
- Food and liquor stores have the highest share of sites participating in EE programs and colleges have the highest share of kWh participating
- Businesses with unknown business types have the lowest share of sites and kWh participating in EE programs

Section 3 of the report presents information on the level of EE, DR, and DG program participation disaggregated by customer size, building type, and IOU.

Figure ES-1: Share of Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size*



* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

ES.3 Telephone Survey Overview

The telephone survey's primary objective is to help develop an on-site sample for estimating a wide range of commercial customer characteristics largely represented by the share of sites purchasing high priority measures and the saturation of electricity consuming end uses. Given that the primary purpose of the telephone survey is to recruit a representative sample for the CSS and CMST on-site surveys, the final telephone survey sample design was adjusted during the survey process to successfully fulfill this objective.

The telephone survey sample design incorporates 14 business types:

- colleges and universities
- food and liquor stores
- non-hospital health care
- hospitals
- hotels and motels
- industrial
- miscellaneous
- offices
- property managers
- restaurants
- retail
- K-12 schools
- warehouses
- unknown

The business type strata were further disaggregated by the three electric IOUs and five usage strata (very small, small, medium, large, and unknown)[6] to produce 210 unique strata. See Section 4 for more information on the sample design.

The telephone survey asks respondents about their business characteristics; attitude and knowledge of EE, DR, and DG; and the types of lighting, TVs, refrigeration, and HVAC equipment at their site. The telephone survey also asks respondents about recent purchases of linear lighting technologies, televisions, and packaged HVAC units.[7] This report presents self-report data describing the current distribution of equipment and describes recent purchases of high priority technologies.

ES.3.1 Business Characteristics

The CSS telephone survey collected information on the business activity undertaken at the site, the site level square footage, the age of the building and the business, the number of employees, and the business outlook. Using information on self-reported business activity, the business type of all telephone survey sites is updated and the disaggregation of phone survey results by

[6] The unknown usage category represents accounts found in the CIS that do not have a matching record in the billing data.

[7] Sites that had recently purchased linear technologies, TVs, or HVAC units were eligible to participate in the CMST on-site survey. These sites were recruited to participate in the CMST on-site study at the end of the telephone survey.

business type is presented by the update business activity information.[8] Business type reclassification is of high importance. The self-reported business type will be used to determine eligibility for the on-site CSS and CMST surveys. In addition, for the CIS business types that do not describe business activities (property management and unknown) it is crucial that these sites are allocated to descriptive business types. The following describes the phone survey business types for non-descriptive NRF business types:

- For sites classified as property management in the NRF, 51% of sites self-identified as offices and 18% as miscellaneous
- For sites with unknown business type in the NRF, 50% self-identified as miscellaneous, 16% as offices, and 10% as retail.

See Section 6 for detailed information on self-reported business characteristics.

ES.3.2 DSM Awareness

The telephone survey collected information on customer attitude toward energy usage and awareness of DSM. The survey questioned nonresidential customers about their awareness of programs and resources designed to reduce their energy usage through EE, DR, and DG. Results from the customer awareness section indicate that larger customers are more likely to state that it is essential to their organization to be environmentally conscious and that they include their environmental consciousness in their marketing material. Larger customers are also more likely to report a higher level of understanding and participation in utility programs designed to reduce their energy bills. See Section 7 for self-reported information on DSM awareness and attitudes.

ES.3.3 Lighting

The telephone survey has an extensive battery of questions on lighting. The survey questions businesses about the types of lighting used in the facility and the age of the existing lighting fixtures. As part of the CMST study, the telephone survey asks respondents if they have replaced their lighting fixtures since January 2009. If the business replaced linear technologies, the business is eligible to be recruited for the CMST on-site verification study. Using site based weights the self-reported telephone survey found the following saturation of lighting technologies:

- 79% of sites self-report having linear technologies at their facility
  - 53% of sites report having T8s or skinny tubes

[8] The results are analyzed and presented to represent the best information at the time of analysis. Thus the telephone survey sites are grouped with the updated business type information. A site's weight, however, represents the stratum for which they were originally pulled from the non-residential frame.

  - 25% of sites report having T12s or fat tubes
  - 7% of sites report having T5s
  - 22% of sites stated that they didn't know the type of linear
- 21% of sites self-reported having occupancy sensors
- 91% of sites are familiar with CFLs
  - 47% of sites that are familiar with CFLs self-reported having CFLs
- 39% of sites self-reported having incandescent technologies
- 86% of sites self-report that they have heard of LEDs
  - 20% of sites that have heard of LEDs self-reported having LEDs

For a sub-sample of sites that participated in both the telephone and the on-site surveys, the telephone survey self-reported saturations for linear technologies, CFLs, and LEDs are compared with results found during the on-site survey. The comparison of the telephone and on-site data indicates that respondents generally know if they have linear technologies but are less accurate on their self-reported understanding of the types of linear technologies or the presence of CFLs and LEDs. The on-site survey found that approximately 98% of sites had linear technologies and 75% of sites have CFLs, for both technologies the on-site saturations where higher than the self-reported saturations. The lighting results are presented in Section 8.

ES.3.4 TVs

The telephone survey includes a battery of questions regarding the incidence of televisions and asks businesses if they have purchased a television since 2009:

- 38% of sites self-report having a TV
  - 71% of large sites self-report having a TV
  - 33% of very small sites report having a TV
- For sites with TVs, 40% of sites have purchased a TV since 2009

For a sub-sample of sites that participated in both the telephone and the on-site surveys, the telephone survey self-reported saturation of TVs and recent purchases of TVs can be compared with the on-site data. The comparison of the telephone and on-site data indicates that respondents generally know if they have TVs and if they recently purchased a TV. The TV results are presented in Section 9.

ES.3.5 HVAC

The telephone survey collected self-report baseline information on cooling equipment. The battery of cooling equipment questions asks about the business' current equipment, recent

purchases of equipment and the state of equipment that was replaced, and the HVAC maintenance practices of the business. The telephone survey also recruits for the CMST HVAC on-site surveys. The HVAC results from the telephone survey estimates include the following:

- 25% of sites self-report no cooling equipment
  - PG&E has a higher share of its sites without cooling equipment than SCE or SDG&E
- 26% of sites self-report that no cooling equipment was replaced when new equipment was added
  - Some of the new equipment installed represents controls such as programmable thermostats
  - Four out of five of the sites self-reporting that no cooling equipment was replaced when new equipment was added also report installing packaged air conditioning equipment
- For sites replacing their HVAC equipment since 2009, 44% of sites report that the equipment was inoperable at time of replacement
- 31% of sites report that they have had HVAC system maintenance within the last 3 months

ES.3.6 Refrigeration

The telephone survey collected self-report baseline information on refrigeration equipment. The battery of refrigeration equipment questions asks about the business' current equipment, recent purchases of equipment and the state of existing equipment.

ES.4 Telephone and On-site Survey Comparison

Baseline surveys are often undertaken using either telephone surveys or on-site surveys. For the CSS/CMST Study, both telephone and on-site surveys were incorporated into the research design with the on-site surveys nested within those sites that participated in the telephone survey. Nesting the on-sites within the telephone survey participants enabled a comparison of the self-reported telephone survey and on-site information on the share of sites with specific end uses and technologies.

The CSS/CMST study analyzed the weighted incidence of end uses and measures as documented using all sites that participant in the telephone survey and the on-site surveys. The incidence analysis compares the share of weighted sites with specific end uses and measures. The study also compared the un-weighted responses for sites that participated in both surveys, highlighting the share of sites whose self-reported telephone survey responses corroborated and disagreed

with the data collected at their facility. The findings from the incidence analysis are presented in Table ES-2. The incidence analysis generally found that the incidence of measures and end uses in the telephone survey are under-reported relative to what is found during the on-sites survey.

The findings from the incidence and comparison analysis call into question baseline studies where telephone surveys represent the primary form of data collection. Customers were found to have substantial difficulty self-reporting on the measures and end uses present in their facilities. This analysis highlights the importance of using on-site surveys to collect information needed to better understand the saturation of end uses and measures in commercial facilities.

Table ES-2: Incendence of Measures from the Telephone and On-Site Surveys

Technology	Telephone Survey	On-site Survey
Solar PV	3%	2%
Linears	79%	94%
T12	8%	42%
Fat Tubes	11%	
T8	18%	71%
Second Generation T8	3%	
Skinny Tubes	22%	
T5	5%	6%
CFLs	47%	62%
LEDs	19%	4%
Occupancy Sensors	21%	17%
TV	38%	47%
No Cooling	25%	23%
Split System	9%	12%
Packaged System	37%	52%

ES.5 Phone Survey Findings

- **DSM program participation** of non-residential sites is substantially higher for EE than for DR or DG. Fourteen percent of non-residential sites participated in EE during 2009-2012 while 4% registered for DR and only 0.4% installed DG. DSM program participation of non-residential kWh is similar for EE and DR and significantly smaller for DG. Approximately 47% of the kWh in the NRF participated in EE during 2009-2012, 50% registered for DR, and 6% participated in DG.[9]

[9] kWh participation for DG is difficult to measure if the installation of DG technologies leads to a significant reduction in the utility energy consumption for participant sites.

- **EE program participation** using site counts is highest for food and liquor stores (46%), hotels (36%) and schools (33%). EE participation is lowest for businesses with nondescript business types such as property management (9%) and unknown (5%).[10] Property management and unknown business types are typically small or very small sites and may be prone to split incentives but collecting better information about sites with nondescript business types could help the IOUs better target programs for these businesses.
- **EE program participation is very dependent on customer size**. By business type, the share of sites participating in EE is 2 to 7 times higher for large sized sites than very small sites. A similar pattern of participation in observed for DG and DR.
- **Awareness and knowledge is highly dependent on customer size**. Large sites are more likely than very small sites to state that being environmentally conscious is essential or very important to their business. Large sites are more than twice as likely as small sites to self-report that they are aware of programs designed to reduce their energy bills.
- **Nearly a quarter of sites self-reported having T12s**. The nested phone and on-site sample of sites provides preliminary evidence that the share of sites with T12s is higher than the self-reported estimate. These data, however, also illustrate that many of the sites with T12s also have T8s, indicating that the sites may be in the process of updating their linear technologies.[11]
- **The self-reported awareness of new lighting technologies is relatively high while the saturation is relatively low.** Approximately 47% of sites self-report having CFLs and 19% have LEDs installed at their facility. High awareness combined with low saturation may indicate that these technologies have a high remaining potential.
- **The saturation of TVs is growing in the commercial sector**. Approximately 38% of sites self-report having TVs. Large sites are significantly more likely to have TVs than small sites. Approximately 40% of sites with TVs have purchased TVs during 2009-2012. TVs are no longer just a residential end use.[12]
- **Packaged HVAC units are the most common air conditioning type** in nonresidential facilities in California. Fifty eight percent of sites installing new HVAC equipment self-

[10] If kWh is used to describe participation instead of sites, colleges have the highest share of EE participation at 79%, food and liquor stores at 67% and hotels with 63% of energy consumption participating in programs. Property management and unknown business types have the lowest share of EE participation by kWh at 38% and 18% respectively.

[11] The CSS on-site study provides additional insight into the share of sites with T12s and the share of T12 fixtures. The CMST on-site study and the lighting contractors' survey provide information on the distribution of linear technologies purchased by the nonresidential sector.

[12] The CSS on-site study provides information on the distribution of all TVs. The CMST on-site study provides additional information on the efficiency distribution of TV purchases.

report that the new equipment is high efficiency. Findings from the CMST on-site surveys do not support the self-reported claims that new equipment is high efficiency.[13]

- **Lack of air conditioning is self-reported at a quarter of sites** (25%), providing for the possibility of increased AC load in the future. Many customers report that newly installed HVAC equipment represents new equipment that is not replacing existing equipment.

ES.6 Recommendations

- **Consider reinstituting Hard-to-Reach Goals for small businesses.**
  - The relatively low incidence of EE program participation among smaller sites (11% participation for very small sites versus 56% for large sites) and their self-reported lack of knowledge of programs available may indicate that hard to reach goals are needed to reach these customers.
  - The program assessments planned as part of the 2013/2014 evaluations may provide information that could help understand those programs whose design and implementation could lead to more and deeper retrofits in the hard to reach segment.
  - **Prior to instituting hard to reach goals the cost effectiveness of programs designed to address this segment also need to be reviewed.**
- Given the emphasis on integrated demand side management (IDSM) in the strategic plan, the research team believes that the **CPUC, IOUs, and evaluators should work to maintain an integrated EE, DR, and DG tracking database** going forward.
  - The integrated EE, DR, and DG tracking database developed during this project highlights segments and customer sizes that were and were not participating in DSM.
  - **The availability of comprehensive DG information has been the primary issue.** The CPUC and the IOUs should discuss the optimal source of data for DG. If all installations of distributed generation technologies are tracked by the IOUs in a tracking database, then tracking data may be the best source of data. Alternatively, if some installations of technologies are occurring outside the program, but these technologies require interconnect information, the interconnect data may provide a more complete list of sites participating in distributed generation.
- **The IOUs should work to limit the use of nondescript business types in their Customer Information Systems (CIS).**
  - Market characterization is difficult if there is a high share of nondescript business types.

[13] The CMST on-site study combined with the HVAC contractor survey findings present a clearer picture of new HVAC installations while the CSS on-site report describe the efficiency of existing equipment.

- The IOUs and their third party partners may find it more difficult to design programs and intervention strategies for businesses with nondescript business types contributing to the lower incidence of DSM program participation for these businesses.

- **The CPUC and the IOUs should review the current set of HVAC offerings.**
  - The low incidence of sites installing new HVAC units prior to the failure of the unit (approximately 50% of HVAC fail prior to replacement and over 30% are in poor condition), combined with the finding that few of the installed units exceed baseline code requirements (approximately 20% of units installed exceed code), points to a need to review the HVAC energy efficiency programs.
  - Achieving a higher share of efficient installations may require more initiatives and promotions and larger incentives.
  - Given the small share of sites currently installing HVAC units that exceed baseline code requirements, standard practice appears to be code. A code based standard practice likely illustrates that free ridership for these measures are low.

- **Future Baseline and Impact Studies need to continue to include on-site surveys.**
  - Due to competing demands for budgets, researchers attempt to limit or eliminate on-sites and hope phone surveys can help answer the research questions. However, comparison of the phone and on-site survey findings indicate that telephone survey respondents often know if they have a general class of technologies (linear technologies and TVs) but have less understanding of the specifics of the technologies (T12s, T8s, T5, CFLs, or LEDs). These findings support the need to continue with on-site surveys and contractor studies to maintain a clear understanding of the efficiency distribution of technologies.

1

Introduction

The Commercial Saturation Survey (CSS) and Commercial Market Share Tracking Survey (CMST) are designed to collect demographic information on California businesses, baseline information on recent purchases by businesses, and data on the current saturation of equipment in commercial buildings. The CMST study is collecting information on recent purchases of high priority measures. The high priority measures chosen for this evaluation include linear fluorescents, televisions, and small packaged HVAC. The CSS study will collect baseline information on the characteristics of commercial buildings, the demographics of businesses, and the saturation and efficiency level of energy consuming measures. These studies will provide the CPUC, IOUs, and the evaluation community with baseline information on the saturation, density, and efficiency levels of existing and newly purchased equipment. This information will help describe current standard practices, illustrate the current distribution of equipment in businesses, and help with the development of future programs designed to reduce energy usage.

The studies collected information on current baselines and current purchases using four overlapping data collection efforts.

- A joint CSS/CMST telephone survey collected information from 7,890 businesses.
  - Program tracking data for energy efficiency, demand response, and distributed generation were combined with the non-residential frame to develop a baseline of current DSM program participation and of sites participating in multiple programs.
- A CMST on-site data collection effort collected data on recent purchases.
  - Data was collected at over 500 businesses installing new linear fluorescents.
  - Data was collected at over 400 businesses installing new televisions.
  - Data was collected at nearly 200 businesses installing new HVAC systems.
- A CMST contractor survey collected information on the efficiency of recent sales.
  - Data was collected from 95 contractors who install linear fluorescents.
  - Data was collected from 123 contractors who install commercial HVAC systems.
- A CSS on-site data collection effort.

- Data was collected across 1,439 businesses on the lighting, HVAC, refrigeration, televisions, and office equipment employed in commercial businesses through a full inventory of commercial lighting.
- Information on the building square footage was combined with the building energy usage to calculate whole-building energy intensities.

The CSS/CMST telephone survey is a nonresidential customer population survey. Its large size and encompassing nature provides a unique set of information on California businesses. The telephone survey collects detailed information on the types of business activities undertaken by California businesses, business attitudes toward the environment and energy efficiency, business square footage, operating hours, recent purchases, and the types of energy-consuming equipment present. These data are combined with information on customer energy consumption and demand side management program participation. Analyzing these data provides the CPUC and the IOUs with extensive information on nonresidential customers by IOU, size, and program participation.

The CMST telephone and on-site surveys collected information about recent purchases of both standard and high efficiency high priority measures. Using this information, it is possible to determine from the telephone survey the self-reported share of businesses that have purchased new equipment, and from the on-site survey to verify new equipment purchases. For the on-site data collection efforts, these data are used to determine the efficiency of new purchases. The data on recent purchases and efficiency levels have been analyzed in conjunction with information from IOU energy efficiency program tracking databases to help determine the share of high efficiency purchases reported to be receiving IOU rebates. The findings from these analyses are presented in a separate CMST report.

The CMST contractor surveys collected market level information on the installation of linear fluorescents and small packaged HVAC systems. These data provide a high level overview of the standard and high efficiency share of these systems currently installed in nonresidential businesses in California. The comparison of the CMST on-site end user and contractor data help to provide a fuller picture of recent purchases of these two high priority end uses. The findings from these analyses are presented in a separate CMST report.

The CSS on-site survey collected detailed information on the types of business activities undertaken by California businesses, business square footage, operating hours, and the types of energy consuming equipment present. The study collected the data needed to describe the efficiency allocation of many lighting measures, small packaged HVAC systems, and TVs. Analyzing these data, the study describes the baseline efficiency distribution of these measures in California businesses. The findings from these analyses are presented in a separate CSS on-site report.

The sections in the phone survey report include the following:

- A description of the detailed objectives of the CMST and CSS surveys,
- A description of the nonresidential IOU frames and the DSM program participation of the frame,
- A description of the telephone survey sample design,
- A description of the telephone survey questions,
- Presentation of the telephone survey respondent business characteristics,
- A description of the telephone survey respondent attitudes and awareness of DSM, and
- Sections presenting information from each of the telephone survey sections.

2

CSS and CMST Research Objectives

The Commercial Saturation Survey and the Commercial Market Share Tracking Survey are designed to answer an extensive list of baseline research objectives. The research objectives differ and overlap for the three components of the study: the CSS/CMST telephone survey, the CMST on-site data collection, and the CSS on-site data collection. The following sections will highlight the objectives of the telephone survey and provide a brief description of the objectives of the CMST and CSS on-site data gathering efforts.

2.1 Telephone Survey Research Objectives

The telephone survey incorporates approximately 8,000 commercial businesses in the three electric IOU service territories. Interviewing this large a sample of commercial customers provides the evaluation team with the unique opportunity to collect baseline information. The team collected information on firm demographics including the business type, number of employees, business age, building age, building square footage, and the business outlook. The survey collected information on the customer's environmental consciousness, their awareness of DSM programs, and their current participation in these programs. The survey also collected information on the types of technologies currently used in the customer's building and whether the customer had purchased any new technologies since 2009. Analyzing these data, the research team will fulfill the following objectives using the telephone survey data.

1) The analysis team will compare the business type information collected during the telephone survey to the NAICS code/business type mapping in the IOU Customer Information System. The telephone survey business type information will be used to develop an updated picture on the distribution of businesses in California.
2) Information on customer environmental consciousness, the importance of environmental marketing, and information on the development of long-term energy plans will be used to describe the current level of environmental awareness. This information will be presented by customer size and energy efficiency participation.
3) A baseline of DSM awareness will be developed using telephone survey questions on knowledge of energy efficiency, demand response, and distributed generation opportunities. This information will also be compared with program tracking information on energy efficiency and distributed generation program participation and demand

response program registration. These data will provide a current baseline on customer awareness of DSM options. This baseline can be used in future studies to determine the growth in DSM program awareness.

4) The phone survey will collect self-report information on the types of equipment and the share of sites purchasing lighting, televisions, and air conditioning equipment. This information will also be used to recruit for the CMST on-site surveys and to compare data collected on site with self-reported telephone survey information.
5) Recent purchasers of televisions were questioned on where they purchased their units. This information will help describe the market where commercial televisions are purchased.
6) Information on linear fluorescents, CFLs, incandescents, and LEDs will be collected in order to determine the share of businesses with different types of lighting systems. A self-reported baseline of lighting types in California by business type, business size, and energy efficiency program participation will be developed. Later, these data will also be compared to information collected as part of the CSS on-site lighting inventory.
7) The analysis team will develop a baseline of the self-reported current knowledge of CFLs and LEDs in California.
8) The analysis team will determine the share of commercial sites planning on purchasing efficient HVAC and refrigeration equipment in the coming year. This provides information on the size of the future market for these equipment systems.

2.2 Commercial Market Share Tracking Research Objectives

Commercial market share tracking information will be collected using three approaches during this study. Information on recent purchases of linear fluorescents, televisions, and small HVAC systems will be collected from end users during telephone surveys and on-site data collection efforts. In addition, telephone surveys of lighting and HVAC contractors will be used to develop a high level picture of the market place.

Select information collected as part of the CMST telephone survey questions will be presented in both the telephone survey report and the CMST on-site survey report. The on-site survey will collect information that will be used to develop information on the efficiency level of recent purchases. The lighting and HVAC contractor surveys will be used to determine a broader picture of these markets for nonresidential customers. These surveys will collect information on the distribution of lighting and HVAC sales and installations by efficiency level. These data will be used to triangulate the information collected as part of the CMST on-site data collection effort.

2.3 Commercial Saturation Survey Research Objectives

The research objectives of the CSS study center around determining the current baseline of equipment in commercial businesses. As part of the CSS study, information was collected on business types, square footage, and building features. These data will help to describe the current California commercial building stock. The CSS on-sites have collected a full inventory of commercial lighting and these data will be used to present a complete picture of the types of lighting currently employed by commercial businesses. The CSS on-sites also collected extensive information on HVAC and refrigeration systems. These data will be analyzed to describe the current saturation of these two important systems. The CSS on-sites collected information on TVs and office equipment. These data will be analyzed to better understand the saturation and distribution of these two important classes of commercial plug loads.

3

Nonresidential Frame and Program Participation

The CSS and CMST studies are nonresidential population baseline studies. The sample of sites needed for these studies is reliant on the population of electric customers in the IOU nonresidential frame.[1] Two types of IOU data were used to create the Nonresidential Frame from which sites were pulled for the telephone and subsequent on-site CSS and CMST survey. These data included the Nonresidential Customer Information System Data (CIS) and the Nonresidential Billing data. Additional IOU data used for these studies include the Energy Efficiency and Distributed Generation Program Tracking Data and the Demand Response Program Registration Data. These data were used to characterize the energy efficiency, distributed generation, and demand response program participation of nonresidential customers and to determine if baseline data gathered during the study differed by program participation.

3.1 Development of the Nonresidential Frame

The sections below describe the datasets and how they were cleaned, prepared, and merged together to create the nonresidential frame.

3.1.1 Customer Information System Data

The 2011 Nonresidential Frame (NRF) is a compilation of data taken from the 2010-2011 Customer Information System (CIS) data. The 2010 Nonresidential CIS was provided to Itron during 2011, and the 2011 CIS was provided in 2012. The CIS data conveys information like address, zip code, customer name/contact, and telephone number at an account level. The purpose of creating the NRF is to provide a set of sites rather than accounts. The team attempted to associate or aggregate accounts to a single identification number given reasonable information to assume that the accounts were part of the same location. These aggregated accounts make up the NRF.

A site development algorithm, using much of the information provided in the CIS, was created to aggregate the accounts into sites. Sites represent a single business or decision maker at a geographic location. The site development algorithm is based on a combination of business names, telephone numbers, and street addresses. The algorithm and the site development were

[1] The reliance on the electric nonresidential frame differs from a typical measurement and evaluation study that draws its sample of sites from the program tracking data.

reviewed thoroughly by the staff at Itron. While this process is more often than not correct in its association of accounts, there are some occasions where accounts should have been aggregated together, or were aggregated but should not have been. It should be noted that these cases are rare. The likelihood of incorrect aggregation is higher at more complicated sites. Sites with multiple buildings, where accounts could reference different street names, are the types of sites where incorrect aggregation is most likely. Complicated sites with multiple buildings on multiple streets are likely to be under-aggregated; this could lead a single large business to be allocated into multiple sites.

During the site aggregation or development process, multiple accounts can be combined into a single site. During this process, Itron carefully maintains much of the individual account information. These data are combined with the billing and program tracking data to develop a set of data to characterize the site.

Itron first developed the NRF using the 2010 CIS. When Itron received the 2011 CIS, the vast majority of sites across the two CIS could be merged or joined. Obviously, some businesses went out of business during the period and may have been replaced by new businesses, property management firms, or building owners managing an empty site. In addition, new construction may have created a limited number of new buildings, though this effect was small during this period due to the state of the construction industry. Given the study's need to contact existing businesses during 2012, the team used the merged 2010 and 2011 CIS frame to develop the nonresidential frame from which sites were pulled for the study. For purposes of describing the energy consumption and sample design, the team used 2010 billing data, where available, and 2011 billing data for sites without 2010 billing data.

3.1.2 Nonresidential Billing Data

The nonresidential billing data were provided to Itron in different formats from each IOU and for each year. Itron has full billing data records for each IOU for the years 2006-2012. For purposes of the CSS/CMST study, the evaluation team used the 2010 billing record, where available. If the site had no billing data for 2010, the evaluation used the 2011 billing information. The billing data generally contains service account number, the electric or gas meter number, a date of billing, the number of days billed, kilowatt hours (kWh) used, maximum kilowatts (kW), and therms used during that billing period. There is usually also a tariff or rate code associated with any given billing record. If the rate code is associated with a time-of-use (TOU) rate plan, then on most billing data extracts there will be a peak time, semi-peak time, and off-peak time usage field for kWh, maximum kW, and therms.

A large part of working with the billing data involved cleaning the data. Duplicate records, overlapping billing periods, and other discrepancies made it difficult to determine which records

were appropriate to keep. An algorithm was developed to take care of these issues. After cleaning the data, the billing data was compared to IOU annual reports for accuracy.

3.1.3 Energy Efficiency Tracking Data

The energy efficiency program tracking data was provided to Itron by the energy division and the CPUC from the IOUs. The data is provided in years corresponding to program cycles. For the CSS/CMST analysis, the energy efficiency program tracking data from 2009 and 2010-2012 were used. These data contain standardized customer information such as address, city, zip code, customer name, and telephone. More importantly, a claim identification number is assigned to each record, which generally associates a measure installed for a certain account through a certain program. The year for which a given record is associated comes from this installation date.

3.1.4 Demand Response Tracking Data

As part of the CSS/CMST study, the research team requested the demand response tracking data. This data was provided to Itron by the energy division and the CPUC from the IOUs. The team requested information from accounts that had signed up to participate in demand response programs from 2009-2012. These data contain standardized customer information such as address, city, zip code, customer name, telephone, and account number. These data indicate accounts that signed up to participate in demand response. It is important to note that these data do not detail the realized demand reductions from these sites.

3.1.5 Distributed Generation Tracking Data

The research team also requested the tracking data from the 2009-2012 California Solar Initiative (CSI) and the Self-Generation Incentive Program (SGIP). This data was provided to Itron by the energy division and the CPUC from SCE and PG&E. For SCE these data contain standardized customer information such as address, city, zip, customer name, telephone and account number. PG&E was able to provide standardized customer information for their CSI participants and for approximately half of their 2009-2012 SGIP participants. SDG&E does not implement the CSI or SGIP programs, these programs are implemented by the California Center for Sustainable Energy (CCSE). CCSE, however, does not have access to participant account numbers. Without account numbers, it is necessary to merge the tracking data to the non-residential frame using addresses and customer names. Itron requested that energy division ask SDG&E for the distributed generation interconnect data. These data provided the team with the standardized customer information, including account numbers.

3.1.6 Combining the Data

As described in the dataset explanations above, each type of data (CIS, billing, and tracking data) came in separate deliveries for different time periods between 2009 and 2012. After the data

from different periods were merged and cleaned, the five comprehensive datasets were merged together to enable summarizing the data according to the data request. The development of the combined dataset used for the CSS/CMST sample design was developed in cooperation with work order 009 (WO009), the Data Development work order.

The CIS data was attached to the billing data based on the service account number and meter number when possible. The tracking data was attached to the CIS data based on the service account number when possible. Due to the nature of the tracking data, account numbers are sometimes incorrect. Therefore, further merges were done using service address, city, ZIP code, phone number, and contact name.[2]

Once all the data were compiled at the account level, the combination of the CIS and billing data was summarized to the site level. Often, multiple NAICS codes and other site-identifying information were inconsistent between accounts that were aggregated into a single site. In cases where there were inconsistencies, a preference was given to accounts with the greatest kWh consumption in 2010. The NAICS codes were then obtained for each site and the kWh, kW, monetary bills, and therm usages were each summed by year for all sites.

Using the NAICS codes and the kWh usage for each site, the research team reviewed the NAICS code to business type mapping for NAICS codes representing the top 97% of the usage in the nonresidential frame. The majority of NAICS codes map easily into one of the business/building types included in the frame mapping process. For NAICS codes where the mapping was uncertain, the research team, the IOUs, and the CPUC agreed upon a mapping.

3.2 Nonresidential Frame

The nonresidential frame, augmented with defined business types and program participation flags, forms the input database for the CSS and CMST nonresidential population surveys. Table 3-1 lists the total number of sites and the total usage by business type as developed under WO009 and the CSS/CMST studies. The site development process led to over one million sites consuming over 114,000 GWh of electricity.[3] The most common types of businesses are Miscellaneous, Unknown, and Office sites. The industrial segment uses substantially more

[2] Given the inaccuracies in the tracking data account numbers and the difficulty associated with merging on these information by address and customer name, a limited quantity of tracking is not successfully merged with the non-residential frame. For this reason, the participation numbers reported in this section may not align precisely with those reported elsewhere.

[3] The number of sites and the GWh consumption largely represents consumption from the 2010 frame. A small share of sites in Table 3-1 represent sites that were first observed in the frame in 2011. In addition, if a site left the sample between 2010 and 2011, the site is not included in the results in Table 3-1.

electricity than any other business type.[4] Sites were categorized as "Not in Study" for the telephone survey sample design if their CIS NAICS code indicated that they were TCU, Mining, Agricultural, street lighting, or residential sites.[5]

Table 3-1: Nonresidential Population by Business Type

CSS Building Type	Total Number of Sites	Share of Telephone Eligible Sites	Total Usage 2010, MWh*	Share of Telephone Eligible Usage
College	1,507	0%	1,816,925	2%
Food/Liquor	24,885	3%	6,296,625	7%
Health Care - Care	4,089	0%	3,881,388	4%
Health Care - Hospital	37,119	4%	1,925,107	2%
Hotel	7,157	1%	2,688,164	3%
Industrial	41,363	4%	22,494,451	24%
Miscellaneous	242,726	25%	11,508,821	12%
Office	133,764	14%	9,595,069	10%
Property Managers	72,672	8%	8,025,888	9%
Restaurant	64,732	7%	6,179,456	7%
Retail	79,755	8%	7,877,868	8%
School	11,482	1%	3,391,931	4%
Unknown	193,902	20%	3,376,771	4%
Warehouse	39,580	4%	4,139,725	4%
Not in Study	5,469		1,027,081	
Not in Study - Agriculture	131,051		9,057,951	
Not in Study - Mining	14,946		3,749,954	
Not in Study - Street Light	47,870		536,662	
Not in Study - TCU	99,702		9,895,324	
Total	**1,253,771**		**117,465,161**	
Eligible for Telephone Survey	**954,733**	**76%**	**93,198,189**	**79%**
Eligible for CSS	**867,587**	**69%**	**64,273,542**	**55%**

* The usage is 2010 usage for all sites from the 2010 frame and 2011 usage for the few sites that did not exist in the 2010 frame.

[4] The classification of business types is always open to interpretation. For the CSS/CMST study, the CPUC, IOUs, and research team mapped the CIS NAICS codes to business types. The results in Table 3-1 use this mapping.

[5] During the actual pulling of sample points for the telephone survey, adequate contact information would be required for a site to be sent to the telephone survey center (CATI) for potential participation in the telephone survey.

After the NRF was combined with the billing data, the team allocated sites to size or yearly consumption groupings. The following is a list of the size categories:

- Large Sites: Yearly kWh > 1,750,000
- Medium Sites: 300,000 < yearly kWh ≤ 1,750,000
- Small Sites: 40,000 < yearly kWh ≤ 300,000
- Very Small Sites: Yearly kWh ≤ 40,000
- Unknown Sites: Sites where billing data was unavailable[6]

Table 3-2 lists the quantity of energy consumption (MWh) by business type and size. The sites in the business type and size categories are the same for Table 3-3 and Table 3-2. While Table 3-3 shows that for most business types the small and very small size categories have more sites, Table 3-2 shows that for most business types the large size category has the most energy consumption. For example, large hospitals account for 28% of hospital sites and 93% of hospital consumption. Very small miscellaneous sites account for 83% of miscellaneous sites but only 15% of miscellaneous consumption.

Table 3-2: Energy Consumption (MWh) of Telephone Survey Eligible Sites by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	1,817,415	1,586,946	177,502	46,832	5,860	275
Food/Liquor	6,296,613	2,455,213	2,002,397	1,707,493	113,167	18,342
Health Care	2,799,467	618,791	1,154,389	611,074	406,138	9,076
Health Care - Hospital	3,009,863	2,797,830	167,542	33,116	3,811	7,565
Hotel	2,689,323	1,388,929	874,814	383,622	36,997	4,962
Industrial	22,493,210	17,660,662	3,257,922	1,270,881	288,002	15,743
Miscellaneous	11,508,290	4,125,236	2,588,577	2,996,193	1,767,762	30,522
Office	9,573,857	4,237,694	2,296,572	2,071,791	921,737	46,064
Property Managers	8,028,358	3,690,126	2,353,092	1,449,364	520,028	15,749
Restaurant	6,179,875	92,601	1,629,062	4,007,683	428,407	22,122
Retail	7,873,623	2,503,571	2,873,328	1,775,636	692,002	29,086
School	3,392,563	633,749	1,952,012	763,340	33,353	10,108
Unknown	3,364,792	688,275	462,766	1,125,938	1,068,532	19,281
Warehouse	4,131,119	1,599,792	1,278,743	923,855	323,966	4,764

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

[6] Unknown represents sites for which the electric billing data was not available for account and meter numbers found in the 2010 and 2011 CIS.

Figure 3-1 illustrates the distribution of electricity consumption by business type, depicting the total consumption column from Table 3-2. Figure 3-1 shows that industrial sites consume the largest total share of electricity, representing 24% of the non-residential electricity consumption. The second and third largest electricity consuming non-residential segments are miscellaneous businesses at 12% and offices at 10% of the frame's electricity consumption. Comparing the site and energy representations of the non-residential frame presented in Figure 3-2 and Figure 3-1, miscellaneous businesses and offices both have a large share of the sites in the frame and the electricity consumption. Industrial sites, however, represent only 4% of the sites and 24% of the electricity consumption, evidence of their large per site electricity consumption. In comparison, unknown business sites represent only 4% of the electricity consumption in the non-residential frame but 20% of the sites. Sites with unknown business types tend to be very small sites.

Figure 3-1: Share Energy Consumption of Telephone Survey Eligible Sites by Business Type

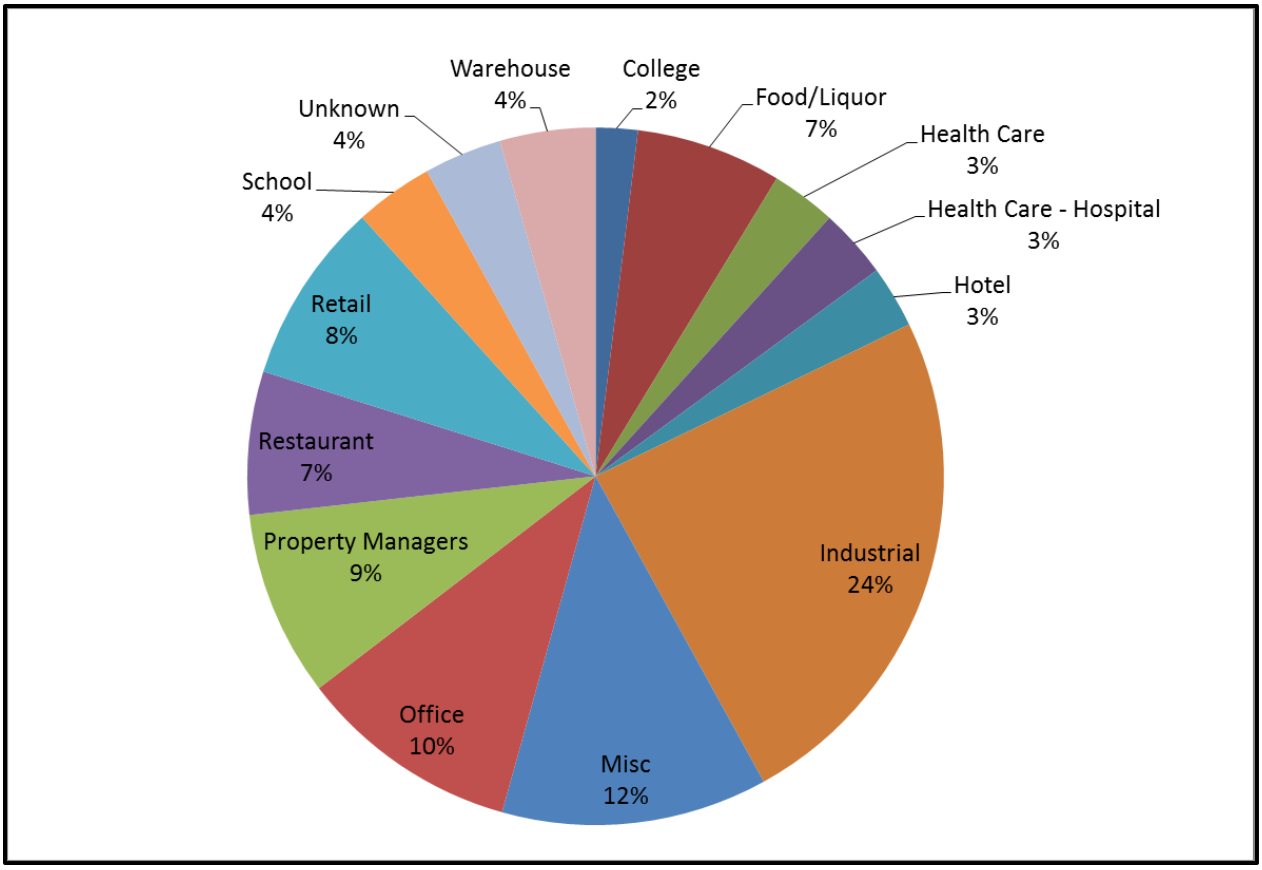


Table 3-3 lists the number of sites in the NRF by the CIS business type and the consumption size of the site. For most business types, the small and very small businesses are more numerous than larger sized businesses. For example, 83% of sites with unknown business types, 80% of miscellaneous sites, 78% of health care sites, and 73% of offices are very small. In contrast, 28% of hospitals are large and only 23% are very small. Figure 3-2 illustrates the total column

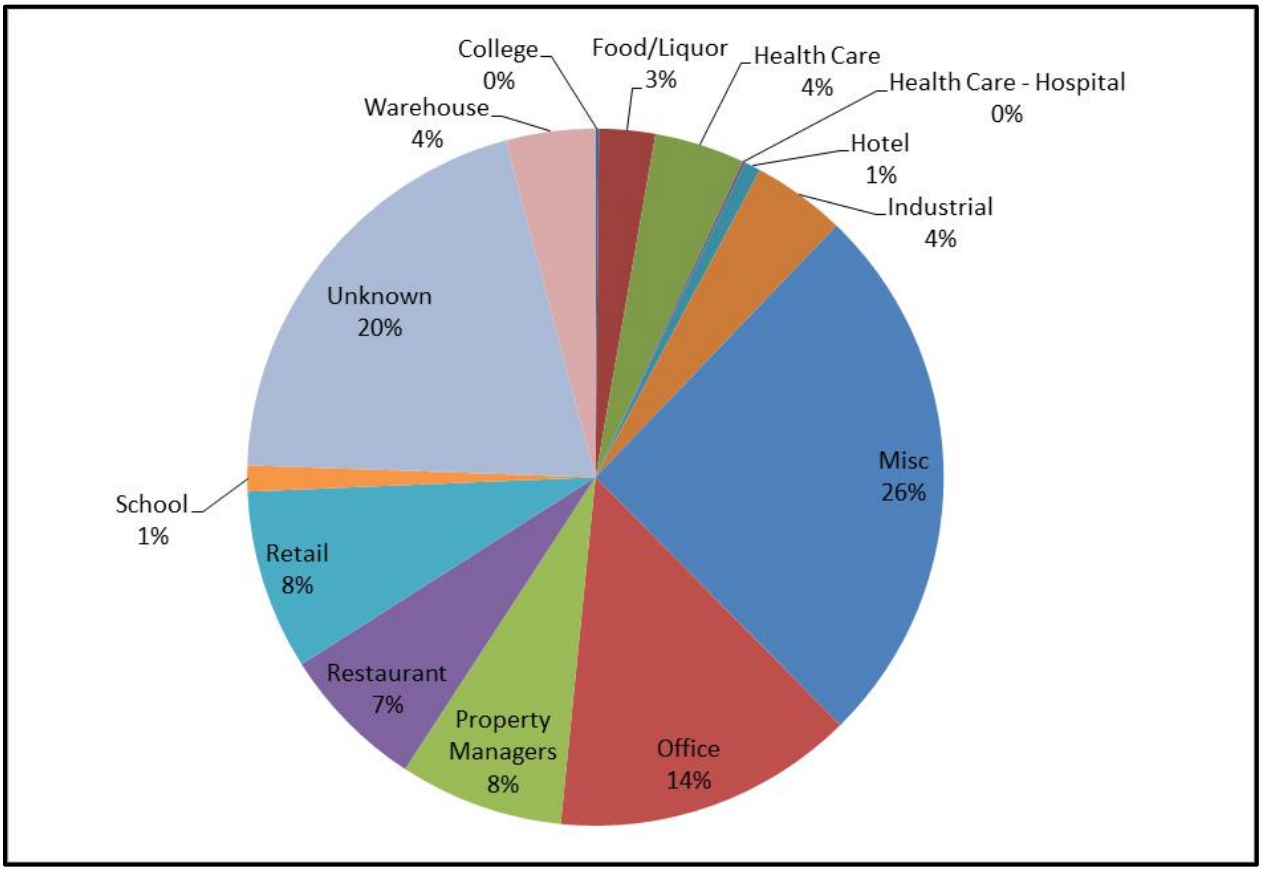
in Table 3-3, the business type distribution of sites in the CIS across the three IOUs. The figure shows that miscellaneous sites represent 26% of the frame, unknown sites are 20% and offices are 14% of the sites.

Table 3-3: Number of Telephone Survey Eligible Sites by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	1,507	155	236	378	465	273
Food/Liquor	24,885	1,053	2,549	14,261	6,337	685
Health Care	40,075	161	1,817	5,867	31,201	1,029
Health Care - Hospital	1,133	313	216	257	256	91
Hotel	7,157	295	1,313	3,197	2,055	297
Industrial	41,363	1,955	4,498	10,831	22,753	1,326
Miscellaneous	242,726	570	4,132	31,122	195,229	11,673
Office	133,764	828	3,405	20,329	97,699	11,503
Property Managers	72,672	831	3,355	14,043	50,459	3,984
Restaurant	64,732	37	3,674	38,871	20,154	1,996
Retail	79,755	872	4,971	17,256	54,137	2,519
School	11,482	264	3,390	4,772	2,211	845
Unknown	193,902	80	817	13,314	160,379	19,312
Warehouse	39,580	358	1,922	8,969	27,046	1,285

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-2: Share of Number Telephone Survey Eligible Sites by Business Type



3.3 Program Participation

The NRF was merged with the energy efficiency, demand response, and distributed generation program participation data. Combining these data sets enables the studies to determine if existing equipment and new purchases of select equipment differ for program participants and nonparticipants. Using these data, the team is also able to describe the current program participation of the NRF. The following subsections largely discussion participation in the NRF as a function of the share of sites participating by business type, IOU and size. Limited information is presented on the share of kWh participating in DSM programs.

3.3.1 Energy Efficiency Program Participation

Table 3-4 and Figure 3-3 present the share of kWh participating in the 2009-2012 IOU energy efficiency programs by business type and size.[7] Table 3-5 lists the share of sites participating in the 2009-2012 IOU energy efficiency programs by business type and size. Figure 3-4 illustrates

[7] The energy efficiency participation of sites with unknown usage is not presented by site level consumption given the very limited information on the energy usage of these sites.

the share of site participation in IOU energy efficiency programs. When looking across the different size businesses, the data presented in Table 3-4and Table 3-5 are very similar. For example, within retail stores, 73% of large site kWh participated in at least one EE program between 2009 and 2012, 23% of small retail kWh and 22% of very small retail kWh (see Table 3-4). These data indicate that a higher share of large sites participate than small or very small sites. Looking participation of sites within retail stores (see Table 3-5), 75% of large sites in the NRF participated in at least one energy efficiency program between 2009 and 2012, while only 22% of small retail and 19% of very small retail participated during the same period. The real difference between the site and kWh participation is in the total share of sites and kWh participating. Continuing with the retail example, 21% of retail sites participated in IOU EE programs and 47% of retail kWh participated. The concentration of EE participation in larger sized sites leads to a higher share of kWh participation than site participation when looking at total participation.

These data also indicate that some business types are more likely to participate in energy efficiency programs than other business types. Food and liquor stores have the highest share of participant sites by business type – 46% of all food and liquor sites in the NRF participated in an energy efficiency program during 2009-2012. The 46% participation of food and liquor sites breaks down into 77% of large food and liquor sites, 59% for medium, 54% for small, 24% for very small, and only 6% for sites with unknown usage. The high share of large sites participating in EE programs contributes to the high share of kWh participating in EE; 67% of kWh in the food and liquor business type participates in EE programs. The significant energy efficiency opportunities available to grocery stores, and/or the fact that many food and liquor stores are owned by large corporations with energy managers dedicated to reducing energy bills, may predispose these businesses to higher energy efficiency program participation. Hotels also have a high level of site and kWh participation in energy efficiency with 36% of sites and 63% of kWh participating

Some business types exhibit a relatively high share of kWh participation while having a relatively average share of sites participating in EE programs. Colleges have the highest share of kWh participating in EE programs at 79% while only 18% of sites participate.[8] Industrial sites also have a high share of kWh participation at 57% percent but only 17% of sites participating.[9] For these two business types, EE participation is highly concentrated in the larger sized sites with fewer smaller sites participating. This distribution of participation leads to significantly different rankings of the share of participation when viewed by kWh versus sites.

[8] Colleges have the highest share of kWh participation in EE programs when viewed by business types but only the seventh highest share of site participation.

[9] Industrial sites have the fifth highest share of kWh participation but only the ninth highest share of site participation.

Alternatively, some businesses have a relatively high share of sites participating while their kWh ranking is lower. For schools, 33% of sites participate in EE programs and 48% of kWh. This ranks schools as the business type with the third highest share of sites participating but only the sixth highest share of kWh participating. Similarly, restaurants have 29% of sites participating and 34% of their kWh participating in EE programs. Restaurants rank 4th highest among the share of sites participating with nearly the lowest share of kWh participating at 12th. Restaurants and schools have a more even distribution of sites participating by size than is found for industrial sites and colleges, leading to a reversal of their relatively ranking when viewed by kWh verses sites.

Businesses with lower than average levels of energy efficiency participation include offices at 11% of sites and 35% of kWh, property management sites at 9% of sites and 38% of kWh, and unknown business types at 5% of sites and 18% of kWh. All three of these business types have a large share of their sites that are small or very small, contributing their relatively low kWh participation (see Table 3-3).[10] Sites labeled as property managers in the NRF likely represent other business types with property managers assigned to the account and/or paying the utility bills. The business activity at sites designated as property managers is described in Section 4.[11] Given the uncertain business activity associated with property management sites and sites with unknown business types, these sites likely have few energy efficiency programs specifically designed for their energy needs. The lack of targeted programs and the very small size of these businesses likely contribute to their relatively low participation rates. Additional research is needed to better understand the higher levels of energy efficiency participation in some segments and the barriers to participation in others.

[10] Split incentives for businesses occupying leased space can also contribute to lower energy efficiency participation. Using phone survey information, restaurants have the highest share of leased sites while these offices, property management and unknown businesses have leased occupancy rate that is slightly higher than the commercial average. While split incentives may contribute to a low participation rate, it is not the only important factor.

[11] Analysis of the telephone survey data also provides information on the business types in the unknown business type. These findings are also presented in Section 4 of this report.

Table 3-4: Share of Telephone Survey Eligible Consumption Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small
College	79%	86%	31%	12%	8%
Food/Liquor	67%	77%	63%	59%	29%
Health Care	29%	53%	26%	18%	18%
Health Care – Hospital	60%	63%	19%	9%	5%
Hotel	63%	76%	52%	46%	22%
Industrial	57%	66%	28%	20%	15%
Miscellaneous	40%	66%	34%	24%	17%
Office	35%	54%	27%	15%	15%
Property Managers	38%	59%	27%	16%	9%
Restaurant	34%	46%	35%	35%	24%
Retail	47%	73%	44%	23%	22%
School	49%	61%	50%	40%	16%
Unknown	18%	35%	24%	16%	7%
Warehouse	39%	55%	34%	25%	19%

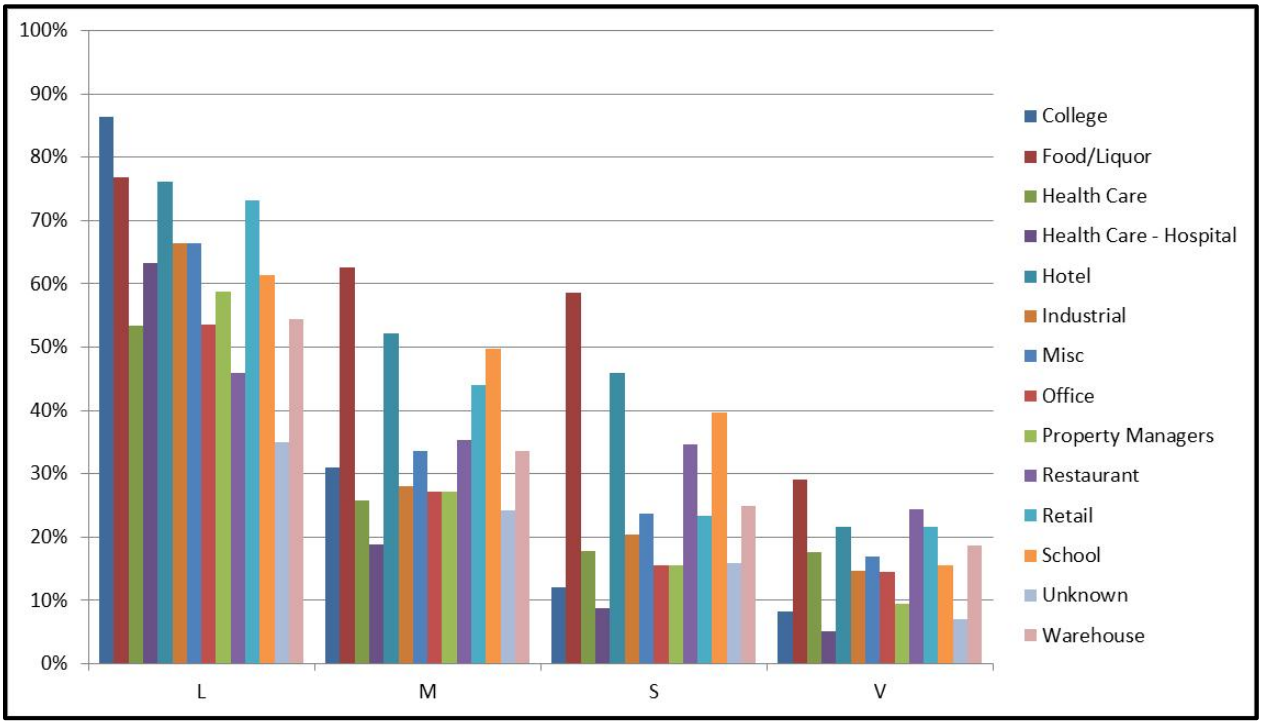
***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-5: Share of Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	18%	77%	28%	10%	7%	5%
Food/Liquor	46%	78%	59%	54%	24%	6%
Health Care	16%	40%	24%	17%	16%	2%
Health Care – Hospital	22%	53%	21%	9%	4%	4%
Hotel	36%	71%	51%	43%	16%	6%
Industrial	17%	46%	27%	19%	12%	4%
Miscellaneous	13%	51%	31%	22%	12%	2%
Office	11%	45%	25%	15%	11%	1%
Property Managers	9%	49%	24%	14%	7%	2%
Restaurant	29%	49%	36%	33%	21%	6%
Retail	21%	75%	41%	22%	19%	3%
School	33%	61%	49%	35%	13%	5%
Unknown	5%	31%	23%	14%	5%	1%
Warehouse	17%	46%	32%	24%	14%	3%

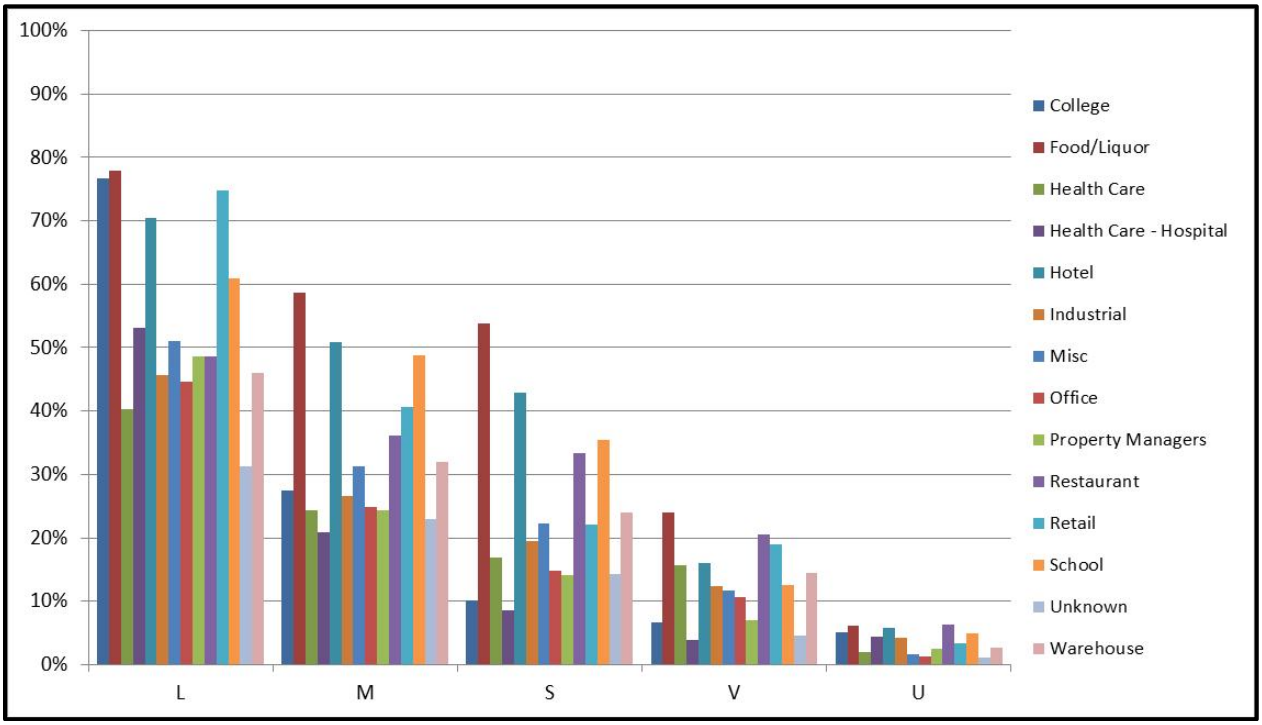
***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-3: Share of Telephone Survey Eligible Consumption Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-4: Share of Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

3.3.2 Energy Efficiency Program Participation by Utility

Table 3-6 and Table 3-7 list the share of consumption and site participation in energy efficiency programs by IOU and consumption size respectively. PG&E has 50% of their consumption and 11% of their sites in the NRF participating in at least one program during 2009-2012, while SCE has 45% consumption and 17% of sites and SDG&E has 39% of consumption and 12% of sites participating in EE. The distribution of participation by size categories differs across utilities with PG&E having a higher participation rate among larger sites, while SCE has a higher rate of participation among very small sites.

Table 3-6: Share of Consumption Participating in Energy Efficiency Programs by IOU and Size

Utility	Total	Large	Medium	Small	Very Small
PG&E	50%	67%	43%	30%	10%
SCE	45%	64%	32%	27%	21%
SDG&E	39%	58%	34%	23%	12%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-7: Share of Sites Participating in Energy Efficiency Programs by IOU and Size

Utility	Total	Large	Medium	Small	Very Small	Unknown
PG&E	11%	61%	42%	26%	6%	1%
SCE	17%	52%	30%	26%	15%	2%
SDG&E	12%	54%	33%	20%	9%	4%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

PG&E Energy Efficiency Program Participation

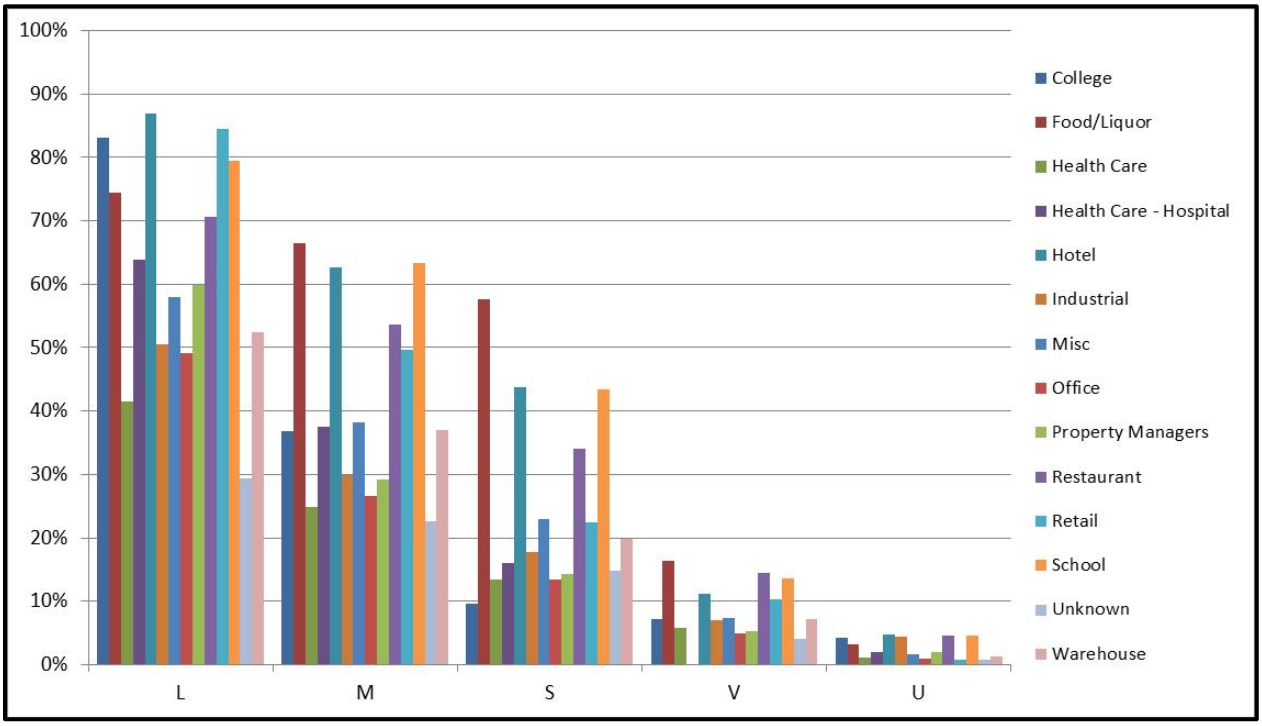
Table 3-8 lists PG&E's share of sites participating in their energy efficiency programs by business type and consumption size, while Figure 3-5 illustrates the distribution. Food and liquor stores are the segment with the highest level of participation with 47% of sites participating, while only 5% of sites with unknown business types participated in an energy efficiency program between 2009 and 2012.

Table 3-8: Share of PG&E Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	19%	83%	37%	10%	7%	4%
Food/Liquor	47%	74%	66%	58%	16%	3%
Health Care	8%	42%	25%	13%	6%	1%
Health Care – Hospital	38%	64%	38%	16%	0%	2%
Hotel	37%	87%	63%	44%	11%	5%
Industrial	15%	50%	30%	18%	7%	4%
Miscellaneous	10%	58%	38%	23%	7%	2%
Office	7%	49%	27%	13%	5%	1%
Property Managers	10%	60%	29%	14%	5%	2%
Restaurant	28%	71%	54%	34%	15%	5%
Retail	16%	85%	50%	22%	10%	1%
School	38%	79%	63%	43%	14%	5%
Unknown	5%	29%	23%	15%	4%	1%
Warehouse	12%	52%	37%	20%	7%	1%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-5: Share of PG&E Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

SCE Energy Efficiency Participation

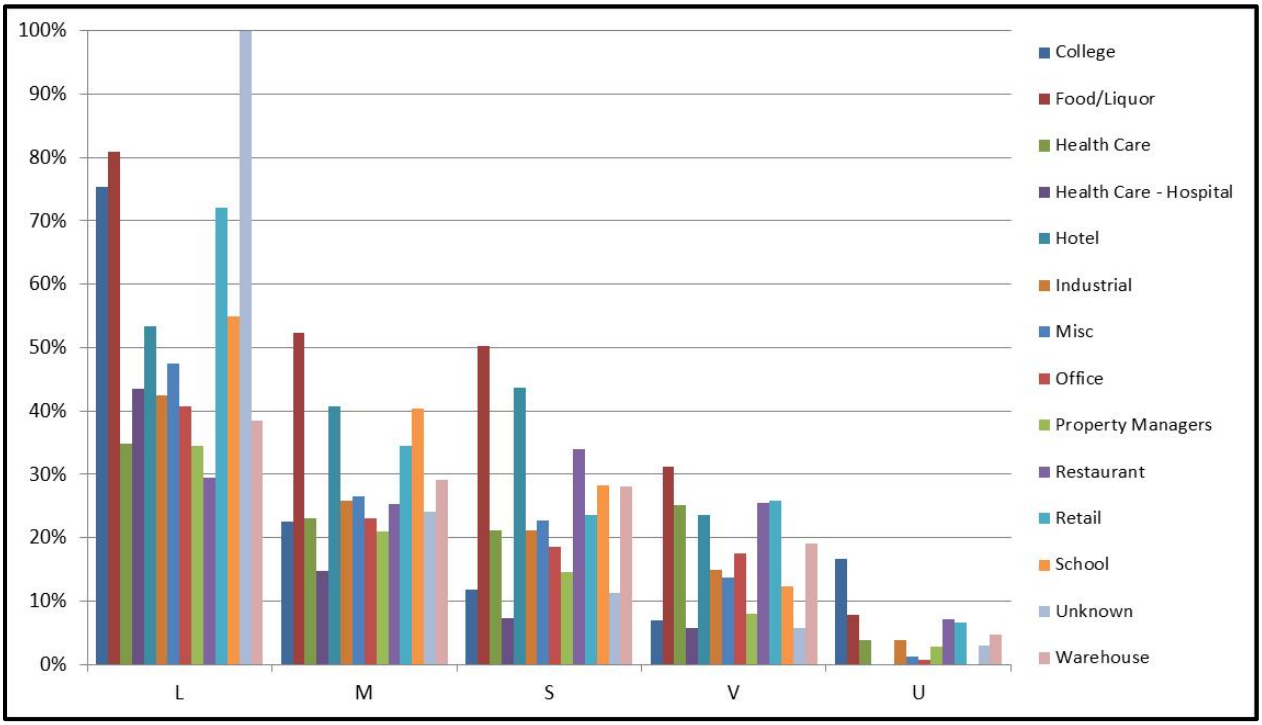
Table 3-9 lists SCE's share of sites participating in their energy efficiency programs by business type and consumption size while Figure 3-6 illustrates the distribution. Similar to PG&E, food and liquor stores are the segment with the highest level of participation with 46% of sites participating, while only 6% of sites with unknown business types participated in an energy efficiency program between 2009 and 2012.

Table 3-9: Share of SCE Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	19%	75%	23%	12%	7%	17%
Food/Liquor	46%	81%	52%	50%	31%	8%
Health Care	24%	35%	23%	21%	25%	4%
Health Care - Hospital	19%	43%	15%	7%	6%	0%
Hotel	37%	53%	41%	44%	24%	0%
Industrial	19%	42%	26%	21%	15%	4%
Miscellaneous	15%	47%	26%	23%	14%	1%
Office	16%	41%	23%	18%	17%	1%
Property Managers	10%	35%	21%	15%	8%	3%
Restaurant	30%	29%	25%	34%	26%	7%
Retail	26%	72%	34%	24%	26%	7%
School	30%	55%	40%	28%	12%	0%
Unknown	6%	100%	24%	11%	6%	3%
Warehouse	22%	38%	29%	28%	19%	5%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-6: Share of SCE Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

SDG&E Energy Efficiency Program Participation

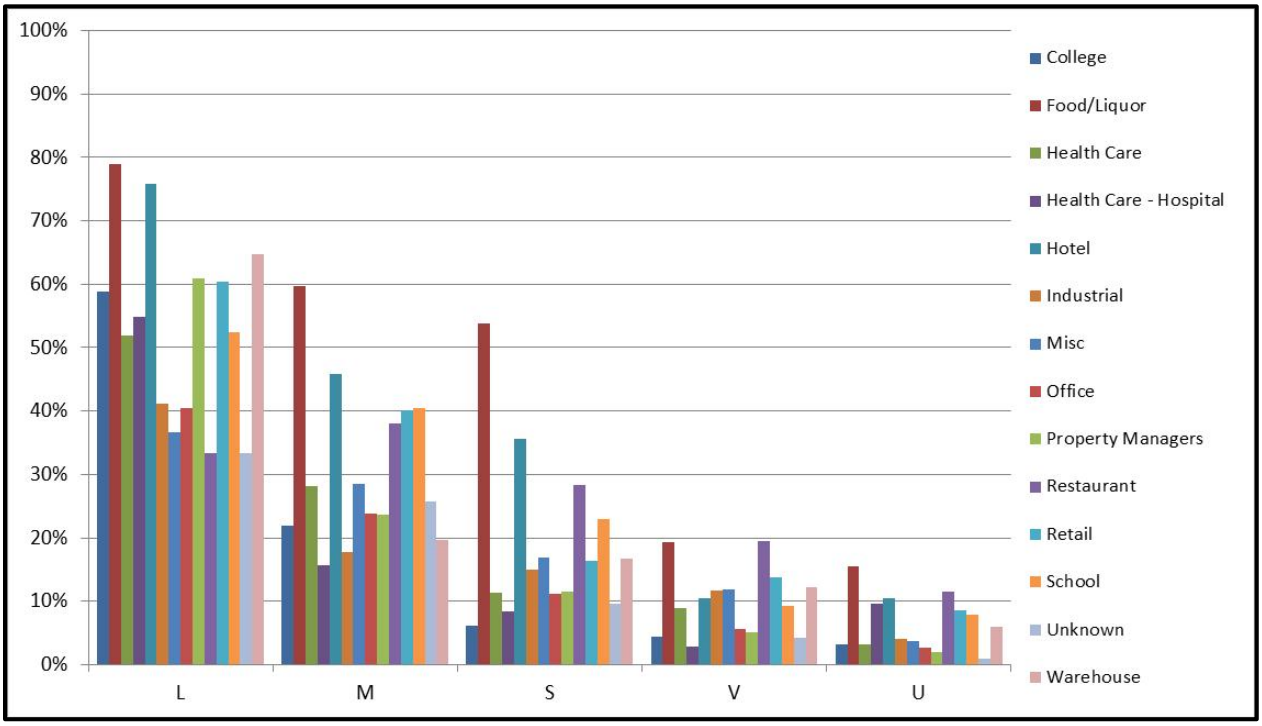
Table 3-10 lists SDG&E's share of sites participating in their energy efficiency programs by business type and consumption size, while Figure 3-7 illustrates the distribution. Similar to PG&E, food and liquor stores are the segment with the highest level of participation with 45% of sites participating, while only 4% of sites with unknown business types participated in an energy efficiency program between 2009 and 2012.

Table 3-10: Share of SDG&E Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	11%	59%	22%	6%	4%	3%
Food/Liquor	45%	79%	60%	54%	19%	16%
Health Care	10%	52%	28%	11%	9%	3%
Health Care – Hospital	12%	55%	16%	8%	3%	10%
Hotel	31%	76%	46%	36%	11%	10%
Industrial	13%	41%	18%	15%	12%	4%
Miscellaneous	13%	37%	28%	17%	12%	4%
Office	7%	41%	24%	11%	6%	3%
Property Managers	7%	61%	24%	12%	5%	2%
Restaurant	25%	33%	38%	28%	19%	11%
Retail	16%	60%	40%	16%	14%	9%
School	24%	52%	41%	23%	9%	8%
Unknown	4%	33%	26%	10%	4%	1%
Warehouse	13%	65%	20%	17%	12%	6%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-7: Share of SDG&E Telephone Survey Eligible Sites Participating in IOU Energy Efficiency Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

3.3.3 Demand Response Program Participation

Table 3-11 and Table 3-12 list the share of consumption and sites signed up for the 2009-2012 IOU demand response programs by business type and size. Figure 3-9 illustrates the share of sites signed up for IOU demand response programs. These data indicate that large sites are significantly more likely to sign up for demand response programs than small and very small sites. Eighty four percent of large schools sites and 85% of large school consumption and 87% of large retail sites and 82% of large retail consumption signed up to participate in a demand response program, while only 3% of very small schools sites and very small retail sites participated. Relative to energy efficiency programs participation, demand response registration is even more highly concentrated in larger sites.

The demand response registration data also indicates that some business types are more likely to sign up for demand response programs than other business types. Industrial sites have the highest share of consumption signed up to participate in DR programs at 77% of consumption followed by collects at 71%. Schools have the highest share of sites signed up to participate in demand response programs at 28%, followed by hospitals at 24% of sites. Restaurants have the lowest share of consumption registered to participate in DR at 6% of their consumption. Sites

with unknown business types have the lowest site level of DR participation at 1% of sites signed up to participate during the 2009-2012 period.

Table 3-11: Share of Consumption of Telephone Survey Eligible Sites Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small
College	71%	76%	50%	3%	5%
Food/Liquor	41%	64%	41%	10%	3%
Health Care	28%	66%	30%	2%	4%
Health Care – Hospital	59%	61%	38%	1%	2%
Hotel	49%	76%	30%	3%	1%
Industrial	77%	87%	57%	6%	3%
Miscellaneous	40%	83%	38%	7%	3%
Office	45%	80%	37%	3%	4%
Property Managers	53%	87%	43%	3%	1%
Restaurant	6%	82%	7%	5%	3%
Retail	43%	82%	42%	8%	4%
School	57%	85%	62%	25%	4%
Unknown	9%	26%	16%	2%	1%
Warehouse	50%	88%	46%	5%	3%

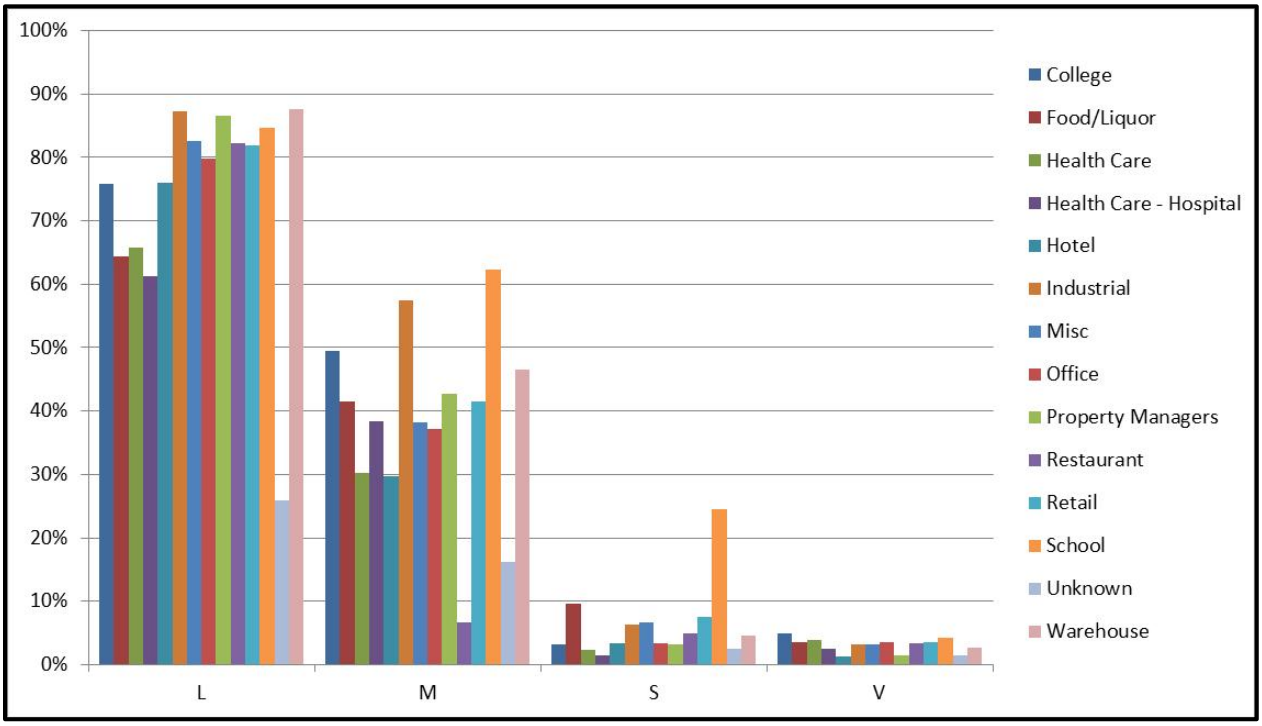
***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-12: Share of Telephone Survey Eligible Sites Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	15%	68%	39%	3%	3%	1%
Food/Liquor	11%	62%	27%	8%	3%	1%
Health Care	4%	67%	19%	3%	3%	1%
Health Care – Hospital	24%	64%	28%	1%	2%	1%
Hotel	8%	73%	21%	3%	1%	1%
Industrial	12%	86%	45%	6%	2%	1%
Miscellaneous	3%	81%	28%	6%	2%	0%
Office	3%	75%	26%	3%	2%	1%
Property Managers	4%	82%	30%	3%	1%	1%
Restaurant	4%	81%	5%	5%	3%	1%
Retail	6%	87%	32%	5%	3%	1%
School	28%	84%	56%	20%	3%	1%
Unknown	1%	51%	11%	2%	1%	0%
Warehouse	5%	87%	34%	4%	2%	0%

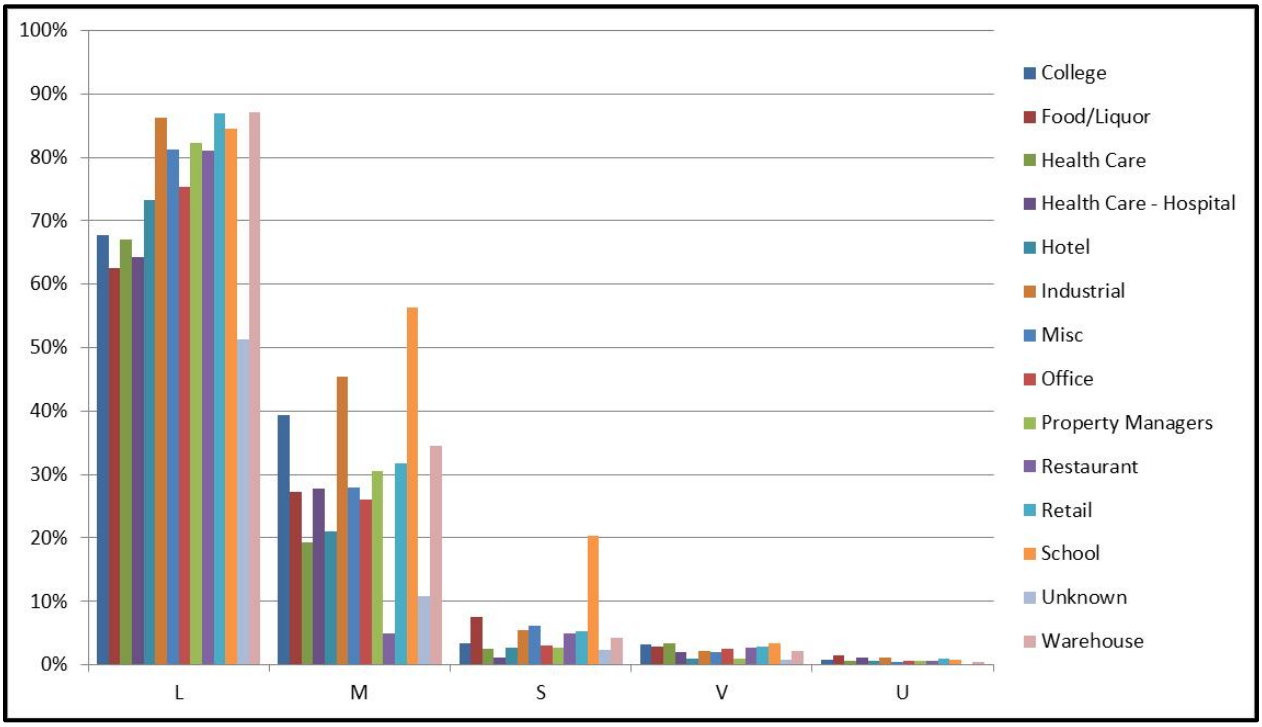
***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-8: Share of Consumption of Telephone Survey Eligible Sites Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-9: Share of Telephone Survey Eligible Sites Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

3.3.4 Demand Response by Utility

Table 3-13 and Table 3-14 list the share of consumption and sites signed up for DR programs by IOU and consumption size. All three utilities are significantly more likely to have sites with large consumption signed up for demand response programs than other size groupings. SCE has 81% of their large sites signed up to participate in demand response programs, PG&E has a similar share at 82%, and SDG&E has a significantly smaller share of large sites registered for demand response programs at 54%. SDG&E, however, has a more of their small and very small sites registered for demand response programs leading them to have a higher share of all sites registered than the other IOUs. Given the dominance of large sized sites in the utility DR programs, PG&E has 53% of their consumption but only 3% of their sites registered to participate in DR, SCE has 52% of their consumption and 4% of their sites, and SDG&E has 30% of their consumption and 6% of their sites registered.

Table 3-13: Share of Consumption Signed Up for Demand Response Programs by IOU and Size

Utility	Total	Large	Medium	Small	Very Small
PG&E	53%	86%	40%	4%	2%
SCE	52%	82%	46%	7%	3%
SDG&E	30%	52%	24%	9%	6%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-14: Share of Sites Signed Up for Demand Response Programs by IOU and Size

Utility	Total	Large	Medium	Small	Very Small	Unknown
PG&E	3%	82%	27%	3%	2%	0%
SCE	4%	81%	35%	6%	2%	1%
SDG&E	6%	54%	18%	9%	5%	2%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

PG&E Demand Response

Table 3-15 lists PG&E's share of sites that are signed up to participate in DR by business type and size, while Figure 3-10 illustrates the distribution. Hospitals have the highest share of sites signed up for DR programs at 44%. Hospitals high share is largely due to the small number of small and very small hospital sites in the NRF. For large sites, retail stores and schools have the highest level of DR with 93% of sites retail and 93% of school sites signed up for programs. In addition, medium-sized schools have a relatively high sign up rate at 49%. Similar to the findings for EE, sites with unknown business types are the least likely to have signed up for DR programs. The low level of DR participation among unknown business types is due in part to the high share of very small unknown sites.

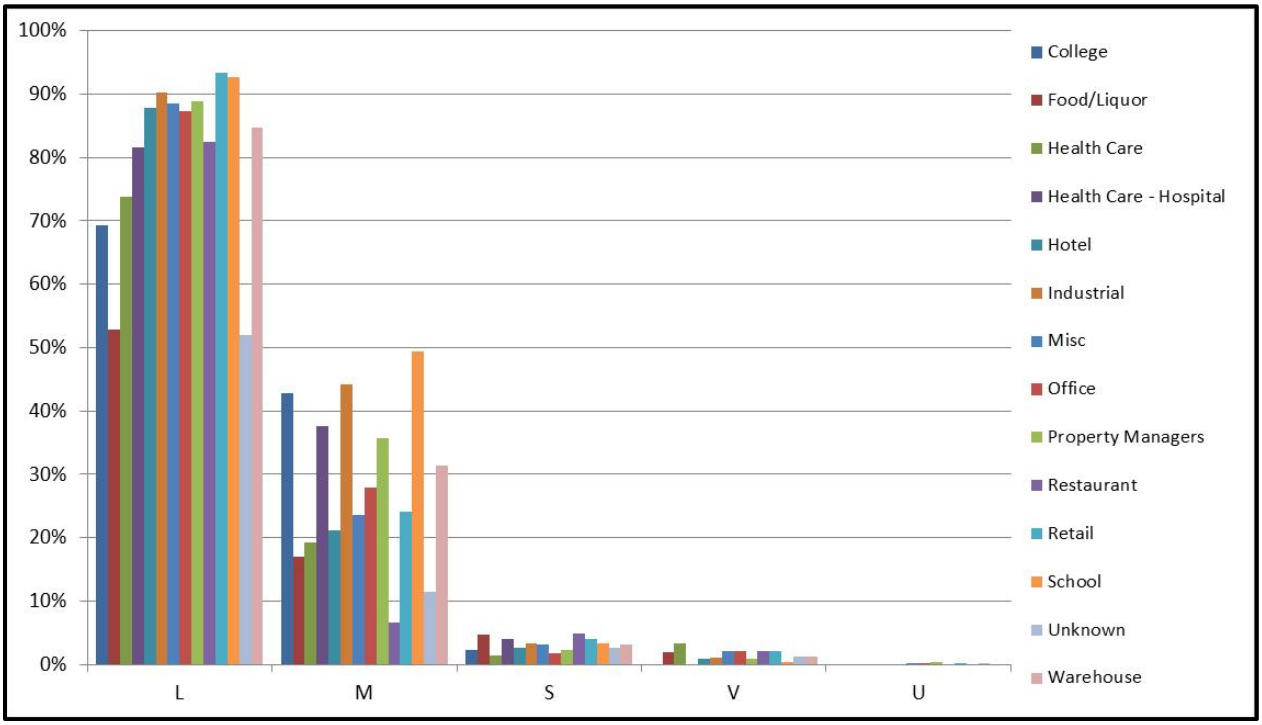
Figure 3-10 illustrates the DR findings for PG&E by business type and size. The figure clearly illustrates the rapid decline in DR program sign up as the size of the customer declines.

Table 3-15: Share of Telephone Survey Eligible Sites Signed up for PG&E Demand Response Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	14%	69%	43%	2%	0%	0%
Food/Liquor	7%	53%	17%	5%	2%	0%
Health Care	4%	74%	19%	1%	3%	0%
Health Care – Hospital	44%	82%	38%	4%	0%	0%
Hotel	8%	88%	21%	3%	1%	0%
Industrial	12%	90%	44%	3%	1%	0%
Miscellaneous	3%	89%	24%	3%	2%	0%
Office	3%	87%	28%	2%	2%	0%
Property Managers	6%	89%	36%	2%	1%	0%
Restaurant	4%	82%	7%	5%	2%	0%
Retail	5%	93%	24%	4%	2%	0%
School	14%	93%	49%	3%	0%	0%
Unknown	1%	52%	11%	3%	1%	0%
Warehouse	4%	85%	31%	3%	1%	0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-10: Share of Telephone Survey Eligible Sites Signed up for PG&E Demand Response Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

SCE Demand Response

Table 3-16 lists SCE's share of sites that are signed up to participate in DR by business type and size, while Figure 3-11 illustrates the distribution. Schools have the highest share of sites signed up for DR programs at 45% of sites. Schools have the highest share due to their relatively high participation across all size strata. Within SCE, schools have the highest sign up rate for DR for all size segmentations. The higher sign up rate for schools is clearly illustrated in Figure 3-11. For large sites, warehouses have the highest level of DR registration with 92% of large sites signed up for programs, followed closely by industrial sites, with 88% of large sites signed up. Similar to the findings for EE, sites with unknown business types are the least likely to have signed up for DR programs. The low level of DR participation among unknown business types is due in part to the high share of very small unknown sites.

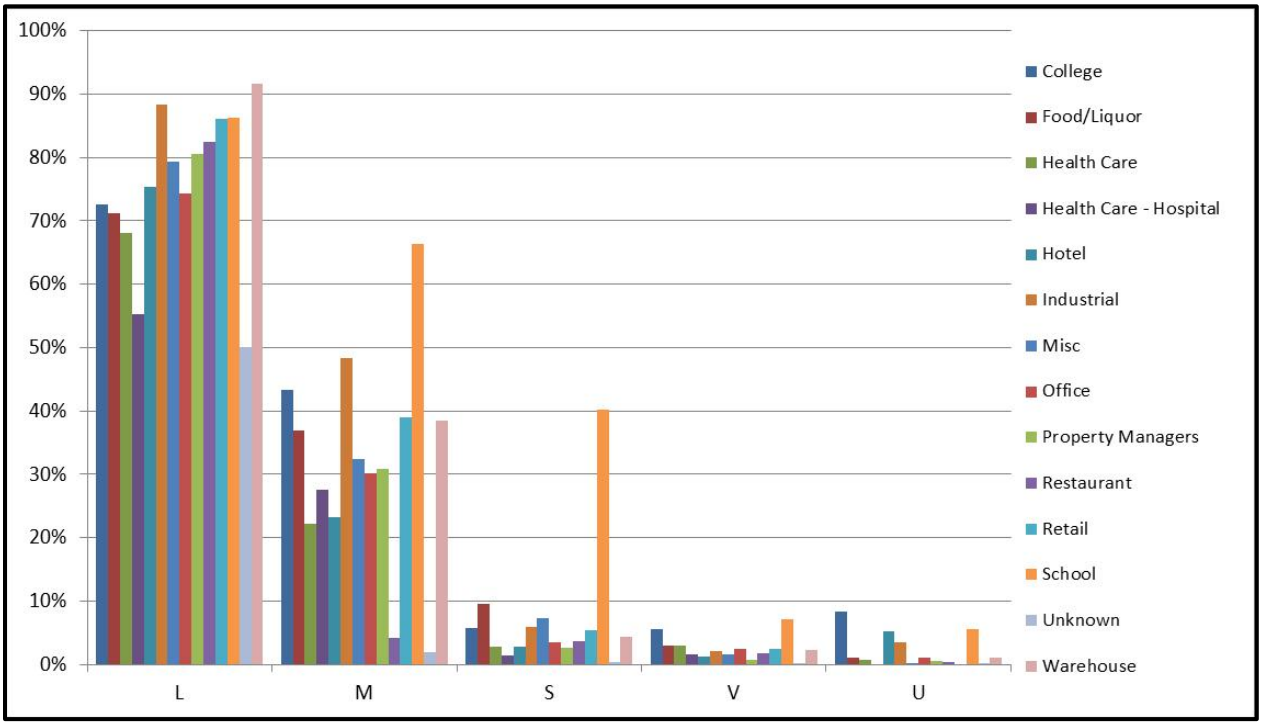
Figure 3-11 illustrates the DR findings for SCE by business type and size. The figure clearly illustrates the rapid decline in DF program sign up as the size of the customer declines. The figure also clearly indicates that schools in SCE's service territory are substantially more likely to sign up for DR programs than other medium and small sized sites.

Table 3-16: Share of Telephone Survey Eligible Sites Signed up for SCE Demand Response Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	19%	73%	43%	6%	6%	8%
Food/Liquor	13%	71%	37%	10%	3%	1%
Health Care	4%	68%	22%	3%	3%	1%
Health Care – Hospital	22%	55%	28%	1%	2%	0%
Hotel	10%	75%	23%	3%	1%	5%
Industrial	12%	88%	48%	6%	2%	3%
Miscellaneous	3%	79%	32%	7%	2%	0%
Office	3%	74%	30%	3%	2%	1%
Property Managers	3%	81%	31%	3%	1%	1%
Restaurant	3%	82%	4%	4%	2%	0%
Retail	6%	86%	39%	5%	2%	0%
School	45%	86%	66%	40%	7%	6%
Unknown	0%	50%	2%	0%	0%	0%
Warehouse	5%	92%	38%	4%	2%	1%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-11: Share of Telephone Survey Eligible Sites Signed up for SCE Demand Response Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

SDG&E Demand Response

Table 3-17 lists SDG&E's share of sites that are signed up to participate in DR by business type and size, while Figure 3-12 illustrates the distribution. Within SDG&E's service territory, schools have the highest share of sites signed up for DR programs at 20% of sites. For large sites, retail stores and restaurants have the highest level of DR with 73% of retail stores and 67% of restaurants signed up for programs. Within SDG&E's service territory, unknown sites have less than 2% of sites signed up to participate in SDG&E's DR programs while offices and property management sites have 4% of sites registered for DR programs.

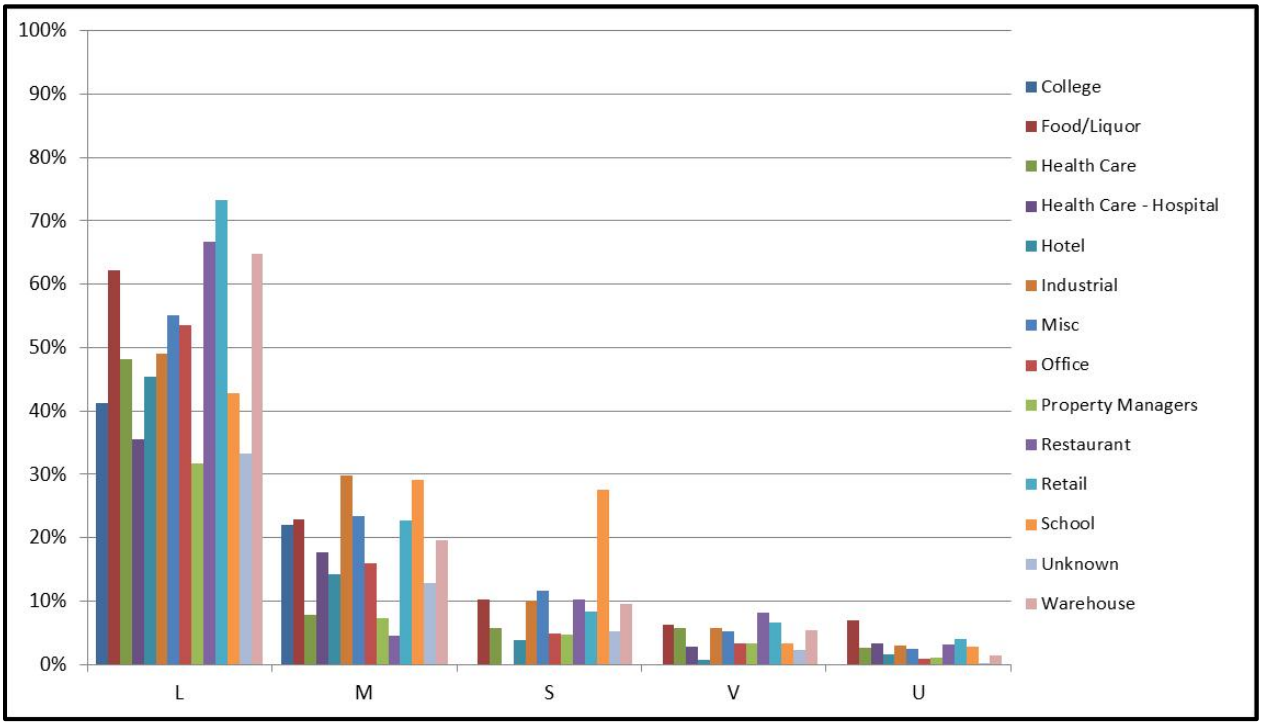
Figure 3-12 illustrates the DR findings for SDG&E by business type and size. The figure clearly illustrates the rapid decline in DR program registration as the size of the customer declines.

Table 3-17: Share of Telephone Survey Eligible Sites Signed up for SDG&E's Demand Response Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	6%	41%	22%	0%	0%	0%
Food/Liquor	13%	62%	23%	10%	6%	7%
Health Care	6%	48%	8%	6%	6%	3%
Health Care – Hospital	8%	35%	18%	0%	3%	3%
Hotel	8%	45%	14%	4%	1%	1%
Industrial	10%	49%	30%	10%	6%	3%
Miscellaneous	7%	55%	23%	12%	5%	2%
Office	4%	54%	16%	5%	3%	1%
Property Managers	4%	32%	7%	5%	3%	1%
Restaurant	9%	67%	5%	10%	8%	3%
Retail	8%	73%	23%	8%	7%	4%
School	20%	43%	29%	28%	3%	3%
Unknown	2%	33%	13%	5%	2%	0%
Warehouse	7%	65%	20%	9%	5%	1%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-12: Share of Telephone Survey Eligible Sites Signed up for SDG&E Demand Response Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

3.3.5 Distributed Generation Program Participation

Table 3-18 and Table 3-19 list the share of consumption and sites that participated in 2009-2012 IOU distributed generation (DG) programs by business type and size. Figure 3-13 and Figure 3-14 illustrates the share of consumption and sites that participated in IOU DG programs. Analyzing the share of consumption participating in DG programs is more problematic than analyzing the share of consumption participating in EE or DR programs. Sites with significant DG installed may significantly reduce or eliminate their utility energy consumption, modifying their site level groupings in the tables and figure presented below. Note, a site with low utility energy consumption due to the presence of DG may still have significant energy consumption that this analysis is unable to measure.

The data presented Table 3-18 and Table 3-19 indicate that large sites are significantly more likely to participate in DG programs than small and very small sites. Twenty-two percent of large college sites and 38% of their consumption participate in DG programs. Eighteen percent of large schools and retail sites participate in DG programs while 18% of large school consumption and 22% of retail consumption participate. In comparison, less than 1% of very small schools and very small retail participated in DG programs. The higher level of DG

participation in larger sized sites may indicate that the current installation of DG technologies are installed at larger sites where they reduce site level utility electricity consumption, but the site's utility electricity consumption remains substantial.

A relatively small share of consumption and sites participate in DG programs when compared with either EE or DR participation. Schools have the highest share of sites that participated in DG programs at 6.3% while colleges have the highest share of consumption participating in DG at 34% of their consumption. Restaurant sites have the lowest level of DG participation at 0.07% of sites and 0.3% of consumption participating during the 2009-2012 period.

Table 3-18: Share of Consumption of Telephone Survey Eligible Sites Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small
College	34.1%	37.7%	11.9%	0.3%	0.4%
Food/Liquor	0.5%	0.8%	0.4%	0.1%	0.0%
Health Care	4.2%	16.4%	1.2%	0.3%	0.2%
Health Care – Hospital	13.9%	14.9%	0.6%	1.6%	0.0%
Hotel	1.6%	1.4%	2.5%	0.3%	0.1%
Industrial	4.8%	5.8%	1.2%	0.5%	0.2%
Miscellaneous	8.7%	21.5%	2.8%	1.1%	0.2%
Office	4.8%	9.0%	2.7%	0.7%	0.2%
Property Managers	2.0%	3.4%	1.1%	0.6%	0.2%
Restaurant	0.3%	7.8%	0.4%	0.1%	0.0%
Retail	7.5%	21.7%	1.4%	0.4%	0.1%
School	12.9%	17.9%	14.0%	6.4%	0.8%
Unknown	4.6%	19.8%	1.9%	0.8%	0.3%
Warehouse	5.4%	11.4%	2.2%	0.9%	0.3%

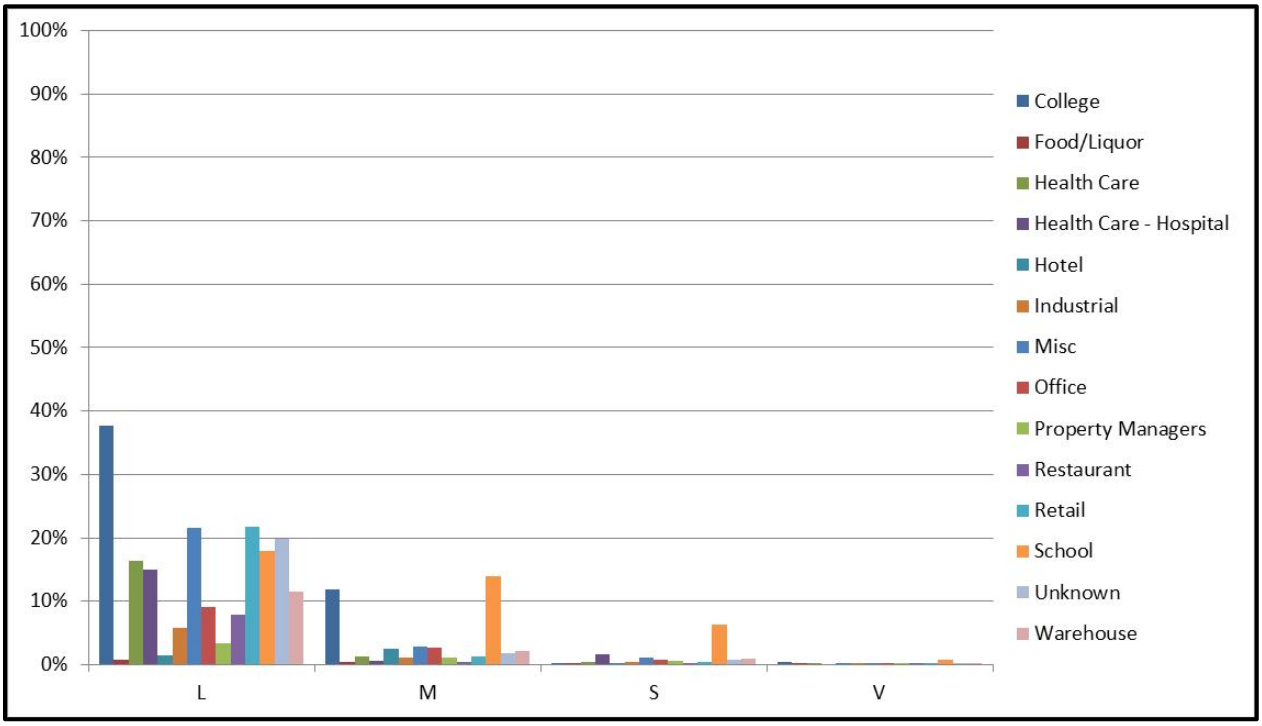
***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-19: Share of Telephone Survey Eligible Sites Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	4.2%	21.9%	10.6%	0.3%	0.6%	0.4%
Food/Liquor	0.1%	0.9%	0.3%	0.1%	0.0%	0.1%
Health Care	0.3%	7.5%	0.8%	0.4%	0.2%	0.1%
Health Care – Hospital	2.1%	6.1%	0.9%	1.2%	0.0%	0.0%
Hotel	0.8%	2.4%	3.3%	0.2%	0.1%	0.0%
Industrial	0.5%	2.9%	1.1%	0.5%	0.2%	0.2%
Miscellaneous	0.3%	10.9%	2.5%	0.9%	0.1%	0.1%
Office	0.3%	4.5%	2.2%	0.6%	0.1%	0.1%
Property Managers	0.3%	2.0%	1.0%	0.6%	0.1%	0.1%
Restaurant	0.1%	8.1%	0.2%	0.1%	0.0%	0.1%
Retail	0.4%	17.8%	1.0%	0.3%	0.1%	0.3%
School	6.3%	18.2%	11.7%	5.4%	0.5%	0.7%
Unknown	0.4%	3.8%	2.2%	0.6%	0.3%	0.5%
Warehouse	0.4%	5.3%	1.9%	0.7%	0.2%	0.0%

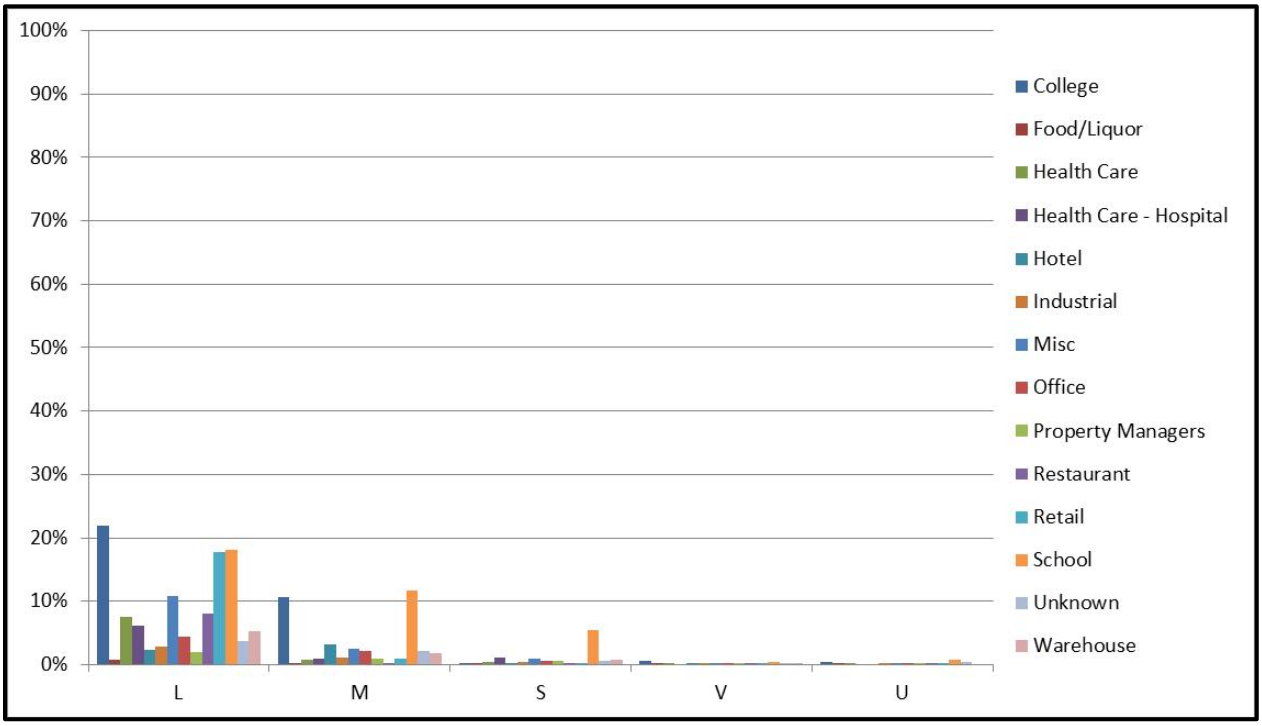
***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-13: Share of Consumption of Telephone Survey Eligible Sites Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-14: Share of Telephone Survey Eligible Sites Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

3.3.6 Distributed Generation by Utility

Table 3-20 and Table 3-21 list the share of consumption and sites participation in DG programs by IOU and consumption size. All three utilities are more likely to have large-sized sites participation in DG than smaller sites. PG&E has 10.4% of their large consumption and 7.3% of their large sites participating in DG programs. SCE has 11.2% of their large sized consumption and 5.7% of their large site participating in DG. SDG&E has 5.9% of their large consumption and 4.2% of their large sites participating.

Table 3-20: Share of Consumption Signed Up for Distributed Generation by IOU and Size

Utility	Total	Large	Medium	Small	Very Small
PG&E	6.3%	10.4%	4.0%	1.2%	0.3%
SCE	5.8%	11.2%	1.8%	0.4%	0.1%
SDG&E	3.2%	5.9%	2.2%	0.7%	0.2%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-21: Share of Sites Signed Up for Distributed Generation by IOU and Size

Utility	Total	Large	Medium	Small	Very Small	Unknown
PG&E	0.6%	7.3%	3.7%	0.9%	0.3%	0.3%
SCE	0.2%	5.7%	1.5%	0.3%	0.1%	0.0%
SDG&E	0.3%	4.2%	1.8%	0.5%	0.1%	0.6%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

PG&E Distributed Generation

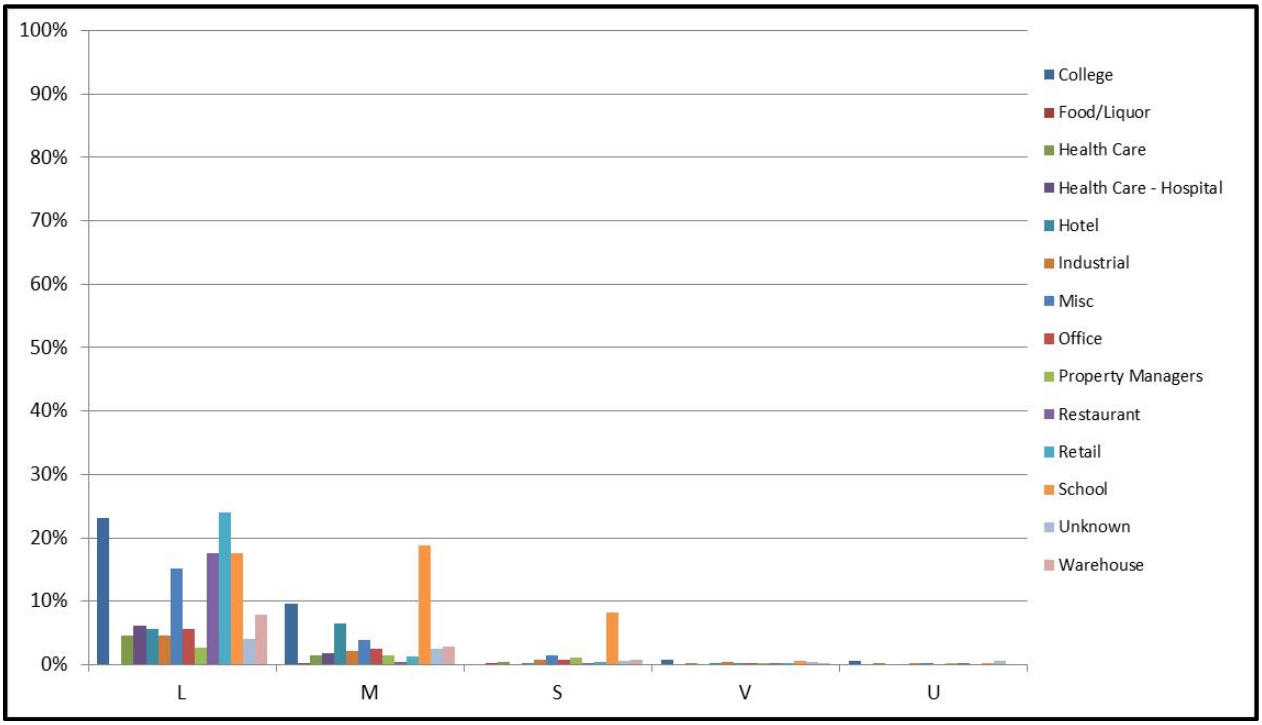
Table 3-22 lists PG&E's share of DG program participation by business type and consumption size, while Figure 3-15 illustrates the distribution. Schools have the highest level of participation with 8.3% of sites participating, while 0.1% of restaurant and food and liquor stores participated in DG programs between 2009 and 2012. . For large sites, retail stores and colleges have the highest level of DG participation with 23.9% of retail sites and 23.1% of college sites participating in programs. In addition, medium-sized schools have a participation rate at 18.7%.

Table 3-22: Share of Telephone Survey Eligible Sites Signed up for PG&E Distributed Generation Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	4.2%	23.1%	9.5%	0.0%	0.8%	0.5%
Food/Liquor	0.1%	0.0%	0.3%	0.2%	0.0%	0.0%
Health Care	0.3%	4.6%	1.5%	0.5%	0.1%	0.2%
Health Care – Hospital	3.1%	6.2%	1.8%	0.0%	0.0%	0.0%
Hotel	1.4%	5.6%	6.5%	0.2%	0.2%	0.0%
Industrial	1.0%	4.6%	2.2%	0.8%	0.4%	0.1%
Miscellaneous	0.6%	15.1%	4.0%	1.4%	0.3%	0.1%
Office	0.3%	5.7%	2.4%	0.7%	0.1%	0.0%
Property Managers	0.6%	2.6%	1.5%	1.1%	0.3%	0.1%
Restaurant	0.1%	17.6%	0.5%	0.1%	0.0%	0.1%
Retail	0.5%	23.9%	1.3%	0.5%	0.1%	0.0%
School	8.3%	17.6%	18.7%	8.3%	0.6%	0.2%
Unknown	0.5%	4.0%	2.5%	0.6%	0.5%	0.5%
Warehouse	0.7%	7.9%	2.9%	0.8%	0.3%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-15: Share of Telephone Survey Eligible Sites Signed up for PG&E Distributed Generation Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

SCE Distributed Generation

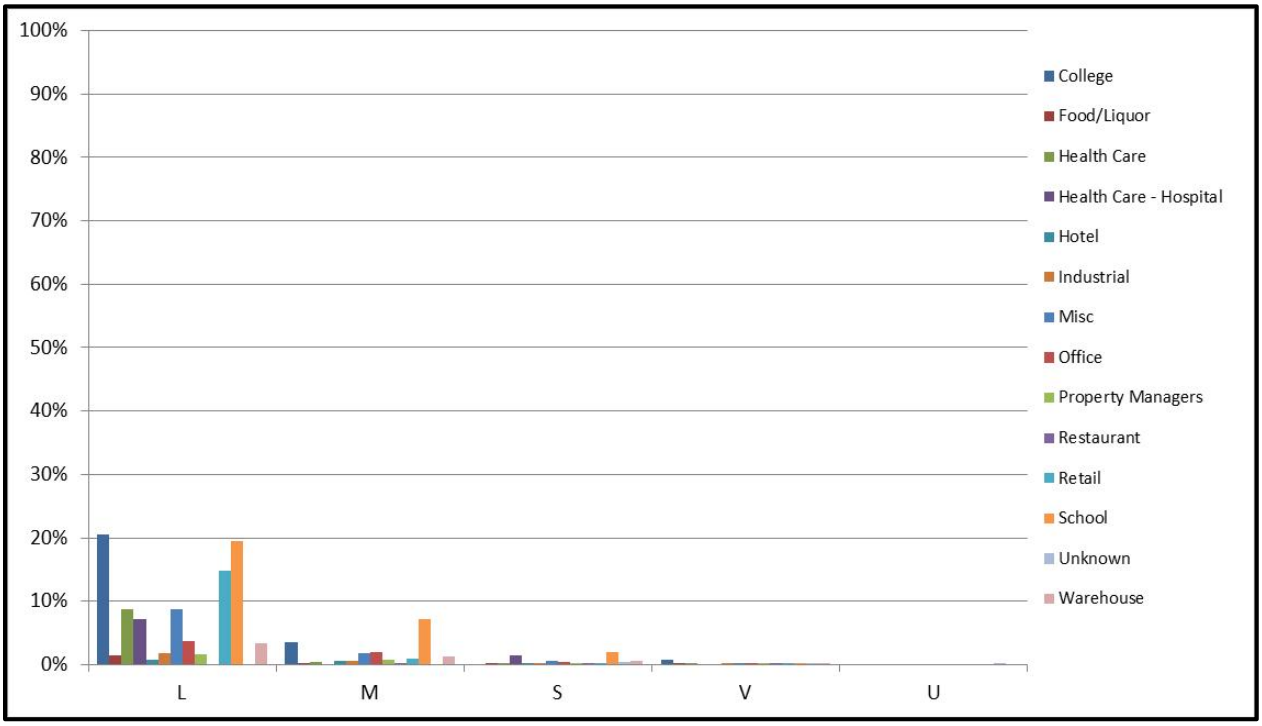
Table 3-23 lists SCE's share of DG program participation by business type and consumption size, while Figure 3-16 illustrates the distribution. Again, schools have the highest level of participation with 4% of sites participating, while 0.1% or less of restaurant and food and liquor stores participated in DG programs between 2009 and 2012. For large sites, colleges and schools have the highest level of DG participation with 20.5% of college sites and 19.4% of school sites participating in programs.

Table 3-23: Share of Telephone Survey Eligible Sites Signed up for SCE Distributed Generation Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	3.2%	20.5%	3.6%	0.0%	0.7%	0.0%
Food/Liquor	0.1%	1.4%	0.2%	0.0%	0.0%	0.0%
Health Care	0.2%	8.7%	0.4%	0.3%	0.2%	0.0%
Health Care – Hospital	2.5%	7.2%	0.0%	1.5%	0.0%	0.0%
Hotel	0.2%	0.8%	0.5%	0.1%	0.0%	0.0%
Industrial	0.3%	1.8%	0.6%	0.3%	0.1%	0.0%
Miscellaneous	0.2%	8.7%	1.8%	0.6%	0.1%	0.0%
Office	0.2%	3.7%	2.0%	0.4%	0.1%	0.0%
Property Managers	0.2%	1.6%	0.7%	0.3%	0.1%	0.0%
Restaurant	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Retail	0.3%	14.8%	0.9%	0.1%	0.0%	0.0%
School	4.2%	19.4%	7.2%	2.0%	0.2%	0.0%
Unknown	0.0%	0.0%	0.0%	0.4%	0.0%	0.1%
Warehouse	0.4%	3.4%	1.3%	0.7%	0.2%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-16: Share of Telephone Survey Eligible Sites Signed up for SCE Distributed Generation Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

SDG&E Distributed Generation

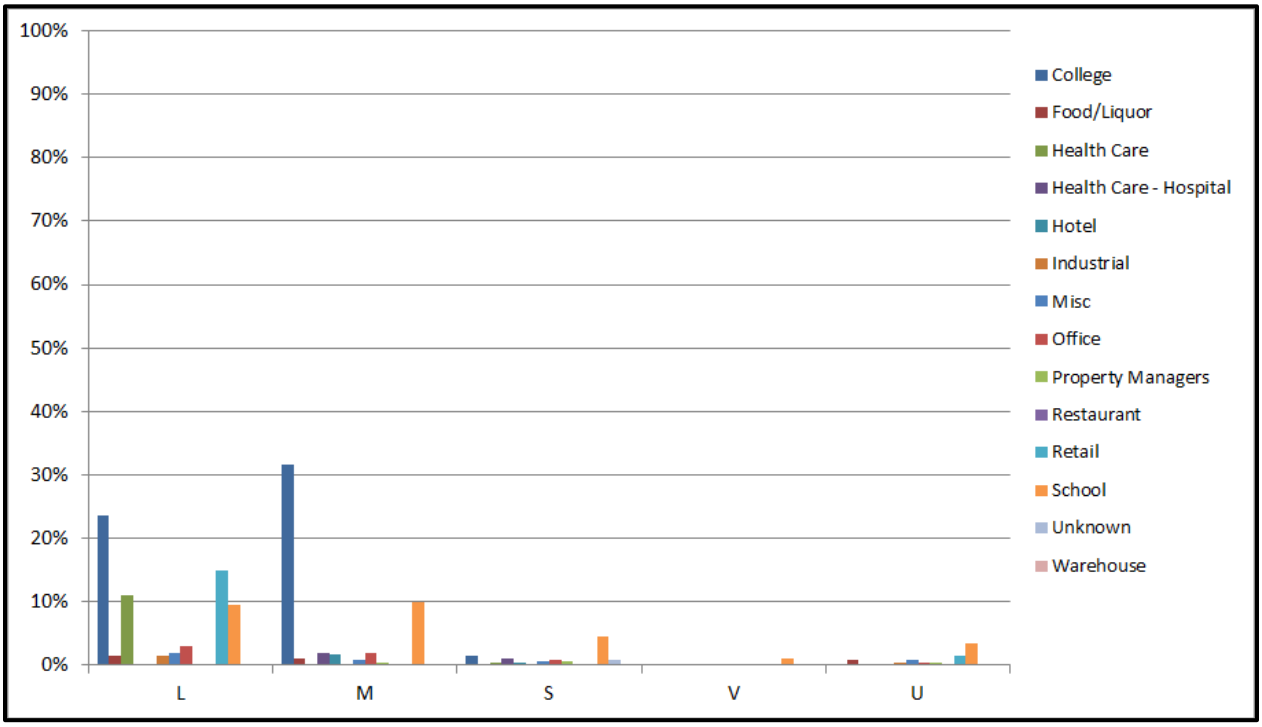
Table 3-24 lists SDG&E's share of DG program participation by business type and consumption size. Figure 3-17 illustrates the distribution. Colleges have the highest level of participation with 7.1% of sites participating, while restaurants are once again the segment with the lowest participation. Medium colleges have a relatively high share of sites participating in DG with 31.7% of sites participating. For large sites, colleges and retail have the highest level of DG participation with 23.5% of college sites and 14.9% of retail sites participating in programs.

Table 3-24: Share of Telephone Survey Eligible Sites Signed up for SDG&E's Distributed Generation Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	7.1%	23.5%	31.7%	1.5%	0.0%	0.0%
Food/Liquor	0.2%	1.6%	1.0%	0.1%	0.0%	0.8%
Health Care	0.2%	11.1%	0.0%	0.4%	0.1%	0.0%
Health Care – Hospital	0.6%	0.0%	2.0%	1.0%	0.0%	0.0%
Hotel	0.5%	0.0%	1.7%	0.3%	0.0%	0.0%
Industrial	0.2%	1.4%	0.3%	0.3%	0.2%	0.4%
Miscellaneous	0.3%	2.0%	0.8%	0.7%	0.1%	0.8%
Office	0.3%	3.0%	1.9%	0.8%	0.1%	0.4%
Property Managers	0.3%	0.0%	0.3%	0.6%	0.2%	0.4%
Restaurant	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%
Retail	0.3%	14.9%	0.2%	0.1%	0.1%	1.4%
School	5.3%	9.5%	9.9%	4.5%	1.1%	3.5%
Unknown	0.2%	0.0%	0.0%	0.9%	0.1%	0.2%
Warehouse	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-17: Share of Telephone Survey Eligible Sites Signed up for SDG&E Distributed Generation Programs 2009-2012 by Business Type and Size



* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

3.3.7 Integrated Demand Side Management

The Strategic Plan emphasizes the importance of encouraging utility customers to participate in multiple types of DSM. The first step to better understanding the current level of integration is to track who is participating in the various types of DSM programs. Analyzing where different types of DSM programs are successful and where they are encountering barriers will help programs expand their successful programs and devise new approaches to better succeed where they are currently less successful.

Table 3-25 and Figure 3-18 illustrate the distribution of sites that participated in all three forms of DSM (EE, DR, and DG) during the 2009-2012 program cycle and the share of sites that participated in at least one form of DSM by business type. The business types most likely to participate in all three forms of DSM are colleges (2.19%), schools (1.77%), and hospitals (0.53%). The type of DSM that limits the three type participation in integrated demand side management (IDSM) is DG. Comparing the participation in EE, DR, and DG, there is a significantly smaller share of sites participating in DG than in the other types of DSM.

Colleges, schools and hospitals have several similar characteristics that may contribute to their higher share of DG participation. These sites tend to be larger non-residential sites or sites that

have a central energy administrator that may make EE, DR, and DG decisions for multiple locations. A knowledgeable energy manager provides both the utilities and the implementers with a point of contact to facilitate participation in DSM. Colleges and schools may also choose to participate in DSM and install DG as part of their teaching mission. DG systems often come with meters and other teaching tools that can help students learn about energy, energy production, chemical reactions, and the environment. These three business types also commonly have substantial roof and parking space that allow for the installation of PV systems. Lastly, schools, colleges, and hospitals often represent non-profit business types that qualify for larger incentives under the California Solar Initiative.[12]

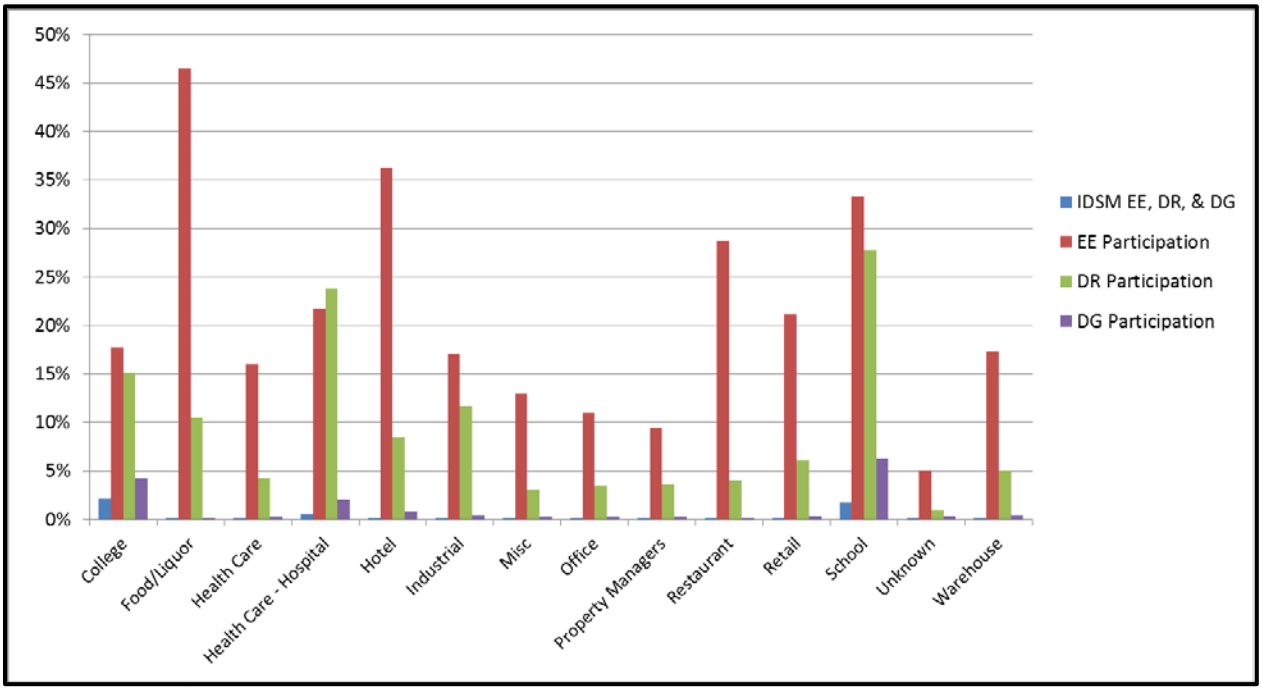
Food and liquor stores and industrial business types represent segments with relatively high levels of EE and DR participation but lower DG participation. The low level of DG participation in these segments limits their three-way participation in IDSM. These business types have many of the same characteristics of colleges and schools: they tend to be larger and have energy managers, but they do not have a teaching mission and are not generally non-profit businesses. Additional research is needed to determine why businesses chose to participate and other do not participate in DSM programs.

Table 3-25: Share of Telephone Survey Eligible Sites Participating in DSM by Business Type

CIS Business Type	Participating in EE & DR & DG	Participating in EE	Participating in DR	Participating in DG
College	2.19%	18%	15%	4.2%
Food/Liquor	0.05%	46%	11%	0.1%
Health Care	0.03%	16%	4%	0.3%
Health Care – Hospital	0.53%	22%	24%	2.1%
Hotel	0.13%	36%	8%	0.8%
Industrial	0.12%	17%	12%	0.5%
Miscellaneous	0.03%	13%	3%	0.3%
Office	0.04%	11%	3%	0.3%
Property Managers	0.02%	9%	4%	0.3%
Restaurant	0.01%	29%	4%	0.1%
Retail	0.13%	21%	6%	0.4%
School	1.77%	33%	28%	6.3%
Unknown	0.00%	5%	1%	0.4%
Warehouse	0.07%	17%	5%	0.4%

[12] Non-profit businesses, however, cannot take advantage of state and federal tax credits designed to encourage clean energy sources. The higher incentives for government and non-profit businesses under the CSI program compensate, at least in part, for the absence of tax credits for these businesses.

Figure 3-18: Share of Telephone Survey Eligible Sites Participating in DSM by Business Type



Energy Efficiency and Demand Response

The following subsection illustrates the number and distribution of sites that have participated in EE and DR programs during 2009-2012. While this analysis does not imply that the customers simultaneously participated in EE and DR programs, the analysis does present the current level of participation. Table 3-27 and Table 3-28 list the share of consumption and sites participating in both EE and DR programs from 2009 to 2012. For all three IOUs, medium and large sized sites are substantially more likely to participate in EE and DR during this four year time period than small and very small sites. Given the higher share of large and medium sites participating in EE and DR, the share of consumption participating in these programs is substantially higher than the share of sites. For PG&E 33.8% of consumption participated in both EE and DR programs from 2009-2012 while only 1.3% of sites were joint participants. For SCE 30% of consumption and 1.7% of the sites jointly participated while 15.7% of SDG&E's consumption and 1.6% of their sites participated in both EE and DR.

Table 3-26: Share of Consumption of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Demand Response Programs 2009-2012 by IOU and Size

Utility	Total	Large	Medium	Small	Very Small
PG&E	33.8%	58.8%	18.7%	1.7%	0.4%
SCE	30.1%	52.4%	18.6%	3.3%	0.9%
SDG&E	15.7%	30.4%	9.2%	2.7%	1.2%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-27: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Demand Response Programs 2009-2012 by IOU and Size

Utility	Total	Large	Medium	Small	Very Small	Unknown
PG&E	1.3%	49.8%	12.9%	1.3%	0.2%	0.0%
SCE	1.7%	42.1%	14.0%	2.3%	0.5%	0.0%
SDG&E	1.6%	30.8%	6.3%	2.3%	0.8%	0.4%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

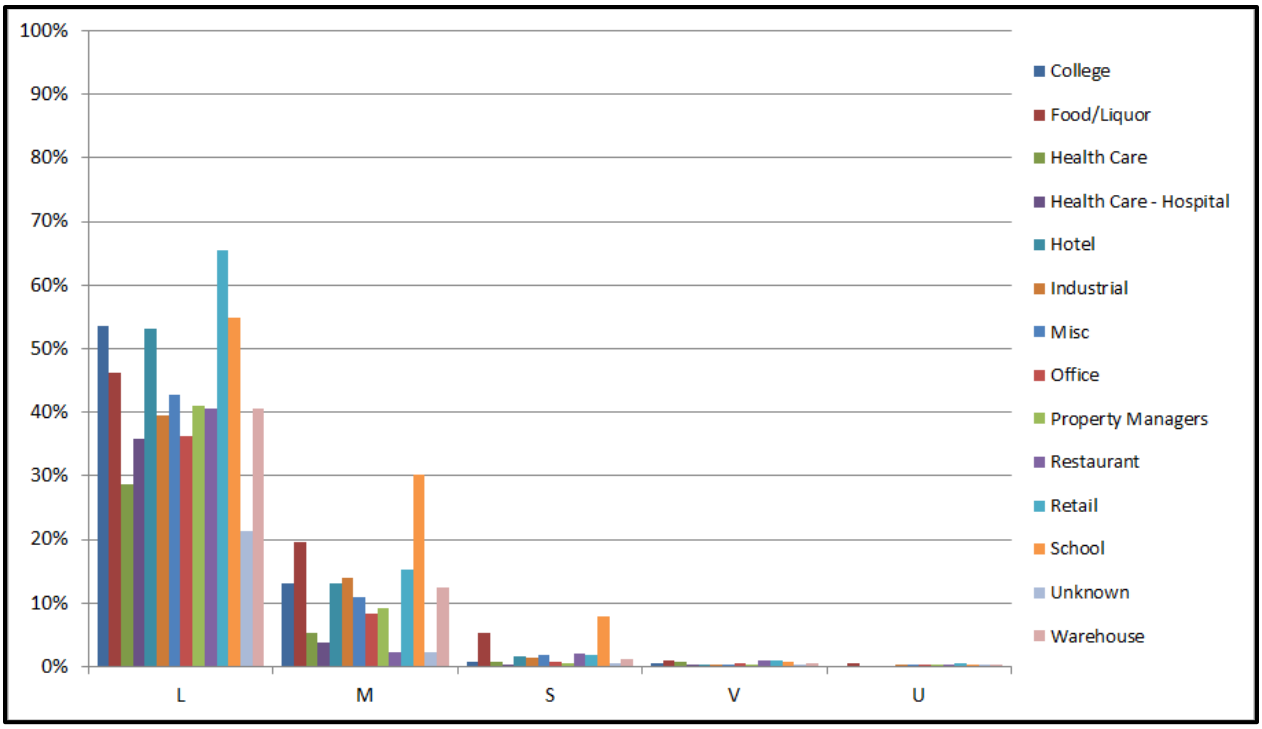
Table 3-28 and Figure 3-19 illustrate the share of sites from the nonresidential frame participating in EE and DR programs between 2009 and 2012 by business type. Given that participants in both energy efficiency and demand response tend to be larger sites, participation in these two types of DSM is more common for larger sites. Sixty six percent of the large retail sites in the three IOU service territories participated in EE and were signed up for DR programs. For large schools, 55% joint participated, while 54% of large colleges and 53% of large hotel were dual DSM participants.

Table 3-28: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	7.9%	53.5%	13.1%	0.8%	0.4%	0.0%
Food/Liquor	7.3%	46.2%	19.5%	5.4%	1.0%	0.6%
Health Care	1.0%	28.6%	5.4%	0.7%	0.7%	0.0%
Health Care – Hospital	10.8%	35.8%	3.7%	0.4%	0.4%	0.0%
Hotel	5.4%	53.2%	13.1%	1.6%	0.2%	0.0%
Industrial	3.9%	39.4%	14.0%	1.3%	0.4%	0.2%
Miscellaneous	0.8%	42.6%	10.9%	1.9%	0.4%	0.0%
Office	0.9%	36.2%	8.4%	0.8%	0.5%	0.0%
Property Managers	1.1%	40.9%	9.2%	0.6%	0.2%	0.1%
Restaurant	1.7%	40.5%	2.3%	2.0%	0.9%	0.1%
Retail	2.7%	65.5%	15.3%	1.9%	0.9%	0.4%
School	13.6%	54.9%	30.2%	7.8%	0.7%	0.1%
Unknown	0.1%	21.3%	2.2%	0.6%	0.1%	0.0%
Warehouse	1.6%	40.5%	12.4%	1.2%	0.5%	0.2%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-19: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Demand Response Programs 2009-2012 by Business Type and Size



* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Energy Efficiency and Distributed Generation

The following subsection illustrates the number and distribution of consumption and sites that have participated in EE and DG programs during 2009-2012. The presentation of these data does not imply that the customers simultaneously participated in EE and DG programs, the analysis focuses on the current level of participation in these two types of DSM. Table 3-30 lists the share of consumption participating in both EE and DG programs from 2009 to 2012 by IOU while Table 3-31 lists the share of sites participating. Given that large sized businesses were more likely to participate in DG than medium and small sized businesses it is not surprising to find that for all three IOUs, large sized businesses are more likely to participate in EE and DG during this four year time period than medium, small, and very small sites. The concentration of participation in larger sized businesses leads to a higher share of consumption participating than sites. PG&E has 5% of their consumption participating in EE and DG during 2009-2012 but only 0.2% of their sites. SCE has 4.1% of their consumption and 0.1% of their sites participating in EE and DG while SDG&E has 2.0% of their consumption and 0.1% of their sites participating. The very low share of consumption and sites participating in both EE and DG during this time period illustrates that much is left to be achieved to integrate EE and DG.

Table 3-29: Share of Consumption of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size

Utility	Total	Large	Medium	Small	Very Small
PG&E	5.0%	8.8%	2.5%	0.4%	0.0%
SCE	4.1%	8.3%	0.8%	0.1%	0.0%
SDG&E	2.0%	4.3%	0.8%	0.2%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-30: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size

Utility	Total	Large	Medium	Small	Very Small	Unknown
PG&E	0.2%	5.8%	2.2%	0.3%	0.0%	0.0%
SCE	0.1%	3.3%	0.6%	0.1%	0.0%	0.0%
SDG&E	0.1%	2.1%	0.6%	0.1%	0.0%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

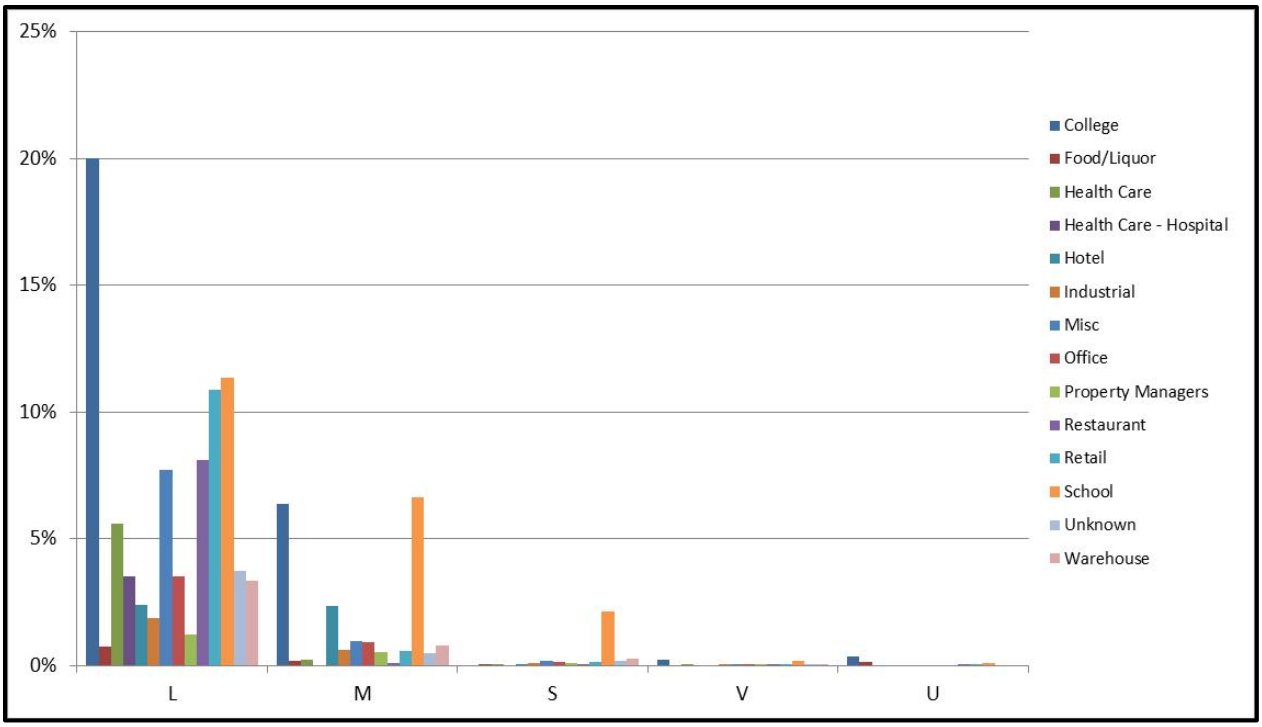
Table 3-31 and Figure 3-20 illustrate the share of sites from the nonresidential frame participating in EE and DG programs from 2009 to 2012 by business type. Participation in these two types of DSM is more common for larger sites and is focused within specific business types. Twenty percent of the large college sites participated in EE and DG programs. For large schools and retail, 11% joint participated, while 8% of large restaurants and 6% of large health care were dual DSM participants.

Table 3-31: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	3.2%	20.0%	6.4%	0.0%	0.2%	0.4%
Food/Liquor	0.1%	0.8%	0.2%	0.1%	0.0%	0.1%
Health Care	0.1%	5.6%	0.2%	0.0%	0.0%	0.0%
Health Care – Hospital	1.0%	3.5%	0.0%	0.0%	0.0%	0.0%
Hotel	0.6%	2.4%	2.4%	0.1%	0.0%	0.0%
Industrial	0.2%	1.9%	0.6%	0.1%	0.0%	0.0%
Miscellaneous	0.1%	7.7%	0.9%	0.2%	0.0%	0.0%
Office	0.1%	3.5%	0.9%	0.1%	0.0%	0.0%
Property Managers	0.1%	1.2%	0.5%	0.1%	0.0%	0.0%
Restaurant	0.0%	8.1%	0.1%	0.0%	0.0%	0.1%
Retail	0.2%	10.9%	0.6%	0.1%	0.0%	0.0%
School	3.1%	11.4%	6.6%	2.1%	0.2%	0.1%
Unknown	0.0%	3.8%	0.5%	0.2%	0.0%	0.0%
Warehouse	0.2%	3.4%	0.8%	0.3%	0.0%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-20: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Demand Response and Distributed Generation

The following subsection illustrates the share and distribution of consumption and sites that have participated in DG and signed up for DR programs during 2009-2012. While this analysis does not imply that the customers simultaneously participated in DR and DG programs, the analysis does present the current baseline of participation. Table 3-32 presents the share of consumption participating in DG and DR while Table 3-33 presents the share of sites participating by IOU. These data indicate that sites that participate in these two types of DSM tend to be larger sites. The higher participation of larger sized sites leads to a higher share of consumption participating in DG and DR than the share of sites. For PG&E 5% of consumption participates in both DR and DG while only 0.2% of sites jointly participate. For SCE 4.5% of consumption participated in DR and DG and 0.1% of sites participate and for SDG&E 1.8% of consumption participates while 0.1% of sites participate in DR and DG.

Table 3-32: Share of Consumption of Telephone Survey Eligible Sites Participating in Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size

Utility	Total	Large	Medium	Small	Very Small
PG&E	5.0%	8.8%	2.6%	0.1%	0.0%
SCE	4.5%	8.8%	1.3%	0.1%	0.0%
SDG&E	1.8%	3.8%	1.0%	0.1%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-33: Share of Telephone Survey Eligible Sites Participating in Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size

Utility	Total	Large	Medium	Small	Very Small	Unknown
PG&E	0.2%	6.4%	1.9%	0.1%	0.0%	0.0%
SCE	0.1%	4.5%	1.0%	0.1%	0.0%	0.0%
SDG&E	0.1%	3.1%	0.7%	0.1%	0.0%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

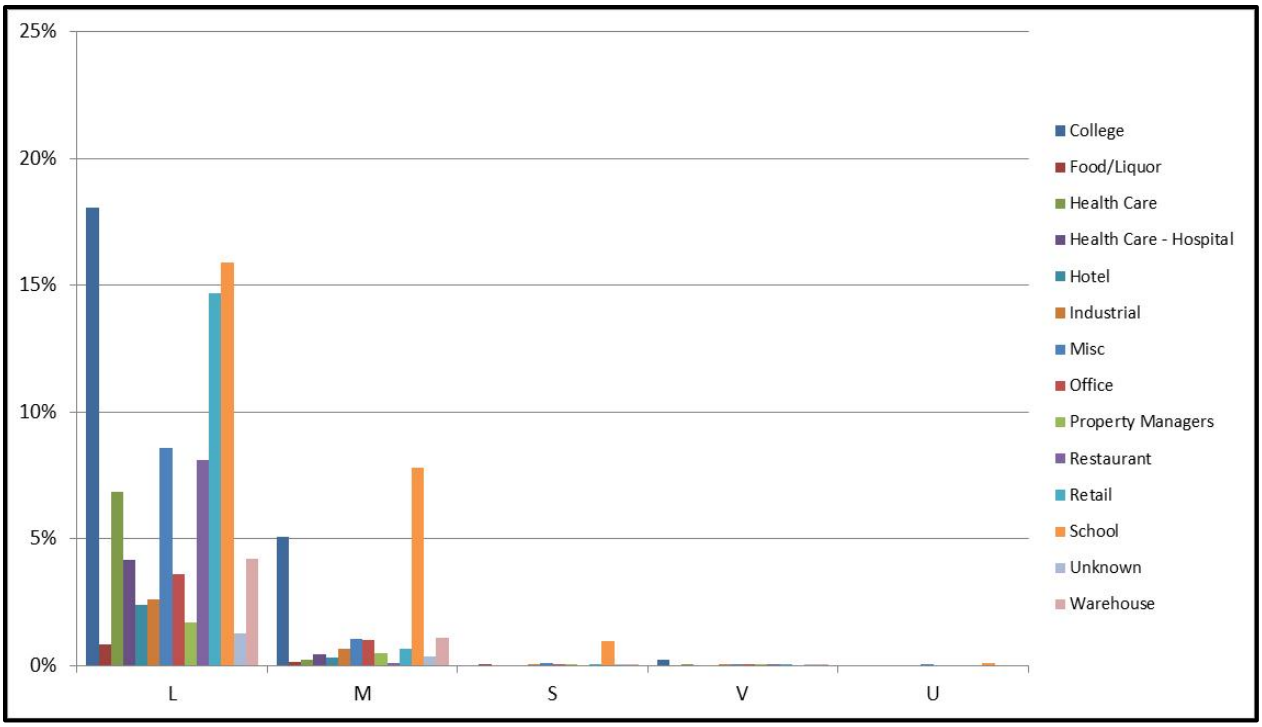
Table 3-23 and Figure 3-21 illustrate the share of sites from the nonresidential frame participating in DG programs and signed up for DR programs. Given that participants in both DG and DR tend to be larger sites, participation in these two types of DSM is more common for larger sites and it is dominated by large colleges, retail stores, and schools. Eighteen percent of the large college sites participate in DG and DR. For large schools, 15.9% joint participated, while 14.7% of large retail and 8.6% of large miscellaneous were dual DSM participants.

Table 3-34: Share of Telephone Survey Eligible Sites Participating in Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	2.7%	18.1%	5.1%	0.0%	0.2%	0.0%
Food/Liquor	0.1%	0.9%	0.2%	0.0%	0.0%	0.0%
Health Care	0.0%	6.8%	0.2%	0.0%	0.0%	0.0%
Health Care – Hospital	1.2%	4.2%	0.5%	0.0%	0.0%	0.0%
Hotel	0.2%	2.4%	0.3%	0.0%	0.0%	0.0%
Industrial	0.2%	2.6%	0.6%	0.1%	0.0%	0.0%
Miscellaneous	0.1%	8.6%	1.1%	0.1%	0.0%	0.0%
Office	0.1%	3.6%	1.0%	0.0%	0.0%	0.0%
Property Managers	0.1%	1.7%	0.5%	0.0%	0.0%	0.0%
Restaurant	0.0%	8.1%	0.1%	0.0%	0.0%	0.0%
Retail	0.2%	14.7%	0.6%	0.0%	0.0%	0.0%
School	3.1%	15.9%	7.8%	1.0%	0.0%	0.1%
Unknown	0.0%	1.3%	0.4%	0.0%	0.0%	0.0%
Warehouse	0.1%	4.2%	1.1%	0.1%	0.0%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-21: Share of Telephone Survey Eligible Sites Participating in Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Energy Efficiency, Demand Response, and Distributed Generation

The Strategic Plan emphasizes the importance of encouraging utility customers to participate in multiple types of DSM. The following subsection illustrates the share and distribution of consumption and sites that have participated in EE, signed up for DR, and participated in DG programs during 2009-2012. Table 3-35 lists the share of kWh participating in EE, DR, and DG while Table 3-36 lists the share of sites participating during 2009-2012 by IOU. While the share of consumption and sites participating in all three types of DSM is very low, PG&E has a slightly higher share of these consumption and sites than the other two IOUs.

Table 3-35: Share of Consumption of Telephone Survey Eligible Sites Participating in Energy Efficiency, Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size

Utility	Total	Large	Medium	Small	Very Small
PG&E	4.1%	7.5%	1.8%	0.1%	0.0%
SCE	3.1%	6.3%	0.6%	0.0%	0.0%
SDG&E	1.3%	3.0%	0.3%	0.0%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-36: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency, Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by IOU and Size

Utility	Total	Large	Medium	Small	Very Small	Unknown
PG&E	0.1%	5.2%	1.3%	0.0%	0.0%	0.0%
SCE	0.0%	2.4%	0.4%	0.0%	0.0%	0.0%
SDG&E	0.0%	1.7%	0.2%	0.0%	0.0%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

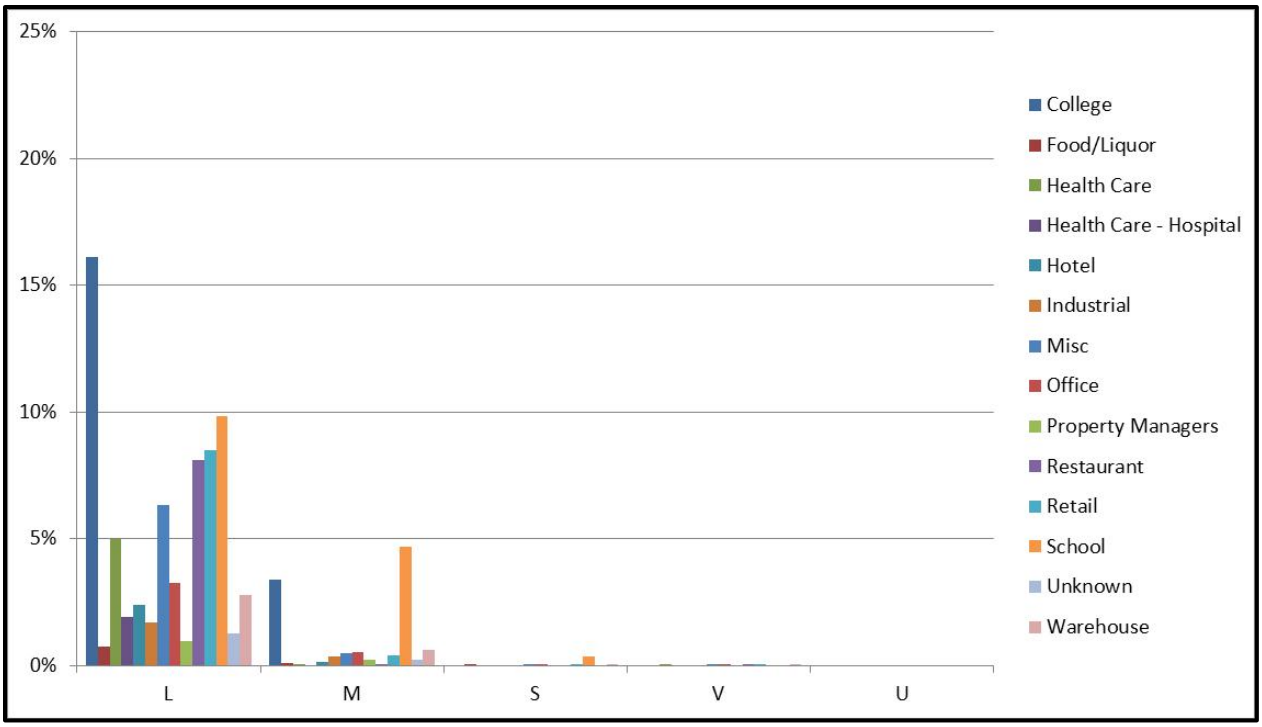
Participation in there types of DSM by business type is presented in Table 3-37 and Figure 3-22. Sixteen percent of the large college sites in the three IOU service territories participated in these three types of DSM. For large schools, 9.8% joint participated, while 8.5% of large retail and 8.1% of large restaurant were participants in energy efficiency programs, signed up for demand response programs, and participated in distributed generation programs. These numbers provide criteria upon which to gauge future progress in achieving increases in sites with multiple types of DSM participation.

Table 3-37: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency, Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size

CIS Business Type	Total	Large	Medium	Small	Very Small	Unknown
College	2.2%	16.1%	3.4%	0.0%	0.0%	0.0%
Food/Liquor	0.1%	0.8%	0.1%	0.0%	0.0%	0.0%
Health Care	0.0%	5.0%	0.1%	0.0%	0.0%	0.0%
Health Care – Hospital	0.5%	1.9%	0.0%	0.0%	0.0%	0.0%
Hotel	0.1%	2.4%	0.2%	0.0%	0.0%	0.0%
Industrial	0.1%	1.7%	0.4%	0.0%	0.0%	0.0%
Miscellaneous	0.0%	6.3%	0.5%	0.0%	0.0%	0.0%
Office	0.0%	3.3%	0.5%	0.0%	0.0%	0.0%
Property Managers	0.0%	1.0%	0.2%	0.0%	0.0%	0.0%
Restaurant	0.0%	8.1%	0.1%	0.0%	0.0%	0.0%
Retail	0.1%	8.5%	0.4%	0.0%	0.0%	0.0%
School	1.8%	9.8%	4.7%	0.4%	0.0%	0.0%
Unknown	0.0%	1.3%	0.2%	0.0%	0.0%	0.0%
Warehouse	0.1%	2.8%	0.6%	0.0%	0.0%	0.0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 3-22: Share of Telephone Survey Eligible Sites Participating in Energy Efficiency, Demand Response and Signed up for IOU Distributed Generation Programs 2009-2012 by Business Type and Size



***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

4

Telephone Survey Sample Design

The sample design for the telephone survey was developed using the IOU nonresidential electric frame; the NAICS codes found in the Customer Information System (CIS), site aggregation methodologies developed in concert with the Data Management Work Order (WO009), and input provided by the DEER team, the IOUs and the CPUC, and other work order evaluation teams.[1] The team used these data to review and map the usage of sites to building type descriptions based on the purpose of the CSS and CMST studies.[2]

The nonresidential frame, augmented with defined business types and program participation flags, forms the input data basis for these nonresidential population surveys. The nonresidential frame is describe and discussed in Section 3 of this report.

4.1 Telephone Survey Sample Design

The goal of the telephone survey sample design is to develop a representative sample of the nonresidential population. The telephone survey's primary objective is to help develop an on-site sample that provides the desired level of statistical precision for estimating a wide range of commercial customer characteristics largely represented by the share of sites purchasing high priority measures and the saturation of electricity consuming end-uses and measures. Given that the primary purpose of the telephone survey is to recruit a representative sample for the on-site surveys, the final telephone survey sample design was adjusted during the survey process to successfully fulfill this objective.

The telephone survey sample design incorporates 14 business types: colleges and universities, food and liquor stores, non-hospital health care, hospitals, hotels and motels, industrial, miscellaneous, offices, property managers, restaurants, retail, k-12 schools, warehouses, and unclassified and undefined.[3] The business type strata were further disaggregated by the three

[1] The initial nonresidential data represented all nonresidential customers with IOU electric accounts in 2010. In 2012, the evaluation team received information on 2011 nonresidential customers. Customers who were in the 2011 but not the 2010 data were added to the group on nonresidential customers.

[2] See the CSS/CMST Research Plan for more information.

[3] Unclassified and undefined buildings represent records in the CIS that the IOUs have classified using an unclassified or undefined building type or records with no NAICs code.

electric IOUs and five usage strata (very small, small, medium, large, and unknown)[4] to produce 210 unique strata. If a site was in the 2010 frame and had electric usage, then their usage stratum was based on their 2010 usage. For sites without usage in 2010 or that were added in the 2011 frame, the site's 2011 usage was used to determine their size stratum. Sites whose annual usage was over 1,750,000 kWh were classified as large. Sites with usage from 300,000 kWh to 1,750,00 kWh were classified as medium, sites with usage from 40,000 to 300,000 kWh were small sites, and sites with usage less than 40,000 kWh were designated as very small. Sites with no kWh in 2010 were classified as unknown usage levels. Some of these sites were later found to have usage reported in the 2011 billing data. If no usage was found in the 2010 or 2011 billing data, the site had no kWh usage.

The telephone survey quota was originally developed based equally upon the usage and number of unique sites. In other words, two separate quotas were calculated by strata based first, on kWh, and then by counts. These two quotas were then averaged for each stratum. The sample design was also dependent upon ensuring that there were an adequate number of sites, but not too many, for each IOU/business type combination and the design allocated a target number of sites by IOU. Over time, some strata were oversampled in order to achieve sufficient survey recruits for the on-site survey in those strata. As additional sites were needed to ensure adequate on-site strata, the quota for the telephone survey was simply increased.

Table 4-1 through Table 4-3 provide information on the final, adjusted telephone survey sample design. Within the final sample design, many large and medium strata had a census attempted to try to meet the telephone quota.

[4] The unknown usage category represents accounts found in the CIS that do not have a matching record in the billing data.

Table 4-1: PG&E Telephone Survey Sample Design

IOU	Business Type	kWh Size	Number of Sites	Usage (kWh)	Quota
PGE	College	Large	65	670,355,026	33
PGE	College	Medium	84	68,606,091	34
PGE	College	Small	135	17,206,623	2
PGE	College	Unknown	187	0	2
PGE	College	Very Small	125	1,543,804	2
PGE	Food/Liquor	Large	439	992,992,997	60
PGE	Food/Liquor	Medium	1,003	778,948,532	142
PGE	Food/Liquor	Small	6,261	716,490,830	56
PGE	Food/Liquor	Unknown	467	901,754	2
PGE	Food/Liquor	Very Small	2,488	47,516,378	50
PGE	Health Care	Large	65	259,043,920	36
PGE	Health Care	Medium	778	495,365,188	65
PGE	Health Care	Small	2,366	255,642,419	45
PGE	Health Care	Unknown	649	1,068,811	7
PGE	Health Care	Very Small	12,012	156,773,046	115
PGE	Health Care - Hospital	Large	130	1,033,068,895	64
PGE	Health Care - Hospital	Medium	56	40,866,849	9
PGE	Health Care - Hospital	Small	25	3,764,117	0
PGE	Health Care - Hospital	Unknown	50	0	2
PGE	Health Care - Hospital	Very Small	29	500,724	0
PGE	Hotel	Large	107	496,390,147	26
PGE	Hotel	Medium	567	364,786,881	21
PGE	Hotel	Small	1,606	191,905,557	18
PGE	Hotel	Unknown	211	42,742	3
PGE	Hotel	Very Small	956	18,341,265	7
PGE	Industrial	Large	802	7,292,666,184	215
PGE	Industrial	Medium	1,548	1,135,279,478	38
PGE	Industrial	Small	3,397	403,410,545	23
PGE	Industrial	Unknown	822	2,428,152	5
PGE	Industrial	Very Small	6,166	80,590,747	20
PGE	Miscellaneous	Large	245	1,983,844,881	96
PGE	Miscellaneous	Medium	1,642	1,017,814,377	117
PGE	Miscellaneous	Small	12,225	1,198,652,936	59
PGE	Miscellaneous	Unknown	5,525	1,433,508	8
PGE	Miscellaneous	Very Small	58,396	619,132,218	158

Table 4-1: PG&E Telephone Survey Sample Design (cont'd.)

IOU	Business Type	kWh Size	Number of Sites	Usage (kWh)	Quota
PGE	Office	Large	387	2,042,236,997	45
PGE	Office	Medium	1,530	1,058,510,476	114
PGE	Office	Small	8,078	814,847,924	120
PGE	Office	Unknown	4,141	1,381,967	8
PGE	Office	Very Small	34,090	336,280,148	115
PGE	Property Managers	Large	419	2,060,569,666	81
PGE	Property Managers	Medium	1,264	934,766,804	62
PGE	Property Managers	Small	3,790	400,045,014	30
PGE	Property Managers	Unknown	773	268,967	7
PGE	Property Managers	Very Small	10,555	131,431,215	43
PGE	Restaurant	Large	17	39,183,282	9
PGE	Restaurant	Medium	1,206	524,995,487	30
PGE	Restaurant	Small	15,167	1,506,520,411	113
PGE	Restaurant	Unknown	1,327	856,933	6
PGE	Restaurant	Very Small	7,825	180,326,688	40
PGE	Retail	Large	284	784,583,412	45
PGE	Retail	Medium	1,784	1,018,828,127	66
PGE	Retail	Small	6,129	650,731,027	85
PGE	Retail	Unknown	1,564	918,802	4
PGE	Retail	Very Small	18,058	241,763,276	74
PGE	School	Large	68	164,601,432	15
PGE	School	Medium	1,243	710,013,399	115
PGE	School	Small	2,413	374,598,579	57
PGE	School	Unknown	650	605,332	4
PGE	School	Very Small	1,056	15,701,572	25
PGE	Unknown	Large	75	668,552,209	16
PGE	Unknown	Medium	732	420,466,327	9
PGE	Unknown	Small	11,201	958,047,259	37
PGE	Unknown	Unknown	16,628	14,078,584	30
PGE	Unknown	Very Small	103,696	779,877,095	195
PGE	Warehouse	Large	164	796,731,177	162
PGE	Warehouse	Medium	806	550,590,044	91
PGE	Warehouse	Small	3,366	348,861,943	110
PGE	Warehouse	Unknown	880	275,117	3
PGE	Warehouse	Very Small	9,299	109,857,079	95

Table 4-2: SCE Telephone Survey Sample Design

IOU	Business Type	kWh Size	Number of Sites	Usage (kWh)	Quota
SCE	College	Large	73	733,856,029	36
SCE	College	Medium	111	80,951,884	33
SCE	College	Small	177	21,745,587	4
SCE	College	Unknown	24	205	0
SCE	College	Very Small	272	3,458,383	2
SCE	Food/Liquor	Large	490	1,184,977,596	64
SCE	Food/Liquor	Medium	1,241	992,932,793	104
SCE	Food/Liquor	Small	6,362	774,223,246	60
SCE	Food/Liquor	Unknown	89	11,662	1
SCE	Food/Liquor	Very Small	3,122	53,600,539	25
SCE	Health Care	Large	69	233,190,477	13
SCE	Health Care	Medium	836	531,983,518	95
SCE	Health Care	Small	2,818	288,218,854	59
SCE	Health Care	Unknown	156	141,973	1
SCE	Health Care	Very Small	15,422	198,779,383	97
SCE	Health Care - Hospital	Large	152	1,475,927,704	67
SCE	Health Care - Hospital	Medium	109	88,087,049	5
SCE	Health Care - Hospital	Small	136	18,560,733	1
SCE	Health Care - Hospital	Unknown	10	0	0
SCE	Health Care - Hospital	Very Small	122	1,916,901	1
SCE	Hotel	Large	122	532,297,188	29
SCE	Hotel	Medium	569	385,615,673	24
SCE	Hotel	Small	1,279	150,843,883	16
SCE	Hotel	Unknown	19	2,438	0
SCE	Hotel	Very Small	842	15,155,330	6
SCE	Industrial	Large	1,012	9,509,860,054	70
SCE	Industrial	Medium	2,568	1,849,935,097	143
SCE	Industrial	Small	6,329	741,661,080	28
SCE	Industrial	Unknown	234	361,726	1
SCE	Industrial	Very Small	13,961	174,127,846	31
SCE	Miscellaneous	Large	276	1,830,863,681	45
SCE	Miscellaneous	Medium	2,097	1,323,279,602	57
SCE	Miscellaneous	Small	16,031	1,521,194,638	96
SCE	Miscellaneous	Unknown	4,987	1,567,559	6
SCE	Miscellaneous	Very Small	122,538	988,184,107	193

Table 4-2: SCE Telephone Survey Sample Design (cont'd.)

IOU	Business Type	kWh Size	Number of Sites	Usage (kWh)	Quota
SCE	Office	Large	241	1,245,675,742	57
SCE	Office	Medium	1,144	754,757,743	84
SCE	Office	Small	7,557	777,980,340	127
SCE	Office	Unknown	4,649	438,070	12
SCE	Office	Very Small	43,313	384,669,725	153
SCE	Property Managers	Large	371	1,472,359,927	15
SCE	Property Managers	Medium	1,777	1,228,991,154	75
SCE	Property Managers	Small	8,710	887,723,018	62
SCE	Property Managers	Unknown	2,489	379,241	7
SCE	Property Managers	Very Small	34,570	332,686,914	116
SCE	Restaurant	Large	17	46,397,031	5
SCE	Restaurant	Medium	2,005	897,311,644	53
SCE	Restaurant	Small	19,170	2,028,150,135	133
SCE	Restaurant	Unknown	295	887,646	2
SCE	Restaurant	Very Small	10,032	199,191,648	40
SCE	Retail	Large	487	1,438,994,120	52
SCE	Retail	Medium	2,599	1,514,298,915	115
SCE	Retail	Small	8,583	865,247,592	75
SCE	Retail	Unknown	393	556,566	4
SCE	Retail	Very Small	28,751	357,520,923	101
SCE	School	Large	175	421,683,403	30
SCE	School	Medium	1,794	1,037,097,962	135
SCE	School	Small	1,910	314,874,326	55
SCE	School	Unknown	54	9,184	0
SCE	School	Very Small	883	13,460,254	12
SCE	Unknown	Large	2	12,475,722	0
SCE	Unknown	Medium	54	25,514,574	1
SCE	Unknown	Small	1,884	146,267,254	18
SCE	Unknown	Unknown	1,823	1,252,672	4
SCE	Unknown	Very Small	50,957	261,693,540	250
SCE	Warehouse	Large	177	744,723,160	177
SCE	Warehouse	Medium	1,014	665,627,578	140
SCE	Warehouse	Small	4,866	504,726,361	237
SCE	Warehouse	Unknown	190	59,265	3
SCE	Warehouse	Very Small	15,353	184,192,999	165

Table 4-3: SDG&E Telephone Survey Sample Design

IOU	Business Type	kWh Size	Number of Sites	Usage (kWh)	Quota
SDGE	College	Large	17	182,735,231	8
SDGE	College	Medium	41	27,944,383	16
SDGE	College	Small	66	7,879,566	19
SDGE	College	Unknown	62	274,590	3
SDGE	College	Very Small	68	857,451	3
SDGE	Food/Liquor	Large	124	277,242,445	28
SDGE	Food/Liquor	Medium	305	230,515,909	32
SDGE	Food/Liquor	Small	1,638	216,779,270	60
SDGE	Food/Liquor	Unknown	129	17,428,230	1
SDGE	Food/Liquor	Very Small	727	12,050,514	35
SDGE	Health Care	Large	27	126,556,738	14
SDGE	Health Care	Medium	203	127,040,371	23
SDGE	Health Care	Small	683	67,212,232	30
SDGE	Health Care	Unknown	224	7,865,419	9
SDGE	Health Care	Very Small	3,767	50,585,100	39
SDGE	Health Care - Hospital	Large	31	288,833,335	16
SDGE	Health Care - Hospital	Medium	51	38,587,617	30
SDGE	Health Care - Hospital	Small	96	10,791,404	3
SDGE	Health Care - Hospital	Unknown	31	7,564,898	0
SDGE	Health Care - Hospital	Very Small	105	1,393,181	2
SDGE	Hotel	Large	66	360,242,062	27
SDGE	Hotel	Medium	177	124,411,005	13
SDGE	Hotel	Small	312	40,872,588	6
SDGE	Hotel	Unknown	67	4,916,740	1
SDGE	Hotel	Very Small	257	3,499,920	3
SDGE	Industrial	Large	141	858,136,069	20
SDGE	Industrial	Medium	382	272,707,059	33
SDGE	Industrial	Small	1,105	125,809,163	48
SDGE	Industrial	Unknown	270	12,953,174	1
SDGE	Industrial	Very Small	2,626	33,283,533	23
SDGE	Miscellaneous	Large	49	310,527,572	24
SDGE	Miscellaneous	Medium	393	247,482,547	34
SDGE	Miscellaneous	Small	2,866	276,345,570	29
SDGE	Miscellaneous	Unknown	1,161	27,520,544	2
SDGE	Miscellaneous	Very Small	14,295	160,445,982	82

Table 4-3: SDG&E Telephone Survey Sample Design (cont'd.)

IOU	Business Type	kWh Size	Number of Sites	Usage (kWh)	Quota
SDGE	Office	Large	200	949,780,968	29
SDGE	Office	Medium	731	483,303,782	65
SDGE	Office	Small	4,694	478,962,395	40
SDGE	Office	Unknown	2,713	44,243,525	9
SDGE	Office	Very Small	20,296	200,787,373	66
SDGE	Property Managers	Large	41	157,195,981	12
SDGE	Property Managers	Medium	314	189,334,303	24
SDGE	Property Managers	Small	1,543	161,595,584	35
SDGE	Property Managers	Unknown	722	15,100,411	3
SDGE	Property Managers	Very Small	5,334	55,909,921	64
SDGE	Restaurant	Large	3	7,020,571	1
SDGE	Restaurant	Medium	463	206,754,564	30
SDGE	Restaurant	Small	4,534	473,012,018	68
SDGE	Restaurant	Unknown	374	20,377,742	4
SDGE	Restaurant	Very Small	2,297	48,888,788	20
SDGE	Retail	Large	101	279,993,256	32
SDGE	Retail	Medium	588	340,201,329	32
SDGE	Retail	Small	2,544	259,656,956	45
SDGE	Retail	Unknown	562	27,610,816	4
SDGE	Retail	Very Small	7,328	92,717,651	61
SDGE	School	Large	21	47,464,173	5
SDGE	School	Medium	353	204,900,477	72
SDGE	School	Small	449	73,867,363	30
SDGE	School	Unknown	141	9,493,929	1
SDGE	School	Very Small	272	4,191,569	18
SDGE	Unknown	Large	3	7,246,907	1
SDGE	Unknown	Medium	31	16,785,545	2
SDGE	Unknown	Small	229	21,623,641	7
SDGE	Unknown	Unknown	861	3,949,751	4
SDGE	Unknown	Very Small	5,726	26,961,106	75
SDGE	Warehouse	Large	17	58,338,152	8
SDGE	Warehouse	Medium	102	62,524,979	32
SDGE	Warehouse	Small	737	70,266,434	55
SDGE	Warehouse	Unknown	215	4,429,212	6
SDGE	Warehouse	Very Small	2,394	29,915,839	35

4.2 Sample Disposition and Phone Survey Completes

Table 4-4 through Table 4-6 list the number of sites in the nonresidential frame by IOU, business type/size, the telephone survey quota, the number of sites pulled, the number of sites sent to the CATI telephone survey center, and the number of telephone survey completes achieved.

In the tables below, the number of sites pulled represents the number of sites pulled from the nonresidential frame to be reviewed to determine if they have sufficient information to be sent to the telephone CATI center to be dialed for the survey. Once a site is pulled, the site is checked to determine if the site includes a telephone contact number. Telephone numbers are needed to participate in the telephone survey. Sites are also checked to determine if their telephone number is a duplicate of a telephone number previously sent as part of the survey. If the site does not have a telephone number or if the telephone number is a duplicate, the sites would participate in a "reverse lookup" where the site's name and address are used to try to determine a telephone number specific to the site name and service address. Sites that pass the data checks are sent to CATI to be dialed for the survey. There can be a substantial drop off in the number of sites available between the pulled and sent phase of the process.

For large and medium sized sites, the number of sites pulled is generally very close to the number of sites in the frame. In an attempt to reach the telephone survey quota for medium and large sized sites, the research team generally pulled all or nearly all of the sites in the frame, these strata were census strata. Many of the large and medium sites have telephone numbers in the CIS that represent corporate representatives who are responsible for paying the electric bill. The corporate telephone number leads to many duplicate telephone numbers that were looked up during the reverse lookup process. Unfortunately, the site-specific number for large and medium sites commonly led to the site redirecting the call to the corporate number. In an attempt to increase the phone survey completes for large and medium sites, the IOUs were asked to provide the study with contact names and telephone numbers used by account executives to discuss DSM opportunities. Additional contact names and telephone numbers were received from all three utilities. The new information was very helpful in some situations. For large and medium sized sites where the number of sites is very close or matches the number of sites pulled, the sites sent to CATI may be substantially lower due to the duplication of phone numbers.[5] Many of the large grocery stores, for example, have the same site contact within the CIS. The additional information the IOUs provided with updated site contacts and telephone numbers was helpful in reducing this issue.

[5] For census stratum, the number of sites pulled is occasionally slightly less than the number of sites in the frame because the extended period associated with the study. The number of sites represents the number of sites originally in the frame, but sites available to be pulled can decline when sites go out of business.

Large and medium strata that were not census included PG&E industrial medium, PG&E unknown medium, PG&E hotel medium, SCE miscellaneous medium and SCE unknown medium. For these medium sized strata, the team was able to reach, or nearly reach, the telephone survey quota without a census. For many of the remaining large and medium sized strata, however, we were not able to reach our telephone survey quota. Many of the small and very small strata had sufficient sites to pull to achieve the desired number of sites.

The primary objective of the telephone survey was to recruit for the on-site survey. The original sample design for the telephone survey incorporated approximately 6,500 sites. To achieve sufficient on-site recruits, however, it was necessary to over sample select stratum. As a result, there is stratum where the telephone survey achieved more completes than were required in the telephone survey design. There is also non-census stratum where the telephone survey achieved less than their telephone survey design. Non-census stratum where the telephone survey achieved less than their quota usually represents stratum with a high number of on-site recruits, for example small offices in PG&E. For the small office stratum, many of the sites originally pulled as part of the property manager and unclassified stratum ultimately self-report to be offices. This process provided a large number of office recruits relative to the number of CIS office sites called.

During the analysis process, telephone and on-site survey participants will be assigned weights that are dependent on the business type classification from the nonresidential frame. The weighting process ensures that the number of sites and the kWh represents the CSS/CMST eligible frame. For the analysis reporting, sites will represent the business type that best represents the activities undertaken at the site.

Table 4-4: PG&E Telephone Survey Sample Design and Disposition

IOU	Business Type	kWh Size	Number of Sites	Quota	Sites Pulled	Sites Sent to CATI	Phone Survey Completes
PGE	College	Large	65	33	61	16	0
PGE	College	Medium	84	34	84	30	5
PGE	College	Small	135	2	36	23	4
PGE	College	Unknown	187	2	68	16	2
PGE	College	Very Small	125	2	88	30	1
PGE	Food/Liquor	Large	439	60	437	393	17
PGE	Food/Liquor	Medium	1,003	142	998	785	88
PGE	Food/Liquor	Small	6,261	56	1,977	1,346	58
PGE	Food/Liquor	Unknown	467	2	58	44	2
PGE	Food/Liquor	Very Small	2,488	50	1,462	1,059	50

Table 4-4: PG&E Telephone Survey Sample Design and Disposition (cont'd.)

IOU	Business Type	kWh Size	Number of Sites	Quota	Sites Pulled	Sites Sent to CATI	Phone Survey Completes
PGE	Health Care	Large	65	36	62	33	8
PGE	Health Care	Medium	778	65	776	499	65
PGE	Health Care	Small	2,366	45	1,383	893	46
PGE	Health Care	Unknown	649	7	259	161	7
PGE	Health Care	Very Small	12,012	115	3,182	2,665	115
PGE	Health Care - Hospital	Large	130	64	130	57	3
PGE	Health Care - Hospital	Medium	56	9	51	22	3
PGE	Health Care - Hospital	Small	25	0	3	-	0
PGE	Health Care - Hospital	Unknown	50	2	44	13	1
PGE	Health Care - Hospital	Very Small	29	0	1	1	0
PGE	Hotel	Large	107	26	104	72	12
PGE	Hotel	Medium	567	21	342	245	23
PGE	Hotel	Small	1,606	18	253	230	19
PGE	Hotel	Unknown	211	3	16	7	3
PGE	Hotel	Very Small	956	7	154	133	8
PGE	Industrial	Large	802	215	799	417	43
PGE	Industrial	Medium	1,548	38	590	499	38
PGE	Industrial	Small	3,397	23	329	290	30
PGE	Industrial	Unknown	822	5	82	60	5
PGE	Industrial	Very Small	6,166	20	551	477	18
PGE	Miscellaneous	Large	245	96	241	142	30
PGE	Miscellaneous	Medium	1,642	117	1,636	927	150
PGE	Miscellaneous	Small	12,225	59	777	628	72
PGE	Miscellaneous	Unknown	5,525	8	219	143	9
PGE	Miscellaneous	Very Small	58,396	158	3,360	2,735	163
PGE	Office	Large	387	45	382	229	58
PGE	Office	Medium	1,530	114	1,524	867	134
PGE	Office	Small	8,078	120	3,778	1,867	115
PGE	Office	Unknown	4,141	8	210	126	9
PGE	Office	Very Small	34,090	115	2,429	1,733	119
PGE	Property Managers	Large	419	81	412	189	28
PGE	Property Managers	Medium	1,264	62	1,262	620	52
PGE	Property Managers	Small	3,790	30	638	467	41
PGE	Property Managers	Unknown	773	7	192	114	7
PGE	Property Managers	Very Small	10,555	43	946	700	46
PGE	Restaurant	Large	17	9	15	8	0
PGE	Restaurant	Medium	1,206	30	1,204	417	31
PGE	Restaurant	Small	15,167	113	3,427	2,488	107
PGE	Restaurant	Unknown	1,327	6	387	264	4
PGE	Restaurant	Very Small	7,825	40	1,643	1,298	40
PGE	Retail	Large	284	45	284	57	10
PGE	Retail	Medium	1,784	66	1,784	515	66
PGE	Retail	Small	6,129	85	2,636	1,308	77
PGE	Retail	Unknown	1,564	4	53	40	4
PGE	Retail	Very Small	18,058	74	1,439	1,235	77

Table 4-4: PG&E Telephone Survey Sample Design and Disposition (cont'd.)

IOU	Business Type	kWh Size	Number of Sites	Quota	Sites Pulled	Sites Sent to CATI	Phone Survey Completes
PGE	School	Large	68	15	65	56	11
PGE	School	Medium	1,243	115	1,240	740	113
PGE	School	Small	2,413	57	1,725	627	57
PGE	School	Unknown	650	4	90	27	3
PGE	School	Very Small	1,056	25	1,030	477	23
PGE	Unknown	Large	75	16	74	31	3
PGE	Unknown	Medium	732	9	245	153	19
PGE	Unknown	Small	11,201	37	1,111	827	47
PGE	Unknown	Unknown	16,628	30	1,185	796	22
PGE	Unknown	Very Small	103,696	195	5,619	4,444	186
PGE	Warehouse	Large	164	162	160	118	19
PGE	Warehouse	Medium	806	91	772	594	104
PGE	Warehouse	Small	3,366	110	2,807	1,770	98
PGE	Warehouse	Unknown	880	3	45	28	4
PGE	Warehouse	Very Small	9,299	95	2,374	1,769	86

Table 4-5: SCE Telephone Survey Sample Design and Disposition

IOU	Business Type	kWh Size	Number of Sites	Quota	Sites Pulled	Sites Sent to CATI	Phone Survey Completes
SCE	College	Large	73	36	72	33	3
SCE	College	Medium	111	33	103	68	6
SCE	College	Small	177	4	129	72	4
SCE	College	Unknown	24	0	-	-	0
SCE	College	Very Small	272	2	102	63	3
SCE	Food/Liquor	Large	490	64	484	358	31
SCE	Food/Liquor	Medium	1,241	104	1,212	837	78
SCE	Food/Liquor	Small	6,362	60	2,674	1,842	73
SCE	Food/Liquor	Unknown	89	1	26	18	1
SCE	Food/Liquor	Very Small	3,122	25	540	485	25
SCE	Health Care	Large	69	13	68	58	14
SCE	Health Care	Medium	836	95	822	735	97
SCE	Health Care	Small	2,818	59	2,601	2,207	62
SCE	Health Care	Unknown	156	1	35	26	1
SCE	Health Care	Very Small	15,422	97	2,937	2,567	101
SCE	Health Care - Hospital	Large	152	67	147	107	12
SCE	Health Care - Hospital	Medium	109	5	102	79	5
SCE	Health Care - Hospital	Small	136	1	29	21	1
SCE	Health Care - Hospital	Unknown	10	0	-	-	0
SCE	Health Care - Hospital	Very Small	122	1	23	16	1

Table 4-5: SCE Telephone Survey Sample Design and Disposition (cont'd.)

IOU	Business Type	kWh Size	Number of Sites	Quota	Sites Pulled	Sites Sent to CATI	Phone Survey Completes
SCE	Hotel	Large	122	29	120	104	15
SCE	Hotel	Medium	569	24	503	471	25
SCE	Hotel	Small	1,279	16	203	186	16
SCE	Hotel	Unknown	19	0	1	1	0
SCE	Hotel	Very Small	842	6	81	76	9
SCE	Industrial	Large	1,012	70	989	846	70
SCE	Industrial	Medium	2,568	143	2,462	2,220	135
SCE	Industrial	Small	6,329	28	548	510	33
SCE	Industrial	Unknown	234	1	18	11	1
SCE	Industrial	Very Small	13,961	31	524	486	33
SCE	Misc	Large	276	45	275	236	49
SCE	Misc	Medium	2,097	57	1,467	1,198	56
SCE	Misc	Small	16,031	96	2,901	2,214	133
SCE	Misc	Unknown	4,987	6	431	235	6
SCE	Misc	Very Small	122,538	193	4,756	3,937	184
SCE	Office	Large	241	57	234	183	36
SCE	Office	Medium	1,144	84	1,113	938	107
SCE	Office	Small	7,557	127	6,010	4,831	147
SCE	Office	Unknown	4,649	12	967	186	11
SCE	Office	Very Small	43,313	153	3,425	2,671	168
SCE	Property Managers	Large	371	15	359	260	15
SCE	Property Managers	Medium	1,777	75	1,714	1,412	68
SCE	Property Managers	Small	8,710	62	2,114	1,675	54
SCE	Property Managers	Unknown	2,489	7	599	431	4
SCE	Property Managers	Very Small	34,570	116	3,831	3,132	112
SCE	Restaurant	Large	17	5	17	15	0
SCE	Restaurant	Medium	2,005	53	1,885	1,633	53
SCE	Restaurant	Small	19,170	133	3,360	3,080	131
SCE	Restaurant	Unknown	295	2	47	33	1
SCE	Restaurant	Very Small	10,032	40	1,498	1,305	41
SCE	Retail	Large	487	52	483	129	30
SCE	Retail	Medium	2,599	115	2,527	1,633	113
SCE	Retail	Small	8,583	75	2,500	1,838	86
SCE	Retail	Unknown	393	4	103	81	4
SCE	Retail	Very Small	28,751	101	2,745	2,605	112
SCE	School	Large	175	30	175	169	22
SCE	School	Medium	1,794	135	1,791	1,493	141
SCE	School	Small	1,910	55	1,585	1,128	59
SCE	School	Unknown	54	0	8	3	0
SCE	School	Very Small	883	12	569	326	12
SCE	Unknown	Large	2	0	2	1	0
SCE	Unknown	Medium	54	1	31	24	1
SCE	Unknown	Small	1,884	18	682	471	16
SCE	Unknown	Unknown	1,823	4	412	211	3
SCE	Unknown	Very Small	50,957	250	11,361	9,158	234

Table 4-5: SCE Telephone Survey Sample Design and Disposition (cont'd.)

IOU	Business Type	kWh Size	Number of Sites	Quota	Sites Pulled	Sites Sent to CATI	Phone Survey Completes
SCE	Warehouse	Large	177	177	177	160	29
SCE	Warehouse	Medium	1,014	140	954	898	124
SCE	Warehouse	Small	4,866	237	4,017	3,119	242
SCE	Warehouse	Unknown	190	3	40	33	2
SCE	Warehouse	Very Small	15,353	165	4,064	3,457	158

Table 4-6: SDG&E Telephone Survey Sample Design and Disposition

IOU	Business Type	kWh Size	Number of Sites	Quota	Sites Pulled	Sites Sent to CATI	Phone Survey Completes
SDGE	College	Large	17	8	17	10	3
SDGE	College	Medium	41	16	41	19	5
SDGE	College	Small	66	19	64	29	5
SDGE	College	Unknown	62	3	57	15	2
SDGE	College	Very Small	68	3	61	31	1
SDGE	Food/Liquor	Large	124	28	124	51	2
SDGE	Food/Liquor	Medium	305	32	304	229	24
SDGE	Food/Liquor	Small	1,638	60	1,633	1,179	41
SDGE	Food/Liquor	Unknown	129	1	57	45	5
SDGE	Food/Liquor	Very Small	727	35	704	612	32
SDGE	Health Care	Large	27	14	26	21	3
SDGE	Health Care	Medium	203	23	201	183	23
SDGE	Health Care	Small	683	30	585	545	33
SDGE	Health Care	Unknown	224	9	79	70	5
SDGE	Health Care	Very Small	3,767	39	891	850	39
SDGE	HealthCare - Hospital	Large	31	16	26	21	1
SDGE	HealthCare - Hospital	Medium	51	30	50	32	1
SDGE	HealthCare - Hospital	Small	96	3	93	61	2
SDGE	HealthCare - Hospital	Unknown	31	-	13	8	-
SDGE	HealthCare - Hospital	Very Small	105	2	92	68	3
SDGE	Hotel	Large	66	27	63	49	6
SDGE	Hotel	Medium	177	13	166	139	13
SDGE	Hotel	Small	312	6	102	95	7
SDGE	Hotel	Unknown	67	1	16	13	2
SDGE	Hotel	Very Small	257	3	72	64	3
SDGE	Industrial	Large	141	20	140	113	12
SDGE	Industrial	Medium	382	33	381	335	27
SDGE	Industrial	Small	1,105	48	902	826	51
SDGE	Industrial	Unknown	270	1	61	55	2
SDGE	Industrial	Very Small	2,626	23	377	362	30
SDGE	Misc	Large	49	24	46	37	8
SDGE	Misc	Medium	393	34	391	356	33
SDGE	Misc	Small	2,866	29	497	450	32
SDGE	Misc	Unknown	1,161	2	111	94	6
SDGE	Misc	Very Small	14,295	82	2,138	1,961	88

Table 4-6: SDG&E Telephone Survey Sample Design and Disposition (cont'd.)

IOU	Business Type	kWh Size	Number of Sites	Quota	Sites Pulled	Sites Sent to CATI	Phone Survey Completes
SDGE	Office	Large	200	29	196	147	16
SDGE	Office	Medium	731	65	729	610	68
SDGE	Office	Small	4,694	40	889	758	40
SDGE	Office	Unknown	2,713	9	209	149	4
SDGE	Office	Very Small	20,296	66	1,525	1,206	66
SDGE	Property Managers	Large	41	12	41	35	4
SDGE	Property Managers	Medium	314	24	314	231	21
SDGE	Property Managers	Small	1,543	35	1,350	1,153	28
SDGE	Property Managers	Unknown	722	3	193	140	8
SDGE	Property Managers	Very Small	5,334	64	1,803	1,467	76
SDGE	Restaurant	Large	3	1	3	2	-
SDGE	Restaurant	Medium	463	30	462	398	32
SDGE	Restaurant	Small	4,534	68	1,885	1,682	60
SDGE	Restaurant	Unknown	374	4	109	95	2
SDGE	Restaurant	Very Small	2,297	20	482	457	20
SDGE	Retail	Large	101	32	99	57	8
SDGE	Retail	Medium	588	32	587	364	26
SDGE	Retail	Small	2,544	45	1,317	1,147	45
SDGE	Retail	Unknown	562	4	134	107	3
SDGE	Retail	Very Small	7,328	61	1,350	1,275	63
SDGE	School	Large	21	5	20	19	2
SDGE	School	Medium	353	72	350	313	38
SDGE	School	Small	449	30	448	297	24
SDGE	School	Unknown	141	1	42	32	3
SDGE	School	Very Small	272	18	262	193	14
SDGE	Unknown	Large	3	1	2	2	-
SDGE	Unknown	Medium	31	2	26	22	2
SDGE	Unknown	Small	229	7	124	111	7
SDGE	Unknown	Unknown	861	4	154	125	6
SDGE	Unknown	Very Small	5,726	75	2,323	1,993	49
SDGE	Warehouse	Large	17	8	17	17	4
SDGE	Warehouse	Medium	102	32	96	87	8
SDGE	Warehouse	Small	737	55	650	595	43
SDGE	Warehouse	Unknown	215	6	63	59	5
SDGE	Warehouse	Very Small	2,394	35	701	661	37

4.2.1 Phone Survey Completes by CSS Building Type

Following the completion of the telephone survey, the building type information collected during the survey was reviewed and sites were assigned to building types representing information collected during the telephone survey (see Section 6 of this report). The telephone survey was restricted to sites in the nonresidential frame that meet the building type criteria of the CSS/CMST phone survey as well as sites with unknown building types and property managers.

During the telephone survey, however, some sites self-reported a different building type than what was found in the CIS. Some of the sites with differing building type information no longer qualified for the CSS/CMST survey. To be included in the CSS/CMST survey, a site's business type must be one of the following: college/university, food/liquor, non-hospital health care, hospital, hotel/motel, industrial, miscellaneous, office, property managers, restaurant, retail, school, or warehouse.

Table 4-7 lists the number of sites in the nonresidential frame and the quota by business type. The fourth column of the table lists the number of telephone survey completes by the business types in the frame. The study completed 7,984 surveys. Following the telephone survey, the self-reported business types were reviewed and 104 of the completed surveys no longer met the CSS/CMST business type criteria. The fifth or right-most column of Table 4-7 lists the distribution of telephone survey completes by CSS/CMST business type using the telephone survey self-reported business type information instead of the CIS building type. Using the telephone survey data, it is possible to allocate the businesses with unknown and property manager business types in the CIS to business types that describe the activity at the site. Allocating the sites by self-reported telephone survey business types leads to a substantial increase in the number of miscellaneous, office and retail completes. Business types will be discussed in more detail in Section 6.

Table 4-7: Telephone Survey Quota and Completes by Business Type

Business Type	Sites in the NRF	Telephone Survey Quota	Telephone Survey Completes CIS Business Types	Share of Telephone Survey Quota Completed	Telephone Survey Completes CSS Business Types
College	1,507	197	44	22%	29
Food/Liquor	24,885	720	543	75%	486
Health Care	40,075	648	628	97%	632
Health Care - Hospital	1,133	200	33	17%	59
Hotel	7,157	200	161	81%	199
Industrial	41,363	699	528	76%	695
Miscellaneous	242,726	1,006	1,020	101%	1,636
Office	133,764	1,044	1,103	106%	1,309
Property Managers	72,672	636	564	89%	
Restaurant	64,732	554	522	94%	595
Retail	79,755	795	758	95%	1,018
School	11,482	574	522	91%	477
Unknown	193,902	649	595	92%	
Warehouse	39,580	1,319	963	73%	745
Total	**954,733**	**9,241**	**7,984**	**86%**	**7,880**

4.3 Weighting Methodology

This section describes the development of weights applied to each telephone survey sample point when reporting findings.

As described in the section above, the participant population was divided into 210 strata based on IOU, business type, and kWh size. Phone survey responses reported in this draft report were aggregated to the frame using two methods: 1) number of sites in the sample (site weights), and 2) energy usage (kWh weights). While the use of two alternative types of weights within a report is uncommon, the selection of a single weighting methodology for a population-based study of this size is difficult. Business types with large numbers of sites are also often business types with many small usage sites. To ensure that the CPUC, IOUs, and evaluators have a more complete understanding of the baseline responses to the telephone survey, both site and kWh weights were developed.

The telephone survey also underwent many changes during the course of the survey (November 2011 – April 2013). Questions were added to reflect a growing desire to better understand customer knowledge of LEDs and HVAC maintenance. Questions were dropped in an effort to improve the response rate among medium and larger sites. Many of the questions were asked to all telephone survey participants. Given that different sites were asked different questions, a given site's weight differs by survey questions. Questions that were asked of all survey participants lead to respondents having a relatively smaller weight than questions asked of fewer participants. Using site- and question-specific weights ensures that the responses to each question represent the sites from the frame or the frame consumption for sites eligible for the survey.

4.3.1 Site Weights

The site weight for a surveyed site within the sample was calculated by dividing the number of eligible sites in the nonresidential frame for that stratum by the number of sites in that stratum. The weight for site *i* in strata *j* is:

$$W_{sss_i} = \frac{PopulationNumberSites_j}{SampleNumberSites_j}$$

where the denominator is summed from *i* to the number of sampled sites in the strata. This provides each site within a stratum the same weight, but each stratum's weight is dependent on the total sites in the population, of that stratum. Applying the site weights to each survey point in the telephone survey results in the telephone survey responses representing the sites in the nonresidential frame that are eligible for the CSS/CMST telephone survey.

4.3.2 Usage (kWh) Weights

The kWh weights for each site within the sample were developed by dividing the energy consumption of the individual site in a sample stratum by the total energy consumption of all surveyed sites in that stratum, and multiplying the quantity by the total energy usage of all eligible sites in the nonresidential frame in that stratum. The weight for site *i* in strata *j* is:

$$W_{sss_i} = \frac{SitekWh_i}{SamplekWh_j} \times PopulationkWh_j$$

where the denominator is summed from *i* to the number of sampled sites in the strata. This provides an individual weight for each site, *i*, within a strata, *j*. Applying the usage weight to each survey point in the telephone survey results in the telephone survey responses representing the kWh in the nonresidential frame that are eligible for the CSS/CMST telephone survey.

"Unknown" Sites

Sites were classified as "unknown" in the nonresidential frame, where electric billing data were not available for account and meter numbers found in the 2010 and 2011 CIS. For a subset of these sites, usage information was subsequently collected. These sites were retained in their original stratum with a size classification of unknown. This additional information was used to guide the development of kWh weights for sites in these strata. Site based weights were developed as described above.

The kWh weights for each unknown site within the sample were developed by dividing the known energy consumption of the population for that stratum by the total number of surveyed sites in that stratum. The weight for site *i* in strata *j* is therefore:

$$W_{sss_i} = \frac{1}{SampleNumberSites_j} \times PopulationkWh_j$$

where the denominator is summed from *i* to the number of sampled sites in the strata. This provides each site within a stratum the same weight.

4.3.3 Energy Efficiency Response Bias

During the development of the CSS/CMST study, concerns were expressed by the research team, CPUC, and IOUs that sites which have participated in IOU rebate programs may be more likely to respond to the telephone survey and participate in the on-site data gathering effort. A program response bias was found after analyzing the telephone survey response rate by energy efficiency

program participation. Participant sites were more likely to respond to the telephone survey than nonparticipant sites. Table 4-8 provides the count of phone survey completes by energy efficiency participation status along with the total sample that was dialed in the effort to achieve the completes. The success rate for completion of phone surveys was 9.5% across all utility energy efficiency program participants and 4.8% for the nonparticipant sample pulled from the nonresidential frame of utility customers.

Table 4-8: Response Rate by IOU EE Program Participation

Utility	Phone Surveys Completed EE Parts	Number of EE Parts in Sample	Share of EE Parts Completing the Survey	Phone Surveys Completed EE Nonparts	Number of EE Nonparts in Sample	Share of EE Nonparts Completing the Survey
PG&E	1,026	8,200	12.5%	1,861	33,890	5.5%
SCE	1,133	13,905	8.1%	2,483	57,140	4.3%
SDG&E	318	3,878	8.2%	1,059	21,156	5.0%
Total	**2,477**	**25,983**	**9.5%**	**5,403**	**112,186**	**4.8%**

Of the 7,880 telephone surveys completed, 31% of sites were EE program participants, while the remaining 69% were nonparticipant sites. Of the sites sent to CATI for the phone survey 18.8% were found to be EE program participants. Within the nonresidential frame eligible for the telephone survey, 14.4% of the sites were determined to be EE program participants.[6] Based on these findings, both the usage and site count based weights were adjusted to ensure that the survey sample represented the IOU energy efficiency program participation trends of the nonresidential frame. Participant bias correction factors were developed for sample points across all utilities and usage sizes and applied to both the site count and usage based weights. The adjustment factors served to decrease the influence of participant responses from within the sample when aggregated to the population, while lending additional weight to responses from non-participant customers. In this way the analysis team addressed concerns of response bias to provide a more accurate representation of population characteristics. Telephone survey analysis results reported in this draft have been weighted using these participant bias correction factors adjusted weights.

[6] A higher share of EE participants were sent to CATI than exist in the NRF due to the requirement that CATI survey sites have contact information. Sites without telephone numbers or sites with duplicate telephone numbers cannot be sent to CATI. It is not surprising that those sites sent to CATI are more likely to be participants than the NRF, participation in EE programs is likely to be correlated with the utility having site level contact information.

5

Telephone Survey Overview

5.1 Introduction

The CSS/CMST telephone survey was designed to fulfill several objectives. The two primary objectives of the telephone survey are to collect a wide variety of information on businesses in the California IOU service territories and to recruit for the CSS and CMST on-site surveys. As described in Sections 3 and 4 of this report, the telephone survey sample was based on the population of California nonresidential sites in the IOUs electric frame. Businesses listed within the IOU nonresidential CIS as TCU, agriculture, or street lighting were not included in the telephone survey sample.

The telephone survey asks all eligible nonresidential sites about their business characteristics, customer attitude, knowledge of energy efficiency, demand response, and distributed generation, the types of lighting, refrigeration, and HVAC equipment at their site, and recent purchases of CFLs and LEDs. The telephone survey also asks respondents about recent purchases of linear fluorescent fixtures, televisions, and packaged HVAC units to determine eligibility for the CMST on-site surveys and asks eligible sites to participate in an on-site verification of recent purchases. For the CSS on-site survey, grocery stores, primary and secondary education sites, non-hospital health care sites, offices, miscellaneous business, restaurants, retail, and warehouses are asked to participate in the CSS on-site survey.[1]

During the process of implementing the telephone survey, the survey was adjusted to incorporate new questions addressing new high priority interests. Series of questions that were added after the start of the survey include CFL and LED questions and questions on HVAC maintenance. The difficulty in achieving telephone survey completes and recruitments in the medium and large sized strata also led to telephone survey changes. In an attempt to increase the completion and recruitment rate, late in the survey process the survey was reduced to essential questions necessary for the on-site survey. The ongoing changes to the telephone survey led to a different number of sites completing individual questions and the necessity to calculate and apply question and site-specific weights to the response.

[1] Hospitals, hotels, colleges and universities, and industrial businesses are included in the CMST study but are not included in the CSS on-site data collection effort.

5.1.1 Business Type

The sample design for the telephone survey is based, in part, on the business type information available as part of the utility customer information system (CIS). The CIS has information on each account's NAICS code, which can be mapped back to a business type. The business type information is collected by the utility when the customer account is established and this information is later translated into NAICS codes that are stored as part of the CIS. Given that this information is usually provided by the individual establishing the account, it is not always clear how well the business type information provided describes the actual business activity at the facility. For example, if a property management company establishes the utility account, the management firm will likely describe the business as "property management." Property management, however, does not describe the business activity undertaken at the facility; it simply describes the business activity of the firm opening the account.

The CSS/CMST telephone survey asks businesses to describe the main business activity at their facility. The self-reported business type information collected as part of the telephone survey will be analyzed to present an updated picture of the business type distribution within the nonresidential frame. The telephone survey response distribution will be compared with the initial distribution from the frame. In addition, the telephone survey self reports for accounts whose CIS NAICS map to miscellaneous business types, property management, and unknown will be mapped to their self-reported business type to provide a better understanding of the types of businesses operating at these facilities. This information will help the IOUs better focus program resources on these segments in the nonresidential frame.

5.1.2 Customer Characteristics

The telephone survey asks several customer characteristic questions including the number of buildings or share of the building the business occupies, the self reported square footage of the business, the conditioned square footage of the business and the heating fuel type. Businesses are asked if they own or lease the facility and if their business is responsible to pay the utility bills. Businesses are asked about the age of the building, what year their business was established at this location, and if and when the building was last remodeled. In addition to the remodeling question, businesses are asked if they have increased or decreased the square footage or the number of employees over the last three years. The businesses are also asked to characterize their business outlook over the next three years and the last three years. The responses to these questions provide the IOUs with information on the square footage, business age, and business outlook of their customers by business type. The responses to business outlook questions may be compared to similar questions asked in previous energy efficiency surveys.

5.1.3 Customer Attitude and Awareness of Energy Efficiency, Distributed Generation, and Demand Response

The telephone survey asks several questions on customer environmental consciousness and awareness of demand side management (DSM) programs and methods to reduce customer utility bills. Businesses are asked about how important it is to be environmentally conscious, if marketing material communicates the business' environmental consciousness, if the business has developed a long-term energy plan, and if the organization has a person or group that is responsible for controlling energy usage and costs. The responses to these questions will be compared to similar question asked in previous telephone surveys to determine if environmental consciousness is changing in California and if it is changing, in which direction.

Businesses are questioned about their previous participation in energy efficiency programs and are asked to name the programs and resources they are aware of that are designed to reduce energy bills. Self-reported participation in energy generation and demand response programs are also obtained. This information will be compared with data available on business participation in these IOU programs. Businesses are also questioned about their participation in an integrated audit and if the audit incorporated recommendations about energy efficiency, demand response, and distributed generation. The responses to these questions and several additional integrated DSM questions will provide the IOUs and the CPUC with information on business types and business sizes that are aware of multiple types of DSM and those where additional marketing is needed to improve awareness.

5.1.4 Lighting

Nonresidential lighting has been a long-running target for IOU energy efficiency programs within California. In addition, codes have advanced curtailing the manufacturing of T12s and restricting the lighting power density of commercial facilities. These on-going programs and codes have led to a constantly evolving commercial lighting environment. The telephone survey will collect information on California's current commercial lighting equipment, purchasing practices, and recent commercial lighting purchases.

As part of the telephone survey, and in coordination with the Residential Advanced and Upstream Lighting (WO028) and Nonresidential Down Stream Lighting (WO029) Work Orders, businesses are asked a series of questions designed to provide self-reported information on how businesses buy lighting, the types of lighting in California businesses, and any lighting equipment that has been retrofitted since January 2009. Sites that report retrofitting their lighting are asked to describe the lighting retrofit. With this information, it is possible to determine if the businesses have replaced their linear fluorescent fixtures, making the site eligible for the CMST on-site verification.

The IOUs will be able to use the information on how businesses buy lighting to better target their lighting programs. If businesses are buying lighting directly from stores or web sites, upstream lighting rebates may be effective, while lighting purchased through contractors may require a mid or downstream approach. Knowledge of where commercial lighting purchases are made and the share of retail lighting purchases for commercial uses may also influence the IOUs' lighting run time assumptions for lighting sold through retailers and, therefore, the savings attributable to these lights.

5.1.5 Televisions

During the 2010-2012 program cycle, the IOUs have run a television energy efficiency program that has provided resources to merchants to promote the sale of Energy Star qualified televisions. During the same period, the requirements for Energy Star qualification have advanced rapidly. Given the mid-stream nature of the television program, the share of televisions purchased for the nonresidential sector is unclear. Concurrently, there is anecdotal evidence that the saturation of televisions in the commercial sector is rising. The telephone survey questions businesses about the presence of a television in the facility. If televisions are present, businesses are asked about the number of televisions and if they have purchased televisions for the facility since January 2009. Sites that have purchased televisions are asked about the number of televisions and their size and type. Television purchasers are also asked where they purchased their televisions. Sites that have purchased a television since January 2009 are eligible for the CMST on-site verification.

The information on televisions collected as part of the telephone survey will provide the utilities with new information on the share of businesses that have televisions and the number of businesses that have recently purchased a new unit. Given the upstream nature of television rebates, there is a very limited understanding of how many rebated televisions are being sold to businesses. The information collected as part of this survey will help to clarify the share of recent television sales that are attributable to the commercial sector. The development of the television telephone survey questions was coordinated with Business and Consumer Electronics Work Order (WO034).

5.1.6 Cooling Equipment

Within the commercial sector in California, HVAC equipment accounts for approximately 30% of the commercial energy usage.[2] At the end-use level, only lighting consumes more energy than HVAC within the commercial sector. The California Strategic Plan also highlights the need to reduce the energy usage associated with HVAC due to it significant contribution to the system peak.

[2] CEUS statewide energy usage for air compressors, heating, cooling, and vent.

The CSS/CMST telephone survey asks businesses about the type of cooling equipment used to cool their facility, the equipment's age, and its condition. The survey also asks businesses if they have purchased new air conditioning equipment since January 2009. Sites purchasing new equipment are asked to describe the equipment they purchased and installed, to indicate if the equipment is energy efficient, and if they received a rebate for the equipment they purchased.[3] New purchasers of air conditioners are also asked to describe the equipment that was removed and the age and condition of the removed equipment. Sites purchasing packaged HVAC units are eligible to be recruited for the CMST on-site verification.

Businesses are also asked about control devices, such as programmable thermostats and EMS on their HVAC equipment. If control devices are present, businesses are asked to characterize the share of HVAC equipment controlled by the devices.

The final questions in the HVAC series ask businesses about HVAC maintenance. Businesses are asked when they last had their air conditioning equipment serviced and if they have a maintenance contract with an outside source. If the business has a maintenance contract with an outside source, the business is asked if the maintenance plan is part of the utility quality maintenance program.[4]

5.1.7 Refrigeration Equipment

The telephone survey questions businesses about the presence of refrigeration equipment. If refrigeration equipment is present, the telephone survey respondent is asked to describe the refrigeration equipment. Businesses with refrigeration equipment are also asked if they have purchased any new refrigeration equipment since January 2009 and what type of equipment they have purchased. The survey also asks businesses if they are considering purchasing new refrigeration equipment in the future.

5.1.8 Other Equipment

The telephone survey asks business about the presence of additional energy consuming equipment. Equipment information that is collected in this series of questions includes natural gas consuming equipment, greenhouse curtains, motors, and computers. Given the high turnover of computers, businesses are also asked if they have purchased any new computers since January 2009.

---

[3] Using information from the participant tracking data, the analysis will compare self-reported receipt of energy efficiency rebates to information in the IOU program tracking data.

[4] The general HVAC telephone questions were coordinated with the Residential and Small Commercial HVAC Work Order WO032. The HVAC maintenance questions were coordinated with the HVAC Market Effects Work Order, WO054.

5.1.9 Customer Schedules and On-Site Recruitment

The telephone survey concludes with a series of questions on the business's operating hours and asks businesses if they are willing to participate in the CSS or CMST on-site surveys. Questions about operating hours will provide the IOUs with information on business hours for approximately 8,000 businesses across California. This information may help the IOUs estimate the operation hours of many types of equipment. The telephone survey operating hour information is also useful to determine the best time to visit a site to complete an on-site survey.

6

Business Characteristics

The CSS/CMST is a stratified survey on the nonresidential population. The sample design for the survey is stratified by IOU, business type, and size. The sample frame was developed from the IOUs nonresidential billing data and their Customer Information Systems (CIS). The account and meter information provided by the utilities was used to develop sites representing businesses. The site level billing data was used to develop size categories based on kW, where available, and kWh, when kW was unavailable. The NAICS codes on the CIS were used to develop business type information. The business type information, however, is updated during the telephone survey to represent the customer's classification of the business at the site. This is necessary to update the existing information on the CIS and to provide a business type for sites listed as unclassified and property management sites.

6.1 CIS and Telephone Survey Business Type

The telephone survey begins with questions designed to determine the business or economic activity undertaken at the facility. This information is used to update the information that exists on the CIS non-residential frame. The updated business type information will be used to better understand the distribution of business types in California. The telephone survey business types will be the analysis business types.[1] The mapping of CIS building types to telephone survey building types will also be provided to the IOUs. This information will help the IOUs better plan programs for CIS building types that may be unclear within the CIS, including businesses mapped to property management, unknown, and miscellaneous business types. The percentage of sites and kWh represented by these three business types within the CIS nonresidential frame is listed in Table 6-1. The number of sites and quantity of energy associated with these sites are listed in Table 6-2.

The business type information collected during the telephone survey is also used to re-assign business types for the on-site survey to business types that more accurately represent the business activity at the facility. The updated business types will be used to design and allocate sites for the on-site survey.

[1] To ensure that the telephone survey is weighted to represent the customer frames of the utilities, the site's level weighting will be dependent on the site's CIS business type.

The building type classifications in the CIS are usually provided by the contact that established the IOU account. The contact is asked to describe the business. If the contact person works for a property management company that is responsible for the energy bills, the person often responds with a business type that is mapped to a NAICS code associated with property management. The business type "property management" however, often does not describe the business or economic activity undertaken at the facility or address associated with the account. The telephone survey attempts to collect information describing the business or economic activity undertaken at the facility. At PG&E, 9% of the MWh and 4% of the sites are classified as property management sites in their CIS. At SCE, 9% of the MWh and 10% of the sites are classified as property management, while at SDG&E, 6% of the MWh and 8% of the sites are property management sites in the CIS.

Table 6-1: Percent of Energy and Sites in the IOU CIS Mapped to Property Management, Miscellaneous, and Unknown by IOU

	Miscellaneous		Property Management		Unknown	
Utility	Sites	MWh	Sites	MWh	Sites	MWh
PG&E	20%	12%	4%	9%	34%	7%
SCE	32%	13%	10%	9%	12%	1%
SDG&E	19%	11%	8%	6%	7%	1%

Table 6-2: Energy and Number of Sites in the IOU CIS Mapped to Property Management, Miscellaneous, and Unknown by IOU

	Miscellaneous		Property Management		Unknown		Total Sites	Total Consumption[2]
Utility	Sites	MWh	Sites	MWh	Sites	MWh		
PG&E	78,033	4,820,87	16,801	3,527,082	132,332	2,841,021	392,294	38,989,279
SCE	145,929	5,665,09	47,917	3,922,140	54,720	447,204	462,944	44,475,391
SDG&E	18,764	1,022,32	7,954	579,136	6,850	76,567	99,495	9,693,698

The miscellaneous business type represents many different NAICS codes or types of businesses within the CIS non-residential frame. For example, the miscellaneous business type includes gas stations, hair salons, and day care centers and pre-schools. During the preliminary stages of this study, the IOUs, CPUC, and evaluation team agreed to a mapping of NAICS codes to building types, including the miscellaneous building type.[3] The customer responses to the telephone

[2] The total consumption and number of sites listed in Table 6-2 are for CSS/CMST telephone survey sites. It does not include sites with business type TCU, agriculture, mining, or residential.

[3] NAICS codes representing the top 95% of the electricity usage were reviewed to ensure that the IOUs, CPUC, and the evaluation team agreed on the NAICS to building type mapping. For the remaining 5% of usage, the CEC's mapping of NAICS to building type was used.

survey business activity questions will determine the share of sites that continue to be mapped to the miscellaneous building type.

Within the IOU CIS, many accounts do not currently have NAICS codes. These sites are classified as "unknown" during the telephone survey sample design. At PG&E, 34% of sites and 7% of usage were classified as "unknown." The number of sites and share of usage for "unknown" sites within the CIS is lower for both SCE and SDG&E (see Table 6-1 and Table 6-2). The telephone survey business type information provides the IOUs with information on the business activity at these relatively smaller sites and allows the sites to correctly represent their business activity within the on-site survey.

6.1.1 Telephone Survey Business Type

Table 6-3 and Table 6-4 list the distribution of responses to the post coded telephone survey question which asks respondents to describe their main business activities. Table 6-3 presents the distribution using kWh-based weights while the distribution in Table 6-4 uses the site-based weights. Figure 6-1 and Figure 6-2 illustrate the total distribution of phone survey business types kWh and site weighted respectively. Not surprisingly, the share of sites weighted by kWh and number of sites are substantially different. The difference in the share sites weighted of kWh and site counts is similar to what is seen for the non-residential frame in Table 3.1. The distribution of business types is presented for all businesses and by the business size, where size reflects the annual electricity usage at the site. Each size column sums to 100% and the share represented reflects the allocation of sites or the number of sites.

Table 6-3: Main Business Activity at Facility By Business Size, kWh Weighted*

Business Type	Total	Large	Medium	Small	Very Small	Unknown
Industrial	25%	41%	14%	8%	7%	5%
Miscellaneous	17%	13%	15%	20%	33%	33%
Office	14%	13%	17%	12%	19%	10%
Retail	10%	6%	13%	11%	16%	17%
Restaurant	7%	1%	6%	22%	7%	11%
Warehouse	7%	7%	7%	6%	7%	6%
Food/Liquor	6%	5%	8%	9%	2%	6%
School	4%	1%	8%	4%	1%	2%
Health/Medical - Hospital	3%	7%	1%	0.3%	0.2%	0%
Health/Medical - Clinic	3%	1%	6%	4%	7%	8%
Hotel	3%	3%	5%	2%	1%	3%
College	1%	1%	0.5%	0%	0.2%	0%
n	**7,890**	**665**	**2,238**	**2,222**	**2,606**	**159**

*** The results are weighted by kWh-based weights.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 6-1: Main Business Activity at Facility, kWh Weighted

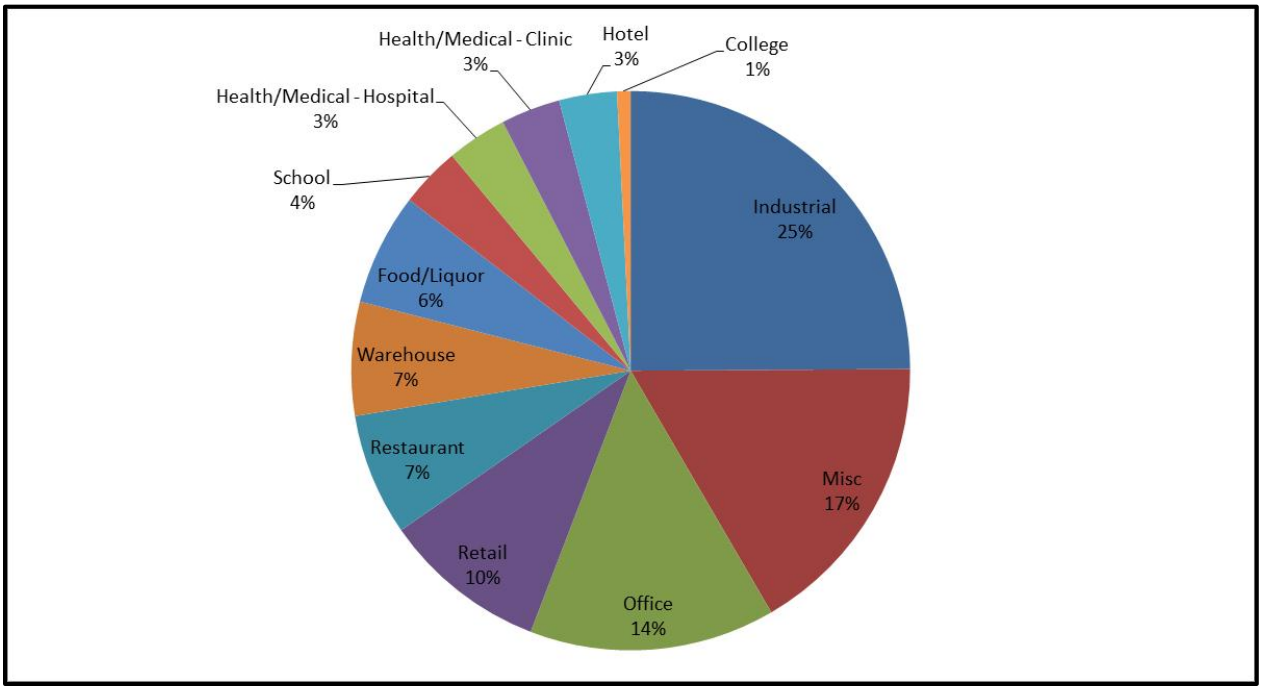
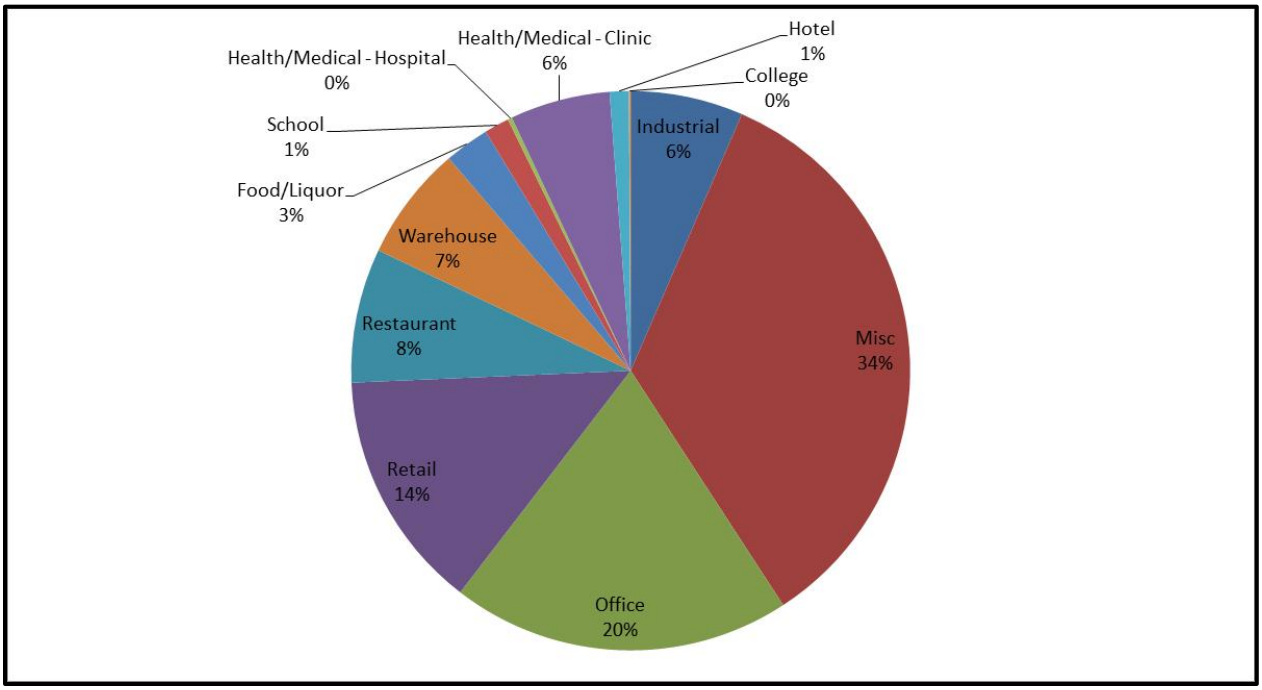


Table 6-4: Main Business Activity at Facility By Business Size, Site Weighted*

Business Type	Total	Large	Medium	Small	Very Small	Unknown
Miscellaneous	34%	11%	16%	23%	39%	28%
Office	20%	17%	15%	12%	22%	22%
Retail	14%	11%	14%	12%	14%	20%
Restaurant	8%	1%	10%	23%	4%	6%
Warehouse	7%	6%	6%	6%	7%	6%
Industrial	7%	25%	12%	8%	6%	7%
Health/Medical - Clinic	6%	2%	6%	4%	6%	3%
Food/Liquor	3%	13%	7%	8%	1%	2%
School	1%	3%	9%	2%	1%	4%
Hotel	1%	5%	5%	2%	1%	1%
Health/Medical - Hospital	0.3%	4%	1%	0.2%	0.2%	0.3%
College	0%	1%	0.4%	0%	0%	0.5%
n	**7,890**	**665**	**2,238**	**2,222**	**2,606**	**159**

* **The results are weighted by site based weights.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 6-2: Main Business Activity at Facility, Site Weighted



The numbers presented in Table 6-3 and Table 6-4 describe the distribution of business types in the nonresidential frame after the telephone survey and post coding information is incorporated.[4] These results can be viewed as an update of the information presented in Table 3.1. For some business types Table 6-3 and Table 6-4 indicate that there is little change in their share of kWh or sites from what was presented in the non-residential frame. For example, in Table 3.1 restaurants represent 7% of the kWh and 7% of the sites. Using the business types updated from the telephone survey, restaurants represent 7% of the kWh and 8% of the sites. For other business types, however, the distribution of kWh and sites is very different using the updated telephone survey information instead of the CIS data. In the non-residential frame (Table 3.1) offices accounted for 10% of the kWh and 14% of the sites. Using the updated telephone survey information, offices are found to represent 14% of the kWh and 20% of the sites. Similarly, miscellaneous business type went from representing 12% of the kWh and 25% of the sites to accounting for 17% of the kWh and 34% of the sites. The large increase in kWh and sites represented by miscellaneous and offices in the updated business type distribution is due to the reallocation of property management and unknown business types to their descriptive business type following the telephone survey. See Section 6.1.2 for a description of the business type distribution for sites labeled as miscellaneous, property management, and unknown in the nonresidential frame.

[4] For sites where it was unclear the appropriate business type when the CIS and phone survey responses were compared, an on-line search was undertaken to try to collect additional information to inform the business type choice.

Given the numbers presented in Table 6-3, which presents the distribution of sites using a kWh weight, industrial sites represent 25% of the kWh of the population and make up 41% of the usage for large sites. Offices come in all sizes and represent 14% of the usage of the population, which is approximately the same in each size classification other than very small and unknown. This differs from miscellaneous that represent approximately 17% of the usage of the population, but only 13% of large sites rising to 33% of usage for very small sites.

Reviewing the distribution of businesses site weighted (see Table 6-4) instead of usage weighted presents a different picture of the distribution of sites. Using site weights, offices represent 20% of the sites in the population and are once again a fairly consistent share across the size classes. Retail stores are also consistent across all size categories at 11-14%. Industrial sites represent 7% of the sites in the total population, but 25% of the large sites. Comparing the findings in Table 6-3 and Table 6-4, industrial site represent 25% of the annual usage in the updated frame and 7% of the sites.

For this telephone survey report, the telephone survey questions will be classified by a series of variables including business size (annual electricity usage), IOU, and EE program participation. The IOU classification reflects the electric IOU. The EE program participation indicates if the site has participated in an IOU EE program between January 2010 and December 2012.

Table 6-5 and Table 6-6 list the business type distribution by IOU, using kWh and site weights, respectively. These tables indicate that while 25% of the total kWh is consumed by industrial sites, SCE (28% of usage) and PG&E (24%) industrial sites consume a higher share of their territories' usage than for SDG&E (15%). Looking at industrial businesses by site counts, industrial businesses account for 7% of sites at PG&E and SDG&E and 6% of sites at SCE. While a greater share of industrial sites are in SDG&E territory, their share of SDG&E's usage is lower than for PG&E or SCE, indicating that SDG&E's industrial sites are relatively smaller when characterized by site level annual kWh usage.

Table 6-5: Main Business Activity at Facility by IOU, kWh Weighted*

Business Type	Total	PG&E	SCE	SDG&E
Industrial	25%	24%	28%	15%
Miscellaneous	17%	18%	14%	23%
Office	14%	17%	12%	13%
Retail	10%	9%	9%	11%
Restaurant	7%	6%	7%	8%
Warehouse	7%	6%	8%	3%
Food/Liquor	6%	6%	6%	7%
School	4%	3%	4%	3%
Health/Medical - Hospital	3%	3%	4%	4%
Health/Medical - Clinic	3%	3%	3%	4%
Hotel	3%	3%	3%	6%
College	1%	0.2%	1%	2%
n	**7,890**	**2,887**	**3,617**	**1,386**

*** The results are weighted by kWh based weights.**

Table 6-6: Main Business Activity at Facility by IOU, Site Weighted*

Business Type	Total	PG&E	SCE	SDG&E
Miscellaneous	34%	29%	39%	32%
Office	20%	20%	19%	21%
Retail	14%	15%	14%	12%
Restaurant	8%	8%	7%	8%
Warehouse	7%	8%	5%	6%
Industrial	7%	7%	6%	7%
Health/Medical - Clinic	6%	6%	5%	8%
Food/Liquor	3%	3%	2%	2%
School	1%	2%	1%	1%
Hotel	1%	1%	1%	1%
Health/Medical - Hospital	0.3%	0.2%	0.3%	0.3%
College	0%	0.1%	0%	0.2%
n	**7,890**	**2,887**	**3,617**	**1,386**

*** The results are weighted by site count.**

Table 6-7 and Table 6-8 list the distribution of business types by EE program participation weighted by kWh and sites, respectively. As discussed in Section 4, the site and kWh weighting methodologies were adjusted to account for EE participant response bias. Specifically, within a stratum customers were drawn randomly to participate in the telephone survey but EE participant customers were more likely to agree to respond to the telephone survey than non-participants.

The weights were adjusted to eliminate this bias in the statistics that are presented in this report. Within the telephone survey participant frame, approximately 13.5% of sites and 45.5% of kWh participated in EE programs during 2010-2012.

Reviewing the data in Table 6-7 and Table 6-8, for many business types the share of annual consumption and sites is similar across both EE participant and non-participant columns. For example, retail sites represent 14% of the sites in the telephone survey frame, 14% of the EE participant sites, and 14% of the EE non-participant sites. Some business types, however, represent a higher share of participants than their share in the frame. Food stores represent 6% of the kWh usage in the frame, but 9% of the kWh among EE participants and only 4% of the usage among non-participant sites. In addition, food stores represent 3% of the sites in the frame, but 6% of the sites among EE participants and 2% of the sites among nonparticipants. The higher share of food stores in the EE participations column relative to the share in the frame is consistent with the data in Section 3 that showed that food and liquor stores have the highest share of sites participating in EE programs of any business type.

For some business types, however, the data presented in Table 6-7 and Table 6-8 present different pictures with respect to their EE participation. Restaurants represent 7% of kWh usage in the telephone survey frame but only 6% of the EE program kWh usage and 8% of the kWh for non-participant sites. Conversely, restaurants represent 8% of the sites in the frame and 12% of the sites participating in EE programs. This finding implies that the restaurants that are participating in EE programs tend to be restaurants with lower than average annual electricity consumption, the restaurants that are participating in EE are the smaller restaurants.

Table 6-7: Main Business Activity at Facility by EE Program Participation, kWh Weighted*

Business Type	Total	EE Program Participant	EE Program Non-Participant
Industrial	25%	22%	27%
Miscellaneous	17%	15%	18%
Office	14%	15%	14%
Retail	10%	10%	9%
Restaurant	7%	6%	8%
Warehouse	7%	7%	6%
Food/Liquor	6%	9%	4%
School	4%	4%	3%
Health/Medical - Hospital	3%	5%	2%
Health/Medical - Clinic	3%	3%	4%
Hotel	3%	4%	3%
College	1%	0.3%	1%
n	**7,890**	**2,487**	**5,403**

*** The results are weighted by kWh based weights.**

Table 6-8: Main Business Activity at Facility by EE Program Participation, Site Weighted*

Business Type	Total	EE Program Participant	EE Program Non-Participant
Miscellaneous	34%	32%	35%
Office	20%	17%	20%
Retail	14%	14%	14%
Restaurant	8%	12%	7%
Warehouse	7%	4%	7%
Industrial	7%	6%	7%
Health/Medical - Clinic	6%	5%	6%
Food/Liquor	3%	6%	2%
School	1%	2%	1%
Hotel	1%	2%	1%
Health/Medical - Hospital	0.3%	0.2%	0.3%
College	0%	0%	0.1%
n	**7,890**	**2,487**	**5,403**

*** The results are weighted by site count.**

The business classifications listed in the tables above are relatively broad. The telephone survey asks all respondents within each of the business classifications listed above to further describe

the business activity at the facility. For example, Table 6-9 lists the types of offices that have currently responded to the telephone survey by business size using kWh based weights while Table 6-10 lists the types of offices using site based weights. Using site-based weights, administrative and management offices are the most common, representing 30% of offices by sites. Administrative and management offices represent 26% of offices by kWh. Mixed use, multi-tenant offices also represent 26% of office kWh, but only 14% of office sites. Mixed use, multi-tenant offices tend to be larger offices, leading to their higher share of offices when measured by kWh and their relatively higher share of "large" offices. Data processing and computer centers represent another type of office with high kWh weighting and relatively lower site weighting. Data processing and computer centers account for 9% of office kWh consumption but only 1% of sites. In contrast, financial and legal offices represent 15% of offices by number of sites, but only 7% of offices by kWh. Financial and legal offices make up only a very small share of "large" offices and are more common among medium, small, and very small offices.

Table 6-9: Type of Office that Best Describes the Business Activity by Business Size, kWh Weighted*

Business Type	Total	Large	Medium	Small	Very Small	Unknown
Mixed-Use/Multi-Tenant	26%	32%	26%	17%	11%	1%
Administration and Management	25%	20%	30%	32%	28%	33%
Data Processing/Computer Center	9%	15%	3%	1%	2%	0%
Lab/R&D Facility	8%	10%	7%	6%	2%	0%
Office w/ Warehouse	8%	9%	5%	8%	5%	0.3%
Financial / Legal	7%	1%	10%	13%	17%	33%
Insurance/Real Estate	5%	3%	4%	10%	16%	0%
Government Services	4%	4%	6%	5%	1%	0%
Software Development	3%	4%	3%	1%	1%	0%
Contractors' Offices	1%	0.4%	1%	2%	5%	0%
Medical / Dental Office	1%	1%	1%	2%	2%	0%
Telecommunications Center	1%	0.2%	1%	0.4%	1%	0%
Non-Profit	0.2%	0%	0.3%	0.2%	1%	31%
Travel Services (travel agent)	0.2%	0%	0%	0.2%	2%	0%
Other	1%	0%	1%	2%	4%	1%
Refused	0%	0%	0%	0%	0%	0%
Don't Know	0.4%	1%	0%	0%	0.3%	0%
n	**1,188**	**131**	**313**	**278**	**442**	**24**

*** The results are kWh weighted.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 6-10: Type of Office Best Describes the Business Activity by Business Size, Site Weighted*

Business Type	Total	Large	Medium	Small	Very Small	Unknown
Administration and Management	30%	22%	31%	32%	30%	32%
Insurance/Real Estate	15%	1%	8%	15%	15%	18%
Financial / Legal	15%	5%	4%	8%	18%	0%
Mixed-Use/Multi-Tenant	14%	39%	27%	16%	12%	25%
Contractors' Offices	5%	4%	4%	7%	5%	10%
Office w/ Warehouse	5%	0.4%	1%	4%	6%	2%
Lab/R&D Facility	2%	11%	8%	5%	2%	0%
Software Development	2%	4%	2%	2%	2%	2%
Data Processing/Computer Center	1%	8%	5%	1%	1%	0%
Government Services	1%	3%	6%	4%	1%	0%
Travel Services (travel agent)	1%	0%	0%	0.3%	1%	0%
Medical / Dental Office	1%	0.3%	1%	2%	1%	0%
Non-Profit	1%	0%	0.4%	0.4%	1%	5%
Telecommunications Center	1%	1%	1%	0%	1%	2%
Other	4%	0%	1%	3%	5%	6%
Refused	0%	0%	0%	0%	0%	0%
Don't Know	0.3%	2%	0%	0%	0.4%	0%
n	**1,188**	**131**	**313**	**278**	**442**	**24**

* **The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 6-11 lists the types of offices by IOU using kWh weights. Office types by IOU and size weights are available in Appendix B. Types of offices differ by IOU. Approximately 26% of all office kWh is from administrative and management offices, but disaggregated by IOU, 19% of PG&E office electricity consumption is from administrative and management offices, with 22% for SDG&E and 34% for SCE.

Table 6-11: Type of Office Best Describes the Business Activity by IOU, kWh Weighted*

Business Type	Total	PG&E	SCE	SDG&E
Mixed-Use/Multi-tenant	26%	28%	23%	30%
Administration and management	25%	19%	34%	22%
Data Processing/Computer Center	9%	14%	3%	2%
Lab/R&D Facility	8%	11%	3%	12%
Office w/ Warehouse	8%	2%	16%	2%
Financial / Legal	7%	7%	6%	12%
Insurance/Real Estate	5%	4%	6%	7%
Government Services	4%	5%	4%	5%
Software Development	3%	5%	0.3%	4%
Contractors' Offices	1%	1%	2%	1%
Medical / Dental Office	1%	1%	1%	0.3%
Telecommunications Center	1%	1%	0.2%	1%
Non-Profit	0.2%	0.3%	0%	0%
Travel Services (Travel Agent)	0.2%	0.3%	0%	0%
Other	1%	0.2%	2%	2%
Refused	0%	0%	0%	0%
Don't Know	0.4%	0.4%	0.4%	0.2%
n	**1,188**	**453**	**522**	**213**

*** The results are kWh weighted.**

6.1.2 Miscellaneous, Property Manager, and Unknown Business Types

In the telephone survey 1,003 telephone survey respondents were classified as property manager, miscellaneous, or unknown in the IOUs' CIS. Table 6-12 lists the telephone survey business types for sites that were classified as miscellaneous in the IOU CIS. Table 6-13 lists the telephone survey business types for sites that were classified as property management in the IOU CIS, while Table 6-14 lists the telephone survey business types for sites that were originally classified as "unknown" business type.

Sites that had been originally assigned NAICS that the IOUs, CPUC, and evaluation team originally mapped to miscellaneous were likely to remain in the miscellaneous business type. Reviewing the telephone survey business types for sites classified as miscellaneous business types in the CIS, Table 6-12 shows that 75% of these sites remain designated as miscellaneous business types after the telephone survey. The share remaining miscellaneous is very consistent across IOUs. The second highest telephone survey business type for sites classified as miscellaneous in the CIS is office at 10%, this is also consistent across the three IOUs with the exception of PGE at 4%.

Table 6-12: Telephone Survey Business Types for CIS Miscellaneous Sites*

Building Types	Total		PG&E		SCE		SDG&E	
	n	%	n	%	n	%	n	%
Misc.	753	75%	323	77%	303	72%	127	74%
Office	103	10%	42	4%	48	11%	13	9%
Retail	31	3%	14	1%	12	3%	5	4%
Industrial	31	3%	7	1%	19	5%	5	2%
Warehouse	19	2%	6	1%	8	2%	5	4%
Health	17	2%	5	0%	8	2%	4	2%
Hotel	14	1%	6	1%	4	1%	1	1%
Food/Liquor	14	1%	4	0%	8	2%	2	1%
School	11	1%	9	1%	3	1%	2	1%
College	5	0%	2	0%	2	0%	1	0%
Restaurant	4	0%	0	0%	2	0%	0	1%
Hospital	3	0%	2	0%	2	0%	1	0%
n	**1,005**		**420**		**419**		**166**	

*** The results are not weighted.**

Table 6-13 lists the telephone survey business types for sites classified as property management within the IOU CIS. Approximately 51% of CIS property management sites map to office sites following the telephone survey. Office is the most likely business type for property management sites across all three IOUs, with 58% at PG&E, 52% at SCE, and 42% at SDG&E. The second most frequent mapping for property management sites is miscellaneous, at 18% of property management sites.

Table 6-13: Telephone Survey Business Types for CIS Property Management Sites*

Building Types	Total		PG&E		SCE		SDG&E	
	n	%	n	%	n	%	n	%
Office	284	51%	98	58%	129	52%	57	42%
Misc.	97	18%	21	13%	39	16%	37	27%
Warehouse	58	10%	5	3%	35	14%	10	7%
Retail	50	9%	24	14%	21	8%	13	10%
Industrial	24	4%	11	7%	9	4%	4	3%
Health	16	3%	0	0%	7	3%	6	4%
Restaurant	13	2%	4	2%	5	2%	7	5%
Hotel	5	1%	3	2%	0	0%	0	0%
School	3	1%	1	1%	3	1%	1	1%
College	1	0%	1	1%	0	0%	0	0%
Food/Liquor	1	0%	0	0%	0	0%	1	1%
Hospital	1	0%	0	0%	1	0%	0	0%
n	**553**		**168**		**249**		**136**	

* **The results are not weighted.**

Table 6-14 lists the telephone survey business type distribution for sites that were classified as "unknown" within the IOU CIS. Not surprisingly, the telephone survey business type mapping of CIS unknown sites does not map as clearly as the mapping for miscellaneous and property management sites. For unknown CIS sites there is no telephone survey business type that dominates except for SCE. Unknown sites in SCE map largely to miscellaneous (78%). In contrast, only 38% of SDG&E's unknown sites interviewed during the telephone survey map to miscellaneous and 26% for PG&E. Office is the second most common business type for unknown sites, constituting 30% of SDG&E's unknowns, 20% of PG&E's and 8% of SCE's.

The telephone survey responses to customer building type will be used to help determine the distribution of sites visited as part of the on-site survey. Correcting the business type will help to ensure that the statistics that are produced on the distribution and efficiency level of equipment by business type reflect the actual distribution as closely as possible.

Table 6-14: Telephone Survey Business Types for CIS Unknown Sites*

	Total		PG&E		SCE		SDG&E	
Building Types	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Misc.	290	50%	69	26%	197	78%	24	38%
Office	91	16%	51	20%	21	8%	19	30%
Retail	58	10%	41	16%	11	4%	6	9%
Warehouse	49	8%	35	13%	11	4%	3	5%
Industrial	34	6%	25	10%	4	2%	5	8%
Restaurant	20	3%	13	5%	4	2%	3	5%
Health/Medical - Clinic	18	3%	13	5%	3	1%	2	3%
Hotel	6	1%	2	1%	3	1%	1	2%
School	6	1%	6	2%	0	0%	0	0%
Food/Liquor	4	1%	4	2%	0	0%	0	0%
Health/Medical - Hospital	2	0%	2	1%	0	0%	0	0%
College	1	0%	0	0%	0	0%	1	2%
n	**579**		**261**		**254**		**64**	

*** The results are not weighted.**

6.2 Business Size

Business size can be calculated in multiple ways including, but not limited to, energy usage, square footage, and number of employees. Energy usage, square footage, and the number of employees are either collected during the telephone or on-site surveys or are provided by the IOUs. Combining these three types of size variables will provide the IOUs with updated information on business size, the distribution of business size, and the saturation of energy using equipment by business size.

Energy usage for the business responding to the CSS/CMST telephone survey was calculated using billing data for the IOU non-residential frame. During the site creation process undertaken as part of the data management work order (WO009), commercial sites were created using information in the IOU CIS. Site creation incorporated comparisons of the account address, account contact name, and account telephone number. The site level usage is then determined by summing the billing data across accounts aggregated into a business site. Great care and effort were taken to create commercial sites that represent a contiguous business given the information available in the CIS. It is likely that the site creation process correctly represents most small businesses and that errors more frequently enter the process as sites become larger and more complicated. The on-site data collection process will collect meter and account number

information during the site visit to correct site aggregation and consumption information for sites included in the on-site analysis.

Table 6-15 lists the telephone survey responses to building square footage by business usage as determined by the site aggregation and billing data. If smaller sized buildings use less energy, the majority of sites should be on the shaded diagonal, with a limited number of sites off the diagonal. Review of the data in Table 6-15 indicates that most sites are on the diagonal. Very small square footage sites (less than 1,500 sq. ft.) with very large usage likely represent property management sites where the telephone survey respondent mistakenly provided square footage information on the property management businesses instead of the business at the addresses associated with the meters. Very large square footage sites (75,000 sq. ft. or larger) with very low usage likely represent sites where the data aggregation process did not aggregate an adequate number of meters during the site creation process. We are continuing to look into the square footage and usage for sites where the usage and square footage do not appear to match.

Table 6-15: Business Square Footage by Business Electricity Usage, kWh Weighted*

Square Footage	Total	Large	Medium	Small	Very Small	Unknown
More than 100,000 sq ft (Ag area)	35%	64%	17%	4%	1%	0.2%
1,501 to 5,000 sq ft	12%	3%	7%	28%	40%	33%
10,001 to 25,000 sq ft	11%	5%	15%	21%	9%	17%
25,001 to 50,000 sq ft	10%	6%	18%	10%	4%	4%
50,001 to 75,000 sq ft	7%	7%	13%	4%	1%	13%
5,001 to 10,000 sq ft	7%	2%	7%	17%	14%	2%
75,001 to 100,000 sq ft	5%	5%	8%	1%	0.4%	5%
0 to 1,500 sq ft	5%	1%	2%	9%	25%	21%
Refused	0%	0%	0%	0%	0%	0%
Don't Know	9%	8%	12%	7%	5%	4%
n	**7,890**	**665**	**2,238**	**2,222**	**2,606**	**159**

***** **The results are kWh weighted.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 6-16 lists the telephone survey responses to the number of full and part-time employees working at the facility for all business respondents and by electricity usage. As with the square footage number presented above, expectations are that businesses using less electricity are also likely to be businesses with fewer employees. For example, 79% of very small businesses (determined by their electricity usage) report having 1 to 10 employees and 46% of large businesses (by usage) report having 101 to 500 employees. For sites included in the CSS on-site

data collection effort, the number of employees will be collected as part of the on-site data collection effort.

Table 6-16: Number of Full and Part-time Employees by Business Electricity Usage, kWh Weighted*

Number of Employees	Total	Large	Medium	Small	Very Small	Unknown
1 to 10	18%	5%	9%	36%	79%	71%
11 to 50	24%	8%	35%	48%	15%	20%
51 to 100	14%	11%	26%	9%	1%	0.1%
101 to 500	27%	46%	21%	1%	0.3%	4%
501 to 1000	5%	10%	1%	0%	0%	0%
Refused	1%	2%	0.4%	1%	1%	0%
Don't Know	12%	19%	8%	4%	4%	4%
n	**7,707**	**598**	**2,123**	**2,222**	**2,605**	**159**

* **The results are weighted by kWh**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

6.2.1 Comparison of Phone Survey to On-Site Survey Square Footage

The CSS on-site survey participants were recruited from the CSS/CMST phone survey participants, enabling the comparison of phone survey self-reported information with information found during the on-site survey. Table 6-17 presents the comparison of the phone and on-site comparison for business square footage for those phone survey sites that provided a response to the square footage question during the phone survey. Only 64% of the phone survey sites that participated in the on-site survey provided a response to the phone survey square footage number. Many of the remaining sites provided a range into which their business' square footage fit, but they did not provide an exact square footage response when asked to do so on the phone survey.[5] The data presented in Table 6-17 is for those sites that provided an exact square footage during the phone survey. The on-site data collection effort found that 62% of the sites were within ten percent of the correct square footage that was verified during the onsite survey. These data also indicate that for sites providing a business square footage, large sites are slightly more likely than very small sites to be within ten percent of their correct square footage during the phone survey.

[5] For Table 6-15 the businesses that provided an exact square footage response are placed into the square footage groupings used for those who could not provide an exact square footage.

Table 6-17: Discrepancy between the Phone and On-site Square Footage

Discrepancy in SQFT	Total	Large	Medium	Small	Very Small	Unknown
0% to 10%	62%	55%	57%	61%	68%	60%
11% to 25%	14%	13%	17%	15%	11%	30%
26% to 50%	10%	10%	11%	10%	8%	0%
51% to 75%	5%	3%	5%	4%	5%	0%
76% to 100%	4%	13%	6%	3%	1%	0%
Over 100%	6%	5%	3%	6%	7%	10%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

6.2.2 Business Changes

The telephone survey asks businesses about remodels, changes in square footage, changes in the number of employees, their outlook over the past three years, and their expectations for the next three years. Table 6-18 lists the telephone survey results for the year of the most recent remodel by site weighting. Approximately 35% of all firms have undergone a remodel since 1990. More than 40% of large, medium, and small firms have under taken a remodel since 1990 while approximately 31% of very small firms have remodeled during this time period. Timings of remodels may represent an important opportunity for upgrades in energy-consuming equipment.

Table 6-18: Year of Most Recent Remodel by Business Size, Site Weighted*

Year of Remodel	Total	Large	Medium	Small	Very Small	Unknown
Between 2009 and Present	17%	27%	22%	19%	15%	27%
Between 2006 and 2008	8%	12%	11%	9%	7%	4%
Between 2000 and 2005	10%	10%	12%	12%	9%	7%
In the 1990's	6%	7%	8%	7%	5%	11%
1980's	3%	3%	2%	3%	3%	3%
1970's	1%	1%	1%	1%	1%	1%
1960's	0.4%	1%	0.2%	0.4%	0.5%	0%
1950's	0.3%	0.2%	0%	0.3%	0.3%	0%
Before 1950	0.4%	0%	0%	0.1%	1%	0%
Never Remodeled	38%	29%	34%	33%	40%	34%
Refused	0.2%	0.1%	0%	0.3%	0.2%	0%
Don't Know	16%	9%	10%	14%	17%	13%
n	**7,697**	**594**	**2,117**	**2,222**	**2,605**	**159**

* **The results are weighted by site count**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Many of the smaller firms may not have remodeled since 1990 because they only recently established themselves at their current location. As listed in Table 6-19, approximately 48% of all firms established themselves at their currently location since 1990. Very small firms are more likely to have established themselves at their currently location between 2009 and the current period.

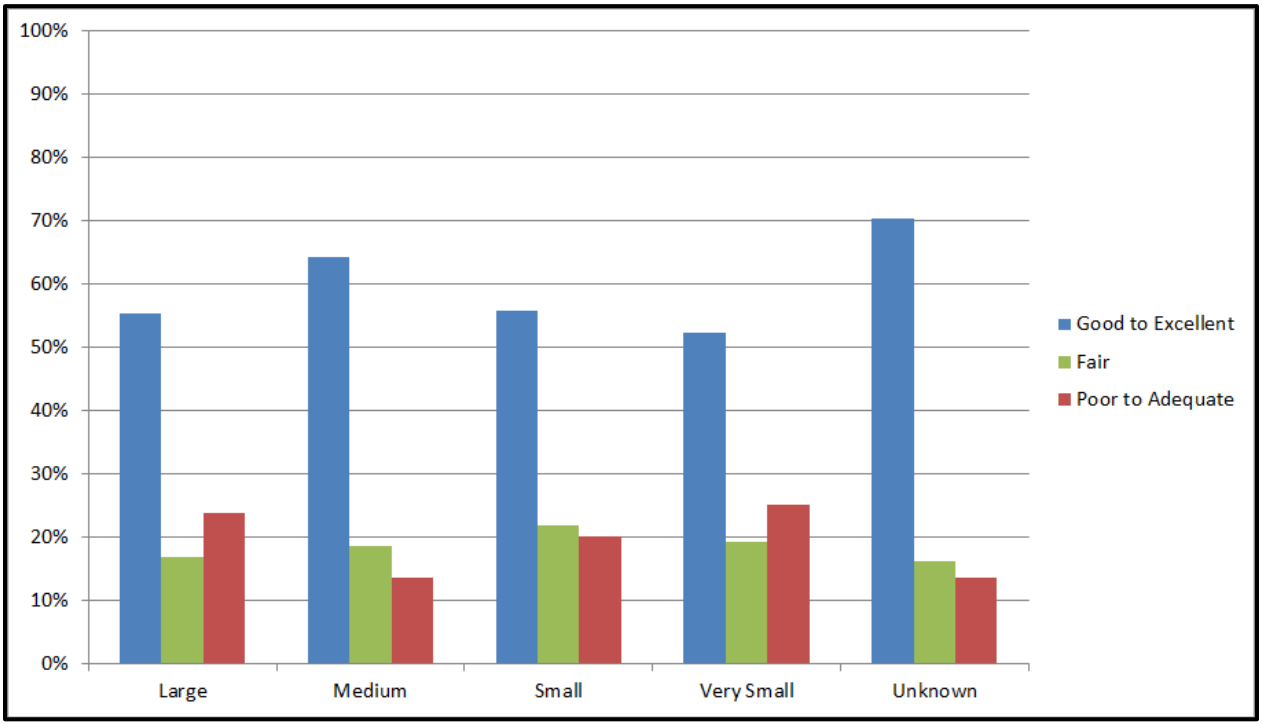
Table 6-19: Year Business was Established at its Current Location by Business Size, Site Weighted*

Year Established	Total	Large	Medium	Small	Very Small	Unknown
Between 2009 and Present	18%	7%	8%	13%	19%	21%
Between 2006 and 2008	13%	9%	12%	12%	13%	14%
Between 2000 and 2005	17%	19%	19%	20%	17%	8%
In the 1990's	16%	20%	20%	17%	16%	17%
1980's	10%	13%	10%	12%	11%	2%
1970's	7%	7%	6%	7%	7%	7%
1960's	5%	5%	5%	3%	3%	17%
1950's	2%	3%	3%	3%	2%	0%
Before 1950	2%	3%	4%	4%	2%	1%
Refused	0.2%	0%	0%	0.2%	0.2%	0%
Don't Know	9%	14%	12%	10%	8%	12%
n	**7,707**	**598**	**2,123**	**2,222**	**2,605**	**159**

* **The results are weighted by site count**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

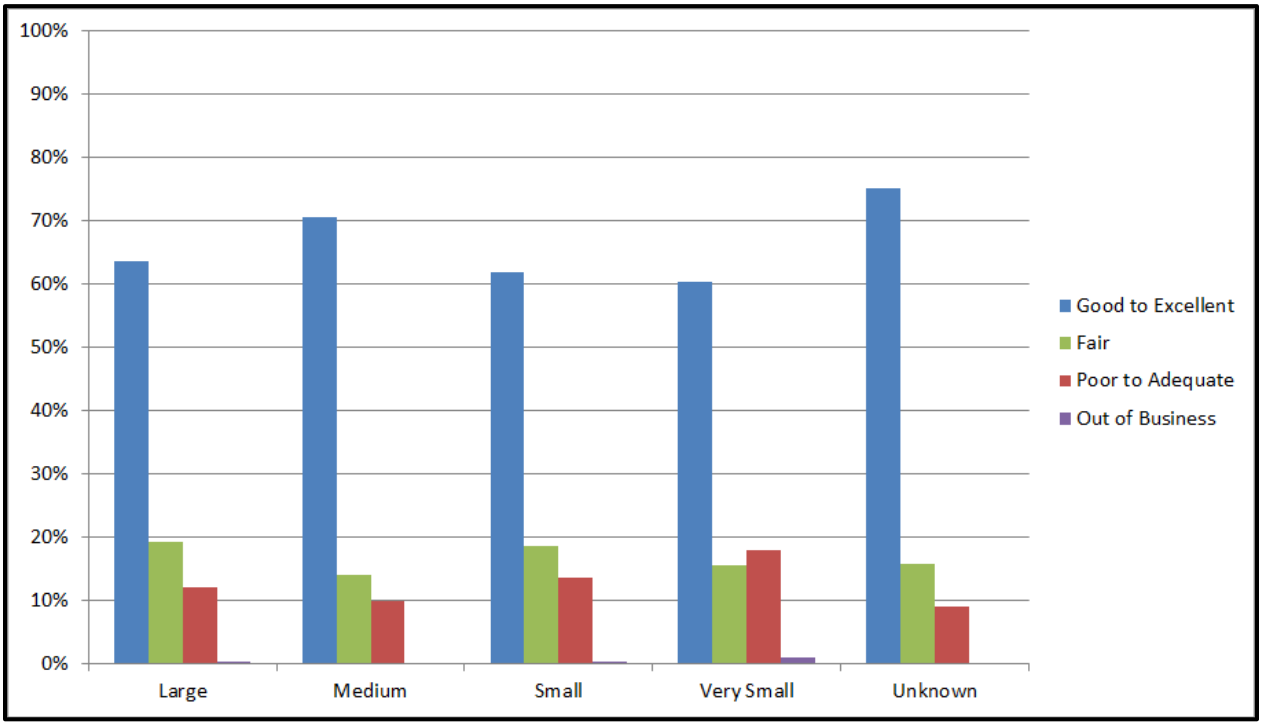
Businesses were also asked to characterize their business outlook over the previous three years and over the next three years. Figure 6-3 and Figure 6-4 illustrate the responses businesses gave describing their business outlook over the past three years and the next three years by business size, respectively. Large businesses were more likely to say that the last three years were excellent than small businesses. The aggregate outlook over the next three years improves relative to the last three years for all firm sizes.

Figure 6-3: Business Outlook over the Past Three Years by Energy Consumption



* **The results are kWh weighted.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

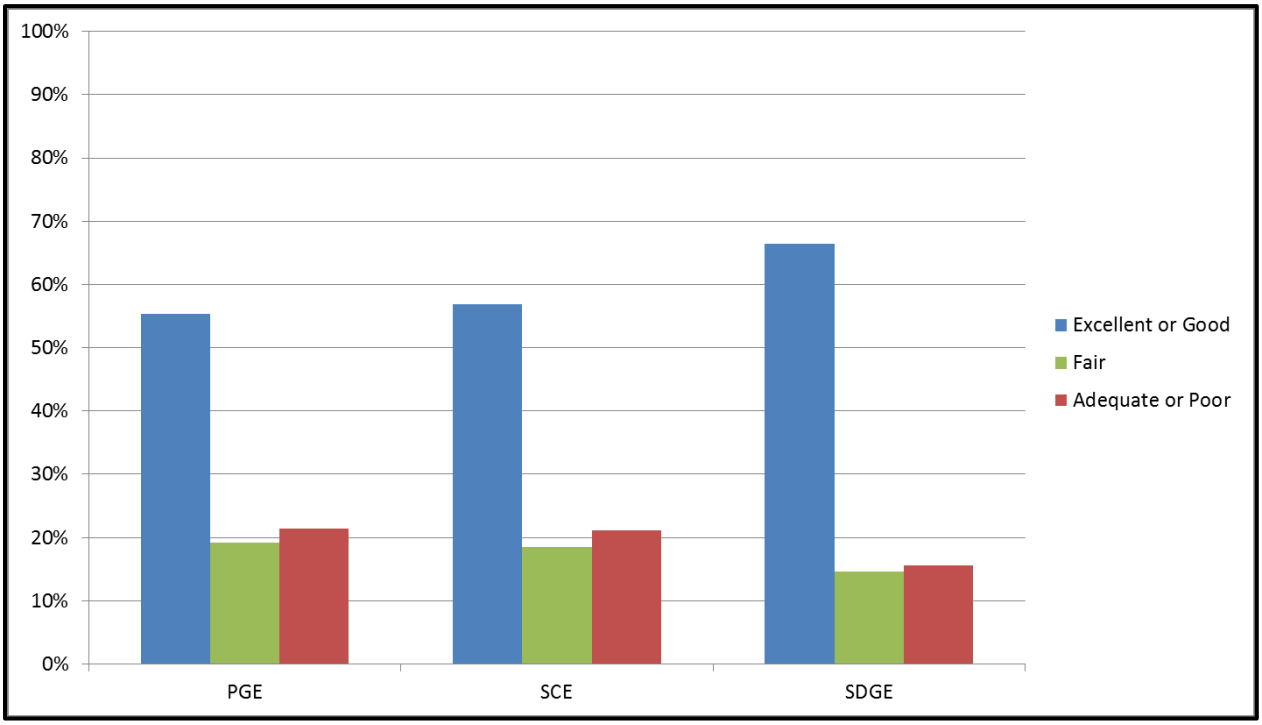
Figure 6-4: Business Outlook over the Next Three Years by Energy Consumption



* **The results are kWh weighted.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

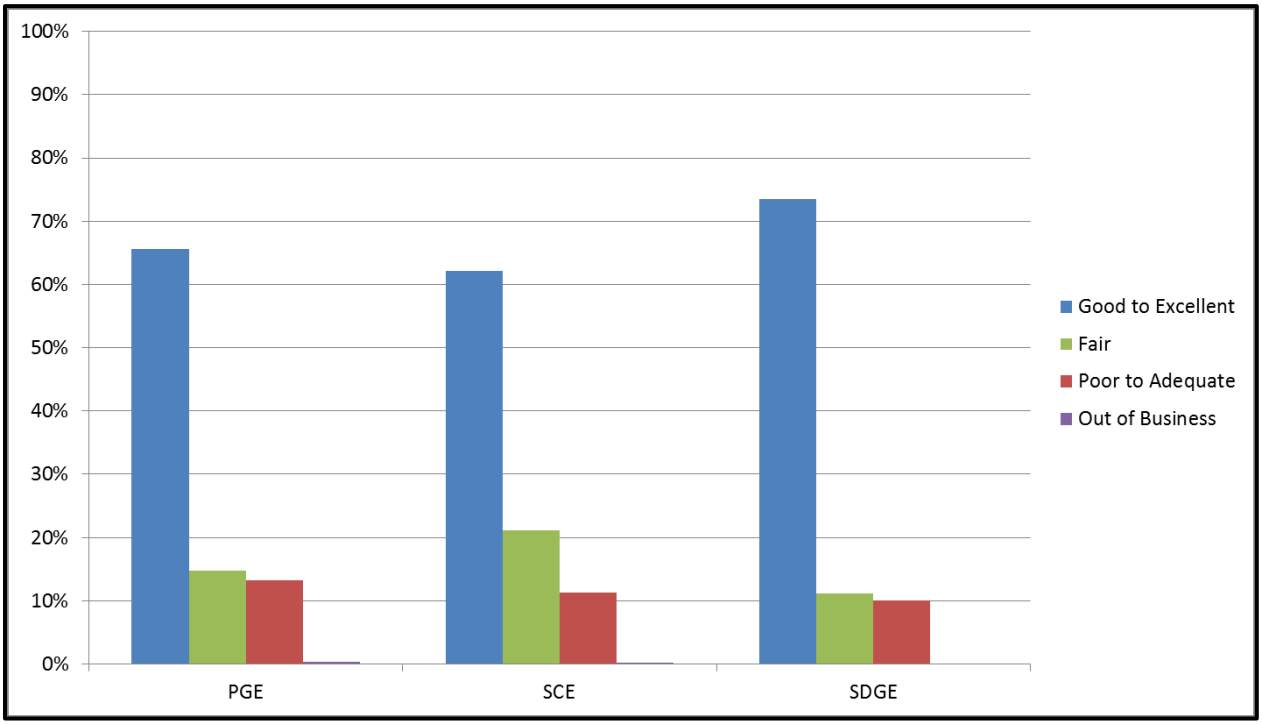
Figure 6-6 illustrate self-reported business outlook by IOU. These data indicate that businesses in SDG&E territory report slightly better business outlook over both the past and the next three years than for businesses in P&GE or SCE territories. The data on business outlook by EE participation (not presented), does not show any substantial differences between EE participation and non-participations in their outlook toward the past or the future.

Figure 6-5: Business Outlook over the Past Three Years by IOU



* **The results are kWh weighted.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 6-6: Business Outlook over the Next Three Years by IOU



* **The results are kWh weighted.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Appendix A includes tables listing responses to all telephone survey questions by energy consumption. Appendix B includes tables listing responses by site count.

7

Attitude and Awareness of DSM and IDSM in the Commercial Population

7.1 Current Attitude and Awareness of DSM

The telephone survey collected information on nonresidential customer attitude toward energy usage and awareness of Demand Side Management (DSM). The survey questions nonresidential customers about their awareness of programs and resources designed to reduce their energy usage through energy efficiency, demand response, and distributed generation.

This series of questions collected baseline information on the current attitude and awareness of nonresidential customers toward their energy use and three types of DSM options: energy efficiency, demand response, and distributed generation. As the utilities redesign, refocus, and supplement their current program offerings to fulfill the Strategic Plan's emphasis on offering more integrated DSM (IDSM) programs, the baseline information collected in the CSS/CMST telephone survey will provide a benchmark to compare future customer attitudes and awareness of IDSM.

The awareness and attitude information presented in this section are disaggregated by customer size. Many of the initial IOU efforts to increase awareness have focused on larger customers. For the size disaggregation, a large site has a maximum yearly usage over 1.750 GWh, a medium site's usage is between 300 MWh and 1.750 GWh, a small site has usage greater than 40 MWh but less than or equal to 300 MWh, and a very small site consumes less than 40 MWh a year. Sites that do not appear to have electricity usage in the billing data provided are listed as unknown usage.

Table 7-1 and Figure 7-1 present information on the importance of being environmentally conscious for businesses in California by business size and weighted by kWh. Using site-based weighting in Table 7-2, 76% of large businesses responded that it is essential or very important to be environmentally conscious, while only 49% of very small businesses feel that it is essential or very important. Figure 7-1 illustrates that large businesses are far more likely to respond that being environmentally conscious is essential to their business than medium and smaller companies.

Table 7-1: Importance of Being Environmentally Conscious by Business Size, kWh Weighted*

Importance	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Essential to your business	23%	33%	17%	12%	9%	28%	0.000
Very important	48%	48%	50%	45%	41%	38%	0.079
Somewhat important	25%	16%	29%	35%	39%	30%	0.000
Not at all important	4%	2%	4%	6%	10%	5%	0.000
Refused	0.1%	0%	0.3%	0.1%	0.1%	0%	N/A
Don't Know	1%	1%	1%	2%	1%	0%	N/A
n	**7,876**	**660**	**2,230**	**2,222**	**2,605**	**159**	

*** The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

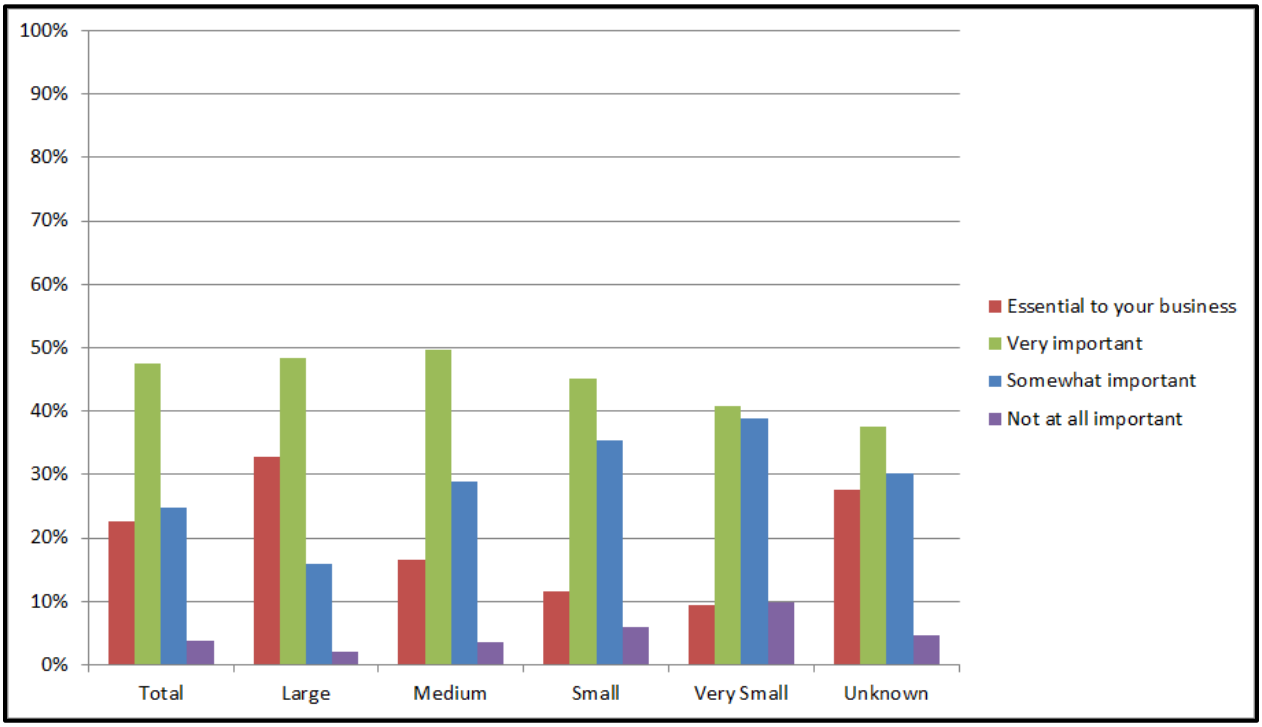
Table 7-2: Importance of Being Environmentally Conscious by Business Size, Site Weighted*

Importance	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Essential to your business	10%	27%	16%	11%	9%	17%	0.000
Very important	41%	49%	49%	44%	40%	39%	0.043
Somewhat important	37%	21%	30%	37%	39%	31%	0.003
Not at all important	9%	2%	4%	6%	10%	13%	0.000
Refused	0.3%	0%	0.2%	0.2%	0.3%	0%	N/A
Don't Know	1%	1%	1%	2%	2%	0.2%	0.269
n	**7,876**	**660**	**2,230**	**2,222**	**2,605**	**159**	

*** The results are weighted by site count**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

[1] The Chi Squared p-value is a statistical test used to determine if categorical data are random or if they follow a pattern. If the p-value is less than 0.05 then the hypothesis that the data in the row are randomly distributed can be rejected. Therefore there is evidence supporting that there are statistically significant differences in these data across row. For example, the Chi Squared p-value in Table 7-1 is supportive of the conclusion that a higher share of large sites find it essential to be environmentally conscious than very small sites. An N/A in the p-value column indicates that there were insufficient sites in the row to develop the Chi Squared test statistic.

Figure 7-1: Importance of Being Environmentally Conscious by Business Size, kWh Weighted*



* **The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Analyzing the data on the importance of being environmentally conscious by energy efficiency program participation, a larger share of EE participants think that being environmentally conscious is important than non-participants. Table 7-3 and Table 7-4 present the findings on environmental consciousness by EE participation weighted by kWh and site counts respectively. The results in Table 7-3 indicate that when using kWh weights, 71% of the kWh in the frame agrees that it is very important or essential for their organization to be environmentally conscious. Using kWh weights, 76% of EE program participants believe it is very important or essential while only 65% of the non-participant segment of the frame agrees with these statements. In contrast, using the results from the site weighted responses (Table 7-4), only 51% of sites reported that it is very important or essential for their organization to be environmentally conscious. Once again, EE program participants were more likely to agree with these statements than non-participants, 58% and 50% respectively. That the share of the kWh weighted responses is higher than the site weighted responses indicates that sites with larger energy consumption are more likely to agree with this sentiment.

Table 7-3: Importance of Being Environmentally Conscious by EE Participation, kWh Weighted*

Importance	Total	EE Program Participants	EE Program Non-Participants	Chi-Squared P-Value[1]
Essential to your business	23%	24%	21%	0.008
Very important	48%	52%	44%	0.000
Somewhat important	25%	20%	29%	0.000
Not at all important	4%	2%	5%	0.000
Refused	0.1%	0.1%	0%	0.925
Don't Know	1%	1%	1%	0.863
n	**7,876**	**2,476**	**5,400**	

***** **The results are weighted by kWh**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-4: Importance of Being Environmentally Conscious by EE Participation, Site Weighted*

Importance	Total	EE Program Participants	EE Program Non-Participants	Chi-Squared P-Value[1]
Essential to your business	10%	11%	10%	0.927
Very important	41%	47%	40%	0.010
Somewhat important	37%	33%	38%	0.063
Not at all important	9%	8%	10%	0.117
Refused	0.3%	0%	0.3%	0.285
Don't Know	1%	2%	1%	0.828
n	**7,876**	**2,476**	**5,400**	

***** **The results are weighted by site count**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-5 and Table 7-6 present the importance of highlighting the business' environmental consciousness in marketing material to customers by kWh and site weights, respectively. These results indicate that 59% of the kWh in the frame and 36% of the sites believe that it is important to present their environmental consciousness in their marketing and communication with customers. The difference in these two shares once again demonstrates that larger sites express more concern about environmental consciousness and marketing. The findings in Table 7-6 indicate that 67% of large sites affirm that their organization highlights their environmental consciousness while only 33% of very small sites agree with this statement. These findings may indicate that larger sites are more concerned about the impact of their organization on the environment or that they are more aware of the importance of environmentally conscious marketing to their customers.

Table 7-5: Organization Highlights their Environmental Consciousness in Marketing Materials by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	59%	72%	56%	42%	34%	17%	0.000
No	34%	20%	36%	54%	63%	70%	0.000
Other	0.4%	0.2%	1%	0.2%	0.5%	0%	N/A
Refused	0.2%	0%	0.3%	1%	0%	0%	N/A
Don't Know	6%	8%	6%	3%	3%	14%	0.000
n	**7,299**	**643**	**2,131**	**2,065**	**2,311**	**149**	

***** **The results are weighted by kWh**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-6: Organization Highlights their Environmental Consciousness in Marketing Materials by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	36%	67%	54%	41%	34%	31%	0.000
No	60%	26%	39%	55%	63%	61%	0.000
Other	1%	0.4%	1%	0.3%	1%	0%	N/A
Refused	0.2%	0%	0.2%	0.4%	0%	0%	N/A
Don't Know	3%	7%	5%	3%	3%	8%	0.000
n	**7,299**	**643**	**2,131**	**2,065**	**2,311**	**149**	

***** **The results are weighted by site count**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

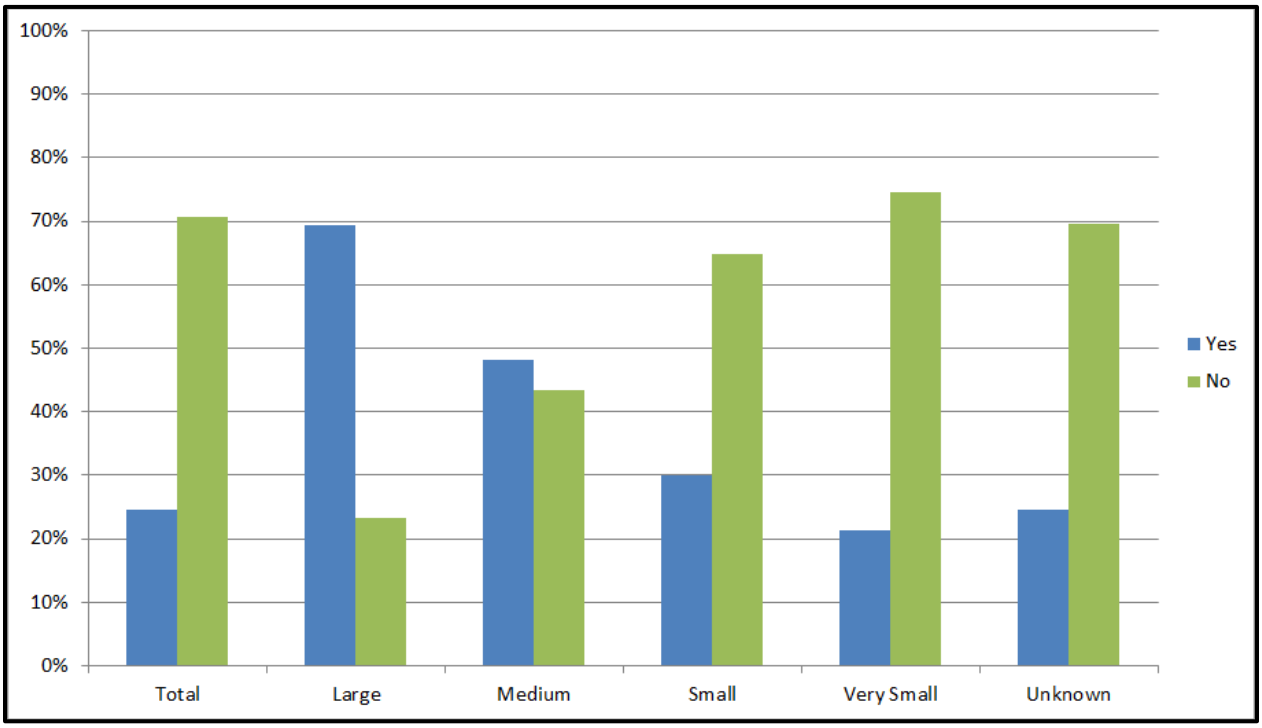
The findings presented in Table 7-7 show that 25% of all sites have developed a long-term energy plan designed to reduce their energy bills. The sites with energy plans can be disaggregated into 69% for large businesses and only 21% for very small businesses. In addition, 31% of sites participating in energy efficiency programs have developed a long-term energy plan, while only 24% of EE non-participant sites have developed a plan. Figure 7-2 illustrates that the share of businesses with long-term energy plans declines rapidly with reductions in size.

Table 7-7: Organization has Developed a Long-Term Energy Plan by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	25%	69%	48%	30%	21%	25%	0.000
No	71%	23%	43%	65%	74%	70%	0.000
Refused	0.1%	0%	0%	0%	0.2%	0%	N/A
Don't know	5%	7%	8%	5%	4%	6%	0.011
n	**7,041**	**399**	**1,708**	**2,170**	**2,605**	**159**	

* **The results are weighted by site count**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 7-2: Organization has a Long-Term Energy Plan by Business Size, Site Weighted



* **The results are weighted by site counts**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-8 and Figure 7-3 show the share of sites by business size that describes themselves as aware of programs and resources that are designed to help businesses reduce their energy bills. The results listed in Table 7-8 show that 76% of large businesses are aware of programs and resources, while less than half of small and slightly more than a third of very small businesses describe themselves as aware. These findings indicate that the IOUs have the potential to

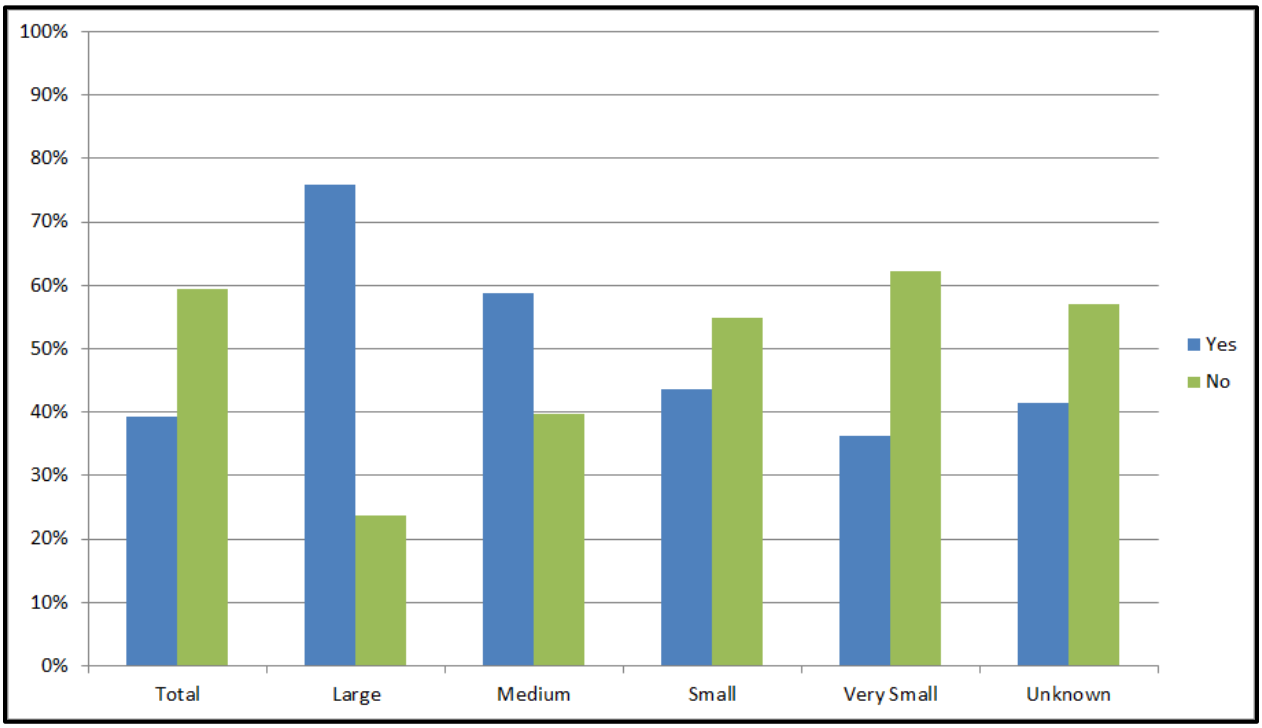
significantly increase the knowledge of small and very small customers about programs and resources that are available to reduce their energy bills. Improving the knowledge of these customers could lead to a significant increase in awareness and a reduction in customer bills.

Table 7-8: Aware of Programs or Resources to Help Reduce Energy Bills by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	39%	76%	59%	44%	36%	41%	0.000
No	59%	24%	40%	55%	62%	57%	0.000
Don't Know	1%	1%	2%	2%	1%	2%	0.989
n	**7,040**	**399**	**1,708**	**2,169**	**2,605**	**159**	

* **The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 7-3: Businesses Aware of Programs or Resources, Site Weighted



* **The results are weighted by site counts**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-9 lists the awareness of programs by IOU, showing that a slightly larger share of sites in SDG&E and SCE self-report being aware of programs and resources than businesses in PG&E.

The findings, however, also indicate that a majority of business customers are unaware of available programs and resources designed to help them reduce their energy bills.

Table 7-9: Aware of Programs or Resources that are Designed to Reduce Energy Bills by IOU, Site Weighted*

Aware of Resources	Total	PG&E	SCE	SDG&E	Chi-Squared P-Value[1]
Yes	39%	37%	41%	41%	0.000
No	59%	61%	58%	59%	0.000
Don't Know	1%	2%	1%	1%	0.001
n	**7,040**	**2,497**	**3,214**	**1,329**	

*** The results are weighted by site count.**

Table 7-10 lists the self-reported responses provided by businesses when asked if they are aware of any programs or resources that are designed to help their organization reduce their energy bills by energy efficiency program participation. Fifty percent of EE program participant sites report that they are unaware, even though the IOU program tracking data indicates that the site has taken advantage of energy efficiency programs. This inconsistency may be due to who is responding to the telephone survey. If the telephone survey is being answered by a person who is not responsible for program participation, they may be unaware that the site has participated. For example, if the telephone survey contacted a person at the facility and program participation decisions are made at a corporate office, the site contact may be unaware of participation.

Table 7-10: Aware of Programs or Resources that are Designed to Reduce Energy Bills by EE Program Participation, Site Weighted*

Aware of Resources	Total	EE Program Participants	EE Program Non-Participants	Chi-Squared P-Value[1]
Yes	40%	49%	38%	0.000
No	59%	50%	61%	0.000
Don't Know	1%	1%	1%	0.955
n	**7,040**	**1,890**	**5,150**	

*** The results are weighted by site counts**.

For the 40% of businesses that describe themselves as aware of programs and resources, the telephone survey asked them to list what types of programs they were aware of. Table 7-11 and Table 7-12 list the types of programs customers are aware of including energy efficiency, demand response, distributed generation, marketing, and tax policies by kWh weighting and site weighting, respectively. The data show that, when using a kWh weight, over half of the commercial kWh that are aware of programs are aware of rebate and incentive programs. Using the site weighted data from Table 7-12, less than half of aware sites are aware of rebate and

incentive programs. Large, medium, and small customers are more likely to be aware of energy efficiency programs and resources than very small customers. The large number of very small sites helps to explain the lower overall awareness of rebate and incentive programs for the site weighted results.

For the 40% of businesses that state that they are aware of some types of resources, awareness of distributed generation and demand response is substantially lower than customer awareness of energy efficiency and appears to be substantially dependent on the customer's size. Only 10% of aware kWh and 13% of all aware sites state that they are aware of solar or other distributed generation programs. Surprisingly, small customers are more likely to state that they know about solar or other distributed generation programs than large customers. The distribution of distributed generation knowledge by customer size may be due in part to the importance of private contractors in providing both knowledge and the installation of solar systems. Conversely, larger customers are more likely to be aware of demand response programs than small customers. The findings listed below may indicate that account representatives are providing their larger customers with information on EE and DR programs, but are less active in providing their customers with information on DG and solar opportunities, leaving this type of DSM activity for private contractors. The general limited awareness of supposedly aware customers concerning DG and DR programs points to potential opportunities to increase customer knowledge of these two types of DSM.

Table 7-11: For DSM Aware Customers, Types of Programs can you Recall by Business Size, kWh Weighted*

Programs	Total	Large	Medium	Small	Very Small	Unknown
Rebates/incentives (include mentions of SPC and Express)	55%	58%	53%	50%	39%	50%
Demand Response Programs (Flex Your Power, Peak Choice, BIP, DBP, Aggregator, PDP)	21%	27%	18%	8%	8%	12%
Direct Install/Contractor offered to install equipment for free	14%	13%	15%	15%	19%	52%
Solar / Distributed Generation Programs (CSI, SGIP)	10%	7%	13%	15%	13%	33%
Business energy audits and feasibility studies	8%	8%	9%	8%	7%	0.2%
Upstream HVAC and Motors Program	7%	7%	8%	6%	3%	0.2%
Energy Centers (Pacific Energy Center, SCE CTAC)	5%	6%	5%	5%	3%	0%
BLDG Commissioning (Retrocommissioning, Monitoring based commissioning)	4%	5%	3%	1%	1%	0%
Federal Tax incentives	3%	3%	3%	2%	1%	22%
Seminars, classes, and workshops	3%	2%	4%	3%	2%	0%
Energy Star	0.3%	0%	1%	1%	0%	0%
Other	26%	28%	22%	23%	22%	1%
Refused	0%	0%	0.2%	0%	0.2%	0%
Don't Know	4%	3%	6%	5%	7%	0.1%
n	**3,368**	**323**	**1,053**	**964**	**954**	**74**

***** **The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-12: For DSM Aware Customers, Types of Programs can you Recall by Business Size, Site Weighted*

Programs	Total	Large	Medium	Small	Very Small	Unknown
Rebates/incentives (include mentions of SPC and Express)	45%	52%	53%	49%	42%	52%
Direct Install/Contractor offered to install equipment for free	17%	16%	15%	16%	16%	21%
Solar / Distributed Generation Programs (CSI, SGIP)	13%	11%	14%	14%	13%	15%
Demand Response Programs (Flex Your Power, Peak Choice, BIP, DBP, Aggregator, PDP)	8%	21%	17%	8%	7%	7%
Business energy audits and feasibility studies	7%	9%	9%	7%	7%	2%
Upstream HVAC and Motors Program	4%	10%	8%	5%	3%	6%
Energy Centers (Pacific Energy Center, SCE CTAC)	4%	7%	6%	5%	3%	3%
Seminars, classes, and workshops	2%	4%	5%	2%	2%	0%
Federal Tax incentives	2%	5%	4%	3%	1%	5%
BLDG Commissioning (Retrocommissioning, Monitoring based commissioning)	1%	6%	3%	1%	1%	1%
Energy Star	0.2%	0%	1%	1%	0%	0%
Other	20%	22%	21%	23%	20%	13%
Refused	0.2%	0%	0.2%	0%	0.3%	0%
Don't Know	9%	5%	7%	6%	10%	7%
n	**3,368**	**323**	**1,053**	**964**	**954**	**74**

***** **The results are weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

7.2 Distributed Generation Participation

The telephone survey also asked customers about the incidence of solar and wind generation equipment at the site. Less than 10% of the frame's kWh appears to report that they have energy generation equipment while less than 5% of sites report having this equipment. As shown in Table 7-13 and Table 7-14, the highest incidence of distributed generation equipment of any type is with large customers.

Table 7-13: Facility Has Solar, Wind or Other Energy-Generation Equipment On-Site by Business Size, kWh Weighted*

Equipment	Total	Large	Medium	Small	Very Small	Unknown
Solar	6%	7%	6%	3%	2%	0.1%
Wind	0.5%	1%	0.4%	0.4%	0.4%	0.0%
Generator / Cogen Equipment	3%	4%	1%	1%	0%	0.0%
None	91%	87%	92%	95%	97%	100%
Other	1%	1%	0.4%	0.4%	1%	0%
Don't Know	0.2%	0%	1%	0.3%	0.2%	0%
n	**7,776**	**624**	**2,167**	**2,221**	**2,605**	**159**

*** The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-14: Facility Has Solar, Wind or Other Energy-Generation Equipment On-Site by Business Size, Site Weighted *

Equipment	Total	Large	Medium	Small	Very Small	Unknown
Solar	3%	7%	6%	3%	2%	5%
Wind	0.4%	0.5%	0.4%	0.3%	0.3%	1%
Generator / Cogen Equipment	0.3%	4%	1%	1%	0.1%	0%
None	96%	89%	92%	96%	97%	95%
Other	0.3%	1%	1%	0.2%	0.3%	0%
Don't Know	0.3%	0%	1%	0.3%	0.3%	0%
n	**7,776**	**624**	**2,167**	**2,221**	**2,605**	**159**

*** The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

7.2.1 Comparison of Phone Survey and On-site Distributed Generation Technology

The CSS on-site survey participants were recruited from the CSS/CMST phone survey participants, nesting on-site participants within the phone survey participants. The nested nature of the on-sites enables the comparison of phone survey self-reported information with what was found during the on-site survey. Table 7-15 presents the comparison of the phone and on-site findings for the presence of solar panels in the facility. These data indicate that 81% of the sites that reported having solar panels during the phone survey were found to have solar panels on-site. In addition, for 99% of the sites that stated during the phone survey that they did not have solar panels, no solar panels were found on-site. In total, approximately 98% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did

not have solar panels, and sites were more likely to know if they did not have solar panels than if they did have solar panels.

Table 7-15: Comparison of Solar Present in the Facility Between the Phone and On-site Surveys

Solar Present?	OS - Yes Solar		OS - No Solar		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes Solar	68	81%	16	19%	84	100%
PS-No Solar	9	1%	1327	99%	1336	100%

Table 7-16 presents the accuracy of phone survey responses by business size. In Table 7-16, the first two rows of data present the share of sites correctly answering the question in the phone survey while the final two rows of data present the share of sites incorrectly answering the question in the phone survey. These data indicate that smaller sites are more likely than larger sites to mistakenly indicate that they have solar panels when none are found on-site. Larger sites, however, are slightly more likely than smaller sites to make a mistake when they self-report on the telephone survey that they do not have solar panels.[2]

Table 7-16: Comparison of Solar Panels in Facility Between the Phone and On-site Surveys for by Business Size*

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Solar	Yes found	81%	100%	76%	83%	67%	100%
PS – No Solar	No found	99%	95%	99%	100%	100%	100%
PS – Yes Solar	No found	19%	0%	24%	17%	33%	0%
PS – No Solar	Yes found	1%	5%	1%	0%	0%	0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Error in the phone survey responses to the presence of solar generation is relatively low. Sites incorrectly stating that they have solar when none is found on-site, however, are still unexpected. Looking carefully at these sites, some of the sites have solar thermal, which is recorded on the on-site survey form, but is not recorded as solar or photo voltaic. Some of the sites are schools or individual businesses from a chain of businesses. For schools and chain businesses the phone survey often spoke with an individual from the central office. It is likely that incorrect responses to the presence of solar may indicate that the respondent was confused about the exact site being discussed. The site contact was likely correct about a different address within the school district or business chain. Other instances of error for this question remain unexplained.

[2] Larger businesses incorrectly stating that they did not have solar panels included corporate sites and schools where the respondent who answered the phone survey was in charge of multiple buildings.

The telephone survey respondents also replied with energy generation equipment other than solar installed in their facility. Table 7-17 presents the comparison of the phone and on-site findings for the presence of other energy generation equipment in the facility. These data indicate 42% of sites can correctly self-report that they have other energy generation equipment in their facility. In addition, for 90% of the sites that stated during the phone survey that they did not have energy generation equipment, no energy generation equipment was found on-site. In total, approximately 89% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have energy generation equipment.[3]

Table 7-17: Comparison of Other Types of Distributed Generation in the Facility Between the Phone and On-site Surveys

	OS - Yes Other DG		OS - No Other DG		Totals	
Other DG Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS-Yes Other DG	10	42%	14	58%	24	100%
PS-No Other DG	146	10%	1250	90%	1396	100%

7.3 Demand Response Participation

The data presented in Table 7-18 and Table 7-19 present the share of kWh and sites, respectively, which self-report participating in demand response programs. Using kWh weights, our results indicate that 36% of the kWh in the frame self-reports participating in demand response programs. The participation among large sites consuming a substantial amount of energy is considerably higher than for small and very small sites. Using site-based weights, our results imply that only 9% of sites self-report participating in demand response programs. The importance of the larger number of small and very small sites in the site weighted analysis and their lower participation rate in these programs significantly impacts the average participation rate. The distribution of demand response participation indicates that potential for participation may be substantially untapped among medium and smaller customers.

[3] The "Other" types of energy generation equipment found during the onsite survey included international combustion engines, gas turbines, micro turbines, solar thermal, and fuel cells.

Table 7-18: Facility Participates in Utility Demand Response Programs by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	36%	55%	29%	12%	8%	23%	0.000
No	51%	39%	53%	70%	76%	64%	0.000
Don't Know	12%	7%	18%	18%	15%	13%	0.000
n	**7,874**	**660**	**2,230**	**2,220**	**2,605**	**159**	

*** The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-19: Facility Participates in Utility Demand Response Programs by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	9%	47%	25%	12%	7%	11%	0.000
No	76%	41%	55%	71%	78%	79%	0.000
Don't Know	15%	12%	20%	17%	14%	10%	0.003
n	**7,874**	**660**	**2,230**	**2,220**	**2,605**	**159**	

*** The results are weighted site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

7.3.1 Comparing Demand Response Self-Report and DR Program Tracking Data

Table 7-20 presents the comparison of the self-report phone and DR tracking data. These data indicate that 53% of the sites that reported that they participate in demand response programs during the phone survey were found to be DR participants in the IOU tracking data. In addition, 88% of the sites that stated during the phone survey that they were not DR participants were correct. In total, approximately 81% of the phone survey respondents correctly knew if they did or did not participate in demand response programs.

Table 7-20: Comparison of Demand Response Present in the Facility Between the Phone and On-Site Surveys

	Tracking Data – Yes DR		Tracking Data – No DR		Totals	
DR Present?	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS – Yes DR	769	53%	670	47%	1439	100%
PS – No DR	605	12%	4538	88%	5143	100%
PS – Don't Know	196	15%	1096	85%	1292	100%

The accuracy of the phone survey self-reported DR participation can also be viewed by business size. Table 7-21 presents the accuracy of phone survey responses by business size. In Table 7-21 the first two rows of data present the share of sites correctly answering the question in the phone survey while the final two rows of data present the share of sites incorrectly answering the DR question in the phone survey. Figure 7-4 illustrates the share of sites that correctly answered the telephone survey question concerning participation of demand response in their facility.

These data indicate that larger sites are more likely to correctly self-report that they participate in DR than smaller sites. These data also indicate, however, that larger sites are more likely to make a mistake than smaller sites when they self-report on the telephone survey that they do not participate in DR. When very small sites self-report that they do not participate in DR, they are correct 98% of the time, but large sites are only correct 29% of the time when they state that they do not participate in DR.

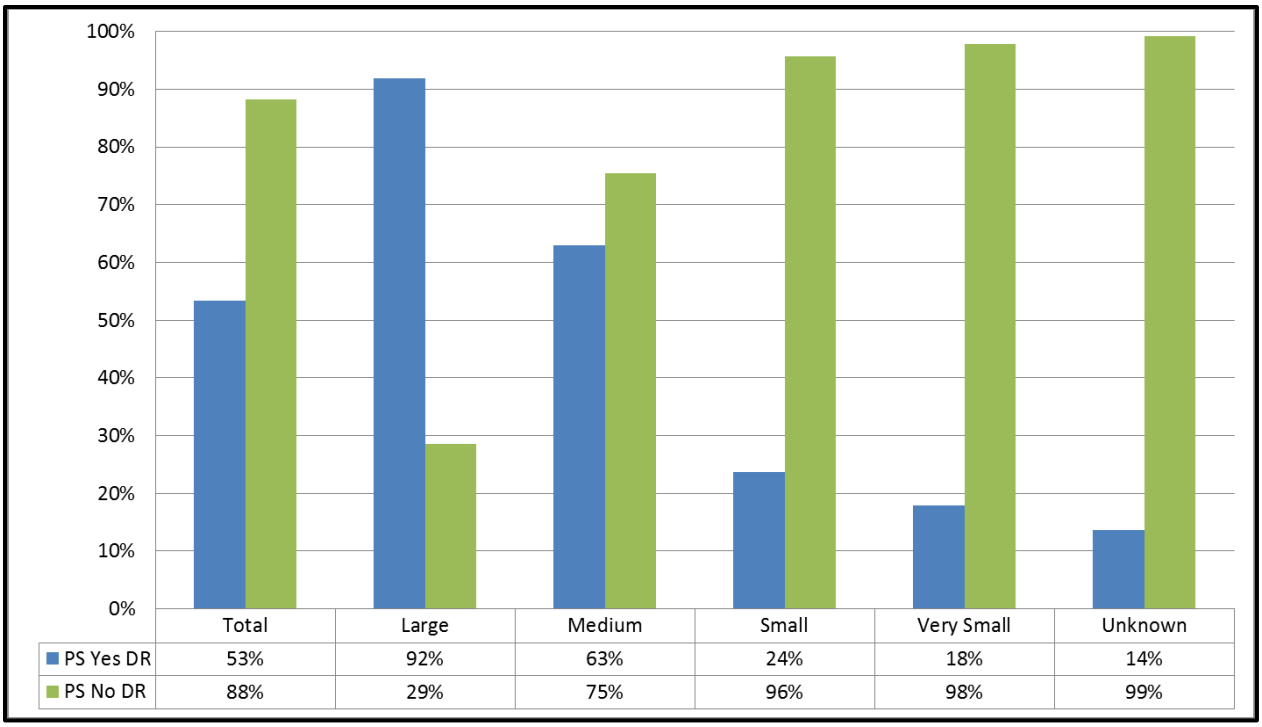
These findings are consistent with the fact that only 54% of large sites self-report that they participate in DR programs during the telephone survey while data presented in Section 3 of this report show that 82% of large PG&E sites, 81% of large SCE sites, and 54% of large SDG&E sites are found to be registered to participate in DR programs. Given that a higher share of large sites are found to be registered in DR than self-report as participants, it is not surprising that 71% of large sites that state that they did not participate in DR are found to be incorrect. In addition, only 2% to 5% of very small sites in the frame are found to participate in DR (see Table 3-10). Therefore, it is not surprising that only 18% of the very small sites that self-report participation in DR programs are found to be registered for DR programs.

Table 7-21: Comparison of Demand Response Participation Between the Phone and IOU Tracking data by Business Size*

Phone Survey	Tracking	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes DR	Yes DR	53%	92%	63%	24%	18%	14%
PS – No DR	No DR	88%	29%	75%	96%	98%	99%
PS – Yes DR	No DR	47%	8%	37%	76%	82%	86%
PS – No DR	Yes DR	12%	71%	25%	4%	2%	1%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 7-4: Sites Whose Phone Survey Response to the Participation in DR was Verified as Correct by the IOU Tracking Data



* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

7.4 Integrated Audits

Table 7-22 lists the share of businesses that claim to have participated in an integrated audit.[4] Statewide, our results imply that 11% of businesses self-report that they have undertaken an integrated audit. The distribution of integrated audits by customer size shows that large customers are over six times as likely to have participated in an integrated audit (53%) as very small customers (8%). Given the dominance of large sized sites within the sites participating in audits, it is no surprise that our estimate of the share of kWh participating in integrated audits is much higher than our estimate of the share of sites (44% versus 11%; these results are available in the kWh weighted Appendix). These results reinforce the remaining opportunities available for energy efficiency, demand response, and distributed generation programs to reduce the energy bills of commercial customers.

Table 7-22: Organization Undertaken an Integrated Audit by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	11%	53%	33%	15%	8%	11%	0.000
No	84%	37%	56%	78%	88%	81%	0.000
Refused	0%	0.2%	0%	0%	0%	0%	N/A
Don't Know	5%	10%	11%	6%	3%	7%	0.000
n	**7,874**	**660**	**2,230**	**2,220**	**2,605**	**159**	

*** The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

For those sites that state that they have not undertaken an integrated audit, the telephone survey asked the customer if they knew where to go to get an audit. Approximately 14% of customers who have not had an audit know where to go to get an integrated online audit (see Table 7-23) and the share declines by customer size. The data also indicates that 12% of these customers know where to go to get an on-site audit (see Table 7-24), but the share of customers aware of where to go to get an on-site audit differs by customer size. Large customers are more than three times as likely to know where to go to get an on-site audit (37%) than very small customers (12%). The distribution of integrated audits and the knowledge of where to go to get an integrated audit indicates that there is an opportunity to increase the knowledge of commercial customers and that smaller customers are largely unaware of this opportunity.

[4] The telephone survey asks the firm representatives if they have undertaken an integrated audit that included energy efficiency, demand response, and distributed generation. The audit is not limited to audits sponsored by the utilities.

Table 7-23: Organization Knows Where to get an Integrated Online Audit by Business Size, Site Weighted *

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	12%	37%	21%	13%	12%	10%	0.001
No	85%	55%	76%	84%	86%	87%	0.512
Refused	0%	0%	0%	0%	0.1%	0%	N/A
Don't Know	3%	8%	3%	4%	2%	4%	0.069
n	**5,215**	**157**	**971**	**1,686**	**2,287**	**114**	

*** The results are weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 7-24: Organization Know Where to get an Integrated On-Site Audit by Business Size, Site Weighted *

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	12%	37%	21%	13%	12%	10%	0.001
No	85%	54%	76%	83%	86%	86%	0.484
Refused	0%	0%	0%	0%	0.1%	0%	N/A
Don't Know	3%	9%	3%	4%	2%	4%	0.080
n	**5,215**	**157**	**971**	**1,686**	**2,287**	**114**	

*** The results are weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

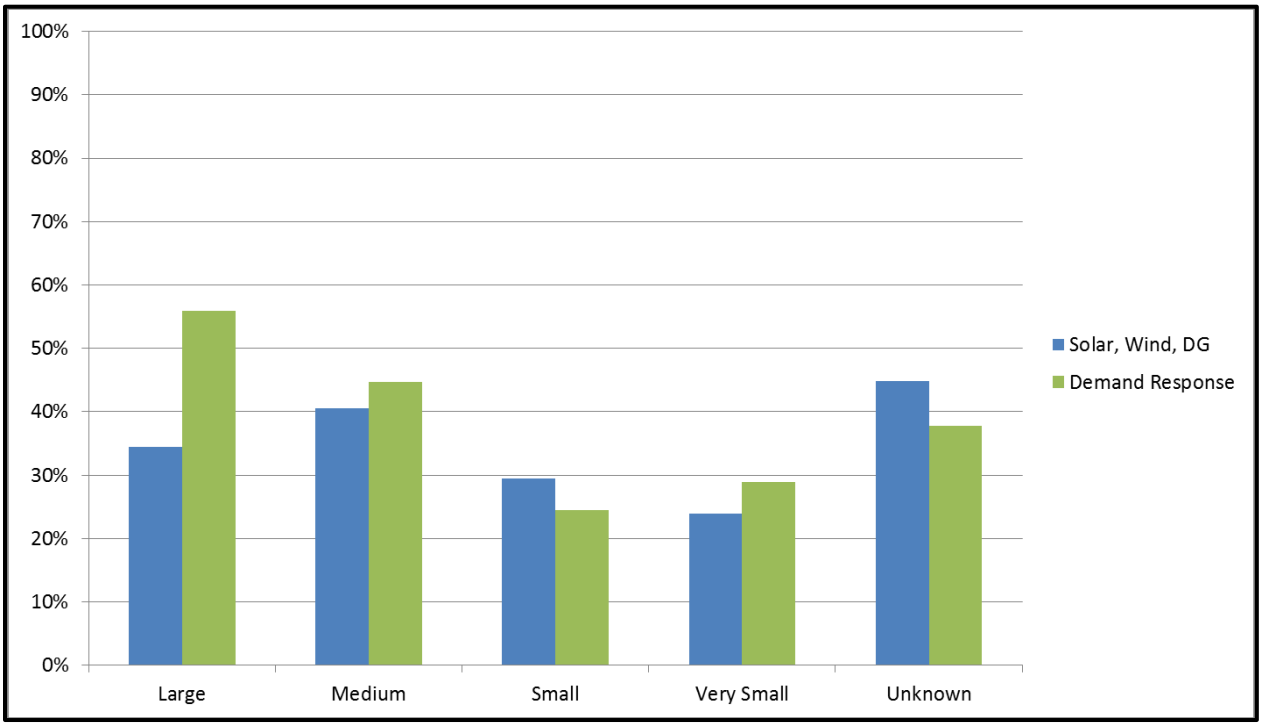
The telephone survey also questioned businesses who had received an audit and who do not currently have self-generation capabilities if they were advised about solar, wind, or other self-generation programs, technologies, or opportunities during the audit. Approximately 29% of audit participants stated that these opportunities were identified within the audit report (see Table 7-25). Surprisingly, medium sized businesses are more likely than large businesses to self-report that solar, wind, or other self-generation programs and technologies were identified (see Figure 7-5).

Table 7-25: Solar, Wind or Other Self-Generation Programs, Technologies, or Opportunities were Identified in the Audit Report by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	29%	35%	41%	30%	23%	45%	0.001
No	58%	54%	45%	55%	64%	43%	0.035
Refused	0%	0%	0.1%	0%	0%	0%	N/A
Don't Know	14%	11%	14%	16%	13%	12%	0.892
n	**1,218**	**173**	**496**	**322**	**204**	**23**	

* **The results are weighted by site counts**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 7-5: Were DG Programs, Technologies, or Opportunities Identified in the Audit Report? Were Demand Response Programs and Opportunities Identified in the Audit Report? By Business Size, Site Weighted*



* **The results are weighted by site counts**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

If a site reported completing an integrated audit and they reported receiving information on solar, wind, or self-generation technologies, the site was asked if they had implemented these technologies. If the site had not installed distributed generation technologies following the

integrated audit, the site was asked to explain why their business did not choose to install these technologies. The responses to these questions are listed in Table 7-26. The high costs of these technologies combined with insufficient funds are the most common reasons provided for not implementing distributed generation recommendations. Only 8% of sites report either being in the process of installing or considering distributed generation recommendations.

Table 7-26: Why Did Your Organization not Adopt the Solar, Wind, or Self-Generation Technologies Recommended? By Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown
High Cost	42%	41%	37%	38%	45%	49%
Lack of Funds	13%	11%	11%	11%	13%	23%
In process or Considering	8%	8%	15%	10%	2%	19%
Insufficient Payback / ROI	4%	12%	7%	5%	2%	4%
Other [5]	29%	29%	32%	31%	34%	4%
Refused	0%	0%	0%	0%	0.2%	0%
Don't Know	5%	7%	3%	5%	6%	1%
n	**421**	**60**	**198**	**101**	**51**	**11**

***** **The results are weighted by site counts**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Approximately 30% of audit participants who are not currently participating in demand response programs reported that these types of opportunities were included in their audit report (see Table 7-27 and Figure 7-5). The telephone survey responses indicate that it is significantly more likely for DR to be identified for large customers (55%) than for small or very small customers (25% and 29%, respectively). This distribution may indicate that DR is easier to implement for larger customers, but these findings may also indicate that the current opportunities identified by integrated audits may need further review to help the IOUs achieve the Strategic Plan's integration goals.

Figure 7-5 illustrates the share of business customers who received information during their integrated audit on demand response or solar, wind, or other generation technologies, but who have not implemented these technologies or program options. This illustration clearly indicates that larger businesses are more likely to receive information on demand response than smaller companies. In addition, larger companies are more likely to receive information on demand response than distributed generation opportunities. The distribution of information that is being

[5] The "Other" responses include businesses who were unable to make these decisions because they leased the building and businesses whose roof did not have the space or could not support the weight of solar panels.

provided by audits is interesting and deserves additional review during the evaluation of the integrated audit program.

Table 7-27: Demand Response Programs, Technologies, or Opportunities were Identified in the Audit Report by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	30%	55%	44%	25%	29%	39%	0.020
No	46%	30%	34%	48%	48%	35%	0.350
Don't Know	24%	15%	21%	28%	22%	26%	0.688
n	**904**	**88**	**354**	**257**	**185**	**20**	

*** The results are weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

If a site reported completing an integrated audit and they reported receiving information on demand response opportunities, the site was asked if they had registered for a demand response program. If the site had not signed up for demand response following the integrated audit, the sites was asked to explain why their business did not choose to participate. The responses to these questions are listed in Table 7-28. The most common response to why sites did not choose to join a demand response program is that they are unable to operate without energy. This response may indicate that the IOUs need to improve the information provided to customers during the audit to ensure that customers know there are multiple types of demand response programs.

Table 7-28: Why Did Your Organization Not Adopt the Demand Response Programs and Technologies Recommended? By Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown
Can't operate without energy	22%	34%	17%	18%	25%	12%
High Costs	17%	8%	15%	23%	18%	0%
Adopted, in process, or considering	8%	15%	14%	7%	6%	6%
Did not qualify	5%	4%	1%	4%	6%	14%
Not interested	3%	0%	4%	8%	2%	0%
Tried and not satisfied	1%	7%	4%	0%	1%	0%
Other [6]	30%	27%	30%	25%	30%	46%
Refused	0.3%	0%	2%	0%	0%	0%
Don't Know	15%	4%	15%	14%	15%	22%
n	**346**	**52**	**159**	**71**	**54**	**10**

*** The results are weighted by site counts**. Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

7.5 Building Benchmarking

The telephone survey asked commercial customers if they were aware of benchmarking. The results presented in Table 7-29 and Table 7-30 show that approximately 32% of the kWh and only 9% of sites are aware of benchmarking. Approximately 48% of large sites are aware of benchmarking, but customer awareness drops off quickly with customer size. The future success of benchmarking will require significant growth in benchmarking awareness.

Table 7-29: Aware of Building Benchmarking by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	32%	48%	26%	13%	7%	5%	0.000
No	67%	51%	73%	86%	92%	95%	0.000
Don't Know	1%	1%	1%	1%	1%	0%	0.781
n	**7,039**	**399**	**1,708**	**2,168**	**2,605**	**159**	

*** The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

[6] The "Other" responses include businesses who thought that demand response would be disruptive to their business and would not be beneficial in the long run.

Table 7-30: Aware of Building Benchmarking by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	9%	46%	24%	12%	7%	13%	0.000
No	90%	54%	76%	88%	92%	86%	0.002
Don't Know	1%	1%	1%	1%	1%	1%	0.869
n	**7,039**	**399**	**1,708**	**2,168**	**2,605**	**159**	

***** **The results are weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8

Lighting

The telephone survey for the CSS/CMST studies has an extensive battery of questions on lighting. Within the commercial sector, lighting is the largest user of electricity and lighting has been the subject of extensive IOU programs and code improvements. The CSS/CMST telephone survey questions businesses about who purchases lighting, where lighting is commonly purchased, the type of lighting used in the facility, and the age of the existing lighting fixtures. As part of the CMST study, the telephone survey asks respondents if they have replaced their lighting fixtures since January 2009. If the business had replaced lighting fixtures, they were asked if they had replaced linear fluorescent fixtures. If the business replaced linear fluorescent fixtures, the business was eligible to be recruited for the CMST on-site verification study.

The results from the lighting questions for the CSS/CMST telephone survey are available in Appendix A and Appendix B.

8.1 Linear Fluorescents

Businesses are asked if they have linear fluorescents at their facility. The self-reported phone survey responses indicate that businesses representing 90% of the kWh in the frame have linear technology, while 79% of businesses using the site based weights have linear fluorescent lighting. The Chi-Squared p-value presented in the far right column of Table 8-1 indicates that it is not possible to reject the hypothesis that the share of businesses self-reporting the presence of linear technologies is random or not based on business size. For Table 8-1, the data support the conclusion that the share of large businesses with linear technologies is similar to the share of small and very small sized businesses. For the site weighted results presented in Table 8-2, however, the Chi-Squared p-value rejects the hypothesis of a random distribution of businesses self-reporting that they have linear technologies. The p-values in Table 8-2 support the observation that when using site weights, large businesses are more likely to self-report linear technologies than smaller businesses.

Table 8-1: Linear Fluorescents by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	90%	93%	92%	86%	83%	73%	0.085
No	6%	4%	5%	10%	13%	23%	0.000
Don't Know	4%	3%	3%	4%	4%	4%	0.693
n	**7,696**	**594**	**2,117**	**2,221**	**2,605**	**159**	

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-2: Linear Fluorescents by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	79%	93%	91%	85%	78%	71%	0.003
No	16%	4%	6%	11%	18%	21%	0.000
Don't Know	4%	3%	3%	4%	4%	8%	0.007
n	**7,696**	**594**	**2,117**	**2,221**	**2,605**	**159**	

*** The results have been weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.1.1 Comparison of Phone Survey to On-site Data for Linear Fluorescents

The CSS on-site survey participants were recruited from the CSS/CMST phone survey participants, nesting on-site participants within the phone survey participants. The nested nature of the on-sites enables the comparison of phone survey self-reported information with what was found during the on-site survey. Table 8-3 presents the comparison of the phone and on-site findings for the presence of linear fluorescents in the facility. These data indicate that 100% of the sites that reported that they have linear fluorescents during the phone survey were found to have linear fluorescents on-site. However, 83% percent of businesses self-reporting that they do not have linear technologies were found to be incorrect during the on-site survey. Approximately 98% of the businesses that were in both the telephone and on-site surveys were found to have linear technologies at their facility. In total, approximately 91% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have linear fluorescents.

[1] The Chi Squared p-value is a statistical test used to determine if categorical data are random or if they follow a pattern. If the p-value is less than 0.05 then the hypothesis that the data in the row are randomly distributed can be rejected. Therefore there is evidence supporting that there are statistically significant differences in these data across the row.

Table 8-3: Comparison of Linear Fluorescents Present in the Facility Between the Phone and On-site Surveys

	OS - Yes LFs		OS - No LFs		Totals	
LFs Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS-Yes LFs	1264	100%	5	0%	1269	100%
PS-No LFs	119	83%	25	17%	144	100%

8.1.2 Linear Fluorescent Technology

Table 8-4 and Table 8-5 list the type of linear fluorescents that businesses with linear technologies self-report by kWh and site weights, respectively. Using the kWh weights, 47% of the customers in the frame self-report having T8s. Businesses representing 74% of the kWh in the frame have T8s which include T8s, skinny tubes, and second generation T8s. Large businesses were likely to state that they had T8s, while smaller businesses referred to their lighting as skinny tubes. Turning to the site weighted results in Table 8-5, skinny tubes were the most common type of linear fluorescent reported, followed by T8s.

Table 8-4: Type of Linear Fluorescent Measures by Business Size, kWh Weighted*

Linear Fluorescent Type	**Total**	**Large**	**Medium**	**Small**	**Very Small**	**Unknown**
T8s	47%	56%	49%	33%	19%	8%
T5s	24%	35%	17%	10%	5%	6%
T12s	17%	21%	14%	12%	9%	7%
Skinny tubes	16%	8%	18%	26%	31%	13%
2nd Generation or higher T8s	12%	16%	10%	5%	3%	0.4%
Fat tubes	5%	1%	5%	9%	15%	30%
Non-Linear / U-Shape / CFL / Metal Halide / Incandescent / LED	1%	0.5%	1%	1%	0.2%	0%
T10s	0%	0%	0.3%	0%	0%	0%
Other	2%	1%	2%	2%	2%	1%
Refused	0%	0%	0%	0%	0%	0%
Don't Know	12%	9%	10%	17%	23%	37%
n	**6,587**	**555**	**1,942**	**1,915**	**2,054**	**121**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-5: Type of Linear Fluorescent Measures by Business Size, Site Weighted*

Linear Fluorescent Type	Total	Large	Medium	Small	Very Small	Unknown
Skinny tubes	28%	11%	20%	29%	29%	25%
T8s	22%	59%	46%	30%	18%	28%
Fat tubes	14%	3%	6%	9%	15%	15%
T12s	11%	18%	14%	12%	10%	16%
T5s	7%	27%	16%	8%	5%	9%
2nd Generation or higher T8s	3%	15%	10%	5%	2%	4%
Non-Linear / U-Shape / CFL / Metal Halide / Incandescent / LED	0.3%	1%	1%	0.4%	0.3%	0%
T10s	0%	0%	0.2%	0%	0%	0%
Other	2%	1%	2%	2%	2%	2%
Refused	0%	0%	0%	0%	0%	0%
Don't Know	22%	8%	10%	17%	24%	19%
n	**6,587**	**555**	**1,942**	**1,915**	**2,054**	**121**

*** The results have been weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.1.3 Comparison of Phone Survey and On-site Survey Linear Technology

The results presented in Section 8.1.1 show that businesses understand that their facilities have linear technologies. In this subsection we investigate their understanding of the different types of linear technologies; analyzing their ability to correctly identify the presence of T12s, T8s, and T5s in their facility.

T12 Linear Technologies

Table 8-6 presents the comparison of the phone and on-site findings for the presence of T12s. These data indicate that 63% of the businesses that reported that they have T12 linear fluorescents during the phone survey were found to have T12 linear fluorescents on-site. In addition, for 65% of the businesses that stated during the phone survey that they did not have T12 linear fluorescents, none were found on-site.

T12s represent a technology that was long synonymous with linear fluorescents, but over the last 20 years T12s have been increasingly replaced by newer T8, T5, and LED technologies. The data presented in Table 8-6 indicate that approximately 18% (265/1,439) of the nested sites self-reported having T12s at their facility, with 81% of sites self-reporting that they do not have T12s. The on-site data collection effort found that 41% (583/1,439) of the sites still have T12s. The discrepancy between the low self-reported incidence of T12s and the number of sites found to have T12s may reflect that businesses have multiple types of linear technologies at their facilities

and are prone to self-report the newer or more common technology. For more information on the distribution of businesses and linear fixtures with T12 technologies please refer to the CSS on-site report.

Table 8-6: Comparison of Linear Fluorescent T12 Technology Present in the Facility Between the Phone and On-site Surveys

	OS - Yes T12s		OS - No T12s		Totals	
T12 LFs Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS-Yes T12s	167	63%	96	37%	265	100%
PS-No T12s	416	35%	751	65%	1174	100%

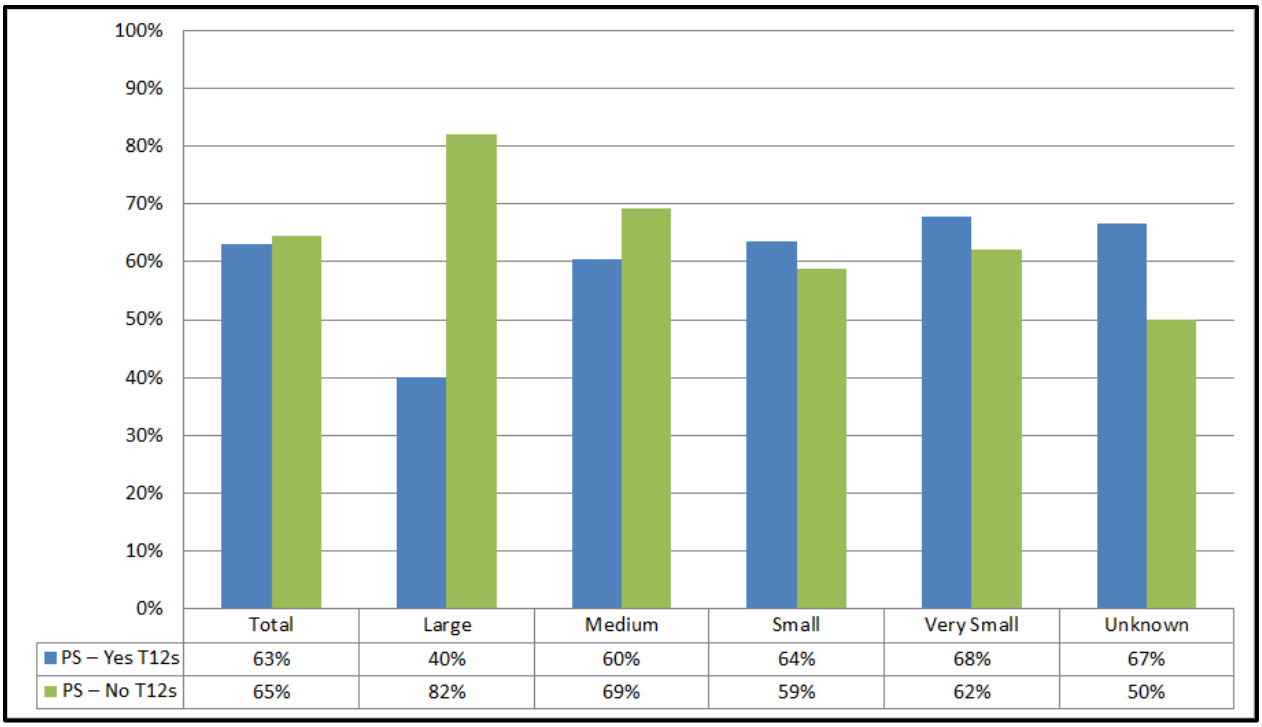
Table 8-7 presents the accuracy of phone survey responses to the presence of T12 technologies by business size. In Table 8-7 the first two rows of data present the share of businesses correctly answering the question of the type of linear fluorescent in the phone survey while the final two rows of data present the share of businesses incorrectly answering the linear fluorescents type question in the phone survey. Figure 8-1 illustrates the share of businesses that correctly answered the telephone survey question concerning the presence of T12 linear fluorescents in their facility.

Table 8-7: Comparison of Linear Fluorescent T12 Technology in Facility Between the Phone and On-site Surveys, by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes T12s	T12s found	63%	40%	60%	64%	68%	67%
PS – No T12s	No T12s found	65%	82%	69%	59%	62%	50%
PS – Yes T12s	No T12s found	37%	60%	40%	36%	32%	33%
PS – No T12s	T12s found	35%	18%	31%	41%	38%	50%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 8-1: Sites Whose Phone Survey Response to the Presence of T12 Linear Fluorescent Technology was Verified as Correct during the On-site



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes T12s	63%	40%	60%	64%	68%	67%
PS – No T12s	65%	82%	69%	59%	62%	50%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

The data in Table 8-7 indicate that smaller businesses are more likely to make a mistake than larger businesses self-reporting that they do not have T12 linear fluorescents. When large businesses self-report that they do not have T12 linear fluorescents they are correct 82% of the time but small businesses are only correct 59% of the time (and very small sites 62% of the time). Conversely, large businesses are more likely to make a mistake when they self-report that they have T12s than small businesses (40% vs. 64% correct).

T8 Linear Technologies

Table 8-8 presents the comparison of the phone and on-site findings for the presence of T8 linear fluorescents. These data indicate that 92% of the businesses that self-reported that they have T8 linear fluorescents during the phone survey were found to have T8 linear fluorescents on-site. For sites self-reporting that they do not have T8 technologies, however, 76% are found to be incorrect during the on-site survey. Approximately 64% of the phone survey respondents who participated in the on-site survey correctly knew if they did or did not have T8 linear fluorescents.

During the on-site survey more businesses were found to have T8 linear technologies than self-report these technologies during the on-site survey. This finding is similar to the findings for

T12s, where more businesses were found to have T12s than self-report during the phone survey. The on-site findings supporting a higher share of businesses having T8s and T12s than is self-reported during the telephone survey is in part due to a high incidence of businesses having both T12 and T8 technologies. During the phone survey only 8% of businesses that later participated in the on-site self-reported that their facility had both T12s and T8s. During the on-site survey, however, over 30% of businesses were found to have both T12s and T8s. For more information on the distribution of businesses and linear fixtures with T8 technologies please refer to the CSS on-site report.

Table 8-8: Comparison of Linear Fluorescent T8 Technology Present in the Facility Between the Phone and On-site Surveys

	OS - Yes T8s		OS - No T8s		Totals	
T8 LFs Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS-Yes T8s	782	92%	72	8%	854	100%
PS-No T8s	445	76%	140	24%	585	100%

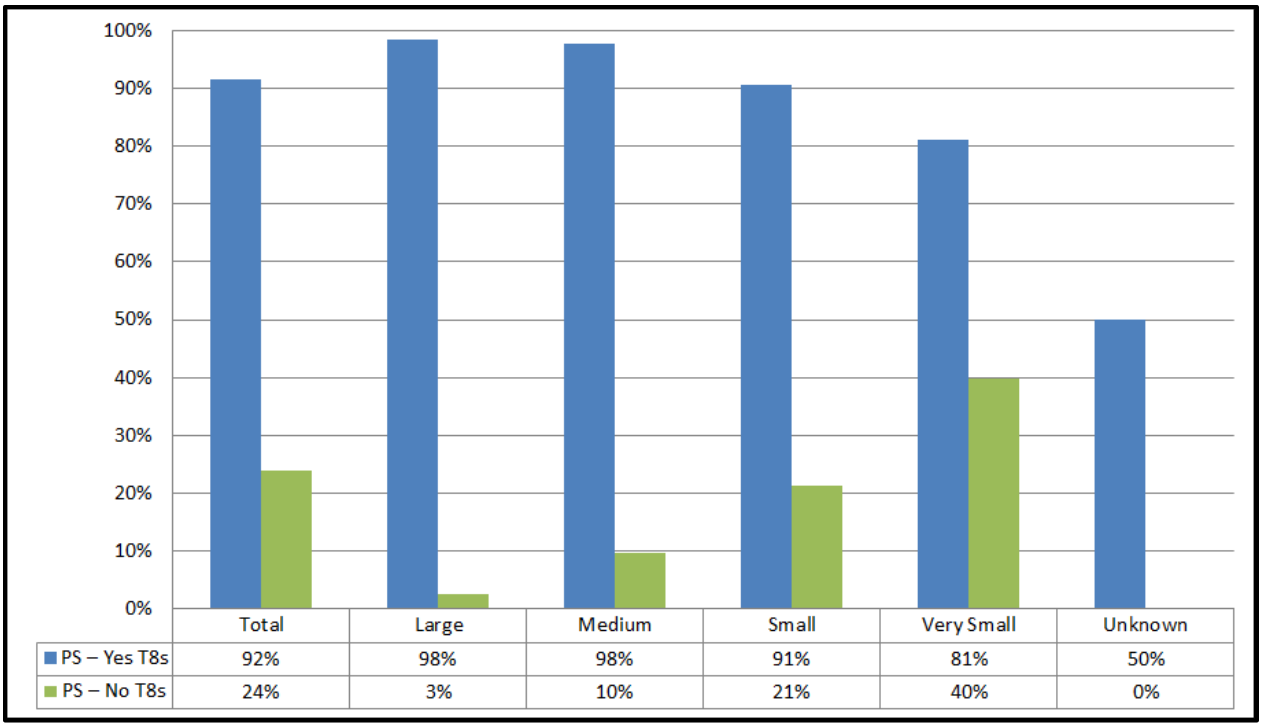
Table 8-9 presents the accuracy of phone survey responses to the presence of T8 technologies by business size. In Table 8-9 the first two rows of data present the share of sites correctly answering the question of the type of linear fluorescent in the phone survey while the final two rows of data present the share of sites incorrectly answering the linear fluorescents type question in the phone survey. Figure 8-2 illustrates the share of businesses that correctly answered the telephone survey question concerning the presence of T8 linear fluorescents in their facility.

Table 8-9: Comparison of Linear Fluorescent T8 Technology in Facility Between the Phone and On-site Surveys, by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes T8s	T8s found	92%	98%	98%	91%	81%	50%
PS – No T8s	No T8s found	24%	3%	10%	21%	40%	0%
PS – Yes T8s	No T8s found	8%	2%	2%	9%	19%	50%
PS – No T8s	T8s found	76%	97%	90%	79%	60%	100%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 8-2: Sites Whose Phone Survey Response to the Presence of T8 Linear Fluorescent Technology was Verified as Correct during the On-site*



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes T8s	92%	98%	98%	91%	81%	50%
PS – No T8s	24%	3%	10%	21%	40%	0%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

These data show that approximately 65% of businesses can correctly self-report that they have or do not have T8 linear fluorescents present in their facility. These data also indicate, however, that larger businesses are more likely to make a mistake than smaller businesses, when they self-report that they do not have T8 linear fluorescents. When large businesses self-report that they do not have T8 linear fluorescents they are only correct 3% of the time but very small businesses are correct 40% of the time when they state that they do not have T8 linear fluorescents.

T5 Linear Technologies

Table 8-10 presents the comparison of the phone and on-site findings for the presence of T5 linear fluorescents. These data indicate that 38% of the businesses that self-reported that they have T5 linear fluorescents during the phone survey were found to have T5 linear fluorescents on-site. For businesses self-reporting that they do not have T5 technologies, 90% are found to be correct during the on-site survey. Overall, 84% of the phone survey respondents who participated in the on-site survey correctly knew if they did or did not have T5 linear fluorescents, with a much larger share of sites correctly identifying that they did not have T5s on-site. For more information on the distribution of businesses and linear fixtures with T5 technologies please refer to the CSS on-site report.

Table 8-10: Comparison of Linear Fluorescent T5 Technology Present in the Facility Between the Phone and On-site Surveys

	OS - Yes T5s		OS - No T5s		Totals	
T5 LFs Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS-Yes T5s	61	38%	99	62%	160	100%
PS-No T5s	127	10%	1152	90%	1279	100%

8.1.4 Linear Fluorescent Ballasts

Businesses with linear fluorescents were also asked if the ballasts for their linear lighting were electric or magnetic. Using kWh-based weights, our estimates indicate that over half of the kWh in the frame is from businesses with electronic ballasts, and larger businesses were more likely to have electronic ballasts than smaller businesses (see Table 8-11). Turning to the site weighted results (Table 8-12), our estimates indicate that 39% of sites have electronic ballasts. The reduction in the share of sites relative to the share of kWh is due to the dominance of electronic ballasts in large businesses and their smaller share in the more prevalent smaller businesses. In addition, a large share of kWh and sites report that they do not know the types of ballasts in their business. The uncertainty of telephone survey respondents concerning the equipment in their businesses illustrates the importance of the on-site data collection effort to collect more in-depth and accurate data.

Table 8-11: Electronic or Magnetic Ballasts for your Linear Fluorescents by Business Size, kWh Weighted*

Ballast Type	**Total**	**Large**	**Medium**	**Small**	**Very Small**	**Unknown**	**Chi-Squared P-Value[1]**
Electronic ballasts	57%	64%	58%	44%	37%	38%	0.000
Both	12%	17%	9%	6%	4%	0.1%	0.000
Magnetic ballasts	5%	2%	6%	7%	10%	6%	0.000
Don't Know	26%	16%	27%	43%	49%	56%	0.000
n	**6,587**	**555**	**1,942**	**1,915**	**2,054**	**121**	

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-12: Electronic or Magnetic Ballasts for your Linear Fluorescents Business Size, Site Weighted*

Ballast Type	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Electronic ballasts	39%	66%	56%	43%	37%	42%	0.000
Magnetic ballasts	9%	4%	6%	8%	9%	9%	0.112
Both	4%	11%	9%	6%	4%	2%	0.000
Don't Know	47%	19%	30%	43%	50%	47%	0.000
n	**6,587**	**555**	**1,942**	**1,915**	**2,054**	**121**	

*** The results have been weighted by site weighted.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses with linear fluorescents were also asked if their linear lighting had dimmable ballasts. Approximately 82% of sites reported that they had no dimmable ballasts, 9% stated that they didn't know if they had dimmable ballasts, and 4% reported that less than 15% of their linear fluorescents had dimmable ballasts.[2] The very small share of sites with dimmable ballasts illustrates the remaining potential for this measure.

8.2 High Bay Lighting

Businesses were asked if they had high bay lighting or lighting over 13 feet. Approximately 64% of kWh reported having high bay lighting, while only 36% of sites stated that they had high bay lighting. High bay lighting was more common in larger businesses than small. The site-weighted phone survey estimates indicate that 73% of large businesses self-reported that they have high bay lighting, while only 31% of very small businesses have this measure. Businesses reporting high bay lighting were asked to describe the type of high bay lighting present at their facility. Table 8-13 and Table 8-14 list the types of high bay lighting present in the telephone survey by kWh and site weights, respectively. Businesses with larger electricity consumption were more likely to report having HIDs than businesses with small or very small electricity consumption. The large share of small and very small businesses that don't know the type of high bay lighting used in their facility, however, points to the importance of on-site data collection to confirm the distribution of lighting types present in facilities in California. The CSS and CMST on-site data collection efforts help to clarify this question. The findings from the on-site data collection efforts are presented in the CMST Report and the CSS On-site Report.

[2] The share of sites with dimmable ballasts is site weighted shares. The kWh weighted shares are approximately 70% without dimmable ballasts, 8% stated that they didn't know, and 15% reported that less than 15% of their linear lighting had dimmable ballasts.

Table 8-13: Type of High Bay Lighting by Business Size, kWh Weighted*

High-Bay Lighting Type	Total	Large	Medium	Small	Very Small	Unknown
HID	20%	25%	15%	11%	8%	8%
T8s	19%	19%	19%	18%	13%	1%
T5s	11%	12%	10%	8%	6%	9%
Mercury Vapor	6%	4%	8%	8%	6%	2%
CFLs	3%	3%	3%	1%	3%	0.1%
Fluorescent, type not specified	3%	2%	3%	4%	5%	0.2%
Halogen	2%	1%	2%	3%	1%	0%
Skinny tubes	2%	1%	2%	3%	5%	0%
T12s	1%	1%	1%	2%	4%	0.3%
Incandescent	1%	1%	2%	2%	2%	0%
LED	1%	1%	1%	2%	1%	0%
High / Low Pressure Sodium	1%	1%	1%	1%	1%	0%
Spotlights	0.3%	0%	0.4%	1%	1%	22%
Fat Tubes	0.2%	0%	0%	1%	2%	0%
Skylight	0%	0%	0.2%	0%	0.4%	0%
Other	8%	9%	7%	6%	7%	3%
Don't Know	23%	20%	26%	29%	34%	55%
n	**3,640**	**430**	**1,285**	**1,065**	**786**	**74**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-14: Type of High Bay Lighting by Business Size, Site Weighted*

High-Bay Lighting Type	Total	Large	Medium	Small	Very Small	Unknown
T8s	15%	18%	18%	17%	14%	15%
HID	9%	22%	13%	10%	8%	6%
Mercury Vapor	7%	7%	8%	9%	6%	8%
T5s	5%	11%	9%	6%	5%	5%
Fluorescent, type not specified	5%	3%	3%	4%	5%	5%
Skinny tubes	4%	1%	2%	4%	4%	1%
T12s	3%	1%	1%	2%	4%	1%
CFLs	3%	4%	3%	1%	4%	5%
Fat Tubes	2%	0%	0.1%	1%	3%	3%
Incandescent	2%	2%	1%	2%	2%	1%
Halogen	1%	1%	2%	3%	1%	0%
Spotlights	1%	0%	0.4%	1%	1%	1%
LED	1%	1%	1%	1%	0.4%	0%
High / Low Pressure Sodium	0.4%	1%	1%	0.5%	0.3%	1%
Skylight	0.3%	0%	0.2%	0%	0.4%	0%
Other	7%	9%	7%	8%	6%	14%
Don't Know	33%	18%	29%	30%	35%	35%
n	**3,640**	**430**	**1,285**	**1,065**	**786**	**74**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

The type of high bay lighting can also be presented by IOU. Table 8-15 lists the distribution of high bay lighting types by IOU for site-based weights. The types of high bay lighting appear to be very similar across IOU when analyzed using site weights.

Table 8-15: Type of High Bay Lighting by IOU, Site Weighted*

Lighting Type	Total	PG&E	SCE	SDG&E
T8s	15%	16%	14%	18%
HID	9%	9%	9%	8%
Mercury Vapor	7%	7%	7%	6%
T5s	5%	5%	6%	6%
Fluorescent, type not specified	5%	5%	4%	6%
Skinny tubes	4%	3%	4%	6%
T12s	3%	4%	3%	2%
CFLs	3%	3%	4%	2%
Fat Tubes	2%	3%	2%	1%
Incandescent	2%	1%	3%	2%
Halogen	1%	2%	1%	0.3%
Spotlights	1%	2%	1%	1%
LED	1%	1%	1%	1%
High / Low Pressure Sodium	0.4%	1%	0.4%	0.4%
Skylight	0.3%	0%	0.4%	1%
Other	7%	9%	5%	8%
Don't Know	33%	31%	35%	35%
n	**3,640**	**1,375**	**1,708**	**557**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-16 lists the distribution of high bay lighting types by EE IOU program participation. EE program participants appear to have a higher share of T8s, T5s, and skinny tubes in high bay lighting applications than non-participants. Non-participant businesses appear to have a higher share of T12 and fat tubes than participants. This finding, however, is tempered by the finding that a very large share of both participants and non-participants don't know what type of high bay lighting is present at their facility.

Table 8-16: Type of High Bay Lighting by EE Program Participation, Site Weighted*

Lighting Type	Total	EE Program Participation	EE Program Non-Participation
T8s	15%	19%	14%
HID	9%	11%	9%
Mercury Vapor	7%	6%	7%
T5s	5%	9%	5%
Fluorescent, type not specified	5%	5%	5%
Skinny tubes	4%	7%	3%
T12s	3%	1%	4%
CFLs	3%	5%	3%
Fat Tubes	2%	1%	3%
Incandescent	2%	2%	2%
Halogen	1%	1%	1%
Spotlights	1%	0%	2%
LED	1%	2%	0%
High / Low Pressure Sodium	0.4%	1%	0.3%
Skylight	0.3%	0%	0.3%
Other	7%	4%	8%
Don't Know	33%	27%	35%
n	**3,640**	**1,239**	**2,401**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.3 Lighting Purchases

Businesses responding to the telephone survey were asked if they had replaced lighting as part of a recent remodel or lighting retrofit. The telephone survey results indicate that 17% of sites and approximately 26% of kWh have remodeled their business since January 2009. The data presented in Table 8-17 indicates that new lighting is commonly installed during remodels. Estimates indicate that 43% of businesses installed new lighting during remodels. All businesses that had not remodeled since January 2009 were asked if they had installed any new lighting equipment since January 2009. Table 8-18 lists the weighted share of businesses reporting that they have retrofitted their lighting equipment. Approximately 20% of all businesses report retrofitting their lighting with 43% of large electricity consuming businesses retrofitting and only 19% of very small electricity consuming businesses retrofitting. Given the disproportionate share of larger sites retrofitting their lighting, the results imply that a much higher share of the frame's kWh has retrofit lighting since 2009.

Table 8-17: Businesses that have Installed New Lighting Systems as Part of a Recent Remodel by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	43%	67%	57%	50%	39%	46%	0.018
No	54%	31%	39%	46%	58%	52%	0.034
Don't Know	3%	2%	4%	4%	3%	3%	0.973
n	**1,560**	**165**	**486**	**423**	**448**	**38**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-18: Businesses that Have Installed New Lighting Equipment since 2009 without a remodel by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	20%	43%	32%	23%	19%	18%	0.000
No	78%	55%	65%	74%	80%	81%	0.049
Don't Know	1%	2%	3%	2%	1%	1%	0.053
n	**6,011**	**420**	**1,589**	**1,766**	**2,120**	**116**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses that reported replacing their lighting equipment (either through a remodel or a retrofit) were asked to describe the type of lighting equipment installed during the retrofit. Table 8-19 and Table 8-20 list the lighting replacement choices provided during the telephone survey by kWh and site weight, respectively. The lighting replacement shares sum to more than 100%, as respondents were asked to list all of their lighting retrofits. Businesses that responded that they had installed linear fluorescents (T5, T8, T10, and T12) or skinny or fat tubes were later recruited to participate in the CMST on-site verification study. During the on-site verification effort, information on the make and model numbers of the newly installed linear fluorescent was collected to better understand the efficiency level of newly installed linear fluorescents.

Table 8-19: Type of Lighting that was Purchased by Business Size, kWh Weighted*

Lighting Type	Total	Large	Medium	Small	Very Small	Unknown
T8 fluorescent fixtures (1in. diameter bulbs)	25%	25%	28%	23%	16%	6%
T5 Fixtures (5/8in. diameter)	16%	21%	12%	5%	5%	16%
Electronic Ballast	11%	9%	14%	13%	10%	1%
High Performance T8	9%	9%	12%	10%	4%	0.4%
Skinny/Thin Tubes	4%	2%	3%	8%	11%	0%
Other Fluorescent	3%	3%	5%	4%	7%	0%
T12 Fixtures (1.5in. diameter bulbs)	1%	0.4%	2%	2%	5%	19%
Magnetic Ballast	0.4%	0.3%	0.5%	0.5%	2%	0%
Ballast - type not specified	1%	0%	0.3%	2%	3%	0%
T10 fluorescent fixtures	0.4%	0%	0.3%	2%	0%	0%
Fat/Thick Tubes	0.2%	0%	0.1%	1%	2%	0%
LED – General	6%	7%	5%	4%	2%	0.3%
HID (High Intensity Discharge) Fixtures-Compact	5%	6%	5%	3%	6%	0.2%
Compact Fluorescent, Hardwire	3%	4%	2%	2%	2%	0.3%
Induction	3%	4%	1%	0.5%	1%	0%
Compact Fluorescent, Screw-in Modular	2%	1%	5%	5%	5%	16%
Halogen	2%	3%	1%	2%	2%	0.2%
Incandescent	1%	1%	1%	2%	3%	19%
Built-in LED fixtures that provide task or display lighting	0.5%	0.2%	1%	1%	0.3%	0.1%
Lighting Controls, Occupancy Sensor	16%	21%	13%	6%	6%	0%
Lighting Controls, Photocell	4%	5%	1%	2%	2%	0.2%
Lighting Controls, Time Clock	2%	1%	2%	3%	1%	0.2%
Lighting Controls, Bypass/Delay Timers	0.4%	0.1%	1%	1%	0.2%	0%
Lighting Control - Manual Switch/Dimmer	0.1%	0%	0.1%	1%	1%	0%
Exit Signs, LED	2%	3%	2%	1%	2%	0.2%
Exterior Lighting	0.4%	0%	1%	1%	1%	0%
Track Lighting - type not specified	0.2%	0%	0%	0.3%	2%	0%
Other	5%	4%	7%	8%	8%	3%
Refused	0.2%	0.2%	0.3%	0%	0%	0%
Don't Know	15%	17%	10%	16%	16%	20%
n	**2326**	**280**	**791**	**625**	**585**	**45**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-20: Type of Lighting that was Purchased by Business Size, Site Weighted*

Lighting Type	Total	Large	Medium	Small	Very Small	Unknown
T8 fluorescent fixtures (1in. diameter	20%	27%	27%	23%	18%	20%
Electronic Ballast	9%	12%	14%	13%	7%	9%
Skinny/Thin Tubes	7%	2%	4%	7%	8%	0%
Other Fluorescent	6%	4%	4%	5%	7%	1%
High Performance T8	5%	11%	11%	9%	4%	3%
T5 Fixtures (5/8in. diameter)	5%	15%	11%	5%	4%	10%
T12 Fixtures (1.5in. diameter bulbs)	4%	1%	2%	2%	4%	4%
Ballast - type not specified	2%	0%	0.5%	2%	2%	0%
Fat/Thick Tubes	2%	0%	0.2%	1%	2%	0%
Magnetic Ballast	1%	1%	1%	0.4%	1%	1%
T10 fluorescent fixtures	1%	0.3%	0.3%	1%	1%	0%
Compact Fluorescent, Screw-in Modular	6%	2%	6%	6%	6%	9%
HID (High Intensity Discharge) Fixtures-Compact	5%	4%	5%	3%	7%	1%
Incandescent	3%	2%	2%	2%	4%	3%
LED - General	3%	9%	5%	3%	2%	5%
Compact Fluorescent, Hardwire	3%	3%	2%	2%	3%	1%
Halogen	2%	3%	2%	3%	1%	4%
Built-in LED fixtures that provide task or display lighting	1%	0.4%	1%	0.5%	0.3%	5%
Induction	1%	4%	1%	1%	1%	0%
Lighting Controls, Occupancy Sensor	5%	11%	11%	6%	4%	6%
Lighting Controls, Time Clock	2%	2%	2%	3%	1%	1%
Lighting Controls, Photocell	1%	3%	1%	1%	1%	1%
Lighting Control - Manual Switch/Dimmer	1%	0%	0.1%	1%	1%	0%
Lighting Controls, Bypass/Delay Timers	1%	0.4%	1%	1%	1%	0%
Exit Signs, LED	2%	3%	2%	2%	2%	1%
Track Lighting - type not specified	1%	0.2%	0.2%	0.5%	2%	0%
Exterior Lighting	1%	0%	1%	1%	1%	0%
Other	8%	9%	7%	8%	7%	11%
Refused	0%	0.2%	0.2%	0%	0%	0%
Don't Know	18%	13%	11%	16%	19%	21%
n	**2326**	**280**	**791**	**625**	**585**	**45**

*** The results have been weighted by Site Counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.4 Occupancy Sensors

Telephone survey respondents were questioned about the use of occupancy sensors on the lighting in their facility. Table 8-21 lists the businesses responses to the occupancy sensor question. The site weighted analysis estimates that 21% of businesses have occupancy sensors present at their facility, with large electricity consuming businesses substantially more likely to have occupancy sensors than small and very small businesses.

Table 8-21: Occupancy Sensors by Business Size, Site Weighted*

Occupancy Sensors	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	21%	69%	50%	29%	16%	26%	0.000
No	77%	30%	49%	69%	82%	72%	0.000
Refused	0%	0%	0%	0%	0%	0%	N/A
Don't Know	2%	1%	2%	2%	2%	2%	0.995
n	**6,913**	**381**	**1,656**	**2,136**	**2,585**	**155**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Analyzing the distribution of occupancy sensors by EE program participation, the site-weighted analysis implies that 34% of businesses participating in EE programs have occupancy sensors while only 19% of non-participating businesses have sensors (see Table 8-22).

Table 8-22: Occupancy Sensors by EE Participation, Site Weighted*

Occupancy Sensors	Total	EE Program Participation	EE Program Non-Participation	Chi-Squared P-Value[1]
Yes	21%	34%	19%	0.000
No	77%	65%	79%	0.000
Refused	0%	0%	0%	N/A
Don't Know	2%	1%	2%	0.208
n	**6,913**	**1,822**	**5,091**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.4.1 Comparison of Phone Survey and On-site Occupancy Sensor Technology

The CSS on-site survey participants were recruited from the CSS/CMST phone survey participants, nesting on-site participants within the phone survey participants. The nested nature of the on-sites enables the comparison of self-reported information with what was found during the on-site survey. Table 8-23 presents the comparison of the phone and on-site findings for the

presence of occupancy sensors in the facility. Forty five percent of the businesses that reported that they have occupancy sensors during the phone survey were found to have occupancy sensors on-site. In addition, for 88% of the businesses that stated during the phone survey that they did not have occupancy sensors, no occupancy sensors were found on-site. In total, approximately 72% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have occupancy sensors and sites were more likely to know if they did not have occupancy sensors than if they did have occupancy sensors. Fewer sites were found to have occupancy sensors during the on-site survey than self-report them during the telephone survey (321 sites with sensor versus 485 self-reports).

Table 8-23: Comparison of Occupancy Sensors Present in the Facility Between the Phone and On-site Surveys

Occupancy Sensors Present?	OS – Yes Occ		OS – No Occ		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS – Yes Have	221	45%	267	55%	488	100%
PS – No Occ	102	12%	718	88%	819	100%

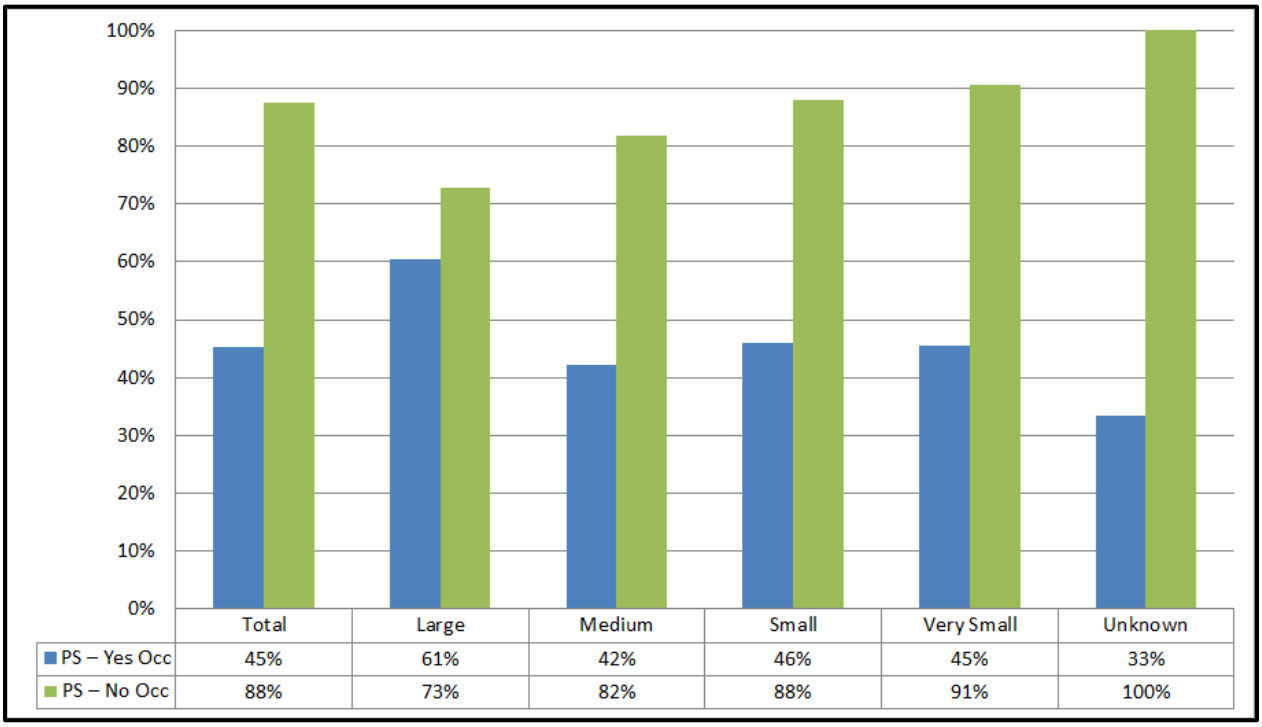
Table 8-24 presents the accuracy of phone survey responses to the presence of occupancy sensor by business size. In Table 8-24 the first two rows of data present the share of sites correctly answering the question in the phone survey while the final two rows of data present the share of sites incorrectly answering the occupancy sensor question in the phone survey. Figure 8-3 illustrates the share of sites that correctly answered the telephone survey question concerning the presence of occupancy sensors in their facility. These data indicate that that the error in sites reporting that they have occupancy sensor grows as the size of sites declines. These data also indicate, however, that larger sites are more likely to make a mistake than smaller sites, when they self-report on the telephone survey that they do not have occupancy sensors. When very small businesses self-report that they do not have occupancy sensors they are correct 91% of the time but large businesses are only correct 73% of the time.

Table 8-24: Comparison of Occupancy Sensors in Facility Between the Phone and On-site Surveys for by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Occ	Occ found	45%	61%	42%	46%	45%	33%
PS – No Occ	No Occ found	88%	73%	82%	88%	91%	100%
PS – Yes Occ	No Occ found	55%	39%	58%	54%	55%	67%
PS – No Occ	Occ found	12%	27%	18%	12%	9%	0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 8-3: Sites Whose Phone Survey Response to the Presence of Occupancy Sensors was Verified as Correct during the On-site



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Occ	45%	61%	42%	46%	45%	33%
PS – No Occ	88%	73%	82%	88%	91%	100%

8.4.2 Occupancy Sensor Lighting Share

Businesses with occupancy sensors were further asked what share of their lighting was controlled by an occupancy sensor. Table 8-25 lists the estimated share of lighting controlled by sensors for businesses that self-report having sensors. Approximately 50% of businesses with sensors self-report having less than 15% to none of their lighting controlled by occupancy sensors. Businesses with less electricity consumption are more likely to respond that less than 15% of their lights are controlled by sensors, while large energy consumption businesses are more likely to respond that a higher share of their lighting is controlled by sensors.

Table 8-25: Share of Your Lighting Controlled by an Occupancy Sensor by Business Size, Site Weighted*

Percentage	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
0 Percent	2%	0.4%	1%	2%	3%	0%	N/A
1 to 15	48%	36%	36%	50%	49%	59%	0.016
16 to 30	12%	15%	13%	15%	11%	5%	0.020
31 to 45	3%	2%	4%	2%	3%	4%	0.508
46 to 60	7%	7%	9%	9%	6%	2%	0.010
61 to 80	7%	12%	13%	6%	6%	12%	0.001
81 to 99	5%	11%	11%	4%	4%	8%	0.000
100 Percent	9%	10%	11%	7%	11%	6%	0.042
Don't Know	6%	6%	3%	5%	8%	4%	0.078
n	**2,463**	**288**	**955**	**695**	**474**	**51**	

* **The results have been weighted by Site Counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

The share of lighting controlled by occupancy sensors was collected as part of the on-site survey. The on-site data were compared to phone survey self-reported share of lighting controlled by occupancy sensors in the facility. These data indicated that businesses tended to overstate the share of lighting controlled by occupancy sensors. The phone survey results indicate that a relatively low share of lighting is currently controlled by occupancy sensors. Energy Efficiency program participants, however, appear to be substantially more likely to have occupancy sensors than non-participants. These results point to a need to better understand why sensors are currently used infrequently and to determine if the potential energy savings for this measure can be realized with better marketing and education.

8.5 Compact Fluorescents

Telephone survey respondents were asked if they had ever heard of or were familiar with CFLs and respondents are then read a comment expressing that CFLs do not look like regular incandescent bulbs and describes the spiral shape of CFLs. The telephone survey responses indicate that only 91% businesses have either heard of or are familiar with CFLs (6,851/7,536). The survey asked businesses that had either heard of or were familiar with CFLs if they had any CFLs either on the inside or the outside of their facility. For businesses that were familiar with CFLs, Table 8-26 and Table 8-27 list the estimated share of businesses responding that they had CFLs installed by kWh and site weights, respectively. The estimates from the telephone survey using site count weights imply that slightly less than 50% of businesses that are aware of CFLs currently have CFLs installed. Using kWh based weights the analysis implies that slightly more

than 50% of the kWh for businesses that are aware of CFLs have CFLs installed. The Chi-Squared statistics reported in Table 8-26 and Table 8-27 supports the hypothesis that the likelihood of a site having a CFL is not dependent on the site's size. Given that only 91% of sites reported that they were familiar with CFLs and only approximately 50% of aware sites self-report having CFLs at their facility, these numbers imply that approximately 47% of sites have CFLs. There appear to be a substantial share of businesses where potential energy savings from CFLs may exist.

Table 8-26: For CFL Aware Sites, Facility Has CFLs by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	53%	54%	55%	50%	46%	31%	0.119
No	39%	37%	39%	42%	49%	59%	0.001
Refused	0%	0%	0%	0%	0%	0%	N/A
Don't Know	8%	9%	6%	8%	5%	10%	0.005
n	**6,851**	**568**	**1,934**	**1,937**	**2,269**	**143**	

*** The results have been weighted by kWh Consumption. Only 91% of sites were aware of CFLs.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-27: For CFL Aware Sites Facility Has CFLs by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	47%	61%	54%	50%	46%	50%	0.171
No	46%	32%	40%	44%	48%	38%	0.003
Refused	0%	0%	0%	0%	0%	0%	N/A
Don't Know	6%	8%	7%	7%	5%	12%	0.000
n	**6,851**	**568**	**1,934**	**1,937**	**2,269**	**143**	

*** The results have been weighted by Site Count. Only 91% of sites were aware of CFLs.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.5.1 Comparison of Phone and On-site Survey Findings for Compact Fluorescents

The CSS on-site survey participants were recruited from the CSS/CMST phone survey participants. The nested nature of the on-sites enables the comparison of phone survey self-

reported information with what was found during the on-site survey. Table 8-28 presents the comparison of the phone and on-site findings for the presence of compact fluorescents in the facility. These data indicate that 87% of the businesses that reported that they have compact fluorescents during the phone survey were found to have compact fluorescents on-site. In addition, for 33% of the businesses that stated during the phone survey that they did not have compact fluorescents, no compact fluorescents were found on-site. In total, approximately 61% of the phone survey respondents who participated in the on-site survey correctly knew if they did or did not have compact fluorescents.

Table 8-28: Comparison of Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys

CFLs Present?	OS – Yes CFLs		OS – No CFLs		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes CFLs	621	87%	92	13%	713	100%
PS-No CFLs	453	67%	225	33%	678	100%
PS Don't Know	52	84%	10	16%	62	100%

Table 8-29 presents the accuracy of phone survey responses by business size. In Table 8-29 the first two rows of data present the share of sites correctly answering the question in the phone survey while the final two rows of data present the share of sites incorrectly answering the compact fluorescent question in the phone survey. Figure 8-4 illustrates the share of sites that correctly answered the telephone survey question concerning the presence of compact fluorescents in their facility. These data indicate that the error in self-reported incidence of CFLs declines slightly as the sites become smaller. These data also indicate, however, that when businesses self-reported they did not have compact fluorescents, they tended to be incorrect and larger sites are more likely to make a mistake than smaller sites. When very small businesses self-report that they do not have CFLs they are correct 41% of the time but large businesses are only correct 11% of the time when they state that they do not have CFLs.

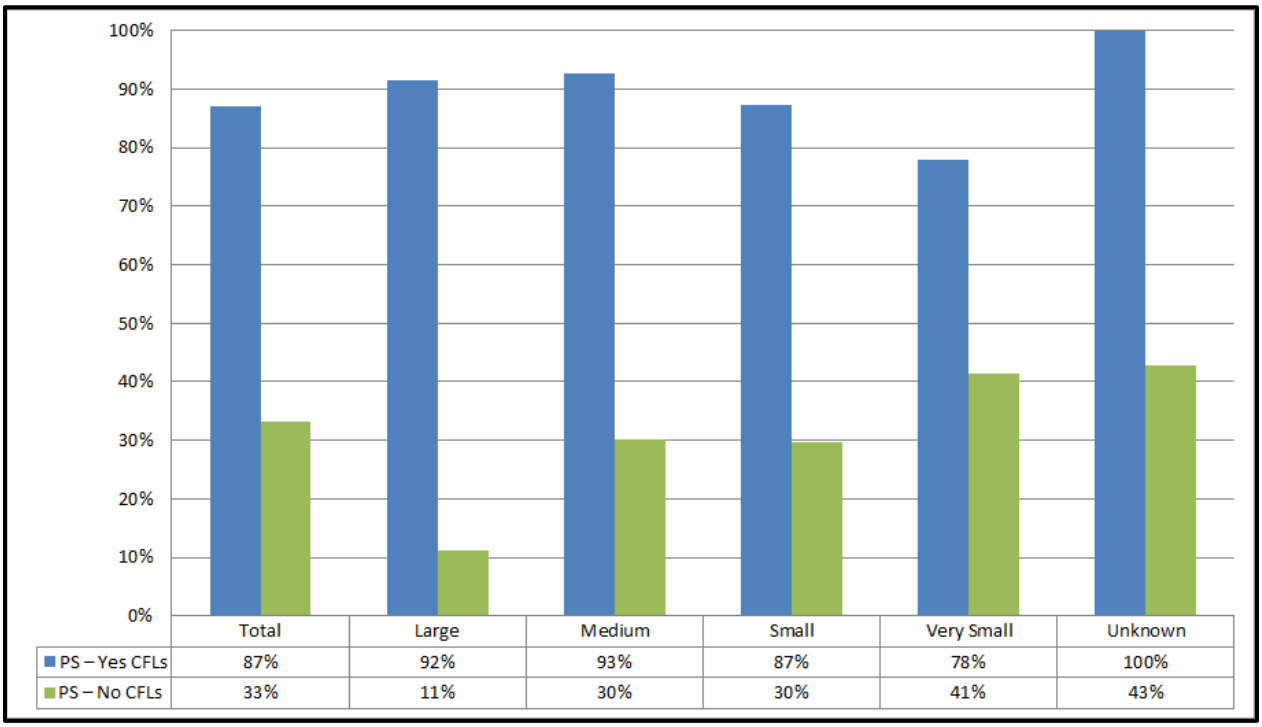
Table 8-29: Comparison of Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes CFLs	CFLs	87%	92%	93%	87%	78%	100%
PS – No CFLs	No CFLs	33%	11%	30%	30%	41%	43%
PS – Yes CFLs	No CFLs	13%	8%	7%	13%	22%	0%
PS – No CFLs	CFLs	67%	88%	70%	70%	59%	57%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Given the distribution of errors in the self-report data, more non-residential sites have CFLs in their facility than self-reported on the telephone survey. Of the 1,453 sites included in the comparison analysis (Table 8-28 and Table 8-29), 713sites self-reported in the telephone survey that their facilities had CFLs installed but during the on-site survey 1,126 sites were found to have CFLs present. These findings support the need for on-site surveys when collecting data on rapidly changing technologies that individuals may not fully understand.

Figure 8-4: Sites Whose Phone Survey Response to the Presence of Compact Fluorescents was Verified as Correct during the On-site



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes CFLs	87%	92%	93%	87%	78%	100%
PS – No CFLs	33%	11%	30%	30%	41%	43%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.5.2 Compact Fluorescent Types

The CFL series of questions asked telephone survey respondents about the type of CFLs installed at their facility – screw-in CFLs or pin based. Using site based weights; approximately 71% of businesses with CFLs self-report having only screw-in CFLs.

Table 8-30: Types of CFLs at your Facility by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Screw In	71%	33%	43%	65%	75%	65%	0.000
Pin Based	10%	19%	18%	10%	9%	17%	0.001
Both	16%	44%	37%	23%	13%	15%	0.000
Don't Know	3%	4%	3%	2%	3%	3%	0.000
n	**3,085**	**240**	**867**	**895**	**1,021**	**62**	

* **The results have been weighted by Site Count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.5.3 Comparison of Phone and On-Site Survey findings of Compact Fluorescent Technology

The results presented in Section 8.5.1 show that more businesses have CFL technologies than self-report these technologies. In this subsection we investigate understanding of the different types of CFLs.

Screw Based CFL Comparison

Table 8-31 presents the comparison of the phone and on-site findings for the presence of screw-in compact fluorescents in the facility. These data indicate that 75% of the businesses that reported that they have screw based compact fluorescents during the phone survey were found to have these technologies on-site. In addition, for 52% of the businesses that stated during the phone survey that they did not have screw-in CFLs, no screw-in CFLs were found on-site. Given the large number of sites that stated during the telephone survey that they did not have screw based CFLs (829) and the relatively high error (48%) in these responses, more sites were found to have CFLs during the on-site (813 of the 1,391 sites that completed the CFL phone survey questions and the on-site) than self-reported having this technology during the telephone survey (558 sites).

Table 8-31: Comparison of Screw-in Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys

Screw-In CFLs Present?	OS – Yes Screw-In CFLs		OS – No Screw-In CFLs		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes Screw-In	417	75%	141	25%	558	100%
PS-No Screw-In	396	48%	437	52%	833	100%

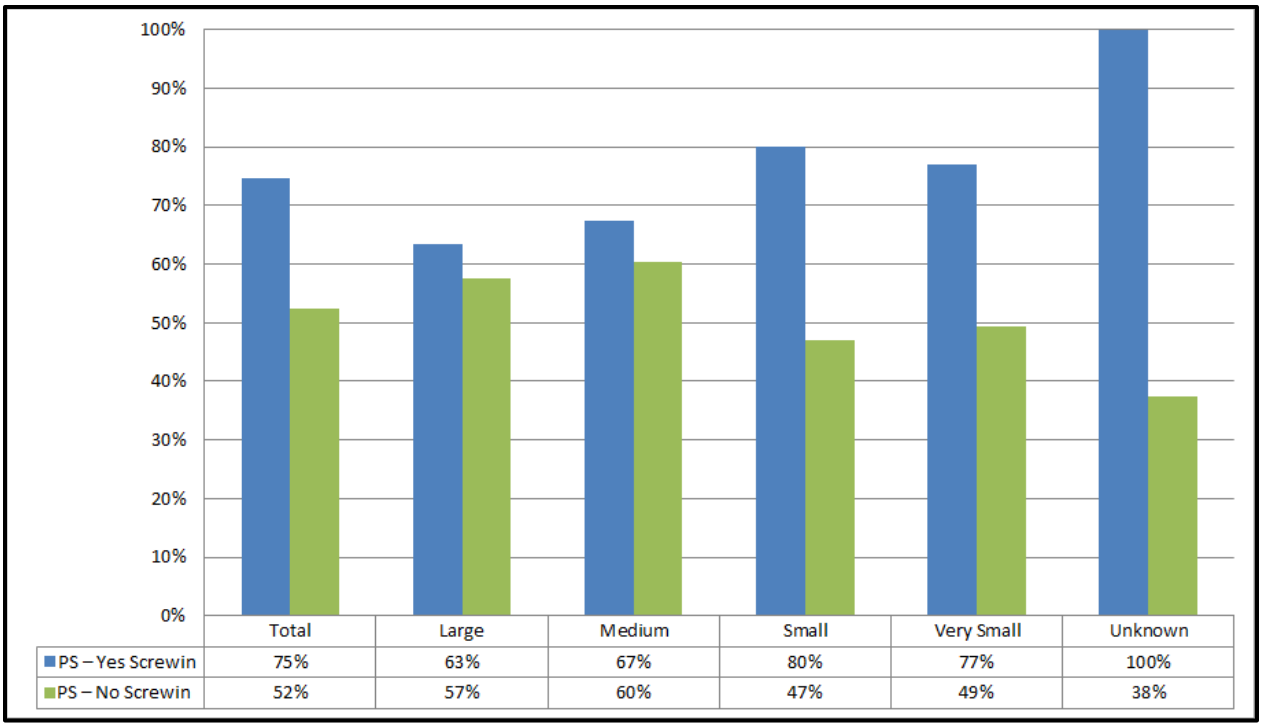
Table 8-32 presents the accuracy of phone survey responses by business size. In Table 8-32 the first two rows of data present the share of sites correctly answering the question of the type in the phone survey while the final two rows of data present the share of sites incorrectly answering the compact fluorescent type question in the phone survey. Figure 8-5 illustrates the share of sites that correctly answered the telephone survey question concerning what type of compact fluorescents is present in their facility. These data indicate that the error in sites reporting that they have screw based CFLs declines slightly as the sites become smaller. These data also indicate, however, that when businesses self-reported they did not have screw-in CFLs, they were incorrect about half the time and larger and medium sized sites are more likely to make a mistake than smaller sites, when they self-report on the telephone survey that they do not have screw-in CFLs.

Table 8-32: Comparison of Screw-In Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Screwin	Yes found	75%	63%	67%	80%	77%	100%
PS – No Screwin	No found	52%	57%	60%	47%	49%	38%
PS – Yes Screwin	No found	25%	37%	33%	20%	23%	0%
PS – No Screwin	Yes found	48%	43%	40%	53%	51%	63%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 8-5: Sites Whose Phone Survey Response to the Presence of Screw-In Compact Fluorescents was Verified as Correct during the On-site



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Screwin	75%	63%	67%	80%	77%	100%
PS – No Screwin	52%	57%	60%	47%	49%	38%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Pin Based CFL Comparison

Table 8-33 presents the comparison of the phone and on-site findings for the presence of pin-based compact fluorescents in the facility. These data indicate that 63% of the businesses that reported that they have pin-based compact fluorescents during the phone survey were found to have pin-based CFLs on-site. In addition, for 68% of the businesses that stated during the phone survey that they did not have pin-based CFLs, no pin-based CFLs were found on-site. In total, approximately 67% of the phone survey respondents who participated in the on-site survey correctly knew if they did or did not have pin-based CFLs. Given the large number of respondents that stated that they did not have pin based CFLs and the finding that approximately one-third of these responses were incorrect, nearly twice as many sites were found to have pin based CFLs (534) as self-reported having pin based CFLs on the phone survey (278).

Table 8-33: Comparison of Pin-Based Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys

Screw-In CFLs Present?	OS – Yes Pin-Based CFLs		OS – No Pin-Based CFLs		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes Pin-Based	176	63%	102	37%	278	100%
PS-No Pin- Based	358	32%	755	68%	1113	100%

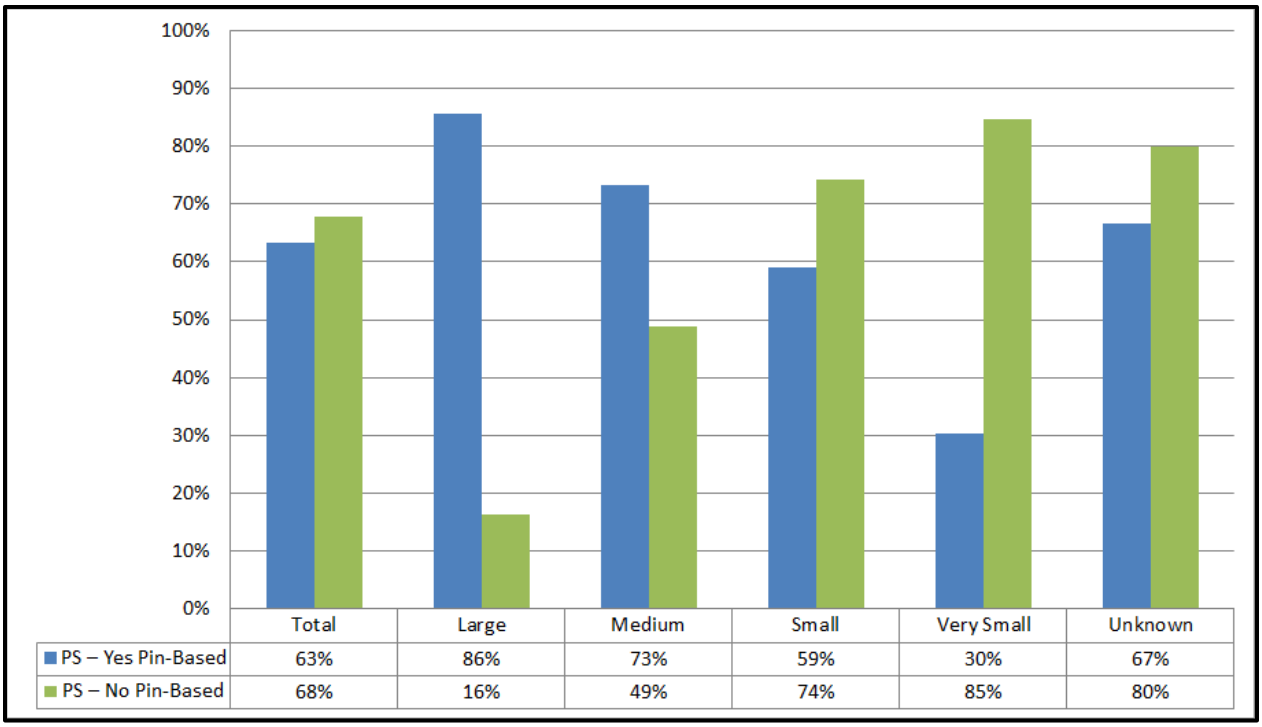
Table 8-34 presents the accuracy of phone survey responses by business size. In Table 8-34 the first two rows of data present the share of sites correctly answering the question in the phone survey while the final two rows of data present the share of sites incorrectly answering the compact fluorescent type question in the phone survey. Figure 8-6 illustrates the share of businesses that correctly answered the telephone survey question concerning what type of compact fluorescents is present in their facility. These data indicate that the error in self-reported incidence of pin based CFLs declines as the businesses become larger. These data also indicate, however, that when businesses self-reported they did not have pin-based CFLs, larger sites are more likely to make a mistake than smaller sites. When very small sites self-report that they do not have pin-based CFLs, they are correct 85% of the time but large sites are only correct 17% of the time when they state that they do not have pin-based CFLs.

Table 8-34: Comparison of Pin-Based Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Pin-Based	Yes found	63%	86%	73%	59%	30%	67%
PS – No Pin-Based	No found	68%	16%	49%	74%	85%	80%
PS – Yes Pin-Based	No found	37%	14%	27%	41%	70%	33%
PS – No Pin-Based	Yes found	32%	84%	51%	26%	15%	20%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 8-6: Sites Whose Phone Survey Response to the Presence of Pin-Based Compact Fluorescents was Verified as Correct during the On-site



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Pin-Based	63%	86%	73%	59%	30%	67%
PS – No Pin-Based	68%	16%	49%	74%	85%	80%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.5.4 Compact Fluorescent Purchases

In addition to the type of CFLs installed, businesses that purchase their own CFLs were asked how many bulbs they had purchased for their facility since January 2009. The site-weighted data collected as part of the telephone survey indicates that for businesses that purchase their own bulbs, slightly more than 60% of businesses reported purchasing more than 10 bulbs since January 2009 (see Table 8-35). The number of bulbs purchased appears to increase with the electricity consumption of the facility, with 92% of large businesses purchasing more than 10 bulbs and 48% of these businesses purchasing more than 1,000 bulbs since January 2009.

Table 8-35: For CFL Purchasers, the Number of CFLs Purchased Since January 2009 By Business Size, Site Weighted*

Number of Bulbs	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
1 to 10	37%	8%	10%	23%	46%	16%	0.000
11 to 50	41%	33%	41%	41%	40%	43%	0.999
51 to 100	8%	5%	11%	13%	5%	23%	0.000
101 to 500	4%	7%	15%	6%	1%	11%	0.000
501 to 1000	0.3%	0%	2%	1%	0%	0%	N/A
More than 1000	10%	48%	22%	16%	8%	8%	0.001
n	**1,013**	**41**	**249**	**323**	**381**	**19**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses that purchased CFLs were asked to describe the type of technology the CFL replaced. The breakdown of self-reported baseline technologies replaced by CFLs is shown in Table 8-36 and Table 8-37, reported by kWh weighting and site weighting, respectively. Both weighting methodologies support the conclusion that CFLs are largely replacing incandescent bulbs. The analysis implies that smaller businesses are more likely to respond that CFLs are replacing incandescent bulbs, but approximately 45-50% of large businesses, weighted either by sites or kWh, are estimated to be installing CFLs to replace incandescent bulbs. For larger businesses, however, CFLs replacing CFLs also appears common, approaching 50% of replacements. A better understanding of the underlying technology is crucial to understanding the energy savings attributable to CFL sales. These results may imply that a large share of CFL sales to smaller businesses continue to contribute to energy savings, while CFL sales to larger businesses have close to a 50-50 likelihood of maintaining savings, but not contributing additional energy savings.

Table 8-36: What Was Replaced When CFLs were Installed by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown
Incandescent	62%	45%	67%	71%	77%	54%
CFLs	33%	49%	25%	31%	18%	48%
Floodlight	2%	0%	2%	3%	1%	0%
HID	1%	0%	3%	1%	0.2%	0%
Fluorescent, type not specified	1%	2%	0.3%	0.2%	1%	0%
Mercury vapor	1%	0%	0%	2%	0%	0%
Nothing replaced	1%	1%	0.3%	1%	0.3%	0.3%
Other	2%	5%	1%	1%	4%	0%
Don't Know	4%	0%	9%	4%	5%	0%
n	**1,012**	**41**	**249**	**324**	**379**	**19**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-37: What Was Replaced When CFLs were Installed by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown
Incandescent	75%	54%	68%	71%	76%	75%
CFLs	22%	43%	25%	31%	19%	31%
Fluorescent, type not specified	1%	3%	1%	0%	1%	1%
Floodlight	1%	0%	1%	3%	1%	0%
Mercury vapor	1%	1%	0%	1%	1%	0%
HID	0.4%	0%	3%	1%	0.1%	0%
Nothing replaced	1%	2%	0.3%	1%	1%	9%
Other	2%	2%	1%	1%	2%	0%
Don't Know	5%	0%	8%	4%	6%	0%
n	**1,012**	**41**	**249**	**324**	**379**	**19**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.6 Incandescent Bulbs

Table 8-38 and Table 8-39 present the kWh and site weighted findings from phone survey questions asking the site contact whether they have incandescent bulbs installed. In general, large businesses report that they have incandescent bulbs, while small and very small businesses are less likely to report having incandescent bulbs installed. The combined results from the CFL and incandescent telephone survey responses show that large businesses are most likely to have CFLs, they are more likely to be replacing CFLs with CFLs, and they are more likely than smaller sites to have incandescents. These results may imply that while much of the potential energy savings from CFLs has been achieved in larger businesses, there are still remaining potential energy savings. The saturation of CFLs and incandescents by business size is explored in the CSS on-site data analysis.

Table 8-38: Incandescent Bulbs by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	54%	65%	46%	40%	39%	54%	0.000
No	44%	33%	51%	56%	60%	46%	0.000
Don't Know	2%	2%	3%	4%	2%	0%	N/A
n	**2,588**	**186**	**675**	**779**	**901**	**47**	

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-39: Incandescent Bulbs by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	39%	53%	43%	43%	36%	47%	0.060
No	59%	45%	53%	54%	62%	53%	0.196
Don't Know	2%	2%	4%	3%	2%	0%	N/A
n	**2,588**	**186**	**675**	**779**	**901**	**47**	

*** The results have been weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.7 LEDs

Table 8-40 presents the responses to the telephone survey's question asking businesses if they have heard of LED lighting. Nearly all businesses report having heard of LED lighting. When

asking businesses that have heard of LEDs to rank their familiarity with this technology, however, only 18% of site weighted businesses responded that they are very familiar with LEDs. The analysis results presented in Table 8-42 and Table 8-43 indicate that approximately 42% of sites state that they are somewhat familiar with LED lighting.

Table 8-40: Heard of LED Lighting by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	94%	98%	95%	89%	85%	93%	0.242
No	6%	2%	5%	11%	15%	7%	0.000
Don't Know	0.2%	0%	0.4%	0.1%	0.3%	0%	N/A
n	**3,320**	**230**	**1,118**	**965**	**922**	**85**	

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-41: Heard of LED Lighting by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value1
Yes	86%	98%	94%	90%	84%	91%	0.511
No	13%	2%	6%	10%	15%	9%	0.000
Don't Know	1%	0%	0%	0%	1%	0%	N/A
n	**3,320**	**230**	**1,118**	**965**	**922**	**85**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-42: Familiarity with LED Lighting Products by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Very familiar	25%	35%	23%	20%	17%	24%	0.000
Somewhat familiar	45%	44%	47%	46%	41%	18%	0.870
Somewhat unfamiliar	12%	8%	14%	12%	19%	15%	0.001
Not at all familiar	17%	13%	15%	22%	23%	43%	0.001
Refused	0%	0%	0%	0%	0%	0%	N/A
Don't Know	0.3%	0%	0.5%	0.3%	0%	0%	N/A
n	**2,555**	**64**	**732**	**869**	**810**	**80**	

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-43: Familiarity with LED Lighting Products by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Very familiar	18%	39%	22%	18%	17%	15%	0.453
Somewhat familiar	42%	39%	47%	46%	41%	40%	0.714
Somewhat unfamiliar	17%	9%	15%	12%	17%	23%	0.016
Not at all familiar	23%	14%	16%	23%	24%	22%	0.580
Refused	0%	0%	0%	0%	0%	0%	N/A
Don't Know	0.1%	0%	1%	1%	0%	0%	N/A
n	**2,555**	**64**	**732**	**869**	**810**	**80**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses that had heard of LEDs were asked if they had any LED lighting technologies installed in their business (see Table 8-44 and Table 8-45). The results from this question indicate that a higher share of large businesses have LED lighting technologies installed than medium, small, or very small businesses.

Table 8-44: For Sites Aware of LEDs, Currently Have LEDs by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	42%	67%	32%	26%	20%	9%	0.000
No	54%	33%	62%	68%	75%	89%	0.000
Refused	0%	0%	0%	0%	0%	0%	N/A
Don't Know	4%	1%	6%	6%	6%	1%	0.000
n	**2,740**	**97**	**775**	**918**	**867**	**83**	

*** The results have been weighted by kWh Consumption. Only 86% of sites had heard of LEDs.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-45: For Sites Aware of LEDs, Currently Have LEDs by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	19%	65%	29%	26%	17%	12%	0.000
No	75%	34%	65%	68%	77%	77%	0.098
Refused	0.2%	0%	0%	0%	0.3%	0%	N/A
Don't Know	6%	1%	6%	6%	5%	11%	0.032
n	**2,740**	**97**	**775**	**918**	**867**	**83**	

*** The results have been weighted by site count. Only 86% of sites had heard of LEDs.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.7.1 Comparison of LED Phone Survey to On-Site Survey

The CSS on-site survey participants were recruited from the CSS/CMST phone survey participants, leading the on-site participants to be nested within the phone survey participants. The nested nature of the on-sites enables the comparison of phone survey self-reported information with what was found during the on-site survey. Table 8-46 presents the comparison of the LED phone and on-site findings. These data indicate that only 34% of the sites that self-reported on the phone survey that they had installed LED were found to have LEDs. In contrast, 88% of the sites that stated during the phone survey that they did not have LEDs were found during the on-site collection to not have LEDs. In total, approximately 79% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have LEDs. These findings indicate that with this relatively new technology, respondents were far more likely to be correct when they believed that they did not have the technology than when

they self-reported that they had the technology. The relative novelty of the technology, combined with the many different types of lighting technology, may have led to some confusion for businesses that reported that they had installed LEDs.

Table 8-46: Comparison of LEDs Installed Between the Phone and On-site Surveys

	OS – Yes LEDs		OS – No LEDs		Totals	
LEDs Installed?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS – Yes Have	54	34%	104	66%	158	100%
PS – No LEDs	91	12%	676	88%	767	100%

8.7.2 LED Installation Timing

For businesses with LEDs installed, the site contact was asked the year the business installed LED lighting technologies. Businesses were encouraged to list multiple years if they had installed LED lighting technologies in more than one year, leading the shares presented in Table 8-47 and Table 8-48 to exceed 100%. The results from the year of installation question imply that businesses have been installing LEDs over the 2009-2012 time period, but the share of sites and kWh installing LEDs increased in 2012. The results for 2013 should be viewed as very preliminary as the study was only fielding surveys for a very short period of 2013.

Table 8-47: LED Installation Years by Business Size, kWh Weighted*

Response	**Total**	**Large**	**Medium**	**Small**	**Very Small**	**Unknown**
2013	2%	0%	3%	2%	1%	0%
2012	42%	37%	43%	53%	42%	12%
2011	31%	45%	24%	19%	21%	86%
2010	13%	3%	20%	18%	15%	0%
2009 or before	27%	35%	21%	25%	18%	3%
Refused	0.2%	0%	0%	1%	0%	0%
Don't Know	3%	1%	5%	4%	5%	0%
n	**369**	**20**	**144**	**121**	**75**	**9**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-48: LED Installation Years by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown
2013	1%	0%	4%	2%	0.5%	0%
2012	42%	37%	42%	49%	36%	51%
2011	23%	57%	21%	15%	26%	20%
2010	23%	7%	21%	20%	29%	9%
2009 or before	21%	15%	23%	25%	19%	20%
Refused	1%	0%	0%	1%	1%	0%
Don't Know	4%	2%	4%	4%	5%	0%
n	**369**	**20**	**144**	**121**	**75**	**9**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

8.7.3 LEDs, Replaced Technology, and Utility Programs

Businesses that reported having LED lighting technologies where asked to describe the type of lighting technology the LEDs had replaced. The replaced technologies are presented in Table 8-49. Installation of LED technology is most commonly associated with the replacement of incandescent lighting, though linear fluorescents are also being replaced with LED lighting.

Table 8-49: Type of Lighting Replaced by LEDs by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown
Incandescent	42%	45%	36%	39%	46%	34%
Linear Fluorescent	24%	45%	23%	19%	20%	46%
CFLs	7%	12%	8%	12%	7%	0%
HID	4%	10%	13%	6%	2%	1%
LED	1%	0%	1%	0%	2%	0%
None - Did not replace	29%	18%	24%	41%	24%	26%
Other	7%	6%	10%	6%	10%	0%
Refused	0%	0%	0%	1%	0%	0%
Don't Know	12%	29%	16%	13%	14%	0%
n	**369**	**20**	**144**	**121**	**75**	**9**

*** The results have been weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses with LED lighting technologies were asked if they had received a rebate when they purchased their lighting. The results presented in Table 8-50 and Table 8-51 indicate that most businesses that have installed LEDs have done so without knowingly receiving an incentive.

The kWh-weighted results indicate that large businesses are more likely to report receiving a rebate than medium, small, or very small businesses.

Table 8-50: Receipt of a Rebate or Financial Incentive for the Installation of the LED Equipment by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes - all of them	14%	19%	11%	8%	9%	1%	0.354
Yes - some of them	2%	1%	4%	3%	0%	0%	N/A
None of them	75%	75%	71%	81%	88%	99%	0.959
Refused	0%	0%	0%	0.2%	0%	0%	N/A
Don't Know	8%	5%	15%	7%	3%	0%	N/A
n	**416**	**21**	**161**	**141**	**81**	**12**	

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 8-51: Receipt of a Rebate or Financial Incentive for the Installation of the LED Equipment by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes - all of them	5%	9%	13%	6%	4%	2%	0.455
Yes - some of them	1%	1%	4%	2%	0%	3%	N/A
None of them	88%	82%	70%	82%	93%	95%	0.769
Refused	0.1%	0%	0%	0%	0%	0%	N/A
Don't Know	5%	9%	13%	9%	3%	0%	N/A
n	**416**	**21**	**161**	**141**	**81**	**12**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses with LEDs installed were asked during the telephone survey why they had installed LEDs. Table 8-52 lists the responses to why businesses installed LEDs. The most common reasons were to save energy and to save money.

Table 8-52: Reason for Purchasing LED Lighting Equipment by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown
Save energy	36%	49%	44%	39%	40%	4%
Save Money	26%	53%	31%	19%	26%	36%
Improve lighting quality	21%	26%	18%	17%	22%	32%
Longer useful life, lower maintenance cost	20%	16%	24%	21%	21%	17%
Better aesthetics for the space	10%	13%	8%	7%	13%	3%
Environmental initiative/responsibility	5%	8%	2%	4%	7%	2%
Improved control over lighting	3%	0%	2%	2%	3%	7%
Available rebates/coupons	2%	0%	2%	2%	2%	0%
Other	19%	2%	24%	29%	15%	14%
Refused	0%	0%	1%	0%	0%	0%
Don't Know	6%	0%	9%	8%	2%	21%
n	**417**	**21**	**161**	**142**	**81**	**12**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less tha n or equal to 40,000 kWh.

9

Televisions

The CSS/CMST telephone survey included a battery of questions regarding the incidence of TVs within businesses. Anecdotal evidence has indicated that the share of businesses with TVs is rising and that many businesses have multiple televisions. Little quantitative information, however, is available on televisions within the nonresidential sector. The findings from the telephone survey help provide information on the incidence and number of televisions and the share of businesses recently purchasing televisions. The telephone survey also served to recruit sites that had recently purchased televisions for the CMST-TV on-site data collection effort.

9.1 Saturation of Televisions

Telephone survey respondents were asked if there are televisions present at their facility. Table 9-1 and Table 9-2 list the share of businesses with televisions for all respondents weighted by kWh consumption and site counts, respectively. Reporting by kWh weights implies that 65% of sites have TVs present, while reporting by site weight indicates that only 38% of sites have televisions. The difference in these shares is due to the fact that in Table 9-1 the large and medium sites (those with high kWh consumption) constitute a high share of the businesses who report having televisions, 73% and 68%, respectively. The high share of large and medium businesses reporting that they have televisions combined with their large share of electricity consumption increases the estimate of business kWh that have a television. Small and very small businesses make up only a small share of the kWh, but they account for a large share of the sites. The site count weighted total share of businesses with televisions, therefore, closely resembles the estimate of television saturations for the small and very small size strata.

Table 9-1: Televisions Present in the Facility by Business Size, kWh Weighted*

TVs Present?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	65%	73%	68%	53%	38%	23%	0.000
No	35%	27%	31%	47%	61%	77%	0.000
Refused	0%	0%	0%	0%	0%	0%	N/A
Don't Know	1%	0.5%	1%	1%	1%	0%	0.492
n	**7,696**	**594**	**2,117**	**2,221**	**2,605**	**159**	

*** The results have been weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 9-2: Televisions Present in the Facility by Business Size, Site Count Weighted*

TVs Present?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	38%	71%	69%	51%	33%	37%	0.000
No	60%	28%	31%	48%	66%	62%	0.000
Refused	0.1%	0%	0%	0%	0.2%	0%	N/A
Don't Know	1%	1%	1%	1%	1%	2%	0.837
n	**7,696**	**594**	**2,117**	**2,221**	**2,605**	**159**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

9.2 Comparison of Phone Survey to On-Site Survey Televisions Present

The CSS on-site survey participants were recruited from the CSS/CMST phone survey participants, enabling the comparison of self-reported information with TVs found during the on-site survey. Table 9-3 presents the comparison of the phone and on-site findings for the presence of a TV in the facility. These data indicate that 84% of the businesses that reported that they had a TV during the phone survey were found to have a TV on-site. In addition, for 73% of the

[1] The Chi Squared p-value is a statistical test used to determine if categorical data are random or if they follow a pattern. If the p-value is less than 0.05 then the hypothesis that the data in the row are randomly distributed can be rejected. Therefore there is evidence supporting that there are statistically significant differences in these data across row. For example, in Table 9-1the Chi Squared finding is supportive of the statement that larger sites are more likely to state that they have a TV than very small sites. If the Chi Squared p-value is N/A there were insufficient sites in the row to compute the test statistic.

businesses that stated during the phone survey that they did not have a TV, no TV was found on-site. In total, approximately 80% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have a TV and sites were slightly more likely to know if they had a TV than if they did not have a TV.[2]

Table 9-3: Comparison of Televisions Present in the Facility Between the Phone and On-site Surveys

	OS – Yes TV		OS – No TV		Totals	
TVs Present?	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS – Yes Have TV	695	84%	136	16%	831	100%
PS – No TV	147	27%	400	73%	547	100%
PS – DK TV	6	46%	7	54%	13	100%

Table 9-4 presents the accuracy of phone survey responses by business size. In Table 9-4 the first two rows of data present the share of customers correctly answering the question in the phone survey while the final two rows of data present the share of businesses incorrectly answering the TV question in the phone survey. Figure 9-1 illustrates the share of sites that correctly answered the telephone survey question concerning the presence of a TV in their facility.

Table 9-4: Comparison of Television Present in Facility Between the Phone and On-site Surveys by Business Size*

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes TV	TV found	84%	92%	85%	84%	77%	80%
PS – No TV	No TV found	73%	45%	54%	69%	87%	88%
PS – Yes TV	No TV found	16%	8%	15%	16%	23%	20%
PS – No TV	TV found	27%	55%	46%	31%	13%	13%

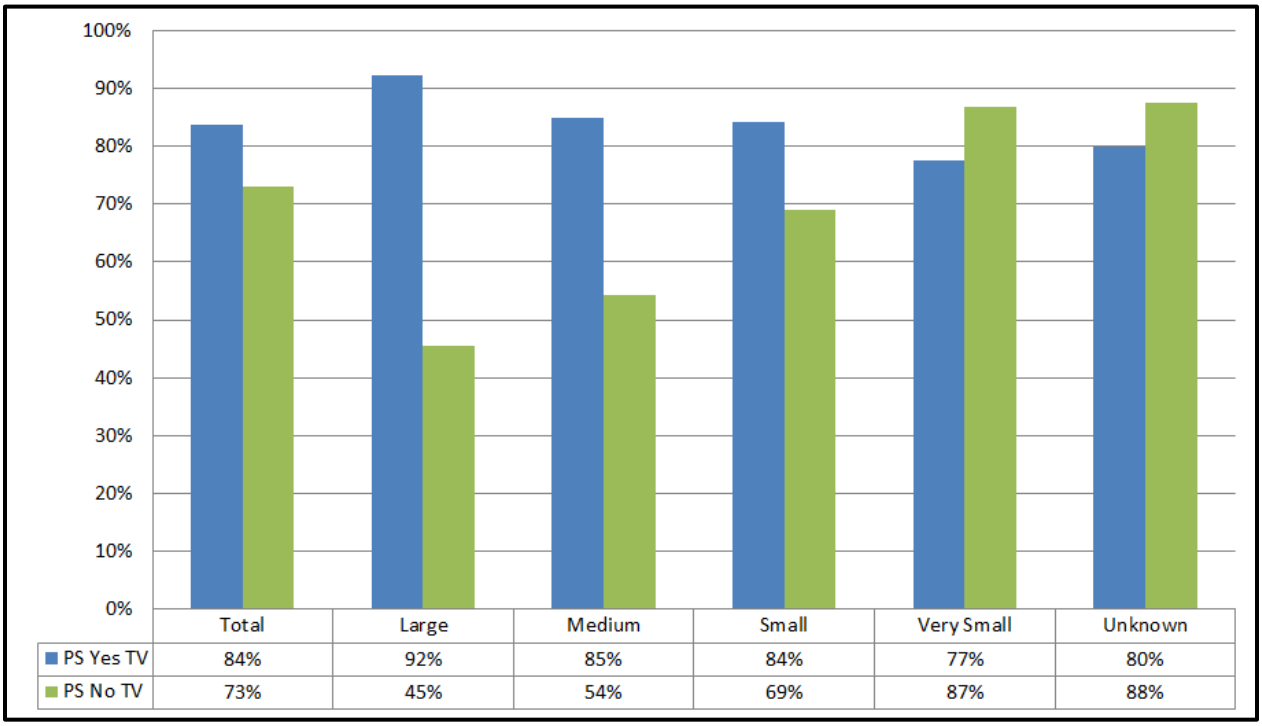
* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

These data indicate that the error in sites' self-reported response affirming that they have a TV is slightly smaller for large businesses than for smaller businesses. These data also indicate, however, that larger businesses are more likely to make a mistake than smaller businesses, when they self-report on the telephone survey that they do not have a TV. When very small businesses self-report that they do not have a TV they are correct 87% of the time but large businesses are only correct 45% of the time when they state that they do not have a TV. Of the telephone

[2] The higher share of error for sites that stated that they did not have a TV may in part be explained by TV purchases between the time of the phone survey and the on-site survey.

survey sites included in the on-site data collection effort, 831 businesses originally stated that they had TVs at their facility while TVs were found at 842 businesses.

Figure 9-1: Sites Whose Phone Survey Response to the Presence of a TV was Verified as Correct during the On-site*



	Total	Large	Medium	Small	Very Small	Unknown
PS Yes TV	84%	92%	85%	84%	77%	80%
PS No TV	73%	45%	54%	69%	87%	88%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

9.3 Number of Televisions

If a business responded that they had at least one television, they were asked to list the number of televisions at the facility. Table 9-5 and Table 9-6 list the number of televisions present at facilities with televisions, weighted by kWh and site counts, respectively. Not surprisingly, small and very small facilities were more likely to report having installed 1 to 5 televisions, while medium and large businesses were more likely than small and very small to report having over 5. The estimate of the share of kWh which reported having over five televisions onsite is just under 50%, while the implied share of sites is less than 20%.

Table 9-5: Number of Televisions by Business Size, kWh Weighted*

Number of TVs	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
1 to 5	52%	42%	52%	73%	85%	98%	0.000
6 to 20	21%	23%	22%	15%	10%	1%	0.000
21 to 50	8%	8%	9%	6%	2%	0.3%	0.057
51 to 100	5%	5%	6%	3%	1%	0%	N/A
101 to 200	5%	7%	6%	1%	1%	1%	0.000
201 to 500	5%	8%	2%	0.4%	0%	0.2%	0.000
501 to 1000	1%	2%	0.2%	0%	0%	0%	N/A
More than 1000	4%	5%	3%	1%	1%	0%	N/A
n	**3,984**	**447**	**1,446**	**1,150**	**869**	**72**	

*** The results have been weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 9-6: Number of Televisions by Business Size, Site Count Weighted*

Number of TVs	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
1 to 5	80%	41%	54%	77%	86%	72%	0.000
6 to 20	12%	23%	22%	14%	9%	15%	0.000
21 to 50	4%	10%	9%	5%	2%	11%	0.000
51 to 100	1%	5%	6%	2%	0.4%	0.3%	0.000
101 to 200	1%	7%	5%	1%	0.3%	1%	0.000
201 to 500	0.3%	7%	1%	0.4%	0%	0.4%	0.000
501 to 1000	0%	1%	0.2%	0%	0%	0%	N/A
More than 1000	2%	6%	2%	2%	2%	1%	0.328
n	**3,984**	**447**	**1,446**	**1,150**	**869**	**72**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

9.4 Recent Television Purchases

As part of the CMST, the telephone survey asked businesses with televisions if they had purchased a television since January 2009. Table 9-7 and Table 9-8 list the baseline data on recent purchases weighted by kWh and sites, respectively. Responses to the telephone survey imply that for businesses with televisions, over 50% of the large and medium businesses self-reported that they installed TVs since January 2009, while fewer than 50% of small and very

small businesses with televisions reported making a new purchase. The share of sites purchasing new televisions is also analyzed in the CMST report.

Table 9-7: Business Purchased a Television since January 2009 by Business Size, kWh Weighted*

TV Purchased?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	58%	66%	52%	47%	38%	59%	0.000
No	38%	29%	44%	51%	61%	41%	0.000
Don't Know	5%	6%	4%	2%	1%	0%	N/A
n	**3,984**	**447**	**1,446**	**1,150**	**869**	**72**	

*** The results have been weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 9-8: Business Purchased a Television since January 2009 By Business Size, Site Weighted*

TV Purchased?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	40%	59%	51%	46%	34%	61%	0.000
No	58%	35%	45%	52%	64%	37%	0.000
Don't Know	2%	6%	4%	2%	1%	2%	0.022
n	**3,984**	**447**	**1,446**	**1,150**	**869**	**72**	

*** The results have been weighted by Site Counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

9.5 Comparison of Phone Survey to On-Site Survey New Televisions Purchased

As described above, the nested nature of the on-sites within the telephone survey population enables the comparison of phone survey self-reported information with what was found during the on-site survey. In this sub-section we compare the findings from the self-reported telephone survey responses of recent purchases of TVs to the on-site findings (see Table 9-9). These data indicate that 81% of the businesses that reported during the telephone survey that they had recently purchased a TV were found to have a new TV on-site. In addition, for 88% of the businesses that stated during the phone survey that they did not have a new TV, no new TV was found on-site. In total, approximately 86% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have a new TV.

Table 9-9: Comparison of Television Recent Purchases for the Phone and On-site Surveys

TV Recent Purchase?	OS – Yes TV Purchase		OS – No TV Purchase		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS – Yes Purchase TV	290	81%	69	19%	359	100%
PS – No Purchase	117	12%	880	88%	997	100%
PS – Don't Know	6	17%	29	83%	35	100%

9.6 Number of New TVs Purchased

Businesses that reported purchasing a new TV since 2009 were asked to list the number of televisions they had purchased. Table 9-10 and Table 9-11 present information on the number of televisions recently purchased weighted by kWh and sites, respectively. Given the self-report data, over 80% of small and over 90% of very small businesses are estimated to have purchased between one to five new televisions. Large and medium sized businesses were more likely than small and very small businesses to purchase over five televisions, with 19% of large businesses and 18% of medium businesses reporting purchasing between 6 and 20. Approximately 15% of businesses reported purchasing over five televisions, while about 54% of kWh shares reported purchasing one to five. These data imply that businesses with larger energy consumption are more likely to purchase larger numbers of televisions. These findings will be further analyzed in the CMST report.

Table 9-10: Number of Televisions Purchased since January 2009 by Business Size, kWh Weighted*

Number of TVs	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
1 to 5	54%	43%	62%	80%	90%	98%	0.000
6 to 20	20%	22%	20%	14%	9%	2%	0.052
21 to 50	9%	12%	6%	4%	0.3%	0.2%	0.000
51 to 100	3%	3%	4%	2%	0%	0%	N/A
101 to 200	4%	4%	4%	1%	0.2%	0%	N/A
201 to 500	5%	8%	2%	0%	0%	0%	N/A
501 to 1000	1%	1%	0.3%	0%	0%	0%	N/A
More than 1000	5%	7%	3%	1%	0.4%	0%	N/A
n	**1,866**	**271**	**734**	**518**	**305**	**38**	

*** The results have been weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 9-11: Number of Televisions Purchased since January 2009 by Business Size, Site Weighted*

Number of TVs	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[11]
1 to 5	85%	49%	64%	83%	92%	78%	0.002
6 to 20	11%	21%	18%	12%	8%	15%	0.000
21 to 50	2%	9%	6%	3%	0.3%	6%	0.000
51 to 100	1%	5%	4%	1%	0%	0%	N/A
101 to 200	1%	4%	3%	0.5%	0.1%	0%	N/A
201 to 500	0.2%	6%	1%	0%	0%	0%	N/A
501 to 1000	0%	1%	0.2%	0%	0%	0%	N/A
More than 1000	1%	6%	2%	1%	0.2%	0%	N/A
n	**1,866**	**271**	**734**	**518**	**305**	**38**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

10

Cooling Equipment

Cooling equipment represents one of the largest uses of electricity in the commercial sector. In addition, cooling equipment is a large contributor to peak demand. For these reasons, the California Strategic Plan designates HVAC and cooling equipment as a high priority measure to attempt to reduce demand and consumption. The survey collected self-report baseline information on the cooling equipment in approximately 8,000 businesses in California. The survey also determines the share of businesses that have purchased small packaged HVAC equipment since January 2009. The recent purchaser's information provides information on the types of HVAC equipment currently being purchased by businesses. Recent purchasers of small packaged HVAC equipment are also recruited for on-site data collection to better understand the efficiency level of recent purchases.

10.1 Type and Condition of Cooling Equipment

As part of the telephone survey, businesses were asked to describe their current cooling equipment. Table 10-1 and Table 10-2 list the types of cooling equipment from the telephone survey by kWh and site weight, respectively, while Table 10-3 and Table 10-4 provide the information by IOU. The results presented in Table 10-1 and Table 10-2 indicate that packaged rooftop systems are most common across all business sizes. The self-reported results imply that approximately 58% of kWh weighted businesses have packaged rooftop systems while only 37% of the businesses have packaged units. Using site weights, the study estimates that approximately 25% of businesses self-report having no air conditioner, with the largest percentage being in very small businesses. The high share of facilities without air conditioning could imply that there is significant potential for an increase in the air conditioning load if these sites add air conditioning.

The results presented in Table 10-3 and Table 10-4 indicate that the share of kWh and sites in PG&E businesses are less likely to have air conditioners than businesses in SCE and SDG&E.

Table 10-1: Types of Cooling Equipment By Business Size, kWh Weighted*

Cooling Equipment	Total	Large	Medium	Small	Very Small	Unknown
Packaged systems (one component-rooftop units)	58%	60%	61%	53%	39%	50%
Water Chiller (Central Plant)	19%	35%	9%	1%	1%	0%
Split system (two components/compressor separate from supply air fan)	15%	18%	15%	13%	9%	4%
Individual A/C/Heat Pump	9%	7%	11%	10%	11%	19%
No A/C	6%	2%	5%	12%	23%	11%
Window/Wall Units	5%	4%	6%	4%	6%	17%
Evaporative coolers (swamp coolers)	4%	4%	5%	5%	5%	0%
Package Terminal A/C (e.g. Hotel/Motel	3%	4%	2%	1%	1%	0.1%
Fans	2%	1%	2%	2%	4%	0%
Other	4%	4%	4%	2%	3%	5%
Refused	0%	0%	0%	0%	0%	0%
Don't Know	5%	3%	5%	7%	6%	4%
n	**7,040**	**399**	**1,708**	**2,169**	**2,605**	**159**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-2: Types of Cooling Equipment By Business Size, Site Weighted*

Cooling Equipment	Total	Large	Medium	Small	Very Small	Unknown
Packaged systems (one component-rooftop units)	37%	58%	62%	51%	32%	43%
No A/C	25%	3%	5%	14%	29%	27%
Individual A/C/Heat Pump Units	9%	8%	11%	10%	9%	9%
Split system (two components/compressor separate from supply air fan)	9%	17%	14%	12%	7%	8%
Window/Wall Units	8%	4%	6%	4%	9%	9%
Evaporative coolers (swamp coolers)	4%	5%	5%	5%	5%	2%
Fans	4%	3%	2%	3%	5%	2%
Water Chiller (Central Plant)	1%	25%	7%	1%	1%	2%
Package Terminal A/C (e.g. Hotel/Motel units)	1%	4%	2%	1%	1%	0%
Other	2%	6%	3%	2%	2%	3%
Refused	0%	0%	0%	0%	0%	0%
Don't Know	6%	5%	5%	7%	6%	3%
n	**7,040**	**399**	**1,708**	**2,169**	**2,605**	**159**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 10-1: Types of Cooling Equipment, kWh Weighted and Site Weighted Comparison

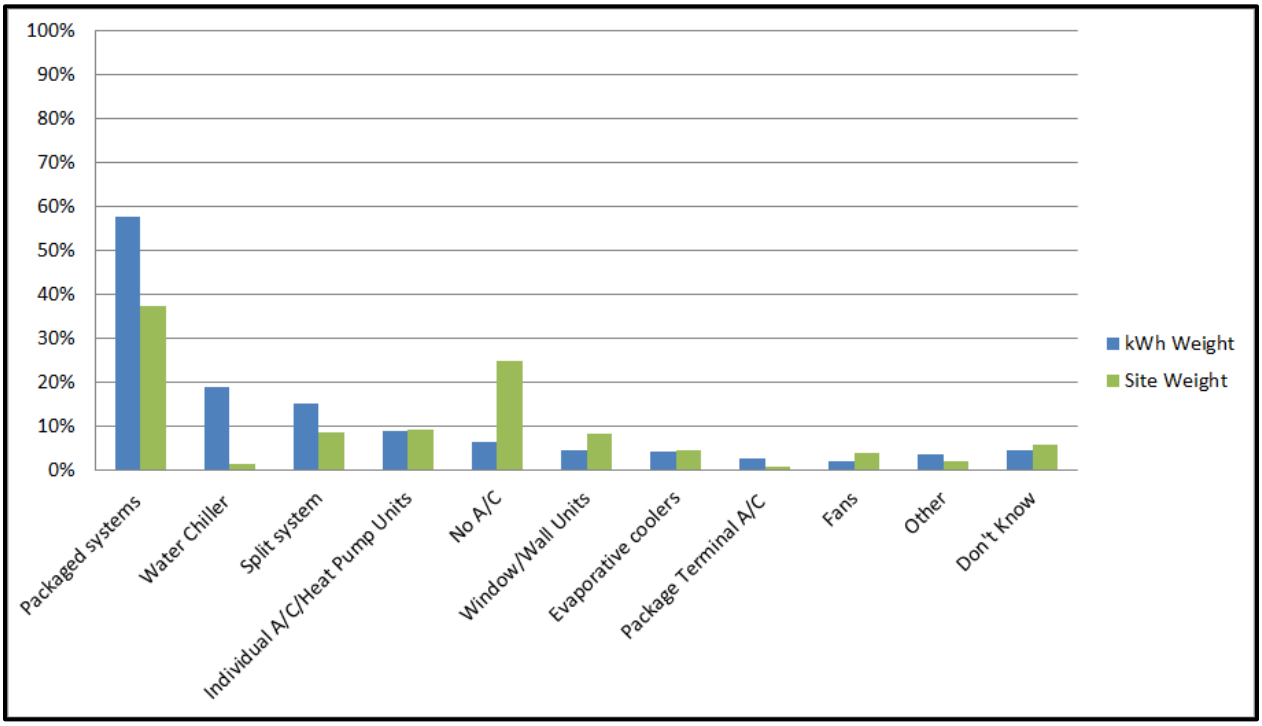


Table 10-3: Types of Cooling Equipment by IOU, kWh Weighted*

Cooling Equipment	Total	PG&E	SCE	SDG&E
Packaged systems (one component-rooftop units)	58%	52%	65%	48%
Water Chiller (Central Plant)	19%	19%	17%	24%
Split system (two components/compressor separate from supply air fan)	15%	17%	15%	13%
Individual A/C/Heat Pump Units (Unitary Equip/Central A/C multiple units/single unit for small business)	9%	7%	10%	15%
No A/C	6%	9%	4%	5%
Window/Wall Units	5%	4%	6%	4%
Evaporative coolers (swamp coolers)	4%	4%	5%	3%
Package Terminal A/C (e.g. Hotel/Motel units)	3%	4%	2%	1%
Fans	2%	2%	2%	2%
Other	4%	4%	2%	8%
Refused	0%	0%	0%	0%
Don't Know	5%	3%	6%	6%
n	**7,040**	**2,497**	**3,214**	**1,329**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-4: Types of Cooling Equipment by IOU, Site Weighted*

Cooling Equipment	Total	PG&E	SCE	SDG&E
Packaged systems (one component-rooftop units)	37%	34%	40%	39%
No A/C	25%	30%	22%	16%
Individual A/C/Heat Pump Units (Unitary Equip/Central A/C multiple units/single unit for small business)	9%	9%	9%	13%
Split system (two components/compressor separate from supply air fan)	9%	9%	8%	10%
Window/Wall Units	8%	7%	9%	10%
Evaporative coolers (swamp coolers)	4%	5%	5%	2%
Fans	4%	4%	4%	5%
Water Chiller (Central Plant)	1%	2%	1%	2%
Package Terminal A/C (e.g. Hotel/Motel units)	1%	1%	1%	1%
Other	2%	3%	2%	3%
Refused	0%	0%	0%	0%
Don't Know	6%	5%	6%	8%
n	**7,040**	**2,497**	**3,214**	**1,329**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Approximately 70% of businesses report that their air conditioners are in good condition, the highest possible level of condition on a poor, fair, good scale. Table 10-5 presents information on the age of cooling equipment by business electricity consumption counts. Using self-reported data from the telephone survey and site based weights, the cooling equipment is less than 5 years old in approximately 26% of small and very small businesses, while only 15% of large businesses have newer cooling equipment. The self-reported data imply that 32% of larger businesses have cooling equipment that is 10-20 years old.

Table 10-5: Age of the Cooling Equipment by Business Size, Site weighted*

Cooling Equipment Age	Total	Large	Medium	Small	Very Small	Unknown
Less than 5 years old	26%	15%	19%	26%	26%	27%
Between 5 and 10 years old	30%	35%	37%	32%	30%	23%
Between 10 and 20 years	24%	32%	28%	27%	22%	26%
More than 20 years old	8%	10%	10%	7%	9%	11%
Refused	0.3%	0.3%	0%	0.1%	0.4%	0%
Don't Know	11%	8%	6%	7%	13%	13%
n	**5,875**	**390**	**1,611**	**1,859**	**1,888**	**127**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

10.2 Comparison of Phone Survey to On-Site Survey Cooling Present

The CSS on-site survey participants were recruited from the CSS/CMST phone survey participants, thus the on-site participants are nested within the phone survey participants. The nested nature of the on-sites enables the comparison of phone survey self-reported information with what was found during the on-site survey. Table 10-6 presents the comparison of the phone and on-site findings for the presence of any cooling equipment in the facility. These data indicate that 91% of the businesses that reported that they had cooling equipment during the phone survey were found to have cooling on-site. Customers were less likely to be correct if they stated that they used no equipment to cool their facility. Only 40% of the businesses that stated during the phone survey that they did not have cooling were found to actually have no equipment during the on-site. In total, approximately 83% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have cooling equipment.

The errors for customers that stated that they did not have cooling equipment and then were found to have equipment on-site may be explained, in part, by new purchases between the time of the phone survey and the on-site survey. Another potential source of disparity is the wording of the phone survey question, which directly asks what kind of equipment is *used to cool the facility*, rather than simply asking if cooling equipment is present. If a site has cooling equipment, but does not use the equipment to cool their facility, they may have replied that they did not have equipment, leading to a disproportionate error for businesses that stated that they did not use equipment to cool their facility. In a temperate climate like some areas of California, where cooling may not be crucial, it is very important to carefully word questions concerning the presence of cooling equipment.

Table 10-6: Comparison of Cooling Present in the Facility Between the Phone and On-site Surveys

	OS – Cooling Found		OS – No Cooling Found		Totals	
Cooling Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS – Yes, Cooling	980	91%	102	9%	1082	100%
PS – No Cooling	112	60%	76	40%	188	100%

10.3 Recent Cooling Purchases

Telephone survey respondents were questioned to determine if they had replaced their cooling equipment as part of a recent remodel or as part of a retrofit. As seen in Table 10-7 and Table 10-8 for businesses reporting a recent remodel, approximately 49% of the kWh indicated they had replaced their cooling equipment during the remodel, while only 33% of sites indicated that they had replaced HVAC equipment during their remodel. The Chi Squared p-value test statistic is consistent with the observation that larger businesses are more likely to self-reported replacing their HVAC during a remodel than very small sized businesses (54% versus 26%) if the information is kWh weighted. Using site weights, however, the Chi Squared p-value test statistic cannot reject the conclusion that the likelihood of HVAC replacement during a remodel is randomly distributed by business size. The combination of these two differing test statistics shows the importance of looking at the data both by kWh and site counts. The information presented in Table 10-10 and Table 10-9 implies that 35% of the kWh with cooling equipment report buying new cooling equipment since January 2009, while only 19% of the sites did. This is likely because a larger share of large and medium businesses replaced their cooling equipment than small and very small businesses.

Table 10-7: Installation of New Cooling Equipment for Firms Remodeling, by Business Size, kWh Weighted*

New Cooling Equipment?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes, Installed New	48%	54%	47%	33%	26%	29%	0.000
No	50%	45%	50%	65%	71%	71%	0.003
Don't Know	2%	1%	3%	3%	3%	0%	N/A
n	**1,429**	**167**	**489**	**375**	**364**	**34**	

*** The results have been weighted by kWh Consumption** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-8: Installation of New Cooling Equipment for Firms Remodeling, by Business Size, Site Weighted*

New Cooling Equipment?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes Installed new	30%	45%	47%	33%	27%	31%	0.029
No	66%	54%	49%	64%	68%	69%	0.455
Don't Know	3%	1%	3%	3%	4%	0%	N/A
n	**1,429**	**167**	**489**	**375**	**364**	**34**	

*** The results have been weighted by site count** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

[1] The Chi Squared p-value is a statistical test used to determine if categorical data are random or if they follow a pattern. If the p-value is less than 0.05 then the hypothesis that the data in the row are randomly distributed can be rejected. Therefore there is evidence supporting that there are statistically significant differences in these data across row. For example, the Chi Squared p-value in Table 10-7 is supportive of the conclusion that a higher share of large sites replace HVAC equipment during remodels than very small sites. An N/A in the p-value column indicates that there were insufficient sites in the row to develop the Chi Squared test statistic.

Table 10-9: Installation of New Cooling Equipment for Firms Not Remodeling, by Business Size, kWh Weighted*

New Cooling Equipment?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes Installed new	36%	45%	33%	26%	18%	1%	0.000
No	60%	51%	64%	71%	80%	98%	0.000
Refused	0%	0%	0%	0.1%	0%	0%	N/A
Don't Know	4%	5%	3%	2%	2%	0.3%	0.003
n	**5,183**	**448**	**1,582**	**1,536**	**1,524**	**93**	

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-10: Installation of New Cooling Equipment for Firms Not Remodeling, by Business Size, Site Weighted*

New Cooling Equipment?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes Installed new	19%	35%	32%	23%	17%	21%	0.000
No	78%	59%	64%	74%	80%	78%	0.027
Refused	0.2%	0%	0%	0%	0.2%	0%	N/A
Don't Know	3%	6%	4%	2%	3%	1%	0.287
n	**5,183**	**448**	**1,582**	**1,536**	**1,524**	**93**	

*** The results have been weighted by Site Count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses that self-reported replacing their cooling equipment were asked to describe the new cooling equipment. Businesses were allowed to report more than one type of equipment. Table 10-11 and Table 10-12 list the newly installed cooling equipment by kWh and site weight, respectively. Given that businesses were encouraged to list all of the equipment installed, the columns in these tables sum to more than 100%. The most common piece of equipment installed was packaged air conditioning systems at 39% of the kWh installing new equipment and 34% of the sites. For the kWh weighted analysis, the second and third most common measures were split systems and programmable thermostats followed by energy management systems. For the site count weighted analysis, the second and third most common measures were programmable thermostats and split systems, but the forth was window wall units. Energy management systems are largely installed in large and medium sized businesses, which explains their importance in the kWh analysis, while window/wall units are more commonly installed in very small businesses.

Table 10-11: Types of New Cooling Equipment Installed by Electricity Consumption, kWh Weighted*

Cooling Equipment Installed	Total	Large	Medium	Small	Very Small	Unknown
Packaged air conditioning systems-1 component	39%	40%	40%	35%	30%	48%
Split system air conditioners-2 components	18%	20%	17%	15%	14%	0.5%
HVAC Controls-Set-Back Programmable	16%	14%	18%	20%	22%	7%
Energy Management System	9%	12%	8%	2%	0%	0.3%
Window/Wall Air-Conditioning Units	9%	10%	5%	7%	13%	38%
Individual A/C Heat Pump Units	8%	7%	11%	11%	9%	0.5%
Water Chiller(s)	7%	11%	3%	0.4%	1%	0%
Adjustable Speed Drives	5%	7%	3%	0.4%	1%	0%
Cooling Tower	4%	6%	1%	1%	0%	0%
Air handler	2%	3%	1%	1%	0%	0%
Compressors	2%	1%	3%	3%	4%	0.3%
Package Terminal A/C (Hotel/Motel units)	2%	1%	3%	3%	3%	0%
Part replacements: belts, fans, filters, pumps, etc	1%	1%	2%	1%	0%	0%
Evaporative (swamp) coolers	1%	0%	2%	4%	5%	0%
Remote Condensing Unit	1%	0%	2%	2%	1%	0%
Evaporative Condenser	0.5%	0.3%	1%	1%	1%	0%
Non-Programmable Thermostat	0.4%	0.2%	1%	1%	2%	0%
Thermal Energy Storage (Ice/Chilled Water Storage) System	0.2%	0%	1%	0.1%	0.3%	0.3%
Other	7%	8%	6%	5%	6%	6%
Refused	0.3%	0.2%	0.3%	1%	0%	0%
Don't Know	8%	6%	8%	10%	16%	0.2%
n	**1,829**	**242**	**735**	**483**	**337**	**32**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-12: Types of New Cooling Equipment Installed by Business Size, Site Weighted*

Cooling Equipment Installed	Total	Large	Medium	Small	Very Small	Unknown
Packaged air conditioning systems-1 component	32%	46%	40%	36%	28%	39%
HVAC Controls-Set-Back Programmable	20%	16%	18%	23%	19%	17%
Split system air conditioners-2 components	13%	16%	16%	14%	13%	3%
Window/Wall Air-Conditioning Units	13%	7%	6%	7%	17%	19%
Individual A/C Heat Pump Units unit.	8%	9%	12%	11%	8%	1%
Evaporative (swamp) coolers	5%	0.3%	2%	4%	6%	0%
Compressors	3%	3%	2%	3%	3%	2%
Package Terminal A/C (Hotel/Motel units)	2%	1%	3%	3%	2%	0%
Energy Management System	2%	13%	8%	2%	0.2%	8%
Water Chiller(s)	2%	10%	3%	1%	2%	5%
Non-Programmable Thermostat	1%	0.2%	1%	1%	2%	0%
Adjustable Speed Drives	1%	5%	2%	0.1%	2%	0%
Remote Condensing Unit	1%	0.4%	2%	1%	1%	2%
Evaporative Condenser	1%	0.4%	1%	1%	1%	0%
Thermal Energy Storage (Ice/Chilled Water Storage)	1%	0%	0.4%	0%	1%	0.3%
Air handler	0.4%	2%	1%	1%	0%	1%
Part replacements	0.4%	1%	2%	1%	0%	0%
Cooling Tower	0.2%	4%	1%	0.3%	0%	0%
Other	5%	5%	6%	4%	5%	7%
Refused	0.1%	0.3%	0.3%	0.3%	0%	0%
Don't Know	13%	7%	9%	11%	15%	10%
n	**1,829**	**242**	**735**	**483**	**337**	**32**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Information on the equipment replaced when new HVAC measures were installed is listed in Table 10-13 and Table 10-14. For both the kWh and the site weighted analyses, the two most frequently replaced measures are older packaged AC systems and no measure, meaning the new measure represents an addition rather than a replacement. Given that Table 10-11 lists programmable thermostats and energy management systems as two of the four most frequently installed measures, finding that the measure is a newly added measure does not imply that the new measure added load. For sites reporting that their new HVAC measure did not replace an existing measure, four out of the five most frequently installed measures represented new air conditioning systems. Therefore, the majority of sites reporting that they are installing new

HVAC measures, but not replacing measures appear to be installing measures that are adding new electric loads to the grid.

Table 10-13: Types of Cooling Equipment Removed and Replaced by the New Equipment by Business Size, kWh Weighted*

Cooling Equipment Removed	Total	Large	Medium	Small	Very Small	Unknown
Packaged AC System (one component)	30%	32%	31%	27%	13%	46%
Nothing was replaced, Equip was added on	27%	28%	25%	23%	30%	40%
Split system air conditioner (two components)	8%	8%	9%	10%	10%	0.5%
Standard (Non-Programmable) Thermostat	8%	7%	8%	11%	8%	6%
Window/Wall Air-Conditioning Units	8%	9%	4%	5%	8%	0.3%
Water Chiller(s)	5%	7%	4%	0.2%	1%	0%
Individual A/C or Heat Pump units	4%	2%	6%	8%	6%	0.5%
HVAC Controls-Set-Back Programmable Thermostat	3%	3%	4%	4%	5%	0.4%
Cooling Tower	2%	2%	1%	0%	0.2%	0%
Adjustable Speed Drives	1%	2%	1%	0%	1%	0%
Compressors	1%	1%	2%	1%	1%	0.3%
Package Terminal A/C (Hotel/Motel)	1%	0.1%	3%	2%	4%	0%
Evaporative Coolers	1%	0%	2%	3%	4%	0%
Energy Management System	1%	1%	0.1%	0%	0%	0%
Air handler	1%	1%	0.4%	0.2%	0%	0%
Remote Condensing Unit	1%	0.3%	1%	1%	0%	0%
Other	5%	3%	9%	9%	5%	6%
Refused	1%	1%	2%	3%	1%	0%
Don't Know	12%	14%	8%	7%	14%	0%
n	**1,672**	**218**	**672**	**445**	**307**	**30**

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-14: Types of Cooling Equipment Removed and Replaced by the New Equipment by Business Size, Site Weighted*

Cooling Equipment Removed	Total	Large	Medium	Small	Very Small	Unknown
Nothing was replaced, Equipment was added on	26%	32%	24%	22%	27%	32%
Packaged AC System (one component)	20%	36%	31%	27%	15%	26%
Split system air conditioner (two components)	9%	7%	9%	10%	9%	4%
Window/Wall Air-Conditioning Units	9%	5%	5%	6%	10%	13%
Standard (Non-Programmable) Thermostat	9%	6%	8%	12%	7%	11%
Individual A/C or Heat Pump units	5%	3%	6%	7%	5%	1%
Evaporative Coolers	3%	0.3%	2%	3%	4%	0%
HVAC Controls-Set-Back Programmable Thermostat	4%	5%	4%	4%	3%	2%
Package Terminal A/C (Hotel/Motel)	3%	0.3%	3%	1%	4%	0%
Water Chiller(s)	1%	5%	3%	0.3%	1%	4%
Compressors	1%	2%	2%	1%	1%	2%
Adjustable Speed Drives	1%	2%	1%	0%	1%	0%
Evaporative Condenser	0.4%	0%	1%	0.2%	0.2%	2%
Cooling Tower	0.3%	2%	1%	0%	0.4%	0%
Fan motor	0.2%	0.3%	1%	0.5%	0%	1%
Remote Condensing Unit	0.2%	1%	1%	1%	0%	0%
Other	6%	8%	7%	8%	4%	11%
Refused	1%	1%	2%	2%	1%	0%
Don't Know	12%	7%	9%	7%	15%	4%
n	**1,672**	**218**	**672**	**445**	**307**	**30**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Individuals installing new equipment were asked if the newly installed equipment was standard or high efficiency. The site weighted results from this question are listed in Table 10-15. Individuals who installed new HVAC systems largely self-reported that their new systems were high efficiency systems. During the CMST-HVAC on-site data collection effort information was gathered on the efficiency of newly installed HVAC systems. These data are presented in the CMST-HVAC section, Section 17. The on-site efficiency for newly installed HVAC small packaged systems was generally less efficient than reported during the telephone survey. The technical nature of HVAC systems can make understanding the efficiency level difficult. Additionally, new HVAC systems are more efficient than the system they are replacing due to advances in technology and standards. If a newly installed system is more efficient than the system replaced, it may be easy for the telephone survey respondent to confuse the improved system with a high efficiency system.

Table 10-15: Efficiency of New Cooling Equipment by Business Size, Site Weighted*

Standard or High Efficiency Equipment	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
High Efficiency	57%	62%	62%	63%	50%	84%	0.000
Standard Efficiency	21%	20%	19%	16%	26%	2%	0.000
Refused	0.1%	0%	0.3%	0.4%	0%	0%	0.000
Don't Know	23%	20%	21%	22%	24%	14%	0.000
n	**1,394**	**186**	**570**	**367**	**247**	**24**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses that reported replacing equipment were asked to describe the condition of the old, replaced system. Table 10-16 lists the condition of equipment removed when new HVAC equipment was installed. The results presented indicate that nearly half of the businesses report replacing equipment only when the old equipment failed and an additional 35% of businesses report that the replaced equipment was in poor condition. These findings support a conclusion that businesses are generally operating their HVAC equipment until they fail or nearly fail. Few businesses appear to be replacing their equipment to simply improve its efficiency.

Table 10-16: Condition of Removed Equipment by Business Size, Site Weighted*

Condition of Equipment when Removed	Total	Large	Medium	Small	Very Small	Unknown
Inoperable (broken)	44%	31%	43%	48%	42%	40%
In Poor	35%	39%	38%	34%	33%	57%
Fair	15%	23%	18%	12%	17%	9%
Good Condition	7%	12%	8%	9%	5%	7%
Refused	0%	0%	0.2%	0%	0%	0%
Don't Know	7%	4%	5%	6%	9%	4%
n	**1,145**	**111**	**422**	**357**	**232**	**23**

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

The phone survey also collected information on the likelihood of businesses to install new high-efficiency HVAC equipment within the next year. Very few businesses respond that they are likely to purchase new high efficiency HVAC equipment within the next year.

Table 10-17: Plan to Install High Efficiency Cooling Equipment within the Next Year by Business Size, kWh Weighted*

Plans to install High Efficient Cooling Equipment within the Next Year	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	7%	9%	8%	4%	4%	1%	0.000
No	82%	81%	79%	88%	91%	64%	0.028
Maybe	4%	4%	5%	5%	3%	27%	0.114
Refused	0%	0%	0%	0%	0%	0%	N/A
Don't Know	6%	6%	7%	3%	2%	8%	0.000
n	**6,894**	**399**	**1,701**	**2,127**	**2,511**	**156**	

*** The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-18: Plan to Install High Efficiency Cooling Equipment within the Next Year by Business Size, Site Weighted*

Plans to install High Efficient Cooling Equipment within the Next Year	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	4%	8%	7%	4%	3%	3%	0.007
No	90%	82%	80%	88%	91%	91%	0.455
Maybe	3%	5%	5%	5%	3%	5%	0.000
Refused	0%	0%	0.1%	0%	0%	0%	N/A
Don't Know	3%	5%	7%	3%	3%	2%	0.001
n	**6,894**	**399**	**1,701**	**2,127**	**2,511**	**156**	

*** The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

10.4 HVAC Controls

The current usage of HVAC controls, like energy management systems (EMS) and programmable thermostats in commercial buildings in California, was collected through the phone survey. Over 50% of kWh and sites claimed that they had programmable thermostats. An additional 19% of kWh and 3% of sites report having an EMS system. EMS systems are largely reported only in large and medium sized businesses with approximately 30% and 15% of these businesses claiming EMS systems, respectively.

Table 10-19: HVAC Controls by Business Size, kWh Weighted*

HVAC Controls Used	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes, programmable thermostat	4%	8%	7%	4%	3%	3%	0.007
Yes, EMS	90%	82%	80%	88%	91%	91%	0.455
Both	3%	5%	5%	5%	3%	5%	0.000
No	0%	0%	0.1%	0%	0%	0%	N/A
Other	3%	5%	7%	3%	3%	2%	0.001
Refused	4%	8%	7%	4%	3%	3%	0.007
Don't Know	90%	82%	80%	88%	91%	91%	0.455
n	**5,532**	**360**	**1,482**	**1,746**	**1,825**	**119**	

* **The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-20: HVAC Controls by Business Size, Site Weighted*

HVAC Controls Used	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes, programmable thermostat	58%	43%	61%	67%	54%	66%	0.000
Yes, EMS	3%	30%	13%	4%	1%	6%	0.000
Both	2%	12%	9%	4%	1%	2%	0.000
No	34%	11%	14%	22%	40%	24%	0.000
Other	0%	0%	0.1%	0%	0.1%	0%	N/A
Refused	0.2%	0%	0%	0.1%	0.2%	0%	N/A
Don't Know	3%	4%	3%	3%	3%	2%	0.892
n	**5,532**	**360**	**1,482**	**1,746**	**1,825**	**119**	

* **The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

10.5 HVAC Maintenance

The phone survey also questioned respondents on the frequency of HVAC maintenance, and whether or not their business has HVAC maintenance contractors or participates in IOU HVAC maintenance programs. Table 10-21 and Table 10-22 present the information on HVAC maintenance by kWh and site weights, respectively. Table 10-21 indicates that 62% of kWh had service performed on their system to improve performance within the last 3 months, implying

that service is performed quarterly for these businesses. Only 25% of very small businesses reported that service was performed within the last three months, helping to explain the analysis finding that only 31% of sites had HVAC maintenance within the last 3 months.

Table 10-21: Timing of Last Service Performed on the HVAC System to Improve System Performance by Business Size, kWh Weighted*

Last Maintenance Performed	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Within last 3 Months	62%	71%	64%	48%	25%	35%	0.000
Between 3 and 6 Months	14%	13%	13%	16%	14%	6%	0.275
Between 6 to 9 Months	4%	3%	5%	4%	5%	7%	0.284
Between 9 Months to 1 Year	5%	3%	5%	8%	13%	7%	0.000
Over a year ago	4%	1%	4%	8%	15%	11%	0.000
Have Cooling, No Maintenance	4%	2%	4%	7%	17%	21%	0.000
No cooling equipment	0.1%	0.1%	0.2%	0%	0.1%	0%	N/A
Landlord/building owner's responsibility	0%	0%	0%	0.1%	1%	0%	0.000
Other	0.2%	0%	0.5%	0.4%	1%	0%	N/A
Refused	0%	0%	0%	0.2%	0%	0%	N/A
Don't Know	6%	6%	4%	7%	9%	12%	0.003
n	**6,104**	**567**	**1,976**	**1,791**	**1,658**	**112**	

***** **The results have been weighted by kWh Consumption** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-22: Timing of Last Service Performed on the HVAC System to Improve System Performance by Business Size, Site Weighted*

Last Maintenance Performed	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Within last 3 Months	31%	69%	62%	44%	23%	36%	0.000
Between 3 and 6 Months	13%	13%	13%	15%	12%	15%	0.020
Between 6 to 9 Months	5%	3%	5%	4%	5%	10%	0.004
Between 9 Months to 1 Year	11%	3%	6%	9%	12%	6%	0.000
Over a year ago	13%	2%	5%	11%	14%	10%	0.000
Never	17%	3%	5%	8%	21%	14%	0.000
No cooling equipment	0%	0.2%	0.2%	0%	0%	0%	N/A
Landlord/building owner's responsibility	1%	0.1%	0%	0.1%	1%	0.4%	0.132
Other	1%	0%	0.4%	0.4%	1%	0%	N/A
Refused	0.1%	0%	0%	0.2%	0.2%	0%	N/A
Don't Know	10%	6%	5%	7%	11%	8%	0.000
n	**6,104**	**567**	**1,976**	**1,791**	**1,658**	**112**	

*** The results have been weighted by site count** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Telephone survey respondents were also asked if they participated in an on-going maintenance agreement. The results presented in Table 10-23 indicate that large and medium sized businesses are much more likely to have on-going HVAC maintenance agreements than very small businesses. For businesses with an on-going HVAC maintenance agreement, they were also questioned if their maintenance agreement was part of a utility sponsored quality maintenance program. The results presented in Table 10-24 indicate that only 8% of businesses with HVAC maintenance agreements report that their agreements are part of a utility Quality Maintenance Program.

Table 10-23: On-going Maintenance Agreement by Business Size, Site Weighted*

Maintenance Agreement	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	33%	66%	64%	46%	25%	38%	0.000
No	61%	30%	34%	51%	68%	57%	0.000
Refused	0.2%	0%	0%	0.2%	0.2%	0%	N/A
Don't Know	6%	4%	3%	3%	7%	5%	0.000
n	**6,447**	**584**	**2,012**	**1,884**	**1,843**	**124**	

***** **The results have been weighted by Site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 10-24: Maintenance Part of a Utility Quality Maintenance Program by Business Size, kWh Weighted*

Utility-Sponsored Quality Maintenance Program	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	8%	7%	10%	9%	6%	26%	0.172
No	58%	62%	53%	53%	55%	37%	0.103
Don't Know	34%	32%	37%	38%	39%	38%	0.181
n	**3,031**	**374**	**1,225**	**895**	**483**	**54**	

***** **The results have been weighted by kWh Consumption.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

11

Refrigeration

11.1 Type of Refrigeration Equipment

The telephone survey questions businesses about the presence of refrigeration equipment at the facility. The survey attempts to identify the type of refrigeration equipment at the business, recent purchases of refrigeration equipment, and if the business plans to purchase high efficiency refrigeration equipment in the near future.

Approximately 69% of businesses report that they have refrigeration equipment at their facility. If a business had refrigeration equipment, they were asked to describe the type of equipment at their facility. Table 11-1 and Table 11-2 list the types of refrigeration found at businesses with refrigeration, weighted by kWh and site count, respectively.[1] Businesses were asked to list all the types of refrigeration present at the site, and therefore the columns sum to more than 100%. Approximately 50% of customers stated that they had residential style refrigerators on-site. High-temp and low-temp walk-ins and prep areas were more commonly found at medium and large sites, but rarely at smaller sites.

[1] Note, 5% of sites responded that they have no refrigeration equipment after they had previously responded that they have equipment.

Table 11-1: Type of Refrigeration Equipment by Business Size, kWh Weighted*

Refrigeration Present?	Total	Large	Medium	Small	Very Small	Unknown
Residential Sized Refrigerator	49%	50%	49%	45%	53%	71%
Walk-ins and Preparation areas-freezer/low temp	28%	30%	34%	23%	3%	0.3%
Walk-ins and Preparation areas-cooler/med temp	27%	27%	34%	27%	4%	1%
Larger Standard Refrigerator (30 cubic ft or larger)	22%	27%	20%	19%	7%	0.2%
Mini Refrigerator (office/dorm size)	18%	15%	22%	17%	30%	29%
Multi-deck (vertical) display cases-open/reach-in multi-deck	8%	9%	8%	7%	2%	0%
Residential Sized Freezer	7%	7%	7%	8%	6%	1%
Self Contained-Vertical Case (multi shelf)	7%	7%	8%	7%	1%	1%
Multi-deck (vertical) display cases-glass door cases	7%	8%	6%	6%	2%	0%
Self Contained-coffin/horizontal case	5%	5%	6%	6%	2%	1%
Water Cooler / Chillers	4%	8%	1%	1%	0.2%	0%
Single-deck display cases-open single-deck	4%	4%	5%	3%	0.4%	0%
Commercial Sized Freezer	3%	3%	3%	5%	2%	0%
Single-Deck display cases-closed service case	3%	4%	3%	2%	1%	0%
Single-deck display cases-coffin/tub (one-side shopping)	2%	3%	2%	2%	0.1%	0.1%
Single-deck display cases-island coffin/tub (shop around)	2%	3%	2%	1%	1%	0%
Ice Machine	2%	2%	2%	1%	0.4%	0%
Soda Vending Machine	2%	2%	1%	1%	0.2%	0%
Worktop Table Refrigerator / Freezer	0.3%	0.3%	0.4%	1%	0.2%	0%
None	2%	3%	1%	1%	5%	6%
Other	5%	6%	5%	4%	2%	0.1%
Refused	0.1%	0.2%	0%	0.2%	0%	0%
Don't Know	3%	5%	2%	2%	2%	7%
n	**5,847**	**478**	**1,672**	**1,763**	**1,818**	**116**

*** The results have been weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 11-2: Type of Refrigeration Equipment by Business Size, Site Weighted*

Refrigeration Present?	Total	Large	Medium	Small	Very Small	Unknown
Residential Sized Refrigerator	50%	49%	48%	46%	51%	56%
Mini Refrigerator (office/dorm size)	31%	18%	22%	18%	35%	34%
Walk-ins and Preparation areas-cooler/med temp	10%	36%	35%	24%	3%	14%
Larger Standard Refrigerator (30 cubic ft or larger)	9%	27%	20%	19%	5%	6%
Walk-ins and Preparation areas-freezer/low temp	8%	38%	34%	18%	2%	14%
Residential Sized Freezer	6%	8%	8%	9%	5%	4%
Self Contained-Vertical Case (multi shelf)	3%	13%	8%	6%	1%	7%
Multi-deck (vertical) display cases-open/reach-in multi-deck	3%	13%	8%	6%	1%	2%
Self Contained-coffin/horizontal case	2%	9%	5%	5%	1%	4%
Multi-deck (vertical) display cases-glass door cases	2%	13%	6%	5%	1%	2%
Commercial Sized Freezer	2%	3%	3%	5%	1%	1%
Single-deck display cases-open single-deck	1%	7%	4%	3%	0.4%	1%
Single-Deck display cases-closed service case	1%	6%	3%	2%	1%	3%
Ice Machine	1%	1%	2%	1%	0.3%	2%
Single-deck display cases-coffin/tub (one-side shopping)	1%	6%	2%	2%	0.2%	1%
Single-deck display cases-island coffin/tub (shop around)	1%	5%	2%	1%	0.2%	1%
Water Cooler / Chillers	0.5%	3%	1%	1%	0.3%	0%
Soda Vending Machine	0.3%	0.5%	1%	1%	0.1%	0%
Worktop Table Refrigerator / Freezer	0.2%	1%	1%	1%	0%	0%
None	4%	1%	1%	1%	5%	1%
Other	2%	7%	5%	4%	1%	1%
Refused	0.1%	0.3%	0%	0.1%	0.1%	0%
Don't Know	2%	4%	2%	2%	2%	6%
n	**5,847**	**478**	**1,672**	**1,763**	**1,818**	**116**

*** The results have been weighted by Site.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

11.2 Refrigeration Purchases

Businesses with nonresidential refrigeration equipment were asked if they had purchased any new refrigeration equipment since January 2009. Table 11-3 lists the share of businesses purchasing new, nonresidential refrigeration equipment weighted by site counts. The Chi Squared statistic presented in the far right hand column of Table 11-3 indicates that the distribution of sites stating that they have purchased a new refrigerator are not statistically different by the size of the customer.

Table 11-3: Purchased New Refrigeration Equipment by Business Size, Site Weighted*

Refrigeration Present?	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[2]
Yes	27%	41%	29%	30%	24%	14%	0.001
No	71%	53%	67%	68%	74%	86%	0.069
Refused	0%	0.2%	0%	0%	0%	0%	N/A
Don't Know	2%	6%	4%	2%	2%	0.3%	0.029
n	**2,694**	**339**	**1,065**	**877**	**367**	**46**	

***** **The results have been weighted by site counts.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Respondents who claimed to have purchased and installed new refrigeration equipment were asked to describe the new equipment. Table 11-4 lists the types of new refrigeration equipment installed using site-based weights. Upright Refrigerator / Freezer were the most common type of equipment installed, being reported at 25% of the businesses.

[2] The Chi Squared p-value is a statistical test used to determine if categorical data are random or if they follow a pattern. If the p-value is less than 0.05 then the hypothesis that the data in the row are randomly distributed can be rejected. Therefore there is evidence supporting that there are statistically significant differences in these data across row. An N/A in the p-value column indicates that there were insufficient sites in the row to develop the Chi Squared test statistic.

Table 11-4: Types of Refrigeration Equipment Installed by Business Size, Site Weighted*

Refrigeration Equipment Installed	Total	Large	Medium	Small	Very Small	Unknown
Upright Refrigerator / Freezer	25%	13%	16%	25%	29%	22%
Residential Refrigerator	18%	19%	18%	17%	18%	32%
Walk-in Refrigerator / Freezer	8%	12%	10%	7%	9%	0%
Condensers	6%	8%	14%	4%	5%	20%
Multiplex compressor systems	5%	4%	7%	7%	3%	9%
Reach in display cases	5%	15%	10%	5%	3%	0%
Glass doors on vertical open display	4%	3%	2%	6%	3%	0%
Under Counter Refrigerator	3%	1%	3%	5%	1%	0%
Evaporative fan coolers	2%	9%	9%	2%	0.2%	4%
Main door cooler/freezer door gaskets	2%	3%	3%	2%	2%	0%
Vending machine controllers	2%	2%	1%	1%	3%	0%
Night covers for display cases	1%	1%	2%	2%	0%	0%
Auto closers for coolers/freezers	1%	1%	2%	2%	0%	0%
Strip Curtains	0.1%	0.4%	1%	0%	0%	0%
Anti-sweat heat controllers	0.1%	2%	0.5%	0%	0%	0%
Floating head pressure controllers	0%	1%	0%	0%	0%	0%
Other	28%	27%	25%	26%	34%	16%
Don't Know	4%	9%	4%	5%	4%	0%
n	**821**	**141**	**311**	**258**	**100**	**11**

***** **The results have been weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

12

Other Equipment

The telephone survey asks businesses a few questions about additional equipment at the facility.

12.1 Computers

The telephone survey asked businesses if they had purchased any new computers for the facility since January 2009. Table 12-1 lists the preliminary share of businesses that report purchasing computers by business size, weighted by kWh. As seen, when weighted using electricity consumption data, approximately 67% of businesses report purchasing computers, with slightly more large and medium sized businesses purchasing computers than small and very small businesses.

Table 12-1: Purchased Computers Recently by Business Size, kWh weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value[1]
Yes	67%	76%	66%	57%	51%	44%	0.000
No	27%	18%	29%	41%	47%	56%	0.000
Refused	0.1%	0.2%	0%	0%	0%	0%	N/A
Don't Know	5%	6%	6%	2%	2%	0%	0.000
n	**7,286**	**576**	**2,079**	**2,111**	**2,373**	**147**	

* **The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

When viewing the same information weighted by site counts in Table 12-2, 49% of sites report installing computers, with more than 50% of all large, medium, and small businesses reporting a purchase.

[1] The Chi Squared p-value is a statistical test used to determine if categorical data are random or if they follow a pattern. If the p-value is less than 0.05 then the hypothesis that the data in the row are randomly distributed can be rejected. Therefore there is evidence supporting that there are statistically significant differences in these data across row. For example, the data in Table 12-1 support the conclusion that large sites are more likely to purchase new computers than very small sites. If the Chi Squared statistic is N/A there were not sufficient observations in the row to calculate the test statistic.

Table 12-2: Purchased Computers Recently by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
Yes	49%	66%	64%	55%	46%	48%	0.000
No	49%	24%	30%	43%	52%	51%	0.000
Refused	0%	0.4%	0%	0%	0%	0%	N/A
Don't Know	2%	10%	6%	2%	2%	1%	0.000
n	**7,286**	**576**	**2,079**	**2,111**	**2,373**	**147**	

*** The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses that reported purchasing computers were asked how many computers they had purchased and installed at their facility since January 2009. Table 12-3 lists the distribution of the number of computers installed by electricity consumption size categories using a kWh weight, while Table 12-4 provides the same distribution using a site weight. As expected, small, and very small businesses were more likely to respond that they installed 1 to 5 computers, while large and medium businesses installed a larger number of computers.

Table 12-3: For Sites Purchasing Computers, Number of Computers Purchased by Business Size, kWh Weighted*

Number of Computers	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
1 to 5	25%	8%	27%	55%	79%	79%	0.000
6 to 10	11%	9%	14%	15%	11%	1%	0.000
11 to 20	12%	14%	12%	11%	5%	0.3%	0.000
21 to 50	14%	16%	17%	8%	1%	10%	0.000
51 to 100	14%	21%	12%	3%	0.4%	10%	0.000
101 to 200	3%	5%	2%	1%	0%	0%	N/A
201 to 500	1%	2%	0.2%	0%	0%	0%	N/A
Refused	1%	2%	0.2%	0.2%	0%	0%	N/A
Don't Know	17%	23%	16%	7%	3%	0%	0.000
n	**4,237**	**399**	**1,371**	**1,250**	**1,143**	**74**	

*** The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 12-4: For Sites Purchasing Computers, Number of Computers Purchased by Business Size, Site Weighted*

Number of Computers	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
1 to 5	72%	11%	30%	60%	81%	55%	0.000
6 to 10	12%	12%	14%	15%	11%	10%	0.028
11 to 20	6%	13%	13%	11%	4%	10%	0.000
21 to 50	4%	14%	16%	6%	1%	10%	0.000
51 to 100	2%	19%	11%	2%	0.3%	8%	0.000
101 to 200	0.3%	5%	2%	0.3%	0%	1%	0.000
201 to 500	0%	2%	0.2%	0%	0%	0%	N/A
Refused	0.2%	1%	0.2%	0%	0.2%	0%	N/A
Don't Know	4%	23%	14%	5%	3%	6%	0.000
n	**4,237**	**399**	**1,371**	**1,250**	**1,143**	**74**	

* **The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

12.2 Motors

The survey asked businesses if they had motors at the facility. Table 12-5 lists the percentage of businesses with motors weighted by kWh. The results indicate that 61% of the kWh-weighted businesses have motors, with 83% of large businesses and 35% of small businesses reporting motors.

Table 12-5: Motors at this Facility by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
Yes	61%	83%	52%	35%	25%	41%	0.000
No	37%	16%	46%	63%	74%	59%	0.000
Refused	0.2%	0.2%	0.4%	0.1%	0%	0%	N/A
Don't Know	2%	2%	2%	2%	1%	0%	N/A
n	**7,039**	**398**	**1,708**	**2,169**	**2,605**	**159**	

* **The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 12-6 lists the percentage of businesses with motors weighted by site counts. The results indicate that 25% of sites have motors, with 74% of large businesses and 31% of small businesses reporting motors. The share of sites with motors is much smaller than the estimate of

the share of the frame's kWh with motors because larger businesses are far more likely to have motors.

Table 12-6: Motors at this Facility by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
Yes	25%	74%	48%	31%	21%	23%	0.000
No	74%	24%	50%	67%	78%	76%	0.000
Refused	0%	0.2%	0.4%	0%	0%	0%	N/A
Don't Know	1%	2%	2%	2%	1%	1%	0.097
n	**7,039**	**398**	**1,708**	**2,169**	**2,605**	**159**	

*** The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Businesses with motors were asked to self report the number of motors at the facility. Table 12-7 and Table 12-8 present information on the number of motors by the electricity consumption of the site. Very small and small businesses with motors were likely to report that they had only 1 to 5 motors, 68% and 60% of kWh, respectively. The most common number of motors for medium sized sites was also 1 to 5. The number of motors in large-sized sites was highly distributed, with the exception of 18% of large sites installing 21-50 motors, no single category dominated.

Table 12-7: Number of Motors at your Facility by Business Size, kWh Weighted*

Number of Motors	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
1 to 5	21%	8%	34%	60%	68%	65%	0.000
6 to 10	9%	7%	13%	15%	17%	22%	0.000
11 to 20	10%	8%	12%	13%	9%	10%	0.082
21 to 50	16%	18%	19%	5%	2%	1%	0.000
51 to 100	9%	11%	8%	1%	2%	1%	0.000
101 to 200	8%	11%	3%	1%	1%	0%	0.000
201 to 500	10%	16%	2%	1%	0%	0%	N/A
501 to 1000	7%	11%	0.2%	0%	0%	0%	N/A
More than 1000	9%	10%	8%	3%	2%	0%	0.001
n	**2,405**	**309**	**847**	**666**	**537**	**46**	

*** The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Using site weights, 64% of all businesses are estimated to have only one to five motors, while only 13% of large businesses report the same. Using site based weights, it is estimated that 6% of large companies have more than 1000 motors at their facility, which is close to the kWh based estimate of 9%.

Table 12-8: Number of Motors at this Facility by Business Size, Site Weighted*

Number of Motors	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
1 to 5	64%	12%	36%	62%	72%	48%	0.000
6 to 10	15%	10%	15%	16%	15%	14%	0.929
11 to 20	9%	13%	13%	12%	6%	12%	0.000
21 to 50	5%	20%	18%	4%	3%	8%	0.000
51 to 100	3%	13%	6%	2%	2%	6%	0.000
101 to 200	2%	8%	3%	1%	1%	9%	0.000
201 to 500	1%	8%	1%	1%	0%	1%	N/A
501 to 1000	0.2%	6%	0.4%	0%	0%	0%	N/A
More than 1000	3%	8%	7%	3%	2%	1%	0.001
n	**2,405**	**309**	**847**	**666**	**537**	**46**	

***** **The results are weighted by site Count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

12.3 Gas Equipment

The survey asked businesses if they have certain types of equipment that are fueled by natural gas. Table 12-9 and Table 12-10 list the types of natural gas equipment noted by the businesses, using kWh and site count weights, respectively. Results from the telephone survey indicate that when responses are weighted by usage, 23% of business kWh report no natural gas fueled equipment, with 46% of very small businesses reporting no natural gas fueled equipment. The most common natural gas measure was water heaters. Using kWh based weights, the study estimates that 53% of kWh in businesses in California are associated with sites having a gas water heater.

Table 12-9: Natural Gas Equipment at this Facility by Business Size, kWh Weighted*

Gas Equipment Type	Total	Large	Medium	Small	Very Small	Unknown
Water Heater	53%	52%	57%	54%	40%	24%
Boiler	23%	25%	22%	19%	17%	22%
Furnace	29%	41%	29%	9%	3%	8%
Stove	18%	16%	22%	21%	12%	12%
Clothes Dryer	8%	7%	11%	7%	6%	0.4%
Oven	1%	2%	1%	1%	2%	9%
Heater	2%	3%	2%	2%	0.5%	0%
Fryer	0.1%	0%	0%	0.4%	0.2%	0%
Grill	1%	1%	1%	1%	1%	1%
HVAC equipment	0%	0%	0.2%	0.2%	0%	0%
Generator / Co-gen Equipment	1%	1%	0.4%	0%	0%	0%
Fireplace	0%	0%	0%	0%	0%	0%
Paint booth	1%	0.3%	1%	1%	1%	0%
Washing Machine	1%	1%	1%	1%	1%	0%
None-Don't use Natural gas	23%	17%	23%	30%	46%	41%
Other	2%	2%	2%	1%	1%	0%
Refused	0.1%	0%	0%	0.2%	0.3%	0%
Don't Know	4%	3%	3%	4%	3%	8%
n	**7,040**	**399**	**1,708**	**2,169**	**2,605**	**159**

*** The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

When responses are weighted by number of sites, the analysis estimates that 42% of businesses report no natural gas fueled equipment, with 48% of very small businesses reporting no natural gas fueled equipment. The most common natural gas measure is once again water heaters, with estimates that gas water heaters are found in 42% of businesses in California.

Table 12-10: Natural Gas Equipment at this Facility by Business Size, Site Weighted*

Gas Equipment Type	Total	Large	Medium	Small	Very Small	Unknown
Water Heater	42%	54%	58%	52%	38%	50%
Furnace	19%	21%	21%	19%	18%	31%
Stove	6%	41%	25%	8%	3%	11%
Clothes Dryer	13%	21%	22%	20%	10%	16%
Boiler	8%	8%	11%	7%	8%	8%
Heater	1%	2%	1%	1%	1%	4%
HVAC equipment	1%	3%	2%	2%	0.3%	2%
Oven	0.1%	0%	0.1%	0.3%	0.1%	0%
Fryer	1%	1%	1%	1%	1%	1%
Grill	0%	0%	0.2%	0.1%	0%	0%
Fireplace	0%	1%	0.2%	0%	0%	0%
Generator / Co-gen Equipment	0%	0%	0%	0.1%	0%	0%
Washing Machine	1%	1%	1%	1%	0.3%	0%
Paint booth	1%	1%	1%	1%	0.4%	0%
None-Don't use Natural gas	43%	14%	24%	32%	48%	26%
Other	1%	2%	2%	1%	1%	1%
Refused	0.1%	0.3%	0%	0.2%	0.2%	0%
Don't Know	4%	3%	4%	4%	3%	6%
n	**7,040**	**399**	**1,708**	**2,169**	**2,605**	**159**

*** The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Telephone survey respondents were asked if they had purchased any natural gas equipment since January 2009. Table 12-11 presents the telephone survey results weighted by usage. The usage weighted analysis estimates that 18% of kWh associated with businesses in California that report having gas equipment have purchased new equipment since January 2009. When responses are weighted by site counts, the analysis estimates that 14% of businesses purchased new gas equipment since January 2009, as seen in Table 12-12.

Table 12-11: Purchased Natural Gas Equipment Recently by Business Size, kWh Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
Yes	18%	20%	18%	14%	13%	8%	0.011
No	79%	77%	80%	83%	85%	92%	0.525
Refused	0%	0%	0%	0.2%	0.3%	0%	N/A
Don't Know	3%	3%	2%	2%	1%	0%	N/A
n	**4,544**	**352**	**1,339**	**1,439**	**1,299**	**115**	

*** The results are weighted by kWh.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 12-12: Purchased Natural Gas Equipment Recently by Business Size, Site Weighted*

Response	Total	Large	Medium	Small	Very Small	Unknown	Chi-Squared P-Value
Yes	14%	17%	18%	14%	14%	10%	0.321
No	84%	79%	80%	84%	84%	88%	0.939
Refused	0.1%	0%	0%	0.1%	0.2%	0%	N/A
Don't Know	2%	5%	3%	2%	1%	2%	0.151
n	**4,544**	**352**	**1,339**	**1,439**	**1,299**	**115**	

*** The results are weighted by site count.** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

13

Telephone and On-site Survey Comparison

The CSS on-site survey participants were nested within the CSS/CMST telephone survey respondents. Given the nested nature of the on-site survey within the telephone survey, the evaluation was able to compare the self-reported responses of participants in the telephone survey with conditions found on-site. It is well understood that on-sites are more accurate than self-reported telephone survey data but there are few studies that have systematically analyzed the accuracy of self-reported telephone survey data relative to on-site data collected from a nested sample of sites. The extensive nature of the CSS/CMST telephone survey and the CSS on-site data collection effort allows for the verification of telephone survey responses over an extensive range of measures and end-uses. The findings from this analysis will help researchers determine if self-reported telephone survey information is sufficiently accurate to be used for some measures and/or end uses or if the degree of inaccuracy in self-reported information is large enough to warrant the added expense associated with on-site data collection.

The comparison of the self-reported telephone survey data and on-site data was undertaken using two approaches. First, the study compared the overall incidence rate from the phone survey to the incidence rate derived from the on-site survey. This comparison uses all of the responses from the telephone and the on-site data collection effort to compare the incidence of end uses and measures within these two surveys. The incidence analysis does not directly analyze the accuracy of any given site's response, but looks at the ability of businesses to correctly respond on average. Given that many baseline analyses are interested in the incidence of end uses and measures, this comparison will shed light on the ability of telephone survey respondents to correctly report the incidence of measures. The incidence analysis allows false affirmatives and false negatives to cancel and determine if the average incidence across the telephone and on-site surveys is similar.

The second comparison looks specifically at the ability of businesses to correctly self-report the types of equipment at their facility. This comparison is restricted to those sites that participated in both the telephone and on-site surveys. The analysis compares the number of sites that stated that they have the equipment with the number of businesses that were found to have the equipment during the on-site survey. The analysis will also compare the number of sites that stated that they did not have the equipment, yet the equipment was observed in the facility during the on-site verification. The results from this analysis will provide information on the accuracy of matched telephone and on-site information. The results from this analysis were also presented

in the end use specific sections. They will be reproduced here for completeness and to provide interested parties with a place to easily compare the findings from different end uses.

13.1 Incidence Analysis

This sub-section presents information on the self-reported incidence of measures within the telephone survey compared to the observed incidence during the on-site survey. The incidence analysis uses the weights developed during the telephone and on-site surveys to report on the share of sites with specific measures as derived from the information provided during the telephone and on-site surveys. If the incidence or share of sites with a specific measure is one of the purposes for a baseline study, then this comparison provides information on the aggregate accuracy of the telephone survey information. The incidence analysis looks at the similarity between the telephone and on-site share of sites with specific measures; it does not look at the accuracy or inaccuracy of individual site's self-reported information. The accuracy of individual self-reported information will be presented in the telephone and on-site comparison information presented below.

Table 13-1 presented the incidence for select measures where information was collected during the telephone and on-site survey. Measures analyzed in the incidence analysis include solar PV, the incidence of linear fluorescents at a facility and the incidence of T12s, T8s, and T5 for businesses with linear fluorescents. Additional lighting measures analyzed during the incidence analysis include CFLs, LEDs, and occupancy sensors. The incidence of TVs and the presence of cooling and split and packaged systems are also compared.

Reviewing the data presented in Table 13-1, the incidence of measures and end uses in the telephone survey are generally under-reported relative to what is found during the on-sites survey. During the telephone survey, customers were asked if they had linear fluorescents installed at their facility. Seventy nine percent of telephone survey respondents reported that their facility's lighting included linear fluorescents while 94% of businesses participating in the on-site data collection were found to have linear fluorescents. The incidence of CFLs, TVs, and split and packaged HVAC systems are also under-reported.

During the telephone survey, all sites that stated that they had linear fluorescents were asked to describe the type of linear technologies at their facility. Customers were allowed to respond with multiple types of linear technologies as the lighting in many facilities include multiple types of linear fluorescents. The telephone survey data indicate that 19% of sites have T12s (T12s or fat tubes) while 42% of businesses in the on-site survey were found to have T12 lighting. The substantial under-reporting of the presence of linear fluorescents contributes to the under-reporting of T12 technology. If a telephone survey site reported that they did not have linear fluorescents, they were not asked to describe the type of linear fluorescents at the facility. T8

technology is also under-reported in the telephone survey, 43% relative to the 71% incidence found during the on-site survey. Telephone survey respondents were substantially less likely to report the presence of linear technologies and substantially less likely to indicate that their facility had multiple types of technology than was observed on-site.

Table 13-1: Incidence for Telephone and On-Site Survey Participants

Technology	Telephone Survey	On-site Survey
Solar PV	3%	2%
Linears	79%	94%
T12	8%	42%
Fat Tubes	11%	
T8	18%	71%
Second Generation T8	3%	
Skinny Tubes	22%	
T5	5%	6%
CFLs	47%	62%
LEDs	19%	4%
Occupancy Sensors	21%	17%
TV	38%	47%
No Cooling	25%	23%
Split System	9%	12%
Packaged System	37%	52%

Measures where the telephone survey incidence and the on-site incidence are similar include solar PV, T5, and the lack of a cooling system. The incidence of LEDs was over-reported during the telephone survey. It is possible that telephone survey respondents are confused by CFL and LED technologies, leading to an under-reporting of CFLs and an over-reporting of LEDs.

13.2 Comparison Analysis

This subsection of the telephone and on-site comparison directly compares the self-reported and on-site data for a nested sample of sites. The comparison incorporates many measures and end uses analyzed during the CSS/CMST studies. The comparison begins with a comparison of the self-reported business square footage with the square footage found on-site. The study also compares self-reported participation in demand response programs (DR) with the IOU program tracking data and the site level solar and distributed generation with self-reported information collected during the telephone survey. The comparison analysis also compares the share of sites self-reporting various lighting measures with the lighting measures observed at the facility during the on-site data collection.

The comparison analysis differs from the incidence analysis in that it looks at under-reporting and over-reporting, false positives and false negatives. The comparison analysis looks at specific sites. The analysis is not weighted, it compares the site level telephone responses with the on-site observations, including only those sites that participated in both the telephone and on-site studies. For many measures, the comparison analysis also analyzes the data by customer size to determine if large or smaller sites more frequently over or understate the presence of equipment.

13.2.1 Business Square Footage

Table 13-2 presents the comparison of the phone and on-site business square footage for the 64% of telephone survey sites that provided an estimate of square footage during the telephone survey. The on-site data collection effort found that 62% of the sites that provided an estimate of square footage were within ten percent of the square footage verified during the onsite survey. These data also indicate that for sites providing a business square footage large sites are slightly less likely than very small sites to self-report within ten percent of verified square footage.

Table 13-2: Discrepancy between the Phone and On-site Square Footage

Discrepancy in SQFT	Total	Large	Medium	Small	Very Small	Unknown
0% to 10%	62%	55%	57%	61%	68%	60%
11% to 25%	14%	13%	17%	15%	11%	30%
26% to 50%	10%	10%	11%	10%	8%	0%
51% to 75%	5%	3%	5%	4%	5%	0%
76% to 100%	4%	13%	6%	3%	1%	0%
Over 100%	6%	5%	3%	6%	7%	10%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

13.2.2 On-site Distributed Generation Technology

Table 13-3 presents the comparison of the phone and on-site findings for the presence of solar panels on the facility. These data indicate that 81% of the sites that reported having solar panels during the phone survey were found to have solar panels on-site. In addition, for 99% of the sites that stated during the phone survey that they did not have solar panels, no solar panels were found on-site. In total, approximately 98% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have solar panels, and sites were more likely to know if they did not have solar panels than if they did have solar panels.

Table 13-3: Comparison of Solar Present in the Facility Between the Phone and On-site Surveys

Solar Present?	OS - Yes Solar		OS - No Solar		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes Solar	68	81%	16	19%	84	100%
PS-No Solar	9	1%	1327	99%	1336	100%

Table 13-4 presents the accuracy of phone survey responses by business size. In Table 13-4, the first two rows of data present the share of sites correctly answering the question in the phone survey while the final two rows of data present the share of sites incorrectly answering the question in the phone survey. These data indicate that smaller sites are more likely than larger sites to mistakenly indicate that they have solar panels when none are found on-site. Larger sites, however, are slightly more likely than smaller sites to make a mistake when they self-report on the telephone survey that they do not have solar panels.[1]

Table 13-4: Comparison of Solar Panels in Facility Between the Phone and On-site Surveys for by Business Size*

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Solar	Yes found	81%	100%	76%	83%	67%	100%
PS – No Solar	No found	99%	95%	99%	100%	100%	100%
PS – Yes Solar	No found	19%	0%	24%	17%	33%	0%
PS – No Solar	Yes found	1%	5%	1%	0%	0%	0%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Error in the phone survey responses to the presence of solar generation is relatively low. Sites incorrectly stating that they have solar when none is found on-site, however, are still unexpected. Looking carefully at these sites, some of the sites have solar thermal, which is recorded on the on-site survey form, but is not recorded as solar or photo voltaic. Some of the sites are schools or individual businesses from a chain of businesses. For schools and chain businesses the phone survey often spoke with an individual from the central office. It is likely that incorrect responses to the presence of solar may indicate that the respondent was confused about the exact site being discussed. The site contact was likely correct about a different address within the school district or business chain. Other instances of error for this question remain unexplained.

The telephone survey respondents also replied with energy generation equipment other than solar installed in their facility. Table 13-5 presents the comparison of the phone and on-site findings

[1] Larger businesses incorrectly stating that they did not have solar panels included corporate sites and schools where the respondent who answered the phone survey was in charge of multiple buildings.

for the presence of other energy generation equipment in the facility. These data indicate 42% of sites can correctly self-report that they have other energy generation equipment in their facility. In addition, for 90% of the sites that stated during the phone survey that they did not have energy generation equipment, no energy generation equipment was found on-site. In total, approximately 89% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have energy generation equipment.[2]

Table 13-5: Comparison of Other Types of Distributed Generation in the Facility Between the Phone and On-site Surveys

	OS - Yes Other DG		OS - No Other DG		Totals	
Other DG Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS-Yes Other DG	10	42%	14	58%	24	100%
PS-No Other DG	146	10%	1250	90%	1396	100%

13.2.3 Comparing Demand Response Self-Report and DR Program Tracking Data

Table 13-6 presents the comparison of the self-report Demand Response participation to the DR tracking data. These data indicate that 53% of the sites that reported that they participate in demand response programs during the phone survey were found to be DR participants in the IOU tracking data. In addition, 88% of the sites that stated during the phone survey that they were not DR participants were correct. In total, approximately 81% of the phone survey respondents correctly knew if they did or did not participate in demand response programs.

Table 13-6: Comparison of Demand Response Present in the Facility Between the Phone and On-Site Surveys

	Tracking Data – Yes DR		Tracking Data – No DR		Totals	
DR Present?	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS – Yes DR	769	53%	670	47%	1439	100%
PS – No DR	605	12%	4538	88%	5143	100%
PS – Don't Know	196	15%	1096	85%	1292	100%

The accuracy of the phone survey self-reported DR participation can also be viewed by business size. Table 13-7 presents the accuracy of phone survey responses by business size. These data indicate that larger sites are more likely to correctly self-report that they participate in DR than smaller sites. These data also indicate, however, that larger sites are more likely to make a mistake than smaller sites when they self-report on the telephone survey that they do not participate in DR. When very small sites self-report that they do not participate in DR, they are

[2] The "Other" types of energy generation equipment found during the onsite survey included international combustion engines, gas turbines, micro turbines, solar thermal, and fuel cells.

correct 98% of the time, but large sites are only correct 29% of the time when they state that they do not participate in DR.

Table 13-7: Comparison of Demand Response Participation Between the Phone and IOU Tracking data by Business Size*

Phone Survey	Tracking	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes DR	Yes DR	53%	92%	63%	24%	18%	14%
PS – No DR	No DR	88%	29%	75%	96%	98%	99%
PS – Yes DR	No DR	47%	8%	37%	76%	82%	86%
PS – No DR	Yes DR	12%	71%	25%	4%	2%	1%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

13.2.4 Linear Fluorescent Comparison

Table 13-8 presents the comparison of the phone and on-site findings for the presence of linear fluorescents in the facility. These data indicate that 100% of the sites that reported that they have linear fluorescents during the phone survey were found to have linear fluorescents on-site. However, of the 144 telephone/on-site survey businesses that self-reported that they did not have linear technologies during the telephone survey, 83% were found have linear fluorescents during the on-site survey. The high share of sites that incorrectly state that they do not have liner fluorescents is consistent with the finding that the incidence of linear technologies from the on-site survey is substantially higher than the incidence from the telephone survey data. In total, approximately 91% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have linear fluorescents.[3]

Table 13-8: Comparison of Linear Fluorescents Present in the Facility Between the Phone and On-site Surveys

	OS - Yes LFs		OS - No LFs		Totals	
LFs Present?	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes LFs	1264	100%	5	0%	1269	100%
PS-No LFs	119	83%	25	17%	144	100%

T12 Linear Technologies

Table 13-9 presents the comparison of the phone and on-site findings for the presence of T12s. These data indicate that 63% of the businesses that reported that they have T12 linear

[3] Note, the incidence data presented above is weighted while the findings in the comparison section represent unweighted representations of correct and incorrect responses.

fluorescents during the phone survey were found to have T12 linear fluorescents on-site. In addition, for 65% of the businesses that stated during the phone survey that they did not have T12 linear fluorescents, none were found on-site.

The data presented in Table 13-9 indicate that approximately 18% (265/1,439) of the nested sites self-reported having T12s at their facility, with 81% of sites self-reporting that they do not have T12s. The on-site data collection effort found that 41% (583/1,439) of the sites still have T12s. The under-reporting of T12s is consistent with the finding that the incidence of T12 is substantially higher in the on-site data than in the telephone survey.

Table 13-9: Comparison of Linear Fluorescent T12 Technology Present in the Facility Between the Phone and On-site Surveys

	OS - Yes T12s		OS - No T12s		Totals	
T12 LFs Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS-Yes T12s	167	63%	96	37%	265	100%
PS-No T12s	416	35%	751	65%	1174	100%

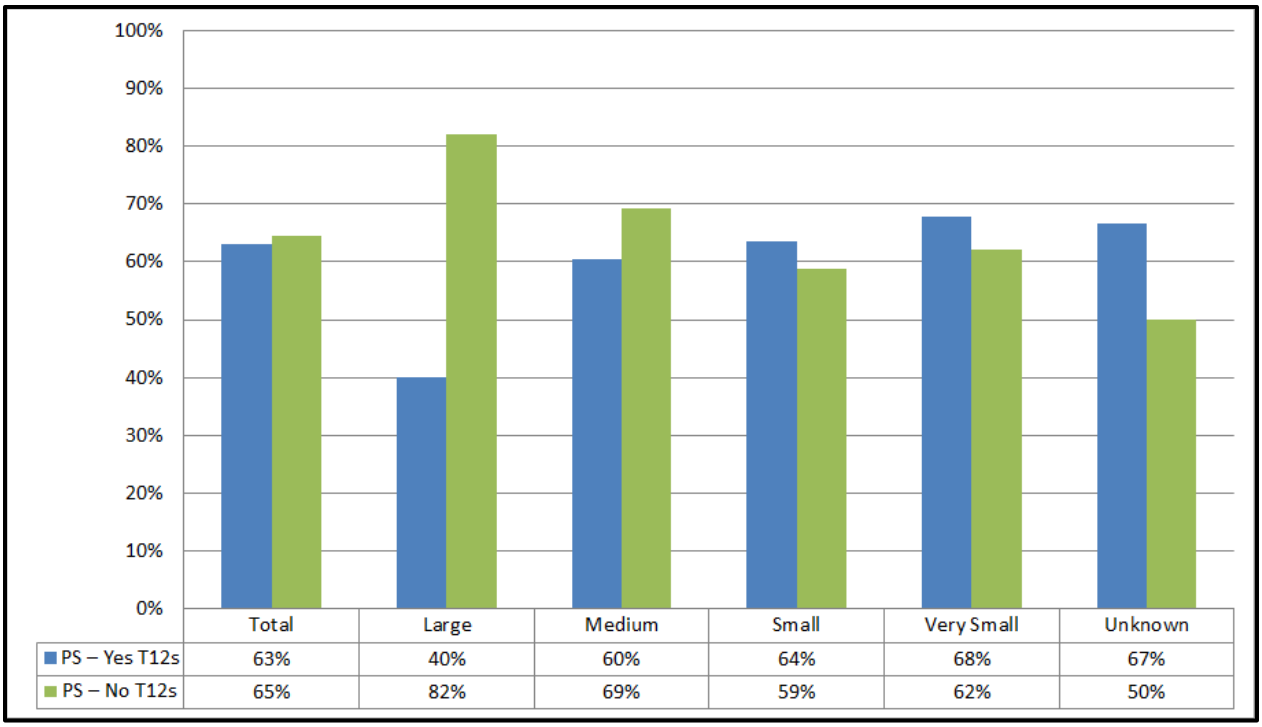
Table 13-10 presents the accuracy of phone survey responses to the presence of T12 technologies by business size. Figure 13-1 illustrates the share of businesses that correctly answered the telephone survey question concerning the presence of T12 linear fluorescents in their facility. The data in Table 13-10 indicate that smaller businesses are more likely to make a mistake than larger businesses self-reporting that they do not have T12 linear fluorescents. When large businesses self-report that they do not have T12 linear fluorescents they are correct 82% of the time but small businesses are only correct 59% of the time (and very small sites 62% of the time). Conversely, large businesses are more likely to make a mistake when they self-report that they have T12s than small businesses (40% vs. 64% correct).

Table 13-10: Comparison of Linear Fluorescent T12 Technology in Facility Between the Phone and On-site Surveys, by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes T12s	T12s found	63%	40%	60%	64%	68%	67%
PS – No T12s	No T12s found	65%	82%	69%	59%	62%	50%
PS – Yes T12s	No T12s found	37%	60%	40%	36%	32%	33%
PS – No T12s	T12s found	35%	18%	31%	41%	38%	50%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 13-1: Sites Whose Phone Survey Response to the Presence of T12 Linear Fluorescent Technology was Verified as Correct during the On-site



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes T12s	63%	40%	60%	64%	68%	67%
PS – No T12s	65%	82%	69%	59%	62%	50%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

T8 Linear Technologies

Table 13-11 presents the comparison of the phone and on-site findings for the presence of T8 linear fluorescents. From the telephone survey data, 854 of the 1,439 on-site survey businesses or 59% of sites self-reported the presence of T8 technologies. The on-site data indicate that 92% of the businesses that self-reported that they have T8 linear fluorescents during the phone survey were found to have T8 linear fluorescents on-site. For sites self-reporting that they do not have T8 technologies (585 of 1,439 on-site survey businesses), 76% are found to be incorrect during the on-site survey. Approximately 85% of the phone/on-site survey participants were found to have T8 technologies (782 + 445 of 1,439 sites).

During the on-site survey more businesses were found to have T8 linear technologies than self-report these technologies during the telephone survey. This finding is similar to the findings for T12s, where more businesses were found to have T12s than self-report during the phone survey. The on-site findings supporting a higher share of businesses having T8s and T12s than is self-reported during the telephone survey is in part due to a high incidence of businesses having both T12 and T8 technologies. During the phone survey only 8% of businesses that later participated in the on-site self-reported that their facility had both T12s and T8s. During the on-site survey, however, over 30% of businesses were found to have both T12s and T8s.

Table 13-11: Comparison of Linear Fluorescent T8 Technology Present in the Facility Between the Phone and On-site Surveys

	OS - Yes T8s		OS - No T8s		Totals	
T8 LFs Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS-Yes T8s	782	92%	72	8%	854	100%
PS-No T8s	445	76%	140	24%	585	100%

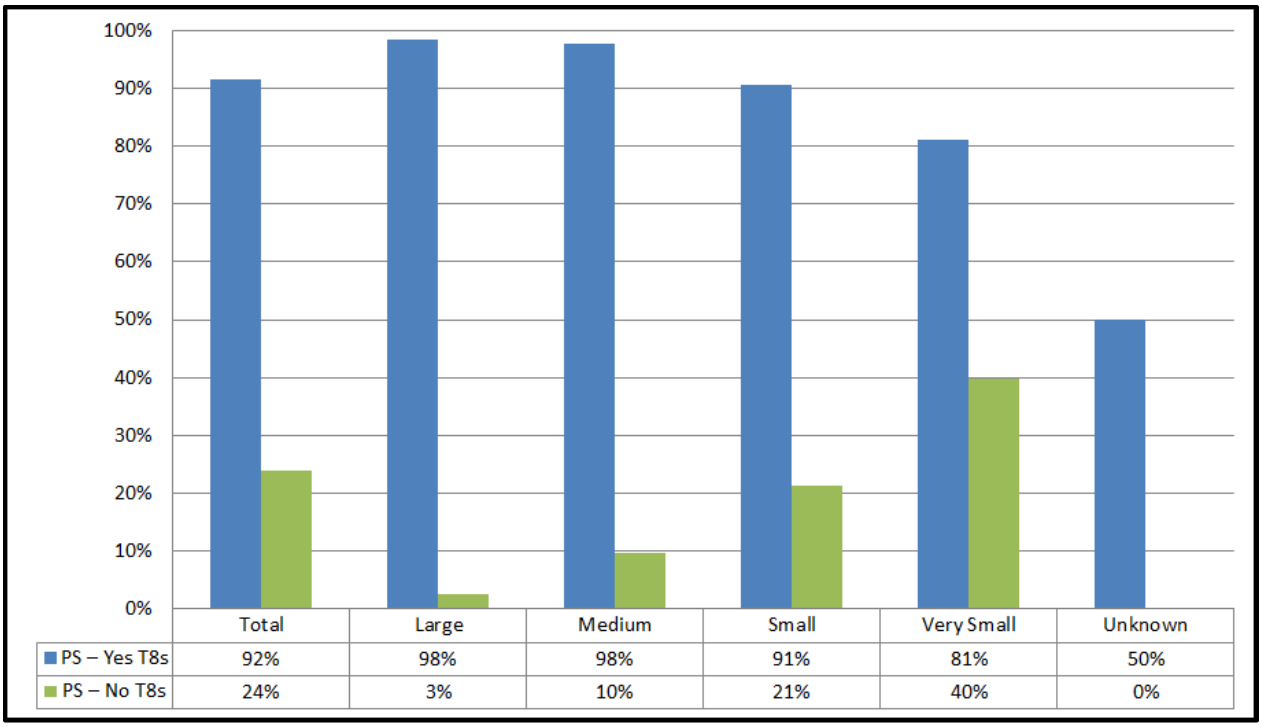
Table 13-12 presents the accuracy of phone survey responses to the presence of T8 technologies by business size. Figure 13-2 illustrates the share of businesses that correctly answered the telephone survey question concerning the presence of T8 linear fluorescents in their facility. These data show that larger businesses are more likely correctly report that they have T8s and more likely to incorrectly state that they do not have T8s than smaller sized sites. When large businesses self-report that they do not have T8 linear fluorescents they are only correct 3% of the time but very small businesses are correct 40% of the time when they state that they do not have T8 linear fluorescents.

Table 13-12: Comparison of Linear Fluorescent T8 Technology in Facility Between the Phone and On-site Surveys, by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes T8s	T8s found	92%	98%	98%	91%	81%	50%
PS – No T8s	No T8s found	24%	3%	10%	21%	40%	0%
PS – Yes T8s	No T8s found	8%	2%	2%	9%	19%	50%
PS – No T8s	T8s found	76%	97%	90%	79%	60%	100%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 13-2: Sites Whose Phone Survey Response to the Presence of T8 Linear Fluorescent Technology was Verified as Correct during the On-site*



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes T8s	92%	98%	98%	91%	81%	50%
PS – No T8s	24%	3%	10%	21%	40%	0%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

T5 Linear Technologies

Table 13-13 presents the comparison of the phone and on-site findings for the presence of T5 linear fluorescents. These data indicate that 38% of the businesses that self-reported that they have T5 linear fluorescents during the phone survey were found to have T5 linear fluorescents on-site. For businesses self-reporting that they do not have T5 technologies, 90% are found to be correct during the on-site survey. In the telephone survey, 160 of the sites that participated in the on-site survey reported having T5 technology while the on-site survey found that 187 sites had T8 technology in their facility. The relative similarity of these numbers explains the relative similarity of the incidence of T5s within the telephone and on-site data while the comparison data indicates that much of the telephone survey data represents a false positive. These data support the conclusion that while the incidence analysis found that the telephone and on-site incidence of T5s was similar, the comparison analysis finds that individuals sites that state that they have T5s are more likely to be incorrect than correct.

Table 13-13: Comparison of Linear Fluorescent T5 Technology Present in the Facility Between the Phone and On-site Surveys

T5 LFs Present?	OS - Yes T5s		OS - No T5s		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes T5s	61	38%	99	62%	160	100%
PS-No T5s	127	10%	1152	90%	1279	100%

13.2.5 Comparison of Phone and On-site Survey Findings for Compact Fluorescents

Table 13-14 presents the comparison of the phone and on-site findings for the presence of compact fluorescents in the facility. These data indicate that 87% of the businesses that reported that they have compact fluorescents during the phone survey were found to have compact fluorescents on-site. In addition, for 67% of the businesses that stated during the phone survey that they did not have compact fluorescents, were found to have compact fluorescents on-site. Of the 1,453 sites that participated in both the telephone survey and the collection of CFL data on-site, 713 sites in the phone survey responded that they had CFLs while 1,136 sites were found to have CFLs during the on-site survey. The dramatic increase in the number of sites verified to have CFLs during the on-sites is consistent with the findings from the incidence analysis. More businesses have CFLS than those who self-report during the telephone survey.

Table 13-14: Comparison of Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys

CFLs Present?	OS – Yes CFLs		OS – No CFLs		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes CFLs	621	87%	92	13%	713	100%
PS-No CFLs	453	67%	225	33%	678	100%
PS Don't Know	52	84%	10	16%	62	100%

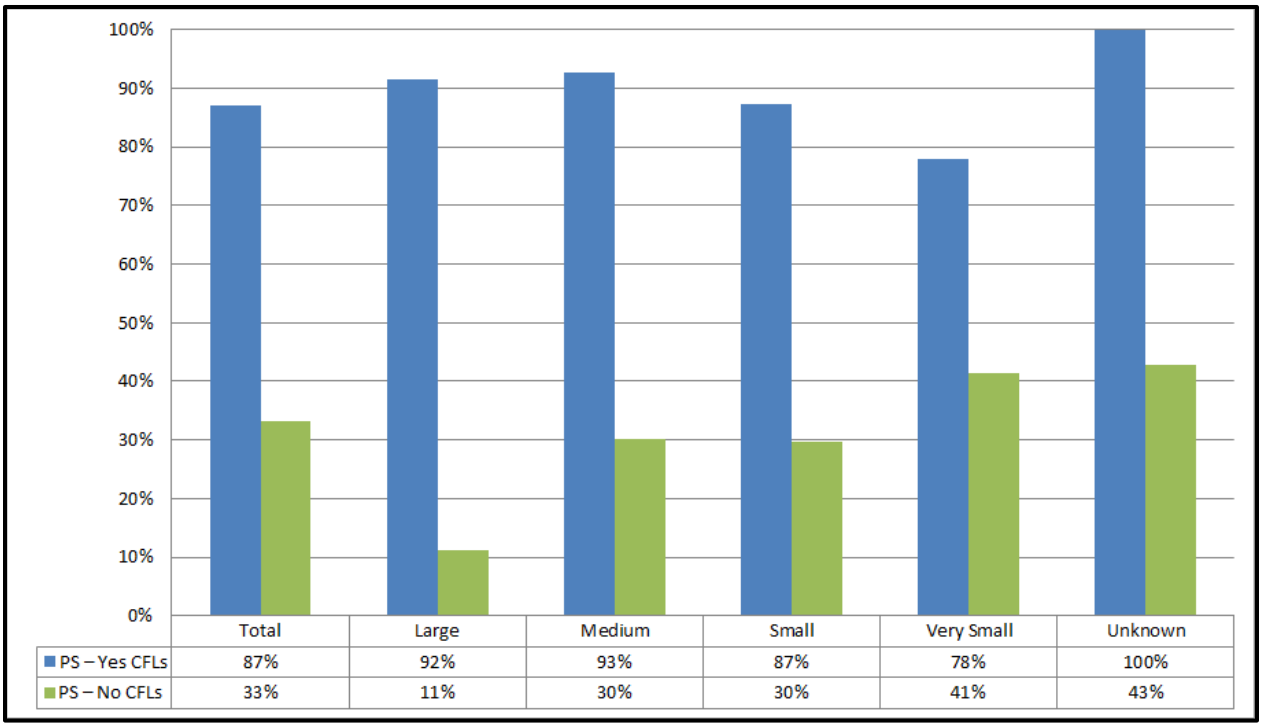
Table 13-15 presents the accuracy of phone survey responses by business size. Figure 13-3 illustrates the share of sites that correctly answered the telephone survey question concerning the presence of compact fluorescents in their facility. These data indicate that when businesses self-reported they did not have compact fluorescents, they tended to be incorrect and larger sites are more likely to make a mistake than smaller sites. When very small businesses self-report that they do not have CFLs they are correct 41% of the time but large businesses are only correct 11% of the time when they state that they do not have CFLs. These findings support the need for on-site surveys when collecting data on rapidly changing technologies that individuals may not fully understand.

Table 13-15: Comparison of Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes CFLs	CFLs	87%	92%	93%	87%	78%	100%
PS – No CFLs	No CFLs	33%	11%	30%	30%	41%	43%
PS – Yes CFLs	No CFLs	13%	8%	7%	13%	22%	0%
PS – No CFLs	CFLs	67%	88%	70%	70%	59%	57%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 13-3: Sites Whose Phone Survey Response to the Presence of Compact Fluorescents was Verified as Correct during the On-site



* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

13.2.6 Comparison of Phone and On-Site Survey findings of Compact Fluorescent Technology

The results presented in Section 13.2.5 show that more businesses have CFL technologies than self-report these technologies. In this subsection we investigate understanding of the different types of CFLs.

Screw Based CFL Comparison

Table 13-16 presents the comparison of the phone and on-site findings for the presence of screw-in compact fluorescents in the facility. These data indicate that 75% of the businesses that reported that they have screw based compact fluorescents during the phone survey were found to have these technologies on-site. In addition, for 52% of the businesses that stated during the phone survey that they did not have screw-in CFLs, no screw-in CFLs were found on-site. Given the large number of sites that stated during the telephone survey that they did not have screw based CFLs (829) and the relatively high error (48%) in these responses, more sites were found to have screw based CFLs during the on-site (813 of the 1,391 sites that completed the CFL phone survey questions and the on-site) than self-reported having this technology during the telephone survey (558 sites).

Table 13-16: Comparison of Screw-in Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys

Screw-In CFLs Present?	OS – Yes Screw-In CFLs		OS – No Screw-In CFLs		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes Screw-In	417	75%	141	25%	558	100%
PS-No Screw-In	396	48%	437	52%	833	100%

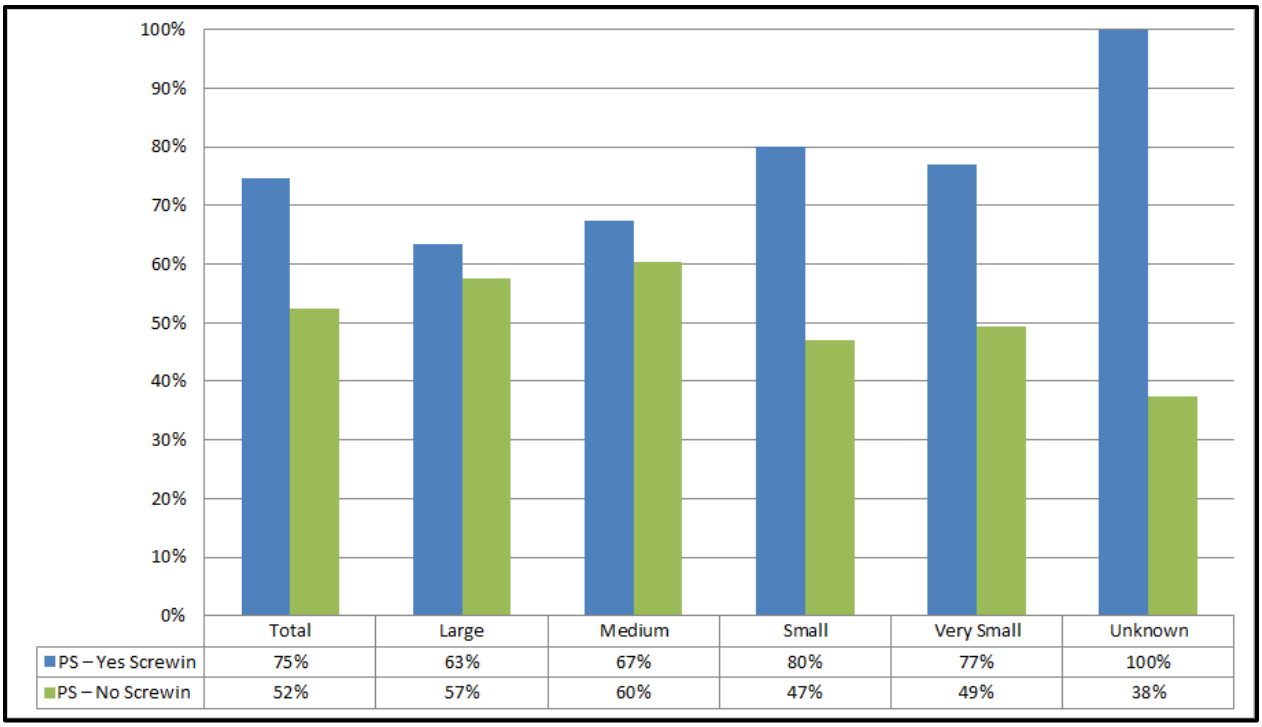
Table 13-17 presents the accuracy of phone survey responses by business size. Figure 13-4 illustrates the share of sites that correctly answered the telephone survey question concerning what type of compact fluorescents is present in their facility. These data indicate that when businesses self-reported they did not have screw-in CFLs, they were incorrect about half the time.

Table 13-17: Comparison of Screw-In Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Screwin	Yes found	75%	63%	67%	80%	77%	100%
PS – No Screwin	No found	52%	57%	60%	47%	49%	38%
PS – Yes Screwin	No found	25%	37%	33%	20%	23%	0%
PS – No Screwin	Yes found	48%	43%	40%	53%	51%	63%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 13-4: Sites Whose Phone Survey Response to the Presence of Screw-In Compact Fluorescents was Verified as Correct during the On-site



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Screwin	75%	63%	67%	80%	77%	100%
PS – No Screwin	52%	57%	60%	47%	49%	38%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Pin Based CFL Comparison

Table 13-18 presents the comparison of the phone and on-site findings for the presence of pin-based compact fluorescents in the facility. These data indicate that 63% of the businesses that reported that they have pin-based compact fluorescents during the phone survey were found to have pin-based CFLs on-site. In addition, for 68% of the businesses that stated during the phone survey that they did not have pin-based CFLs, no pin-based CFLs were found on-site. Given the large number of respondents that stated that they did not have pin based CFLs and the finding that approximately one-third of these responses were incorrect, nearly twice as many sites were found to have pin based CFLs (534) as self-reported having pin based CFLs on the phone survey (278).

Table 13-18: Comparison of Pin-Based Compact Fluorescents Present in the Facility Between the Phone and On-site Surveys

Screw-In CFLs Present?	OS – Yes Pin-Based CFLs		OS – No Pin-Based CFLs		Totals	
	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS-Yes Pin-Based	176	63%	102	37%	278	100%
PS-No Pin- Based	358	32%	755	68%	1113	100%

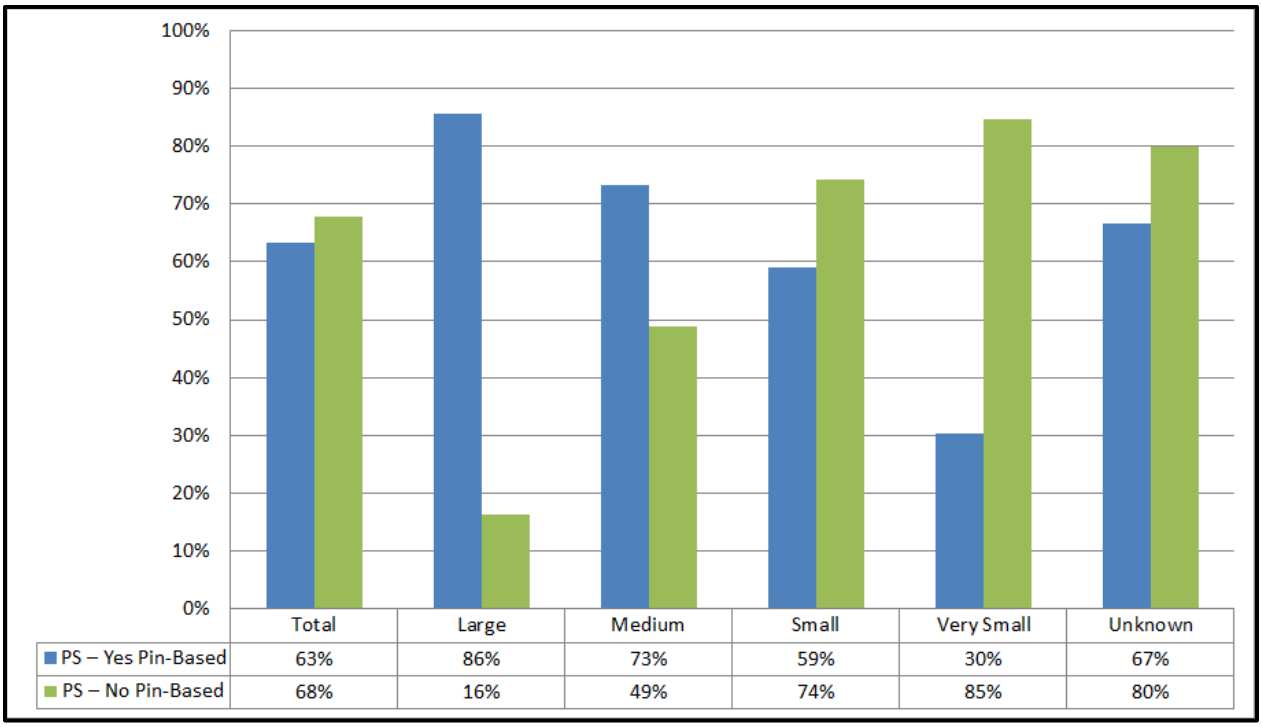
Table 13-19 presents the accuracy of phone survey responses by business size. Figure 13-5 illustrates the share of businesses that correctly answered the telephone survey question concerning what type of compact fluorescents is present in their facility. These data indicate that the error in self-reported incidence of pin based CFLs declines as the businesses become larger. These data also indicate, however, that when businesses self-reported they did not have pin-based CFLs, larger sites are more likely to make a mistake than smaller sites. When very small sites self-report that they do not have pin-based CFLs, they are correct 85% of the time but large sites are only correct 17% of the time when they state that they do not have pin-based CFLs.

Table 13-19: Comparison of Pin-Based Compact Fluorescents in Facility Between the Phone and On-site Surveys for by Business Size

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Pin-Based	Yes found	63%	86%	73%	59%	30%	67%
PS – No Pin-Based	No found	68%	16%	49%	74%	85%	80%
PS – Yes Pin-Based	No found	37%	14%	27%	41%	70%	33%
PS – No Pin-Based	Yes found	32%	84%	51%	26%	15%	20%

***** Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 13-5: Sites Whose Phone Survey Response to the Presence of Pin-Based Compact Fluorescents was Verified as Correct during the On-site



	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes Pin-Based	63%	86%	73%	59%	30%	67%
PS – No Pin-Based	68%	16%	49%	74%	85%	80%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

13.2.7 Comparison of LED Phone Survey to On-Site Survey

Table 13-20 presents the comparison of the LED phone and on-site findings. These data indicate that only 34% of the sites that self-reported on the phone survey that they had installed LED were found to have LEDs. In contrast, 88% of the sites that stated during the phone survey that they did not have LEDs were found during the on-site collection to not have LEDs. In total, approximately 79% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have LEDs. These findings indicate that with this relatively new technology, respondents were far more likely to be correct when they believed that they did not have the technology than when they self-reported that they had the technology. The relative novelty of the technology, combined with the many different types of lighting technology, may have led to some confusion for businesses that reported that they had installed LEDs.[4]

[4] Note, the LED questions were added to the telephone survey after it was initially launched and were not asked of all telephone survey participants.

Table 13-20: Comparison of LEDs Installed Between the Phone and On-site Surveys

	OS – Yes LEDs		OS – No LEDs		Totals	
LEDs Installed?	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS – Yes Have	54	34%	104	66%	158	100%
PS – No LEDs	91	12%	676	88%	767	100%

13.2.8 Comparison of Phone Survey to On-Site Survey Televisions Present

Table 13-6 presents the comparison of the phone and on-site findings for the presence of a TV in the facility. These data indicate that 84% of the businesses that reported that they had a TV during the phone survey were found to have a TV on-site. In addition, for 73% of the businesses that stated during the phone survey that they did not have a TV, no TV was found on-site. In total, approximately 80% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have a TV and sites were slightly more likely to know if they had a TV than if they did not have a TV.[5]

Table 13-21: Comparison of Televisions Present in the Facility Between the Phone and On-site Surveys

	OS – Yes TV		OS – No TV		Totals	
TVs Present?	Sites	Percentages	Sites	Percentages	Sites	Percentages
PS – Yes Have TV	695	84%	136	16%	831	100%
PS – No TV	147	27%	400	73%	547	100%
PS – DK TV	6	46%	7	54%	13	100%

Table 13-7 presents the accuracy of phone survey responses by business size. Figure 13-6 illustrates the share of sites that correctly answered the telephone survey question concerning the presence of a TV in their facility. These data indicate that the error in sites' self-reported response affirming that they have a TV is slightly smaller for large businesses than for smaller businesses. These data also indicate, however, that larger businesses are more likely to make a mistake than smaller businesses, when they self-report on the telephone survey that they do not have a TV. When very small businesses self-report that they do not have a TV they are correct 87% of the time but large businesses are only correct 45% of the time when they state that they do not have a TV. Of the telephone survey sites included in the on-site data collection effort, 831 businesses originally stated that they had TVs at their facility while TVs were found at 842 businesses.

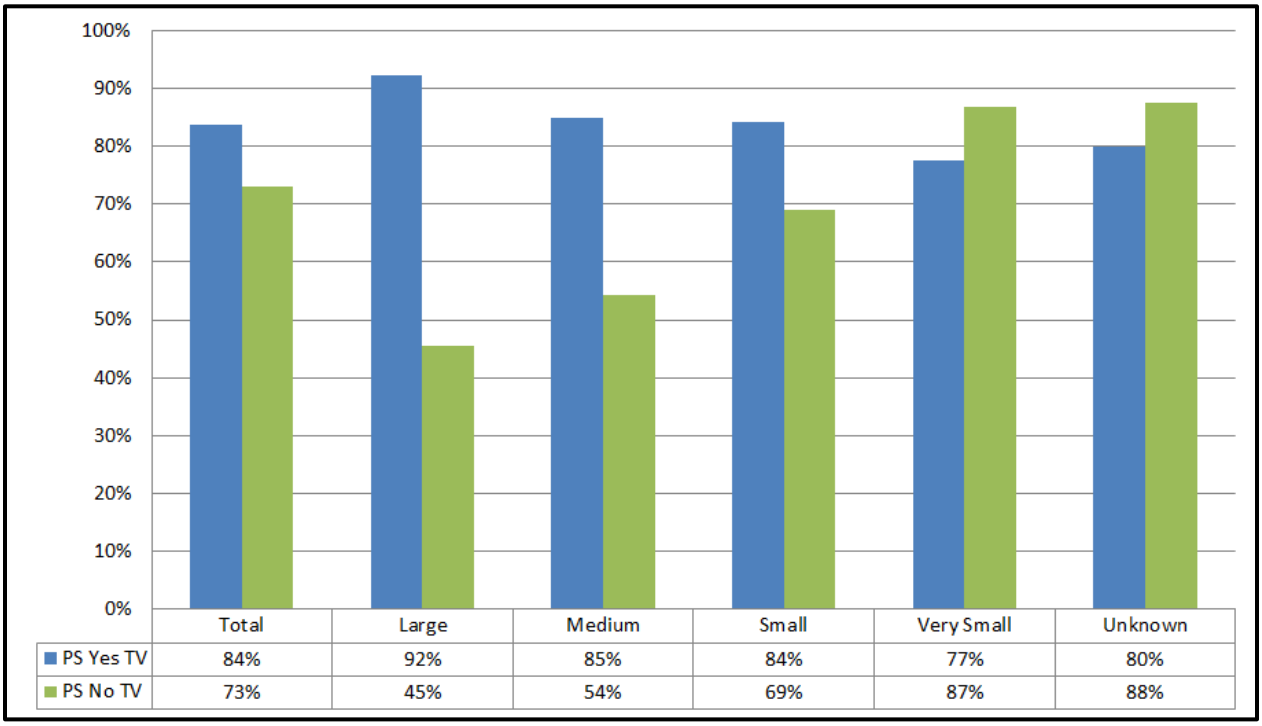
[5] The higher share of error for sites that stated that they did not have a TV may in part be explained by TV purchases between the time of the phone survey and the on-site survey.

Table 13-22: Comparison of Television Present in Facility Between the Phone and On-site Surveys by Business Size*

Phone Survey	On-site	Total	Large	Medium	Small	Very Small	Unknown
PS – Yes TV	TV found	84%	92%	85%	84%	77%	80%
PS – No TV	No TV found	73%	45%	54%	69%	87%	88%
PS – Yes TV	No TV found	16%	8%	15%	16%	23%	20%
PS – No TV	TV found	27%	55%	46%	31%	13%	13%

* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Figure 13-6: Sites Whose Phone Survey Response to the Presence of a TV was Verified as Correct during the On-site*



* Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

13.2.9 Comparison of Phone Survey to On-Site Survey Cooling Present

Table 13-23 presents the comparison of the phone and on-site findings for the presence of any cooling equipment in the facility. These data indicate that 91% of the businesses that reported that they had cooling equipment during the phone survey were found to have cooling on-site. Customers were less likely to be correct if they stated that they used no equipment to cool their

facility. Only 40% of the businesses that stated during the phone survey that they did not have cooling were found to actually have no equipment during the on-site. In total, approximately 83% of the phone survey respondents who also participated in the on-site survey correctly knew if they did or did not have cooling equipment.

The errors for customers that stated that they did not have cooling equipment and then were found to have equipment on-site may be explained, in part, by new purchases between the time of the phone survey and the on-site survey. Another potential source of disparity is the wording of the phone survey question, which directly asks what kind of equipment is *used to cool the facility*, rather than simply asking if cooling equipment is present. If a site has cooling equipment, but does not use the equipment to cool their facility, they may have replied that they did not have equipment, leading to a disproportionate error for businesses that stated that they did not use equipment to cool their facility. In a temperate climate like some areas of California, where cooling may not be crucial, it is very important to carefully word questions concerning the presence of cooling equipment.

Table 13-23: Comparison of Cooling Present in the Facility Between the Phone and On-site Surveys

	OS – Cooling Found		OS – No Cooling Found		Totals	
Cooling Present?	**Sites**	**Percentages**	**Sites**	**Percentages**	**Sites**	**Percentages**
PS – Yes, Cooling	980	91%	102	9%	1082	100%
PS – No Cooling	112	60%	76	40%	188	100%