

CALMAC Study ID: CPU0019.02

Small Commercial Contract Group Direct Impact Evaluation Report

Appendices A-D



Prepared by
Itron, Inc.
ECONorthwest
KEMA Inc.
PA Consulting
Summit Blue
Robert Thomas Brown Co.

For the
California Public Utilities Commission
Energy Division

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Appendix A

Telephone Survey Instruments

**06-08 Small Commercial Contract Group
CFL 90/10 and Lighting Logger Recruitment**

INTRODUCTION AND FINDING CORRECT RESPONDENT

OUTCOME1

This is %n calling on behalf of the CPUC, California Public Utilities Commission from ITRON, Incorporated. THIS IS NOT A SALES CALL NOR A SERVICE CALL. Recently, we started a study with ...on ENERGY EFFICIENCY PROGRAMS for the CPUC and we would like to complete this study at this time. May I please speak with the person at your organization that is most knowledgeable about your organization's lighting equipment and bulb replacement. This could include fixtures and or bulbs. Our records show that to be.....<%CONTACT> ...

[IF NEEDED] This is not a sales call.

[IF NEEDED] This is a fact-finding survey only, authorized by the California Public Utilities Commission. The CPUC wants to better understand how businesses like yours think about and manage their energy consumption.

1	No, that person is not available right now	Appoint
2	Unable to refer someone who can help	Appoint
3	Yes, that would be me	S1
4	Yes, let me transfer you to _____.	Q1C
5	Our property management handles this.	Prop
77	No, Other reason (specify)	Q1B
88	Refused	Q1B
99	Don't know	Q1B

Ask if OUTCOME1=5

Prop1 Could you give me the name and telephone number of your property manager?

77	Record name and telephone number	FM050
88	Refused	FM050
99	Don't know	FM050

Appoint [IF RECOMMENDED CONTACT IS NOT CURRENTLY AVAILABLE]
When would be a good day and time for us to call back?

77	Record day of the week, time of day and date to call back, as &APPOINT	Name
88	Refused	Thank & Terminate
99	Don't know	Name

PERSON Are you the person most knowledgeable about your organization's lighting purchases?

1	Yes	Intro3:s
2	No	Hi
3	No one knows about the lighting purchases	Intro3(99)

	If Person(3)	
Intro3(99)	Thank you for your time. We need to speak with the person at your organization that is most familiar with your lighting purchases. Those are all of the questions I have for you today.	Abandoned User30

Hi Who would be the person at this location who is most knowledgeable about your organizations' lighting purchases?[Enter technical Contact Name and move on.]

77	Record Name, as &CONTACT	May I
88	Refused	Thank & Terminate
99	Don't know	Ext

May I May I speak with him/her?

77	Yes	Intro3:s
88	No (not available right now@, set cb)	Abandoned Appointment

Intro3:s	Hello, my name is <INTERVIEWER NAME> calling on behalf of the CPUC, California Public Utilities Commission from Itron Consulting. This is not a sales call. We are interest in speaking with the person most knowledgeable about you organization's lighting equipment, including either fixtures and/or bulb replacement. I was told that you are the person most knowledgeable about your lighting purchases. Is this correct?	
1	Yes	COMMENT
2	No	Thank & Terminate
99	No one knows about the lighting purchases	Thank & Terminate

Ext Is there a phone extension or phone number you recommend we use when we call back?

77	Record Extension or Phone Number, &PHONE	Thank & Terminate
88	Refused	Thank & Terminate
99	Don't know	Thank & Terminate

**06-08 Small Commercial Contract Group
CFL 90/10 and Lighting Logger Recruitment**

Thank & Terminate Thank you for your time and help today. END

Q1B [IF YOU ARE TRANSFERRED TO ANOTHER PERSON OTHER THAN THE BEST CONTACT]
Who would be the person at this location who is most knowledgeable about your organizations' lighting purchases.
[IF NEEDED] This is not a sales call.
[IF NEEDED] This is a fact-finding survey only, and responses will not be connected with your firm in any way. The California Public Utilities Commission wants to better understand how businesses think about and manage their energy consumption.

77	There is no one here who can help you	T&T
1	Continue Q1B until you find appropriate contact person, record as &CONTACT	Q1C

[IF BEST CONTACT IS AVAILABLE]

Q1C Hello Mr./Mrs. &CONTACT, this is <INTERVIEWER NAME> calling on behalf of the California Public Utilities Commission from Itron Incorporated. I understand you are the person at your location that is most knowledgeable about your lighting purchases. Is this correct?

1	Current individual is best contact	S1
2	Transferred to best contact	Repeat Q1C w/best contact
3	Given best contact's name and number	Appoint
99	Don't know/refused	T&T

Before we start, I would like to inform you that for quality control purposes, this call may be monitored by my supervisor.

Today we're conducting a very important study on the energy needs and perceptions of organizations like yours. We are interested in how organizations like yours think about and manage their energy consumption.

Your input will allow the California Public Utilities Commission to build and maintain better energy savings programs.

This is a fact-finding survey only, and responses will not be connected with your organization in any way.

SCREENER

Scrn_Addr First, I'd like to ask you a few questions about your organization and facility. Our records show your firm is located at &SERV_ADDR in &CITY. Is that correct?
[CONTINUE IF ADDRESS REPORTED BY RESPONDENT IS SIMILAR ENOUGH]

1	Yes	S4
2	No	CORRECT
88	Refused	COMMENT
99	Don't know	COMMENT

COMMENT We were attempting to reach the customer at &ADDRESS and since you cannot confirm this address, those are all the questions that we have for you today, on behalf of the California Public Utilities Commission, thank you for your time.

CORRECT May I have your correct address?
&CORRECT Corrected Address **COMPARE**

Are these addresses similar or totally different?
COMPARE Computer Address - &ADDRESS
Corrected Address - &CORRECT

1	Similar	COMMENT1
2	Totally Different	COMMENT2

COMMENT2 We were attempting to reach the customer at &ADDRESS in &CITY and since that does not match your address, then we must have misdialed the telephone number. Those are all the questions that we have for you today, on behalf of the California Public Utilities Commission. Thank you for your time and cooperation.

Comment	The questions in this survey will refer to your "FACILITY," which means ALL of the buildings and tenants serviced by &UTILITY under the following billing address: &SERV_ADDR. [INTERVIEWERS SHOULD RE-READ THIS STATEMENT AS NEEDED THROUGHOUT THE SURVEY TO REMIND THE RESPONDENTS]
----------------	---

FM050 What is the main business ACTIVITY at your facility?

1	Offices (non-medical)	FM050a
2	Restaurant/Food Service	FM050b
3	Food Store (grocery/liquor/convenience)	FM050c
4	Agricultural (greenhouses)	FM050d
5	Retail Stores	FM050e
6	Warehouse	FM050f
7	Health Care	FM050g
8	Education	FM050h
9	Lodging (hotel/condos/rooms)	FM050i
10	Public Assembly (church, fitness, theatre, library, museum, convention)	FM050j
11	Services (gas, repair)	FM050k
12	Industrial (Manufacturing)	FM050l
13	Laundry	GL1
77	Other \ Do not use unless necessary	GL1
88	Refused	GL1
99	Don't Know	GL1

**06-08 Small Commercial Contract Group
CFL 90/10 and Lighting Logger Recruitment**

FM050a Which of the following types of offices best describes your facility? Would you say...[READ]

1	Administration and management	GL1
2	Financial / Legal	GL1
3	Insurance/Real Estate	GL1
4	Data Processing/Computer Center	GL1
5	Mixed-Use/Multi-tenant	GL1
6	Lab/R&D Facility	GL1
7	Software Development	GL1
8	Government Services	GL1
77	OPEN\DO NOT USE unless necessary	GL1
88	Refused	GL1
99	Don't know	GL1

FM050b Which of the following types of restaurants or food service best describes your facility? Would you say... [READ]

1	Fast Food or Self Service	GL1
2	Specialty/Novelty Food Service	GL1
3	Table Service	GL1
4	Bar/Tavern/Nightclub/Other entertainment	GL1
5	Other Food Service	GL1
88	Refused	GL1
99	Don't know	GL1

FM050c Which of the following types of food stores best describes your facility? Would you say...[READ]

1	Supermarkets	GL1
2	Small General Grocery	GL1
3	Specialty/Ethnic Grocery	GL1
4	Convenience Store	GL1
5	Liquor Store	GL1
77	OPEN\DO NOT USE unless necessary	GL1
88	Refused	GL1
99	Don't know	GL1

FM050d What type of agricultural facility is this? [READ]

1	Commercial Greenhouse	GL1
77	OPEN\Describe type of agricultural facility	GL1
88	Refused	GL1
99	Don't know	GL1

FM050e Which of the following types of retail store best describes your facility? Would you say... [READ]

1	Department / Variety Store	GL1
2	Retail Warehouse/Club	GL1
3	Shop in Enclosed Mall	GL1
4	Shop in Strip Mall	GL1
5	Auto Sales	GL1
77	OPEN\DO NOT USE unless necessary	GL1
88	Refused	GL1
99	Don't know	GL1

FM050f Which of the following types of warehouses best describes your facility? Would you say... [READ]

1	Refrigerated Warehouse	GL1
2	Unconditioned Warehouse, High Bay (lighting higher than 13 ft)	GL1
3	Unconditioned Warehouse, Low Bay	GL1
4	Conditioned Warehouse, High Bay (lighting higher than 13 ft)	GL1
5	Conditioned Warehouse, Low Bay	GL1
77	OPEN\DO NOT USE unless necessary	GL1
88	Refused	GL1
99	Don't know	GL1

FM050g Which of the following types of health care centers best describes your facility? Would you say... [READ]

1	Hospital	GL1
2	Nursing Home	GL1
3	Medical/Dental Office	GL1
4	Clinic/Outpatient Care	GL1
5	Medical/Dental Lab	GL1
77	OPEN\DO NOT USE unless necessary	GL1
88	Refused	GL1
99	Don't know	GL1

FM050h Which of the following types of educational centers best describes your facility? Would you say... [READ]

1	Daycare or Preschool	GL1
2	Elementary School	GL1
3	Middle / Secondary School	GL1
4	College or University	GL1
5	Vocational or Trade School	GL1
77	OPEN\DO NOT USE unless necessary	GL1
88	Refused	GL1
99	Don't know	GL1

**06-08 Small Commercial Contract Group
CFL 90/10 and Lighting Logger Recruitment**

FM050i Which of the following types of lodging best describes your facility? Would you say... [READ]

1	Hotel	GL1
2	Motel	GL1
3	Resort	GL1
77	OPEN\DO NOT USE unless necessary	GL1
88	Refused	GL1
99	Don't know	GL1

FM050j Which of the following types of public assembly buildings best describes your facility? Would you say... [READ]

1	Religious Assembly (worship only)	GL1
2	Religious Assembly (mixed use)	GL1
3	Health/Fitness Center	GL1
4	Movie Theaters	GL1
5	Theater / Performing Arts	GL1
6	Library / Museum	GL1
7	Conference/Convention Center	GL1
8	Community Center	GL1
77	OPEN\DO NOT USE unless necessary	GL1
88	Refused	GL1
99	Don't know	GL1

FM050k Which of the following types of service buildings best describes your facility? Would you say...[READ]

1	Gas Station / Auto Repair	GL1
2	Gas Station w/Convenience Store**	GL1
3	Repair (Non-Auto)	GL1
77	OPEN\Record Other Service Shop	GL1
88	Refused	GL1
99	Don't know	GL1

FM050l Which of the following types of buildings best describes your facility? Would you say...[READ]

1	Assembly / Light Manufacturing.	FM050m
2	Police / Fire Stations	FM050m
3	Post Office	FM050m
77	OPEN\Record other building type	FM050m
88	Refused	FM050m
99	Don't know	FM050m

ASK if OUTCOME1~=5 else skip to PC2

First I have a few general questions about your firm's lighting purchases. [We are not selling anything]

GL1 Who purchases the lighting for your facility? [Allow multiple responses]

1	Self or other employee	GL2
2	Contractor	Con1
3	Property Manager	Prop2
77	OPEN\Other-record	S1
88	Refused	S1
99	Don't know	S1

Ask if they respond to more than one answer in GL1

GL1a Who purchases the MAJORITY of your lighting versus secondary lighting purchases?

	Record response	Prop1
88	Refused	Prop1
99	Don't know	Prop1

Ask if GL1=3 and OUTCOME1~=5

Prop1 Could you give me the name and telephone number of your property manager?

77	Record name and telephone number	PC2
88	Refused	PC2
99	Don't know	PC2

PC2 Does your business occupy your entire building?

1	Yes	PC3
2	No	PC3
88	Refused	PC3
99	Don't know	PC3

PC3 Which of the following best describes how your property manager replaces burned out bulbs?

1	They leave spare lighting for you to replace as needed	S1
2	They come out and replace each time a bulb burns out	S1
3	They come out and replace after a few bulbs burn out	S1
77	OPEN\Other-schedule	S1
88	Refused	S1
99	Don't know	S1

Ask if GL1=2

Con1Name Could you give me the name of your contractor?

77	Record name	Con2
88	Refused	Con2
99	Don't know	Con2

Ask if GL1=2

Con1Phone Could you give me the telephone number of your contractor?

77	Record telephone number	Con2
88	Refused	Con2
99	Don't know	Con2

Ask if GL1=2

Con2 Which of the following best describes how your contractor replaces burned out bulbs?

1	They leave spare lighting for you to replace as needed	S1
2	They come out and replace each time a bulb burns out	S1
3	They come out and replace after a few bulbs burn out	S1
77	OPEN\Other-schedule	S1
88	Refused	S1
99	Don't know	S1

Ask GL2-GL3b if GL1=1

GL2 Which of the following best describes your lighting purchases?

1	You buy lighting as it burns out	GL3
2	You buy lighting in bulk	GL3
3	You buy lighting on a regular schedule	GL3
4	You buy lighting in bulk on a regular schedule	GL3
77	OPEN\Other-schedule	GL3
88	Refused	GL3
99	Don't know	GL3

GL3 Where does your firm make the MAJORITY of the lighting purchases?

1	Drug Stores	GL3a
2	Grocery Stores	GL3a
3	Convenience Stores	GL3a
4	Small Hardware Stores	GL3a
5	Large Hardware Stores (Home Depot, Lowes)	GL3a
6	Club Stores (Costco, Sam's Club)	GL3a
7	Online	GL3b
8	Directly from distributor or contractor	GL3a
9	Mass merchandise stores (Target/Walmart/Staples)	GL3a
10	Lighting stores	GL3a
11	Electronic stores (Frys, Best buy)	GL3a
12	Discount stores (Smart & Final, 99 Cents store)	GL3a
77	OPEN\Other-record	GL3a
88	Refused	GL3a
99	Don't know	GL3a

ASK IF GL3 = 7

GL3b Which websites do you order from?

77	Record Response	GL3a
88	Refused	GL3a
99	Don't know	GL3a

GL3a Where else do you make lighting purchases?

1	Drug Stores	S1
2	Grocery Stores	S1
3	Convenience Stores	S1
4	Small Hardware Stores	S1
5	Large Hardware Stores (Home Depot, Lowes)	S1
6	Club Stores (Costco, Sam's Club)	S1
7	Online	GL3c
8	Directly from distributor or contractor	S1
9	Mass merchandise stores (Target/Walmart/Staples)	S1
10	Lighting stores	S1
11	Electronic stores (Frys, Best buy)	S1
12	Discount stores (Smart & Final, 99 Cents store)	S1
66	No Where Else	S1
77	OPEN\Other-record	S1
88	Refused	S1
99	Don't know	S1

ASK IF GL3a = 7

GL3c Which websites do you order form?

77	Record Response	S1
88	Refused	S1
99	Don't know	S1

ASK ALL

S1 Before we get started, I would like to ask you a few questions about your awareness of different types of light bulbs, Before this call today, had you ever heard of CFLs...compact fluorescent bulbs?

1	Yes	S3
2	No	S2
88	Refused	S2
99	Don't know	S2

**06-08 Small Commercial Contract Group
CFL 90/10 and Lighting Logger Recruitment**

Compact fluorescent light bulbs, also known as CFLs, usually do not look like regular incandescent bulbs. The most common type of CFL S2 is made with a glass tube bent into a spiral, resembling a soft-serve ice cream, and it fits in a regular light bulb socket. Before today, were you familiar with CFLs?

1	Yes	S3
2	No	ZOTH1
88	Refused	ZOTH1
99	Don't know	ZOTH1

Throughout this survey, we will be discussing the CFLs you currently have installed throughout your facility and then we will be discussing the CFLs you have purchased since 2006. I understand that this is a long period of time so please use your best approximation if you are unsure of the exact answer.

S3 Do you currently have any CFLs installed inside or outside your facility? This does not include CFLs in storage or any CFLs that are not in a fixture.

1	Yes	S3a
2	No	S4
88	Refused	S4
99	Don't know	S4

S3a There are two types of Compact fluorescent light bulbs... they usually do NOT look like regular incandescent bulbs. The screw-in types that you install like a regular incandescent bulb and are frequently made with a glass tube bent into a spiral, resembling a soft serve ice cream the pin-based types that you "push in" to install. These pin-based cfls can NOT be interchanged with regular incandescent bulbs. Which types of CFLs do you have INSTALLED in your facility, screw-in, pin-based or both?

1	Screw in	AA1
2	Pin based	S4
3	Both	S4
4	Neither	S4
88	REFUSED	S4
99	DON'T KNOW	S4

For the balance of this study, we will only be interested in the SCREW IN type of CFLS. When answering the following questions, please disregard any PIN@-based CFLs you may have installed at your facility.

Ask If S3=2

S4 Do you have any regular screw in light bulbs (medium screw base incandescent) installed inside or outside your facility?

1	Yes	ZOTH1
2	No	ZOTH1
88	Refused	ZOTH1
99	Don't know	ZOTH1

Ask all

AA1 How many CFLs do you have installed in windowed offices?

	Record number of bulbs	AA2
66	Not applicable	AA2
88	Refused	AA2
99	Don't know	AA2

Ask all

AA2 How many CFLs do you have installed in non-windowed offices?

	Record number of bulbs	AA3
66	Not applicable	AA3
88	Refused	AA3
99	Don't know	AA3

Ask all

AA3 How many CFLs do you have installed in hallways?

	Record number of bulbs	AA4
66	Not applicable	AA4
88	Refused	AA4
99	Don't know	AA4

Ask all

AA4 How many CFLs do you have installed in storage areas?

	Record number of bulbs	AA5
66	Not applicable	AA5
88	Refused	AA5
99	Don't know	AA5

Ask if FM050=2

AA5 How many CFLs do you have installed in the kitchen?

	Record number of bulbs	AA6
66	Not applicable	AA6
88	Refused	AA6
99	Don't know	AA6

**06-08 Small Commercial Contract Group
CFL 90/10 and Lighting Logger Recruitment**

Ask if FM050=2

AA6 How many CFLs do you have installed in the dining area?

	Record number of bulbs	AA7
66	Not applicable	AA7
88	Refused	AA7
99	Don't know	AA7

Ask if FM050=3, 5

AA7 How many CFLs do you have installed in retail space?

	Record number of bulbs	AA8
66	Not applicable	AA8
88	Refused	AA8
99	Don't know	AA8

Ask if FM050=6

AA8 How many CFLs do you have installed in the warehouse?

	Record number of bulbs	AA9
66	Not applicable	AA9
88	Refused	AA9
99	Don't know	AA9

Ask if FM050=7

AA9 How many CFLs do you have installed in patient/exam rooms?

	Record number of bulbs	AA10
66	Not applicable	AA10
88	Refused	AA10
99	Don't know	AA10

Ask if FM050=8

AA10 How many CFLs do you have installed in classrooms?

	Record number of bulbs	AA11
66	Not applicable	AA11
88	Refused	AA11
99	Don't know	AA11

Ask if FM050=9

AA11 How many CFLs do you have installed in the lobby?

	Record number of bulbs	AA12
66	Not applicable	AA12
88	Refused	AA12
99	Don't know	AA12

Ask if FM050=9

AA12 How many CFLs do you have installed in guestrooms?

	Record number of bulbs	AA13
66	Not applicable	AA13
88	Refused	AA13
99	Don't know	AA13

Ask all

AA13 How many CFLs do you have installed in restrooms?

	Record number of bulbs	AA14a_1
66	Not applicable	AA14a_1
88	Refused	AA14a_1
99	Don't know	AA14a_1

Ask all

AA14a_1 Do you have CFLs installed in other areas we haven't discussed?

1	No where else	AB1
77	OPEN\First Other Location - describe	AA14a_2
88	Refused	AB1
99	Don't know	AB1

[ASK IF AA14a_1 = 77]

AA14a_2 How many CFLs do you have installed in this area?

1	Record number of bulbs	AA14b_1
66	Not applicable	AA14b_1
88	Refused	AA14b_1
99	Don't know	AA14b_1

[ASK IF AA14a_1 = 77]

AA14b_1 Do you have CFLs installed in another area we haven't discussed?

	No where else	AB1
77	OPEN\SECOND Other Location @- describe	AA14b_2
88	Refused	AB1
99	Don't know	AB1

[ASK IF AA14b_1 = 77]

AA14b 2 How many CFLs do you have installed in this area?

	Record number of bulbs	AB1
66	Not applicable	AB1
88	Refused	AB1
99	Don't know	AB1

[ASK IF AA14b_1 = 77]

AA14c 1 Do you have CFLs installed in another area we haven't discussed?

	No where else	AB1
77	OPEN\SECOND Other Location @- describe	AA14b_2
88	Refused	AB1
99	Don't know	AB1

[ASK IF AA14c_1 = 77]

AA14c 2 How many CFLs do you have installed in this area?

	Record number of bulbs	AB1
66	Not applicable	AB1
88	Refused	AB1
99	Don't know	AB1

AB1 In the past two years have you removed any CFLs before they burned out?

1	Yes	AB2
2	No	CC1a
88	Refused	CC1a
99	Don't Know	CC1a

AB2 Why did you remove them before they burned out?

1	Didn't like color	CC1a
2	Took too long to start up	CC1a
3	Wasn't bright enough	CC1a
4	Didn't like the way it looked	CC1a
5	Didn't fit	CC1a
6	Made noise/buzzed	CC1a
7	Didn't work in dimmer switch	CC1a
8	Wasn't available in 3-way	CC1a
77	OPEN\RECORD Reason	CC1a
88	Refused	CC1a
99	Don't know	CC1a

Ask if GL1=3

I understand that most of your lighting purchased are made by your property manager, but has anyone in your office purchased any CFLs on their own for your facility at a retail store since 2006?

CC1a

1	Yes	C1
2	No	C1
88	Refused	C1
99	Don't know	C1

Ask if GL1=2

I understand that most of your lighting purchases are made by your contractor but has anyone at your firm purchased any CFLs on their own for your facility at a retail store since 2006?

CC1aa

1	Yes	C1
2	No	C1
88	Refused	C1
99	Don't know	C1

Ask if GL1 = 1

Earlier you stated that your firm purchased most of you general lighting equipment needs from <GL3>. Now I would like to find out if your firm has acquired any CFL since January 2006...

C1

1	Through a utility giveaway	RET1
2	A contractor	RET1
3	Property management	RET1
4	A retail store	RET1
5	A friend or family member	RET1
66	None of these	RET1
77	Open/Somewhere else	RET1
88	Refused	RET1
99	Don't know	RET1

[READ if GL1=2,3] Previously we were discussing general lighting purchases for your business. Now I would to discuss specifically CFLs obtained for your business since 2006.

Ask if GL1 =2,3

RET1 Has any one at your firm purchased CFLS from a retail store for your business since 2006?

1	Yes	RET2
2	No	RET2
88	Refused	RET2
99	Don't know	RET2

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RET2 Have you received any CFLs from a utility giveaway since 2006 for your business?		
1	Yes	RET2a
2	No	RET3
88	Refused	RET3
99	Don't know	RET3

ASK IF RET2=1

RET2a From which UTILITY did you receive the CFLs?		
1	PGE	C1a
2	SDGE	C1a
3	SCE	C1a
77	OPEN\OTHER UTILITY	C1a
88	Refused	C1a
99	Don't Know	C1a

C1a How many CFLs were given to you through the utility giveaway?		
1	Record number of CFLs	RET3
88	Refused	RET3
99	Don't Know	RET3

RET3 Have you received any CFLs from a CONTRACTOR since 2006 for your business?		
1	Yes	RET3a
2	No	RET4
88	Refused	RET4
99	Don't know	RET4

RET3a How many CFLs were given to you by your contractor?		
1	Record number of CFLs	RET4
88	Refused	RET4
99	Don't Know	RET4

RET4 Have you received any CFLs from a PROPERTY MANAGER since 2006 for your business??		
1	Yes	RET4a
2	No	RET5
88	Refused	RET5
99	Don't know	RET5

RET4a How many CFLs were given to you from your property manager?		
1	Record number of CFLs	RET5
88	Refused	RET5
99	Don't Know	RET5

RET5 Have you received any CFLs from a friend or family member since 2006 for your business?		
1	Yes	C1aa
2	No	RET6
88	Refused	RET6
99	Don't know	RET6

ASK IF RET5=1

C1aa How many CFLs were given to you from family and friends?		
1	Record number of CFLs	RET6
88	Refused	RET6
99	Don't Know	RET6

RET6 From what other sources have you obtained CFLs since 2006 for your business?		
1	None	RET6a
77	OPEN\RECORD SOURCE	CC1b
88	Refused	CC1b
99	Don't know	CC1b

RET6a How many CFLs were given to you from this/these source(s)?		
1	Record number of CFLs	CC1b
88	Refused	CC1b
99	Don't Know	CC1b

ASK if CC1a=1, CC1aa=1, or RET1=1

Now I am going to ask you about your recent CFL purchases

CC1b How many CFLs has your organization purchased since January 1, 2006 from retail stores? If a package contained multiple CFLs, please count each bulb separately.

1	Record Response (in number of bulbs)	C2006
88	Refused	C2006
99	Don't know	C2006

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Of these <CC1>b bulbs that you purchased in retail stores, adding up to 100 percent, what percent of these CFLs do you think that you purchased in each of the years 2006, 2007, and 2008?

C2006 Could you tell me approximately how many CFLs were purchased in 2006 in retail stores?

1	Record number of bulbs	C2007
88	Refused	C2007
99	Don't know	C2007

C2007 Could you tell me approximately how many CFLs were purchased in 2007 in retail stores?

1	Record number of bulbs	C2008
88	Refused	C2008
99	Don't know	C2008

C2008 Could you tell me approximately how many CFLs were purchased in 2008 in retail stores?

1	Record number of bulbs	CFL_1a
88	Refused	CFL_1a
99	Don't know	CFL_1a

Thank you for giving us these counts...we understand that they are your best estimate. We now would like to account for these <CC1b> CFL bulbs to the best of your knowledge.

CFL_1a Where did you purchase the majority of these bulbs? We are looking for up to 2 different retail stores.

1	\$1 Super Store	C2
2	98 Cent World	C2
3	99 Cent Depot	C2
4	99 Cent Mart	C2
5	99 Cents Only	C2
6	99 Cents Outlet Plus	C2
7	99 Cents Plus	C2
8	99 Ranch	C2
9	Ace Hardware	C2
10	Ace Maintenance Mart	C2
11	Albertson's/Lucky	C2
12	All American Home Center	C2
13	Arcadia Market	C2
14	B & B Hardware	C2
15	Best Way Supermarket	C2
16	Big A Drugs	C2
17	Big Lots	C2
18	Big Save 98 Cents	C2
19	Big Saver Food	C2
20	Cal Do It Center	C2
21	Cardenas Market	C2
22	Cole Hardware	C2
23	Contractor's Warehouse	C2
24	Costco	C2
25	CVS/Sav-On Drugs	C2
26	D & M Gift Store	C2
27	Del Mar Supermarket	C2
28	Discount Club 3	C2
29	Dixieline Lumber	C2
30	Dollar Club	C2
31	Dollar K	C2
32	Dollar Mart	C2
33	Dollar Tree	C2
34	Drug Emporium	C2
35	El Toro Market	C2
36	El Valle Discount	C2
37	Food 4 Less	C2
38	Foothill Builders Mart	C2
39	Friedman Brothers Hardware	C2
40	Fry's Electronics	C2
41	Ganahl Lumber	C2
42	Giant Bargain	C2
43	Grant's Hardware	C2
44	Grocery Outlet	C2
45	Hannam Market	C2
46	Hawaii Supermarket	C2
47	Henry's Farmers Market	C2
48	Home Depot	C2
49	Hong Kong Market	C2
50	JC 98 Cents Plus	C2
51	Jumbo 99	C2
52	Lamps Plus	C2
53	Light Bulbs Etc.	C2
54	Light Bulbs Unlimited	C2
55	Light Concern	C2
56	Lion Foods	C2
57	Long's Drugs	C2
58	Lowe's	C2
59	Marukai Market	C2
60	Northgate Markets	C2
61	Orchard Supply	C2

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62	Payless Foods	C2
63	Q Bargain	C2
64	Qualy Electric Supply Inc.	C2
65	Ralph's	C2
66	Rite Aid	C2
67	San Gabriel Superstore	C2
68	Shun Fat Supermarket	C2
69	Smart & Final	C2
70	Stater Bros	C2
71	Super 99	C2
72	Super Bargain Inc.	C2
73	Superco Home Theater & Appliances	C2
74	Superfood Warehouse	C2
75	Superior Super	C2
76	T.S. Emporium	C2
77	Tashman's Hardware	C2
78	Tawa Supermarket	C2
79	Todo \$1 Only Store	C2
80	Top Fancy Lighting	C2
81	True Value Hardware	C2
82	Under \$1 Store	C2
83	Valley Thrift Store	C2
84	Victor's Lighting	C2
85	Walgreen's	C2
86	Wal-Mart	C2
87	Winco Foods	C2
88	Target	C2
89	Sam's Club	C2
90	OPEN/Other-RECORD	CFL_1b
98	Refused	CFL_1b
99	Don't Know	CFL_1b

Ask if CFL_1a=90, 99

CFL 1b What is the store type? [ACCEPT MULTIPLES]

1	Discount (such as 99 Cent, Dollar Store)	C2
2	Grocery	C2
3	Small Hardware	C2
4	Lighting & Electronics	C2
5	Drug	C2
6	Large Home Improvement (such as Home Depot, Lowe's)	C2
7	Mass Merchandise (such as Wal-Mart, Target)	C2
8	Membership Stores (such as Costco, Sam's Club)	C2
77	OPEN/Other RECORD STORE TYPE	C2
88	REFUSED	C2
99	DONT KNOW	C2

CFL 2a What was the second retail store?

1	\$1 Super Store	
2	98 Cent World	
3	99 Cent Depot	
4	99 Cent Mart	
5	99 Cents Only	
6	99 Cents Outlet Plus	
7	99 Cents Plus	
8	99 Ranch	
9	Ace Hardware	
10	Ace Maintenance Mart	
11	Albertson's	
12	All American Home Center	
13	Arcadia Market	
14	B & B Hardware	
15	Best Way Supermarket	
16	Big A Drugs	
17	Big Lots	
18	Big Save 98 Cents	
19	Big Saver Food	
20	Cal Do It Center	
21	Cardenas Market	
22	Cole Hardware	
23	Contractor's Warehouse	
24	Costco	
25	CVS/Sav-On Drugs	
26	D & M Gift Store	
27	Del Mar Supermarket	
28	Discount Club 3	
29	Dixieline Lumber	
30	Dollar Club	
31	Dollar K	
32	Dollar Mart	
33	Dollar Tree	
34	Drug Emporium	

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35	El Toro Market	
36	El Valle Discount	
37	Food 4 Less	
38	Foothill Builders Mart	
39	Friedman Brothers Hardware	
40	Fry's Electronics	
41	Ganahl Lumber	
42	Giant Bargain	
43	Grant's Hardware	
44	Grocery Outlet	
45	Hannam Market	
46	Hawaii Supermarket	
47	Henry's Farmers Market	
48	Home Depot	
49	Hong Kong Market	
50	JC 98 Cents Plus	
51	Jumbo 99	
52	Lamps Plus	
53	Light Bulbs Etc.	
54	Light Bulbs Unlimited	
55	Light Concern	
56	Lion Foods	
57	Long's Drugs	
58	Lowe's	
59	Marukai Market	
60	Northgate Markets	
61	Orchard Supply	
62	Payless Foods	
63	Q Bargain	
64	Qualy Electric Supply Inc.	
65	Ralph's	
66	Rite Aid	
67	San Gabriel Superstore	
68	Shun Fat Supermarket	
69	Smart & Final	
70	Stater Bros	
71	Super 99	
72	Super Bargain Inc.	
73	Superco Home Theater & Appliances	
74	Superfood Warehouse	
75	Superior Super	
76	T.S. Emporium	
77	Tashman's Hardware	
78	Tawa Supermarket	
79	Todo \$1 Only Store	
80	Top Fancy Lighting	
81	True Value Hardware	
82	Under \$1 Store	
83	Valley Thrift Store	
84	Victor's Lighting	
85	Walgreen's	
86	Wal-Mart	
87	Winco Foods	
88	Target	
89	Sam's Club	
90	OPEN\Other-RECORD	
98	Refused	
99	Don't Know	

Ask if CFL_1b=90, 91,98, 99

CFL_2b What is the store type?

1	Discount (such as 99 Cent, Dollar Store)	C2_1
2	Grocery	C2_1
3	Small Hardware	C2_1
4	Lighting & Electronics	C2_1
5	Drug	C2_1
6	Large Home Improvement (such as Home Depot, Lowe's)	C2_1
7	Mass Merchandise (such as Wal-Mart, Target)	C2_1
8	Membership Stores (such as Costco, Sam's Club)	C2_1
77	OPEN\Other RECORD STORE TYPE	C2_1
88	REFUSED	C2_1
99	DON'T KNOW	C2_1

C2_1 Since 2006, how many PACKAGES of CFLS did you purchase at this first retail store?

	Record number of packages	C3_1
88	Refused	C4_1
99	Don't know	C4_1

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C3_1 How many CFLS bulbs were in each package that you purchased from ...this store...?		
	Record number of bulbs per package	C4_1
88	Refused	C4_1
99	Don't know	C4_1

C4_1 Approximately what was the price of the package?		
	Record price	CFL_2_1
88	Refused	CFL_2_1
99	Don't know	CFL_2_1

CFL_2_1 Did the CFL's have a sticker indicating a UTILITY instant rebate?		
1	Yes	CFL_3_1
2	No	CFL_2a_1
3	Some	CFL_3_1
88	Refused	CFL_2a_1
99	Don't know	CFL_2a_1

Ask if CFL_2_1 = 2, 88, or 99

CFL_2a_1 Were the CFLs discounted? (if needed: was there any signage at the store to indicate a rebate or discount?)		
1	Yes	C2_2
2	No	C2_2
88	Refused	C2_2
99	Don't know	C2_2

C2_2 Since 2006, how many PACKAGES of CFLS did you purchase at this first retail store?		
	Record number of packages	C3_2
88	Refused	C4_2
99	Don't know	C4_2

C3_2 How many CFLS bulbs were in each package that you purchased from ...this store...?		
	Record number of bulbs per package	C4_2
88	Refused	C4_2
99	Don't know	C4_2

C4_2 Approximately what was the price of the package?		
	Record price	CFL_2_2
88	Refused	CFL_2_2
99	Don't know	CFL_2_2

CFL_2_2 Did the CFL's have a sticker indicating a UTILITY instant rebate?		
1	Yes	CFL_3_2
2	No	CFL_2a_2
3	Some	CFL_3_2
88	Refused	CFL_2a_2
99	Don't know	CFL_2a_2

Ask if CFL_2_1 = 2, 88, or 99

CFL_2a_2 Were the CFLs discounted? (if needed: was there any signage at the store to indicate a rebate or discount?)		
1	Yes	CFL_3
2	No	CFL_3
88	Refused	CFL_3
99	Don't know	CFL_3

ASK ALL

CFL_3 Why did you purchase these CFLs? [OPEN END, MULTIPLE RESPONSE]		
1	Low Price	LII
2	Rebate/utility coupon	LII
3	Utility recommended	LII
4	Wanted to try	LII
5	Wanted long-life bulb	LII
6	To save energy/electricity	LII
7	To save money on electric bills	LII
8	Good for environment	LII
77	OPEN\Other-record	LII
88	Refused	LII
99	Don't know	LII

Ask ALL

Again talking about the <&CC1b> CFL's you have purchased since January 2006,

LII How many of these CFLs were actually installed?		
&LII	Bulbs Record number of bulbs	LI90
88	Refused	LI90
99	Don't know	LI90

LI90 How many of these <&CC1b> CFLs were placed in storage?		
&LI90	Bulbs Record number of bulbs	CFL_5
88	Refused	CFL_5
99	Don't know	CFL_5

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IF LI90>0

CFL_5 Why were they put in storage? [ACCEPT MULTIPLE RESPONSES. DO NOT READ]

1	To have them on hand if bulb burns out	CFL_6
2	Purchased more CFLs than needed	CFL_6
3	Bought them in bulk	CFL_6
4	Bought them on sale	CFL_6
5	Can't use them in certain rooms	CFL_6
6	Can't use them in certain applications (e.g. dimmer switch)	CFL_6
7	Didn't like having them installed	CFL_6
77	OPEN\Other-RECORD	CFL_6
88	Don't Know	CFL_6
99	Refused	CFL_6

CFL_6 Were any of your CFLs installed at any other location?

1	Yes	LI91
2	No	CFL_FR1
3	There are no other locations	CFL_FR1
88	Refused	CFL_FR1
99	Don't know	CFL_FR1

LI91 Approximately how many of these CFLs were installed at another facility?

&LI91Bulbs	Record number of bulbs	LI92
88	Refused	LI92
99	Don't know	LI92

Ask if CFL_6=1 else skip to LII1

LI92 Was this facility inside or outside California?

1	Inside	LI91
2	Outside	LI92a
88	Refused	LI91
99	Don't know	LI91

LI92a Which State outside CA?

	Record State	LI91
88	Refused	LI91
99	Don't know	LI91

Ask if GI1~=2,3 else skip to CFL24

If <&LIIBulbs> + <&LI90Bulbs> + <&LI91Bulbs> < <&purchased> then ask LII1 else skip to LII2

We show that ... <%CC1B> bulbs were purchased <%LI1> bulbs were installed....<%LI90> were put into storage and <%LI91> bulbs were installed at another facility. That still leaves <%LI_DIFF> bulbs to account for. Do you think the other bulbs could have ...

1	Burned out	LII3
2	Stored somewhere else	LII4
3	Gave them away	LII5
4	Misplaced them	LII6
77	OPEN\OTHER-specify	LII7
88	Refused	LII3
99	Don't know	LII3

LII3 How many of these remaining <%LI_DIFF> bulbs burned out?

	Record number of bulbs	CFL24
88	Refused	CFL24
99	Don't know	CFL24

Ask if LII1=2

LII4 How many of these remaining <%LI_DIFF> bulbs were stored somewhere else?

	Record number of bulbs	LII4a
88	Refused	LII4a
99	Don't know	LII4a

LII4a Were they stored inside or outside of California?

1	Inside	LII5
2	Outside	LII4b
88	Refused	LII5
99	Don't know	LII5

LII4b In which states?

	Record state	LII5
88	Refused	LII5
99	Don't know	LII5

Ask if LII1=3

LII5 How many of these remaining <%LI_DIFF> bulbs were given away?

	Record number of bulbs	LII6
88	Refused	LII6
99	Don't know	LII6

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Ask if LI1=4

LI16 How many of these remaining <%LI_DIFF> bulbs were misplaced?

	Record number of bulbs	LI17
88	Refused	LI17
99	Don't know	LI17

Ask if LI1=77

LI17 How many of these remaining <%LI_DIFF> bulbs did you do something else with?

	Record number of bulbs	LI12
88	Refused	LI12
99	Don't know	LI12

If <&LI1Bulbs> + <&LI90Bulbs> > 110% X <&purchased> then ask LI2 else skip to CFL_5

We show that ... <%CC1B> bulbs were purchased....<%LI1> bulbs were installed....<%LI90> were put into storage and <%LI91> bulbs were installed at another facility. This adds up to more than we estimated you purchased. Please state which of the following best describes the number of CFLs we estimated for the purchase...

LI12 describes the number of CFLs we estimated for the purchase...

1	The number I originally stated that I purchased is correct. The individual numbers were just an estimate.	CFL24
2	The number I estimated for installed & stored is a correct	CFL24
77	OPEN\RECORD other answer	CFL24
88	Refused	CFL24
99	Don't know	CFL24

ASK ALL

CFL24 When you installed your CFLs, what kind of bulb/lamp did you replace?

1	Incandescent	LI30
2	CFLs	LI30
3	HID	LI30
4	Mercury vapor	LI30
77	OPEN\Other-RECORD	LI30
88	Refused	LI30
99	Don't Know	LI30

ASK IF RET1 = 1, CC1a = 1, or CC1a = 1

Considering the CFL installations we just discussed, approximately what percentage of the facility's lighting was affected by those

LI30 changes?

	% Percent	FR1_L
101	Refused	FR1_L
102	Don't know	FR1_L

FR1_L At the time that you purchased the CFLs, had you...? (READ LIST)

1	Already been thinking about purchasing CFLs?	FR4a_L
2	Already begun collecting information about CFLs?	FR4a_L
3	Already selected the particular CFLs you were going to get?	FR4a_L
77	OPEN\SOMETHING OTHER	FR4a_L
88	Refused	FR4a_L
99	Don't know	FR4a_L

FR4a_L If the CFLs had cost \$2 more PER BULB, would you still have purchased them?

1	Yes	FR4b_L
2	No	CFLa_FR5
88	Refused	FR4b_L
99	Don't Know	FR4b_L

FR4b_L Would you have purchased the CFLs at the same time as you did?

1	Yes	FR4c_L
2	No	FR4b1_L
88	Refused	FR4b1_L
99	Don't Know	FR4b1_L

FR4b1_L Would you have bought the ...CFLs... Earlier than you did or later?

1	Earlier	FR4b2_L
2	Same Time	FR4c_L
3	Later	FR4b2_L
88	Refused	FR4c_L
99	Don't Know	FR4c_L

FR4b2_L How much [earlier/later] would you have bought the CFLs?

	{RECORD RESPONSE} _____ Years (and/or) _____ Months	FR4c_L
88	Refused	FR4c_L
99	Don't know	FR4c_L

FR4c_L If the CFLs had cost \$2 more per bulb, would you have purchased the same quantity as you did?

1	More	FR4c1_L
2	Same quantity	FR4e_L
3	Less	FR4c1_L
88	Refused (SKIP TO FR4d)	FR4e_L
99	Don't Know (SKIP TO FR4d)	FR4e_L

FR4c1_L How much [more/less] would you have bought?

	{RECORD RESPONSE}	FR4e_L
88	Refused	FR4e_L
99	Don't know	FR4e_L

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FR4e L If the CFLs had cost \$2 more per bulb, would you have done anything else differently?

1	Yes	FR4e_L1
2	No	FR5_L
88	Refused	FR5_L
99	Don't Know	FR5_L

FR4e L1 What would you have done differently?

77	OPEN\RECORD	FR5_L
88	REFUSED	FR5_L
99	DON'T KNOW	FR5_L

FR5_L If the bulbs had cost \$2 more PER BULB, Using a scale of zero to 10, where 0 is NOT AT ALL LIKELY and 10 is EXTREMELY LIKELY, how likely is it that you would have bought them?

1	NOT AT ALL LIKELY,2,3,4,5,6,7,8,9,10 EXTREMELY LIKELY	FR8_L
11	ZERO NOT AT ALL LIKELY	FR8_L
88	Refused	FR8_L
99	Don't Know	FR8_L

FR8 L How much more per bulb would you have been willing to pay?

	(RECORD RESPONSE) _____ (in \$)	FR9_L
88	Refused	FR9_L
99	Don't know	FR9_L

I'm going to read a couple statements to you about how you came to choose your CFLs. Using a scale of zero to 10, where 0 is DO NOT AT ALL AGREE and 10 is AGREE COMPLETELY, please tell me how much you agree with each of the following.

FR9 L If the CFLs had been \$2 more each, I would have paid the additional amount to buy the CFLs.

	DO NOT AT ALL AGREE,2,3,4,5,6,7,8,9,10 AGREE COMPLETELY	FR10_L
11	ZERO DO NOT AT ALL AGREE	FR10_L
88	Refused	FR10_L
99	Don't know	FR10_L

FR10_L There may have been several reasons for my purchase decision, but the price was a critical factor in my decision to purchase the CFLs.

	DO NOT AT ALL AGREE,2,3,4,5,6,7,8,9,10 AGREE COMPLETELY	FR11_L
11	ZERO DO NOT AT ALL AGREE	FR11_L
88	Refused	FR11_L
99	Don't know	FR11_L

FR11 L I would have bought CFLs within 2 years of when I did even if the price per CFL had been \$2 more per bulb..

	DO NOT AT ALL AGREE,2,3,4,5,6,7,8,9,10 AGREE COMPLETELY	C1a_L
11	ZERO DO NOT AT ALL AGREE	C1a_L
88	Refused	C1a_L
99	Don't know	C1a_L

CONSISTENCY CHECK & RESOLUTION

DEVELOPING PROGRAMMING TO TEST FOR INCONSISTENCIES BETWEEN RESPONSES IN THE FREE-RIDERSHIP BATTERY, C1 WILL TAKE PRECEDENCE OVER INCONSISTENT RESPONSES.

- IF FR4A = 1 AND FR5 = 0,1 AND FR10 = 9,10 AND FR11 = 0,1;
- IF FR4A = 2 AND FR5 = 9,10 AND FR10 = 0,1 AND FR11 = 9,10;
- IF FR5 = 0,1 AND FR4A = 1 AND FR10 = 0,1 AND FR11 = 9,10;
- IF FR5 = 9,10 AND FR4A = 2 AND FR10 = 9,10 AND FR11 = 0,1;
- IF FR10 = 0,1 AND FR4A = 2 AND FR5 = 0,1 AND FR11 = 0,1;
- IF FR10 = 9,10 AND FR4A = 1 AND FR5 = 9,10 AND FR11 = 9,10;
- IF FR11 = 9,10 AND FR4A = 2 AND FR5 = 0,1 AND FR10 = 9,10;
- IF FR11 = 0,1 AND FR4A = 1 AND FR5 = 9,10 AND FR10 = 0,1

Let me make sure I understand. In your own words, could you please describe how the price influenced your decision to purchase these

C1a_L CFLs?

77	OPEN\RECORD	V1a
88	Refused	V1a
99	Don't know	V1a

ROLE OF CONTRACTORS

ASK ALL

Now I would like to talk specifically about who installed your CFLs:

V1a Who installed your CFLs?

1	Contractor	V5
2	Property Manager	V46
3	Self-installation	L11
4	Other employee	L11
77	OPEN\Other-RECORD	L11
88	Refused	L11
99	[DO NOT READ] Don't know/No Answer	L11

Ask if V1a=1 else skip to V46

V5 Had you worked with this contractor before installing CFLs?

1	Yes	V40
2	No	V40
99	[DO NOT READ] Don't know/No Answer	V40

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V40 How important was the input from the contractor you worked with in deciding to install CFLs? Was it ...		
1	Very	V45_Name
2	Somewhat	V45_Name
3	Not at all important	V45_Name
66	They did not have any input.	V45_Name
88	Refused	V45_Name
99	Don't know	V45_Name

V45_Name Could I have the contact name of the contractor you used to install your CFLs?		
77	OPEN\RECORD CONTACT NAME	V45_Phone
88	Refused	V45_Phone
99	Don't know	V45_Phone

V45_Phone Do you have their phone number?		
77	OPEN\RECORD CONTACT PHONE	V45_City
88	Refused	V45_City
99	Don't know	V45_City

V45_City Do you know in which city they are located?		
77	OPEN\RECORD CONTACT CITY	V46
88	Refused	V46
99	Don't know	V46

Ask if V1a=2 else skip to V48

V46 How important was the input from your property manager in deciding to install CFLs? Was it ...		
1	Very	V47_Name
2	Somewhat	V47_Name
3	Not at all important	V47_Name
66	They did not have any input.	V47_Name
88	Refused	V47_Name
99	Don't know	V47_Name

V47_Name Could I have the contact name for your property manager?		
77	OPEN\RECORD CONTACT NAME	V47_Phone
88	Refused	V47_Phone
99	Don't know	V47_Phone

V47_Phone Do you have their phone number?		
77	OPEN\RECORD CONTACT PHONE	V47_City
88	Refused	V47_City
99	Don't know	V47_City

V47_City Do you know in which city they are located?		
77	OPEN\RECORD CONTACT CITY	L1
88	Refused	L1
99	Don't know	L1

COMMENT Now I would like to discuss other types of lighting in your facility.

L1 Do you have linear fluorescents installed in your facility?		
1	Yes	L1a
2	No	HB1
88	Refused	HB1
99	Don't know	HB1

Ask if L1=1 else skip to HB1

L1a What kind of linear fluorescents do you have?		
1	T5s	L12
2	T8s	L12
3	2nd generation or higher T8s	L12
4	T12s	L12
5	skinny tubes	L12
6	fat tubes	L12
77	OPEN\RECORD Other description	L12
88	Refused	L12
99	Don't know	L12

L12 Are the ballasts electronic or magnetic?		
1	Electronic ballasts	HB1
2	Magnetic ballasts	HB1
3	Both	HB1
88	Refused	HB1
99	Don't know	HB1

HB1 Do you have high bay lighting? (If needed, lighting higher than 13 ft)		
1	Yes	HB2
2	No	HB3
88	Refused	HB3
99	Don't know	HB3

Ask if HB1=1 else skip to HB3

HB2 What kind of High Bay Lighting is it?

1	HID	HB3
2	Mercury Vapor	HB3
3	T8s	HB3
4	T5s	HB3
77	OPEN\RECORD OTHER	HB3
88	Refused	HB3
99	Don't know	HB3

HB3 Do you have incandescent lighting?

1	Yes	HB4
2	No	HB4
88	Refused	HB4
99	Don't know	HB4

HB4 Do you have motion sensors?

1	Yes	LI3
2	No	LI3
88	Refused	LI3
99	Don't know	LI3

LI3 How old is the lighting equipment currently in use at your facility? Would you say...

1	Less than 5 years old	LI4
2	Between 5 and 10 years old	LI4
3	Between 10 and 15 years old	LI4
4	More than 15 years old	LI4
88	Refused	LI4
99	Don't know	LI4

LI4 How would you describe the condition of lights currently in use at your facility? Would you say it is...

1	In poor condition	LI6
2	Fair condition	LI6
3	Good condition	LI6
88	Refused	LI6
99	Don't know	LI6

LI6 Since January 2006 has anyone at your facility consulted with a contractor concerning the lighting systems?

1	Yes	LI16a
2	No	L17
88	Refused	L17
99	Don't know	L17

LI6a Did the lighting contractor recommend that you make changes to your lighting systems?

1	Yes	L17
2	No	L17
88	Refused	L17
99	Don't know	L17

Since January 2006 has anyone at your facility consulted with an architect, engineer, designer or energy services company concerning the lighting systems?

LI7

1	Yes	OTH1
2	No	OTH1
88	Refused	OTH1
99	Don't know	OTH1

OTHER LIGHTING PURCHASES

Comment Now I have a few questions about some other types of light bulbs you may have purchased recently.

OTH1 How many incandescent (regular light bulbs) have you purchased since January 2006? [Work to get best estimate]

	Record Number of Incandescent Bulbs _____	OTH3
88	REFUSED	OTH3
99	DON'T KNOW	OTH3

[IF OTH1>0 ASK OTH3 ELSE SKIP TO Q_12INT]

OTH3 What type of store(s) did you purchase the incandescent or regular light bulbs from? Was it...

1	Discount (such as 99 Cent, Dollar Store)	OTH2
2	Grocery stores	OTH2
3	Small Hardware	OTH2
4	Lighting & Electronics	OTH2
5	Drug stores	OTH2
6	Large Home Improvement (such as Home Depot, Lowe's)	OTH2
7	Mass Merchandise (such as Wal-Mart, Target)	OTH2
8	Membership Stores (such as Costco, Sam's Club)	OTH2
77	FIXED OPEN\Other describe	OTH2
88	REFUSED	OTH2
99	DON'T KNOW	OTH2

Since January 2006, besides regular incandescent light bulbs and CFLS, how many other bulbs of various types have you purchased?
OTH2 This could include halogen bulbs, long fluorescent tubes and other types of specialty light bulbs. [Work to get best estimate.]

	Record Number of other Bulbs _____	OTH3
88	REFUSED	OTH3
99	DON'T KNOW	OTH3

CUSTOMER CHARACTERISTICS

Now, I'd like to ask you questions regarding your facility.

CC1 How many square feet of heated or cooled floor area is your facility?

77	Square feet	CC3a
88	Refused	CC3
99	Don't know	CC3
66	No heating or cooling	CC4

IF CC1 IN (88, 99)

CC3 Would you say that the heated or cooled floor area is ...?

1	less than 1,500 sq ft	CC3a
2	1,500 - 5,000 sq ft	CC3a
3	5,000 - 10,000 sq ft	CC3a
4	10,000 – 25,000 sq ft	CC3a
5	25,000 – 50,000 sq ft	CC3a
6	50,000 – 75,000 sq ft	CC3a
7	75,000 – 100,000 sq ft	CC3a
8	greater than 100,000 sq ft	CC3a
88	Refused	CC3a
99	Don't know	CC3a

CC3a Is your space heated using electricity or gas?

1	Electricity	CC4
2	Gas	CC4
3	Both electricity and gas	CC4
4	Propane	CC4
5	None	CC4
77	OPEN\Other-record	CC4
88	Refused	CC4
99	Don't know	CC4

CC4 Does your business own, lease or manage the facility?

1	Own	CC6
2	Lease/Rent	CC5a
3	Manage	CC5
88	Refused	CC5
99	Don't know	CC5

ASK IF CC4 in (3, 88, 99)

CC5 Does your company pay the electric and/or gas utility bill?

1	Yes	CC6
2	No	CC6
88	Refused	CC6
99	Don't know	CC6

ASK IF CC4 = 2

CC5a Which of the following best describes how your business pays the electric and/or gas utility bill for your space at this facility? Is it...

1	You pay & UTILITY directly	CC6
2	You pay a fee to your landlord that varies according to the size of the total utility bill	CC6
3	You pay a fixed fee to your landlord	CC6
4	You do not pay for electric and gas utilities	CC6
77	OPEN\OTHER ARRANGEMENT-describe	CC6
88	Refused	CC6
99	Don't know	CC6

ASK ALL

CC6 How active a role does your business take in making lighting and climate control equipment purchase decisions at this facility? Would you say you are...

1	Very active – involved in all phases and have veto power	CC7
2	Somewhat active – we approve decisions and provide some input and review	CC7
3	Slightly active – we have a voice but it's not the dominant voice	CC7
4	Not active at all – we're part of a larger organization	CC7
5	Or, not active at all – our firm doesn't get involved in these issues	CC7
88	Refused	CC7
99	Don't know	CC7

ASK IF CC4 = 2; ELSE SKIP TO CC8

CC7 How long is the term of your lease?

1	1 year	CC8
2	2 years	CC8
3	3 years	CC8
4	4 years	CC8
5	5 years	CC8
6	6 years	CC8
7	7 years	CC8
8	8 years	CC8
9	9 years	CC8
10	10 years	CC8
11	Greater than 10 years	CC8
12	Month to month	CC8
77	OPEN\Other lease term-describe	CC8
88	Refused	CC8
99	Don't know	CC8

CC8 In what year was the facility built?

&YRB	Year	CC11
88	Refused	CC10
99	Don't know	CC10

CC10 If don't know, would you say it was...

1	After 2000	CC11
2	In the 1990's	CC11
3	1980s	CC11
4	1970s	CC11
5	1960s	CC11
6	1950	CC11
7	Before 1950	CC11
88	Refused	CC11
99	Don't know	CC11

CC11 In what year was this facility last remodeled?

&YR	Year	CC12
66	Never Remodeled	CC13
88	Refused	CC11a
99	Don't know	CC11a

NOTE: Get year if prior to 2005, get year and month if during or after 2005.

ASK IF CC11 in (88, 99); ELSE SKIP TO CC12

CC11a Would you say the last remodeling was done [READ RESPONSES.]

1	Between 2005 and Present	CA1
2	Between the years 2000 and 2004	CA1
3	During the 1990's	CA1
4	Before the 1990's	CA1
88	Refused	CA1
99	Don't know	CA1

CUSTOMER ATTITUDE

CA1 How important is being environmentally conscious to your business? Would you say it is

1	Essential to your business	CA2
2	Very important	CA2
3	Somewhat important	CA2
4	Not at all important	CA3a
88	Refused	CA3a
99	Don't know	CA3a

CA2 In marketing materials or in communications with customers, does your company highlight the ways in which your business is environmentally conscious?

1	Yes	CA3a
2	No	CA3a
77	OPEN\RECORD OTHER	CA3a
88	Refused	CA3a
99	Don't know	CA3a

CA3a Suppose your company identified an energy efficient building upgrade, such as a lighting change-out, that would pay for itself through reduced utility bills within 2 years...If the cost of this upgrade were \$2,000, how difficult would it be for your company to find the funds to invest in this energy efficient upgrade? Would you say...

1	Very difficult, the funds would likely not be available	CAPB
2	Somewhat difficult, it would take some work, but funding could be found	CAPB
3	Not difficult, finding the funds for such an investment would be easy	CAPB
88	Refused	CAPB
99	Don't Know	CAPB

CAPB Given that it would take 2 years to recoup the initial investment through reduced utility bills, how interested would your company be in pursuing such an investment? Would you say...

1	Very	CAPB2
2	Somewhat	CAPB2

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3	Not at all interested	CAPB2
88	Refused	CAPB2
99	Don't know	CAPB2

CAPB2 Energy efficient investments pay for themselves through reduced utility bills over time. Considering projects your company would approve, what is the longest period of time your company would allow for an energy efficient investment to pay for itself?

&YRCAPB2	IN NUMBER OF YEARS	CA4
88	Refused	CA4
99	Don't Know	
77	OPEN\RECORD	CA4

CA4 Prior to 2006, had your facility ever installed equipment that involved the receipt of rebates or incentives from an energy efficiency program?

1	Yes	CA6
2	No	AP6a
88	Refused	AP6a
99	Don't know	AP6a

CA6 What type of equipment did you install through this (these) program(s)? [READ RESPONSE CATEGORIES]

1	Indoor lighting	AP6a
2	Cooling equipment	AP6a
3	Natural gas equipment, such as water heater, furnace or appliances	AP6a
4	Insulation or windows	AP6a
5	Refrigeration	AP6a
6	Industrial process equipment	AP6a
7	Greenhouse heat curtains	AP6a
8	Food service equipment	AP6a
77	OPEN SOMETHING OTHER (specify)	AP6a
88	Refused	AP6a
99	Don't Know	AP6a

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ZOTH1	How many incandescent (regular light bulbs) have you purchased since January 2006? [Work to get best estimate]	
	Record Number of Incandescent Bulbs _____	ZOTH2
88	REFUSED	ZOTH2
99	DON'T KNOW	ZOTH2

Since January 2006, besides regular incandescent light bulbs and CFLS, how many other bulbs of various types have you purchased? This could include halogen bulbs, long fluorescent tubes and other types of specialty light bulbs. [Work to get best estimate.]

ZOTH2	Record Number of other Bulbs _____	ZOTH3
88	REFUSED	ZOTH3
99	DON'T KNOW	ZOTH3

[IF ZOTH1>0 ASK ZOTH3]

ZOTH3	What type of store(s) did you purchase the incandescent or regular light bulbs from? Was it...	
1	Discount Stores	ZCC1
2	Grocery stores	ZCC1
3	Small Hardware	ZCC1
4	Lighting & Electronics	ZCC1
5	Drug stores	ZCC1
6	Large Home Improvement (Home Depot, Lowe's)	ZCC1
7	Mass Merchandise (Wal-Mart, Target)	ZCC1
8	Membership Stores (Costco, Sam's Club)	ZCC1
77	Other describe	ZCC1
88	REFUSED	ZCC1
99	DON'T KNOW	ZCC1

Now, I'd like to ask you questions regarding your facility.

ZCC1	How many square feet of heated or cooled floor area is your facility?	
77	Square feet	ZCC3a
88	Refused	ZCC3
99	Don't know	ZCC3
66	No heating or cooling	ZCC3a

[IF ZCC1 = 88, 99]

ZCC3	Would you say that the heated or cooled floor area is ...?	
1	less than 1,500 sq ft	ZCC3a
2	1,500 - 5,000 sq ft	ZCC3a
3	5,000 - 10,000 sq ft	ZCC3a
4	10,000 – 25,000 sq ft	ZCC3a
5	25,000 – 50,000 sq ft	ZCC3a
6	50,000 – 75,000 sq ft	ZCC3a
7	75,000 – 100,000 sq ft	ZCC3a
8	greater than 100,000 sq ft	ZCC3a
88	Refused	ZCC3a
99	Don't know	ZCC3a

ZCC3a Is your space heated using electricity or gas?

1	Electricity	ZCC4
2	Gas	ZCC4
3	Both electricity and gas	ZCC4
4	Propane	ZCC4
5	None	ZCC4
77	OPEN\Other-record	ZCC4
88	Refused	ZCC4
99	Don't know	ZCC4

ZCC4 Does your business own, lease or manage the facility?

1	Own	ZCC6
2	Lease/Rent	ZCC5a
3	Manage	ZCC5
88	Refused	ZCC5
99	Don't know	ZCC5

[ASK IF ZCC4 = 3 OR 99]

ZCC5	Does your company pay the electric and/or gas utility bill?	
1	Yes	ZCC6
2	No	ZCC6
88	Refused	ZCC6
99	Don't know	ZCC6

[ASK IF CC4 = 2]

ZCC5a Which of the following best describes how your business pays the electric and/or gas utility bill for your space at this facility? Is it...

1	You pay &UTILITY directly	ZCC6
2	You pay a fee to your landlord that varies according to the size of the total utility bill	ZCC6
3	You pay a fixed fee to your landlord	ZCC6
4	You do not pay for electric and gas utilities	ZCC6
77	OPEN\OTHER ARRANGEMENT-describe	ZCC6
88	Refused	ZCC6
99	Don't know	ZCC6

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ASK ALL

ZCC6 How active a role does your business take in making lighting and climate control equipment purchase decisions at this facility?

Would you say you are...

1	Very active – involved in all phases and have veto power	ZCC7
2	Somewhat active – we approve decisions and provide some input and review	ZCC7
3	Slightly active – we have a voice but it's not the dominant voice	ZCC7
4	Not active at all – we're part of a larger organization	ZCC7
5	Or, not active at all – our firm doesn't get involved in these issues	ZCC7
88	Refused	ZCC7
99	Don't know	ZCC7

[ASK IF CC4 = 2; ELSE SKIP TO CC8]

ZCC7 How long is the term of your lease?

1	1 year	ZCC8
2	2 years	ZCC8
3	3 years	ZCC8
4	4 years	ZCC8
5	5 years	ZCC8
6	6 years	ZCC8
7	7 years	ZCC8
8	8 years	ZCC8
9	9 years	ZCC8
10	10 years	ZCC8
11	Greater than 10 years	ZCC8
12	Month to month	ZCC8
77	OPEN\Other lease term-describe	ZCC8
88	Refused	ZCC8
99	Don't know	ZCC8

ZCC8 In what year was the facility built?

&YRB	Year	ZCC11
88	Refused	ZCC10
99	Don't know	ZCC10

ZCC10 If don't know, would you say it was...

1	After 2000	ZCC11
2	In the 1990's	ZCC11
3	1980s	ZCC11
4	1970s	ZCC11
5	1960s	ZCC11
6	1950s	ZCC11
7	Before 1950	ZCC11
88	Refused	ZCC11
99	Don't know	ZCC11

ZCC11 In what year was this facility last remodeled?

&YR	Year	ZCC12
66	Never Remodeled	ZCC13
88	Refused	ZCC11a
99	Don't know	ZCC11a

ASK IF CC11 in (88, 99); ELSE SKIP TO CC12

ZCC11a Would you say the last remodeling was done [READ RESPONSES.]

1	Between 2005 and Present	ZCC12
2	Between the years 2000 and 2004	ZCC12a
3	During the 1990's	ZCC12a
4	Before the 1990's	ZCC12a
88	Refused	ZCC12a
99	Don't know	ZCC12a

Are you aware of any programs or resources that are designed to promote energy efficiency for businesses like yours? [IF YES]

What types of programs can you recall? [RECORD ALL MENTIONS] [After each response prompt with "Can you recall any

ZAP6a others?"]

1	NOT AWARE OF ANY	ZAP20
2	SPC / Standard Performance Contracting	ZAP20
3	20/20	ZAP20
4	Flex-your-Power	ZAP20
5	Distributor incentives	ZAP20
6	Upstream HVAC and Motors Program	ZAP20
7	Rebate (unspecified)	ZAP20
8	Nonresidential Audits or Energy Audits	ZAP20
77	Other programs (SPECIFY) _____	ZAP20
88	Refused	ZAP20
99	Don't know	ZAP20

ASK IF ZAP6a NE 3; ELSE SKIP TO ZAP22

Have you ever heard of the 20/20 Rebate Program? Each summer the governor of California promotes an energy conservation and efficiency program called the "20/20 Rebate program." Businesses that saved 20% off their electricity bill in the summer

ZAP20 months as compared to the previous year's bill qualify for a 20% rebate on their bill.

1	Yes	ZAP22
2	No	
88	Refused	
99	Don't know	

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ZAP22 Did you attempt to get the 20/20 rebate during any of the summers from 2005 through 2008?

1	Yes	ZAP23
2	No	
88	Refused	
99	Don't know	

ZAP23 During which summer(s) did you attempt the 20 percent reduction? (Multiples Allowed)

1	2005	ZAP24
2	2006	ZAP24
3	2007	ZAP24
4	2008	ZAP24
88	Refused	ZAP24
99	Don't know	ZAP24

ZAP24 In which year(s) were you successful in reducing your electricity bill by 20%? (Multiples Allowed)

1	2005	
2	2006	
3	2007	
4	2008	
88	Refused	
99	Don't know	

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PROGRAM AWARENESS - OTHER PROGRAMS

Are you aware of any programs or resources that are designed to promote energy efficiency for businesses like yours? [IF YES]
What types of programs can you recall? [RECORD ALL MENTIONS] [After each response prompt with "Can you recall any others?"]

AP6a

1	Express Program	AP20
2	SPC / Standard Performance Contracting	AP20
3	20/20	AP20
4	Flex-your-Power	AP20
5	Distributor incentives	AP20
6	Upstream HVAC and Motors Program	AP20
7	Rebate (unspecified)	AP20
8	Nonresidential Audits or Energy Audits	AP20
66	NOT AWARE OF ANY	HR025
77	Other programs (SPECIFY) _____	AP20
88	Refused	HR025
99	Don't know	AP20

ASK IF AP6a NE 3; ELSE SKIP TO AP22

Have you ever heard of the 20/20 Rebate Program? Each summer the governor of California promotes an energy conservation and efficiency program called the "20/20 Rebate program," Businesses that saved 20% off their electricity bill in the summer months as compared to the previous year's bill qualify for a 20% rebate on their bill.

AP20

1	Yes	AP22
2	No	HR025
88	Refused	HR025
99	Don't know	HR025

AP22 Did you attempt to get the 20/20 rebate during any of the summers from 2005 through 2008?

1	Yes	AP23
2	No	HR025
88	Refused	HR025
99	Don't know	HR025

AP23 During which summer(s) did you attempt the 20 percent reduction? (Multiples Allowed)

1	2005	AP24
2	2006	AP24
3	2007	AP24
4	2008	AP24
88	Refused	AP24
99	Don't know	AP24

AP24 In which year(s) were you successful in reducing your electricity bill by 20%? (Multiples Allowed)

1	2005	HR025
2	2006	HR025
3	2007	HR025
4	2008	HR025
88	Refused	HR025
99	Don't know	HR025

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OPERATING HOURS

Ask Everyone

Now we'd like to talk about the hours that your business is open.

HR025 Are you typically open every day, Monday through Friday?

1	Yes	HR030b
2	No	HR026a
88	Refused	HR030b
99	Don't Know	HR030b

HR026a Which days are you closed Monday through Friday?

1	Monday	HR030b
2	Tuesday	HR030b
3	Wednesday	HR030b
4	Thursday	HR030b
5	Friday	HR030b
88	Refused	HR030b
99	Don't Know	HR030b

HR030b What time do you open during the week?

&HR30F	Hours on FROM (use 24 hour format eg 0700)	HR030c
88	Refused	HR030c
99	Don't know	HR030c

HR030c What time do you close during the week?

&HR30F	Hours on UNTIL (use 24 hour format eg 0700)	HR040
88	Refused	HR040
99	Don't know	HR040

HR040 How about Saturday's hours?

1	Open 24 Hrs	HR050
2	Never on	HR050
3	Open part of the day	HR040b
4	Same as weekday schedule	HR050
5	Open by appointment	HR050
88	Refused	HR050
99	Don't know	HR050

HR040b What time do you open on Saturday?

&HR40F	Hours on FROM (use 24 hour format eg 0700)	HR040c
88	Refused	HR050
99	Don't know	HR050

HR040c What time do you close on Saturday?

&HR40F	Hours on UNTIL (use 24 hour format eg 0700)	HR050
88	Refused	HR050
99	Don't know	HR050

HR050 How about Sunday's hours?

1	Open 24 Hrs	HR059
2	Closed	HR059
3	Open part of the day	HR050b
4	Same as Saturday schedule	HR059
5	Same as Weekday schedule	HR059
6	Open by appointment	HR059
88	Refused	HR059
99	Don't know	HR059

HR050b What time do you open on Sundays?

&HR50F	Hours on FROM (use 24 hour format eg 0700)	HR050c
88	Refused	HR059
99	Don't know	HR059

HR050c What time do you close on Sundays?

&HR50T	Hours on UNTIL (use 24 hour format eg 0700)	HR059
88	Refused	HR059
99	Don't know	HR059

ASK IF FM050=8, ELSE SKIP TO EER001

We realize that you may operate your facility differently when classes are not in session. Is the operating schedule for your facility

HR059 different when classes are not in session?

1	Yes	HR060
2	No	EER001
8	Refused	EER001
9	Don't Know	EER001

**06-08 Small Commercial Contract Group
CFL 90/10 and Lighting Logger Recruitment**

I'd like to ask the same set of questions for your operating schedule when students are not in the classroom. What are the		
HR060 weekday hours that your facilities are operating/open?		
1	On 24 Hrs	HR062
2	Never on	HR062
3	On part of the day	HR060b
88	Refused	HR062
99	Don't know	HR062
HR060b What time do you open on Mondays through Fridays?		
&HR60F	Hours on FROM (use 24 hour format eg 0700)	HR060c
88	Refused	HR062
99	Don't know	HR062
HR060c What time do you close (on Mondays through Fridays)?		
&HR30F	Hours on UNTIL (use 24 hour format eg 0700)	HR060c
88	Refused	HR062
99	Don't know	HR062
HR062 How about Saturdays?		
1	On 24 Hrs	HR064
2	Never on	HR064
3	On part of the day	HR062b
4	Same as weekday lighting schedule	HR064
88	Refused	HR064
99	Don't know	HR064
HR062b What time do you open on Saturday?		
&HR62F	Hours on FROM (use 24 hour format eg 0700)	HR062c
88	Refused	HR064
99	Don't know	HR064
HR062c What time do you close on Saturday?		
&HR62T	Hours on UNTIL (use 24 hour format eg 0700)	HR064
88	Refused	HR064
99	Don't know	HR064
HR064 And Sundays?		
1	Never On	EER001
2	On 24 Hrs	EER001
3	On part of the day	HR064b
4	Same as Saturday lighting schedule	EER001
5	Same as Weekday lighting schedule	EER001
88	Refused	EER001
99	Don't know	EER001
HR064b What time do you open on Sunday?		
&HR64F	Hours on FROM (use 24 hour format eg 0700)	HR064c
88	Refused	EER001
99	Don't know	EER001
HR064c What time do you close on Sunday?		
&HR64T	Hours on UNTIL (use 24 hour format eg 0700)	EER001
88	Refused	EER001
99	Don't know	EER001

ONSITE RECRUITING

TO SCHEDULE INSTALLATION OF LIGHTING LOGGERS

As you may know &Utility offers various programs for small businesses to encourage the installation of high efficiency lighting such as CFLs. In order to improve &Utility program's performance, the CPUC would like to make an accurate measurement of the energy savings associated with compact fluorescent lighting by collecting and analyzing information from selected customers.

If you agree to participate, Itron, on behalf of the CPUC, will come to your business to install lighting logger devices on your lights to record when each light is in use. The lighting loggers would then be installed in an unobtrusive place and would be removed by us at the end of the research project. We'll come back and remove the logger devices after about one month. Note, the electric use data will be used strictly for the study of the &Program and will not affect your electric service at all.

OS_REC Are you interested in participating in this project?

1	Yes	OS_NAME1
2	No	T&T
88	Refused	T&T
99	Don't know	T&T

OS_NAME1 May I please have the name of the person who our technician can call you to set up an appointment time?

&OS_NAME1	NAME OF PRIMARY CONTACT	OS_PHONE1
88	Refused	T&T
99	Don't know	T&T

OS_PHONE1 May I also have the best phone number for the technician to reach this person?

&OS_PHONE1	PHONE FOR PRIMARY CONTACT	OTHER
88	Refused	T&T
99	Don't know	T&T

OTHER Is there another person that the engineer might speak with at your company, if this primary person is not available?

&OTHER	Get name	OS_NAME2
88	Refused	T&T
99	Don't know	T&T

OS_NAME2 May I please have their name so our technician can call them at another time?

&OS_NAME2	Get name	OS_PHONE2
88	Refused	T&T
99	Don't know	T&T

OS_PHONE2 May I also have the best phone number for the technician to reach them?

&OS_PHONE2	Get phone number	VERIFY
88	Refused	T&T
99	Don't know	T&T

VERIFY For verification purposes only, may I please have your name?

	Get name	OS_REC
88	Refused	T&T
99	Don't know	T&T

OS_BUSINESS Do you have a sign or business name other than &BusinessName that our surveyors should look for when they visit your site?

END.	Those are all the questions I have for today. Thank you for you time and help in this important study.
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**06-08 Small Commercial Contract Group
Onsite CFL redial**

INTRODUCTION AND FINDING CORRECT RESPONDENT

(After finding the correct contact person) Intro... Thanks for participating in our phone survey and allowing us to come onsite. We have a couple follow up questions regarding your answers to our previous phone survey and what we found when we visited your location at &Address.

[IF NEEDED] This is not a sales call.

[IF NEEDED] This is a fact-finding survey only, authorized by the California Public Utilities Commission. The CPUC wants to better understand how businesses like yours think about and manage their energy consumption.

READ: According to your responses on our phone survey, you purchased &phonebulbcount CFLs at a retail stores b/t 2006 and 2008. When we came onsite we accounted for a total of &onsitebulbcount CFLs. The following questions are in reference only to your location that we visited.

We understand that your response on the phone survey was just an estimate. We also realize that some of the bulbs you purchased b/t 2006-2008 have probably burned out and been replaced.

OSCFL1 Of the bulbs you purchased at retail stores b/t 2006-2008, how many would you estimate have burned out at this location?

77	Record number	OSCFL2a
88	Refused	OSCFL2a
99	Don't know	OSCFL2a

OSCFL2a Of the bulbs you purchased at retail stores b/t 2006-2008, how many would you estimate that you removed or replaced for other reasons?

77	Record number	OSCFL2b
88	Refused	OSCFL3a
99	Don't know	OSCFL3a

If OSCFL2>0 then ask:

OSCFL2b Why did you replace those bulbs?

77	Record response	OSCFL3a
88	Refused	OSCFL3a
99	Don't know	OSCFL3a

If &onsitebulbcount+&burnout+&replaced>&phonebulbcount then ask:

OSCFL3a Of the &onsitebulbcount bulbs found onsite, were any of them obtained through other methods such as through a contractor, a property manager or a utility giveaway?

1	Yes	OSCFL3b
2	No	OSCFL4a
88	Refused	OSCFL4a
99	Don't know	OSCFL4a

OSCFL3b How many were obtained through this other source?

77	Record number	OSCFL4a
88	Refused	OSCFL4a
99	Don't know	OSCFL4a

If &onsitebulbcount+&burnout+&replaced-&othersource>&phonebulbcount then ask:

OSCFL4a Of the &onsitebulbcount bulbs found onsite, were any of them obtained since January 2009?

1	Yes	OSCFL4b
2	No	OSCFL5a
88	Refused	OSCFL5a
99	Don't know	OSCFL5a

OSCFL4b How many were obtained since January 2009?

77	Record number	OSCFL5a
88	Refused	OSCFL5a
99	Don't know	OSCFL5a

If &onsitebulbcount+&burnout+&replaced-&othersource-&purch2009>&phonebulbcount then ask:

OSCFL5a Of the &onsitebulbcount bulbs found onsite, were any of them obtained prior to 2006?

1	Yes	OSCFL5b
2	No	T&T
88	Refused	T&T
99	Don't know	T&T

OSCFL5b How many were obtained through this other source?

77	Record number	T&T
88	Refused	T&T
99	Don't know	T&T

**06-08 Small Commercial Contract Group
Onsite CFL redial**

If &onsitebulbcount+&burnout+&replaced-&phonebulbcount then ask:

Would you say that the number of bulbs found onsite plus the number of bulbs that burned out or were removed, totaling

OSCFL6a sum(&onsitebulbcount+&burnout+&replaced), is a better estimate of the number you purchased for **this facility** than the original estimate of &phonebulbcount?

1	Yes	T&T
2	No	OSCFL6b
88	Refused	T&T
99	Don't know	T&T

OSCFL6b What would you say is your current best estimate?

77	Record number	OSCFL6c
88	Refused	T&T
99	Don't know	T&T

OSCFL6c Why?

77	Record response	T&T
88	Refused	T&T
99	Don't know	T&T

**Non-Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

INTRODUCTION AND FINDING CORRECT RESPONDENT

This is %n calling on behalf of the CPUC, from ITRON CONSULTING. THIS IS NOT A SALES CALL NOR A SERVICE CALL. May I please speak with the person at your organization that is most familiar with your cooling and lighting equipment? [ENTER TECHNICAL CONTACT NAME]

May I speak with him/her?

Q1 Hello, my name is <INTERVIEWER NAME> calling from Itron on behalf of &UTILITY from Itron, Inc. Today we are conducting a short study on the energy needs and perceptions of organizations like your. By giving us a few minutes of your time, you can help the CPUC and your Utility develop energy savings programs that will benefit organizations like yours.

This is not a sales call and all information you give me will be kept strictly confidential.

Are you the person most knowledgeable about your organization's energy using use such as the cooling and lighting equipment?

1	No, that person is not available right now	Appoint
2	Unable to refer someone who can help	Appoint
3	Yes, that would be me	S1
4	Yes, let me transfer you to _____.	Q1C
77	No, Other reason (specify)	Q1B
88	Refused	Q1B
99	Don't know	Q1B

Appoint [IF RECOMMENDED CONTACT IS NOT CURRENTLY AVAILABLE]
When would be a good day and time for us to call back?

77	Record day of the week, time of day and date to call back, as &APPOINT	Name
88	Refused	Hasta La Vista
99	Don't know	Name

Name May I please have the name of the person we should speak with?

[DO NOT RECORD INFORMATION FOR INDIVIDUAL AT SOME OTHER BUILDING OR LOCATION. WE WANT THE INDIVIDUAL MOST KNOWLEDGEABLE ABOUT THIS LOCATION, EVEN IF BUILDING IS OWNED BY OFF-SITE MANAGER.]

77	Record Name, as &CONTACT	Ext
88	Refused	Hasta La Vista
99	Don't know	Ext

Ext Is there a phone extension or phone number you recommend we use when we call back?

77	Record Extension or Phone Number, &PHONE	Hasta La Vista
88	Refused	Hasta La Vista
99	Don't know	Hasta La Vista

Hasta La Vista Thank you for your time and help today.

END

Q1B [IF YOU ARE TRANSFERRED TO ANOTHER PERSON OTHER THAN THE BEST CONTACT]
May I please speak with the person most knowledgeable about recent changes in cooling, lighting, or other energy-related equipment for your company?

[IF NEEDED] This is not a sales call.

[IF NEEDED] This is a fact-finding survey only, and responses will not be connected with your firm in any way. Your utility wants to better understand how businesses think about and manage their energy consumption.

[IF NEEDED] By giving us a few minutes of your time, you can help the CPUC and your Utility develop energy savings programs that will benefit organizations like yours.

77	There is no one here who can help you	T&T
1	Continue Q1B until you find appropriate contact person, record as &CONTACT	Q1C

Q1C [IF BEST CONTACT IS AVAILABLE]
Hello Mr./Mrs. &CONTACT, this is <INTERVIEWER NAME> calling from Itron on behalf of &UTILITY. I understand you are the person at your location that is most knowledgeable about decisions affecting energy using equipment, such as cooling and lighting.

1	Current individual is best contact	S1
2	Transferred to best contact	Repeat Q1C w/best contact
3	Given best contact's name and number	Appoint
99	Don't know/refused	T&T

**Non-Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

Before we start, I would like to inform you that this call may be monitored by my supervisor.

SCREENER

First, let me just ask you a few questions to see if you qualify for our survey:

S1 According to our records, we show that you get your ELECTRICITY through <%UTILITY> Is this correct?

1	Yes	SCRN_Addr
2	No	S1_Util
77	Other (specify)	S1_Util
88	Refused	T&T
99	Don't know	T&T

S1 Util What is the name of your electric utility company? RECORD AS &UTILITY

1	PG&E	S1_Gas
2	SCE/Edison	S1_Gas
3	SDG&E	S1_Gas
77	Other (specify)	S1_Gas
88	Refused	T&T
99	Don't know	T&T

S1 Gas Do you get your gas from <&UTILITY>?

1	Yes	SCRN_Addr
2	No	T&T
77	Other (specify)	T&T
88	Refused	T&T
99	Don't know	T&T

SCRN_Addr Our records show your firm is located at <&SERV_ADDR>?

[CONTINUE IF ADDRESS REPORTED BY RESPONDENT IS SIMILAR ENOUGH]

1	Yes	Comment
2	No, but respondent says it is similar/close enough	Comment
3	No	T&T
88	Refused	T&T
99	Don't know	T&T

Comment	The questions in this survey concern the facilities located at <&SERV_ADDR>. [INTERVIEWERS SHOULD RE-READ THIS STATEMENT AS NEEDED THROUGHOUT THE SURVEY TO REMIND THE RESPONDENTS]	CC1
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CUSTOMER CHARACTERISTICS

Now, I'd like to ask you questions regarding your facility.

CC1 How many square feet of heated or cooled floor area is your facility?

77	Square feet	CC3a
88	Refused	CC3
99	Don't know	CC3

IF CC1 IN (88, 99)

CC3 Would you say that the heated or cooled floor area is ...?

1	Less than 1,500 sqft	CC3a
2	Between 1,500 - 5,000 sqft	CC3a
3	Between 5,000 - 10,000 sqft	CC3a
4	Between 10,000 - 25,000 sqft	CC3a
5	Between 25,000 - 50,000 sqft	CC3a
6	Between 50,000 - 75,000 sqft	CC3a
7	Between 75,000 - 100,000 sqft	CC3a
8	Over 100,000 sqft	CC3a
88	Refused	CC3a
99	Don't know	CC3a

**Non-Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

CC3a Is your space heated using electricity or gas?

1	Electricity	CC4
2	Gas	CC4
3	Propane	CC4
4	Both electricity and gas	CC4
5	Neither	CC4
77	OPEN\Other-RECORD	CC4
88	Refused	CC4
99	Don't know	CC4

CC4 Does your business own, lease or manage the facility?

1	Own	CC6
2	Lease/Rent	CC5a
3	Manage	CC5
88	Refused	CC5
99	Don't know	CC5

ASK IF CC4 in (3, 88, 99)

CC5 Does your company pay the electric and/or gas utility bill?

1	Yes	CC6
2	No	CC6
88	Refused	CC6
99	Don't know	CC6

ASK IF CC4 = 2

CC5a Which of the following best describes how your business pays the electric and/or gas utility bill for your space at this facility? Would you say...[READ LIST.]

1	You pay &UTILITY directly	CC6
2	You pay a fee to your landlord that varies according to the size of the total utility bill	CC6
3	You pay a fixed fee to your landlord	CC6
4	You do not pay for electric and gas utilities	CC6
77	OPEN\SOME OTHER ARRANGEMENT\OTHER (Specify)	CC6
88	Refused	CC6
99	Don't know	CC6

ASK ALL

CC6 How active a role does your business take in making lighting and climate control equipment purchase decisions at this facility? Would you say you are... [READ LIST.]

1	Very active – involved in all phases and have veto power	CC7
2	Somewhat active – we approve decisions and provide some input and review	CC7
3	Slightly active – we have a voice but it's not the dominant voice	CC7
4	Not active at all – we're part of a larger firm	CC7
5	Or, not active at all – our firm doesn't get involved in these issues	CC7
88	Refused	CC7
99	Don't know	CC7

ASK IF CC4 = 2; ELSE SKIP TO CC8

CC7 How long is the term of your lease?

1	1 year	CC8
2	2 years	CC8
3	3 years	CC8
4	4 years	CC8
5	5 years	CC8
6	6 years	CC8
7	7 years	CC8
8	8 years	CC8
9	9 years	CC8
10	10 years	CC8
11	Greater than 10 years	CC8
12	Month to month	CC8
13	Other (Specify)	CC8
88	Refused	CC8
99	Don't know	CC8

CC8 In what year was your facility built?

&YRB	Year	CC11
88	Refused	CC10
99	Don't know	CC10

**Non-Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

CC10 If don't know, would you say it was...

1	After 2000	CC11
2	In the 1990's	CC11
3	1980s	CC11
4	1970s	CC11
5	1960s	CC11
6	1950	CC11
7	Before 1950	CC11
88	Refused	CC11
99	Don't know	CC11

CC11 In what year was this facility last remodeled?

&YR	Year	CC12a
66	Never	CC12a
88	Refused	CC11a
99	Don't know	CC11a

ASK IF CC11 in (88, 99); ELSE SKIP TO CC12a

CC11a Would you say the last remodeling was done [READ RESPONSES.]

1	Between 2003 and Present	CC12a
2	Between the years 2000 and 2002	CC12a
3	During the 1990's	CC12a
4	Before the 1990's	CC12a
88	Refused	CC12a
99	Don't know	CC12a

CC12a In what year was this business established at this location?

&YRB	Year	FM050
88	Refused	CC12b
99	Don't know	CC12b

CC12b If don't know, would you say it was...

1	After 2000	FM050
2	In the 1990's	FM050
3	1980s	FM050
4	1970s	FM050
5	1960s	FM050
6	1950	FM050
7	Before 1950	FM050
88	Refused	FM050
99	Don't know	FM050

ADDITIONAL FACILITY CHARACTERISTICS

FM050 What is the main business ACTIVITY at your facility?

1	Office	FM070
2	Retail (non-food)	FM070
3	College/University	FM070
4	School	FM070
5	Grocery Store	FM070
6	Restaurant	FM070
7	Health Care (other than Hospital)	FM070
8	Hospital	FM070
9	Hotel or Motel	FM070
10	Warehouse	FM070
11	Construction	FM070
12	Community Service/Church/Temple/ Municipality	FM070
13	Industrial Process/ Manufacturing/ Assembly	FM070
14	Condo Assoc./Apartment Mgr.	FM070
15	Greenhouse	FM070
16	Laundry/Cleaners	FM070
77	OPEN\Other - SPECIFY	FM070
88	Refused	FM070
99	Don't Know	FM070

**Non-Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

FM070	How many people are currently working at the facility, including both full and part time? (IF DON'T KNOW ASK FOR BEST GUESS)	
&NUM	Number of people	FM080
88	Refused	FM080
99	Don't know	FM080

FM100	In 2005 approximately how many people were working at this facility, including both full- or part-time employees? (IF DON'T KNOW ASK FOR BEST GUESS)	
&NUM03	Number of people	CA1
88	Refused	CA1
99	Don't know	CA1

CUSTOMER ATTITUDE

CA1	How important is being environmentally conscious to your business? Would you say it is	
1	Essential to your business	CA2
2	Very important	CA2
3	Somewhat important or	CA2
4	Not at all important	CA3a
88	Refused	CA3a
99	Don't know	CA3a

CA2	In marketing materials or in communications with customers, does your company highlight ways in which your business is environmentally conscious?	
1	Yes	CA3a
2	No	CA3a
77	Other (Specify)	CA3a
88	Refused	CA3a
99	Don't know	CA3a

CA3a	This is a hypothetical situation, suppose your company identified an energy efficient building upgrade, such as a lighting change-out, that would pay for itself through reduced utility bills within 2 years...If the cost of this upgrade were \$2,000, how difficult would it be for your organization to find the funds to invest in this energy efficient upgrade? Would you say...	
1	Very difficult, the funds would likely not be available	CAPB
2	Somewhat difficult, it would take some work, but funding could be found	CAPB
3	Not difficult, finding the funds for such an investment would be easy	CAPB
88	Refused	CAPB
99	Don't Know	CAPB

CAPB	Given that it would take 2 years to recoup the initial investment through reduced utility bills, how interested would your organization be in pursuing such an investment? Would you say...	
1	Very Interested	CAPB2
2	Somewhat interested	CAPB2
3	Not at all interested	CAPB2
88	Refused	CAPB2
99	Don't know	CAPB2

CAPB2	Energy efficient investments pay for themselves through reduced utility bills over time. Considering projects your company would approve, what is the longest period of time your organization would allow for an energy efficient investment to pay for itself?	
&YRCAPB2	Years	CA4
88	Refused	CA4
99	Don't Know	CA4

CA4	Prior to 2006, had your facility ever installed equipment that involved the receipt of rebates or incentives from an energy efficiency program?	
1	Yes	CA6
2	No	CA15
88	Refused	CA15
99	Don't know	CA15

**Non-Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

PROGRAM AWARENESS

Next, I'd like to ask you about various energy efficiency programs

AP6 Are there &UTILITY programs or resources you are aware of that are designed to promote energy efficiency for businesses like yours? [IF YES] What types of programs can you recall? [RECORD ALL MENTIONS] [After each response prompt with "Can you recall any others?"]

1	Express Efficiency	AP9
2	SPC / Standard Performance Contracting	AP7a
3	20/20	AP7a
4	Flex-your-Power	AP7a
5	Distributor incentives	AP7a
6	Upstream HVAC and Motors Program	AP7a
7	Rebate (unspecified)	AP7a
8	Nonresidential Audits or Energy Audits	AP7a
9	No, not aware of any programs	AP7a
77	Other programs (SPECIFY) _____	AP7a
88	Refused	AP7a
99	Don't know	AP7a

ASK IF AP6 NE 1 AND CA5 NE 1 ; ELSE SKIP TO AP9

The **Express Efficiency** rebate program is a prescriptive rebate program designed for small to medium commercial and industrial utility customers. Have you heard of the Express Efficiency rebate program? (IF NEEDED: where rebates are offered by your utility for energy efficient equipment purchases)?

1	Yes	AP9
2	No	AP20
88	Refused	AP20
99	Don't Know	AP20

ASK IF AP6=1 OR AP7A=1

AP9 How did you first learn about the Express Efficiency program? [DO NOT READ]

1	Utility provided advertising--radio, newspaper, trade journal, billboard, TV	AP9a
2	Bill insert, newsletter, or other mailing from utility	AP9a
3	Utility Website	AP9a
4	Email from Utility	AP9a
5	Other utility source (SPECIFY)	AP9a
6	Local government, community or nonprofit meeting, event, workshop or training (SPECIFY)	AP9a
7	Local government/community agency (SPECIFY)	AP9a
8	Local government, community, or nonprofit advertising- radio, newspaper, trade journal, TV	AP9a
9	School, classes, energy center (SPECIFY)	AP9a
10	Building audit or assessment (SPECIFY)	AP9a
11	Flex your Power TV or radio advertising	AP9a
12	Other meeting, event or workshop training (SPECIFY)	AP9a
13	Other advertising	AP9a
14	Word of mouth: Friend/Relative/Neighbor/Co-worker	AP9a
15	Contractor	AP9a
66	No other sources	AP11
77	Other (SPECIFY)	AP9a
88	Refused	AP11
99	Don't know	AP11

**Non-Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

AP9a How ELSE did you learn about the Express Efficiency program? [DO NOT READ LIST, ACCEPT MULTIPLES]		
1	Utility provided advertising--radio, newspaper, trade journal, billboard, TV	AP11
2	Bill insert, newsletter, or other mailing from utility	AP11
3	Utility Website	AP11
4	Email from Utility	AP11
5	Other utility source (SPECIFY)	AP11
6	Local government, community or nonprofit meeting, event, workshop or training (SPECIFY)	AP11
7	Local government/community agency (SPECIFY)	AP11
8	Local government, community, or nonprofit advertising- radio, newspaper, trade journal, TV	AP11
9	School, classes, energy center (SPECIFY)	AP11
10	Building audit or assessment (SPECIFY)	AP11
11	Flex your Power TV or radio advertising	AP11
12	Other meeting, event or workshop training (SPECIFY)	AP11
13	Other advertising	AP11
14	Word of mouth/Friend/Relative/Neighbor	AP11
15	Contractor	AP11
66	No other sources	AP11
77	Other (SPECIFY)	AP11
88	Refused	AP11
99	Don't know	AP11

ASK IF AP9 NE 4

AP11 Did a utility representative talk to you about the Express Efficiency Program?

1	Yes	AP11a
2	No	AP11a
88	Refused	AP11a
99	Don't know	AP11a

AP11a When did you first become aware of the Express Efficiency program? Would you say...

1	2005 or before	AP20
2	Sometime during the 2006	AP20
3	In 2007 or after	AP20
88	Refused	AP20
99	Don't know	AP20

ASK IF AP6 NE 3 ; ELSE SKIP TO AP25

Have you heard of the 20/20 Rebate Program? Each summer the governor of California promotes an energy conservation and efficiency program called the "20/20 Rebate program." Businesses that saved 20% off their electricity bill in the summer months as compared to the previous year's bill qualify for a 20% rebate on their bill.

AP20

1	Yes	L11
2	No	L11
88	Refused	L11
99	Don't Know	L11

**Non-Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

LIGHTING EQUIPMENT BATTERY

In the next section we'll be discussing the lighting systems at your facility.

What are the primary types of lighting used at your facility? [DO NOT READ, BUT PROBE TO GET SPECIFIC CATEGORIES;

L11 RECORD MULTIPLE MENTIONS BY RESPONDENT, AND SAY "ANY OTHERS" UNTIL UP TO FOUR HAVE BEEN MENTIONED]

1	High Performance T8	L13
2	T8 fluorescent fixtures (1" diameter bulbs)	L13
3	T5 fluorescent fixtures (5/8" diameter bulbs)	L13
4	T10 fluorescent fixtures	L13
5	T12 Fixtures (1.5" diameter bulbs)	L13
6	HID (High Density Discharge) Fixtures, Compact	L13
7	Compact Fluorescent, Screw-in Modular	L13
8	Compact Fluorescent, Hardwire	L13
9	Incandescent	L13
10	Other Fluorescent	L13
11	Fat/Thick Tubes	L13
12	Skinny/Thin Tubes	L13
77	Other (PLEASE SPECIFY)	L13
88	Refused	L13
99	Don't know	L13

L13 How old is the lighting equipment currently in use at your facility? Would you say...

1	Less than 5 years old	L14
2	Between 5 and 10 years old	L14
3	Between 10 and 15 years old	L14
4	More than 15 years old	L14
88	Refused	L14
99	Don't know	L14

L14 How would you describe the condition of lights currently in use at your facility? Would you say they are...

1	In poor condition	L16
2	Fair condition, or	L16
3	Good condition	L16
88	Refused	L16
99	Don't know	L16

L16 Since January 2006 has anyone at your facility consulted with a contractor concerning the lighting systems?

1	Yes	L16a
2	No	L17
88	Refused	L17
99	Don't know	L17

L16a Did the lighting contractor recommend that you make changes to your lighting systems?

1	Yes	L17
2	No	L17
88	Refused	L17
99	Don't know	L17

Since January 2006 has anyone at your facility consulted with an architect, engineer, designer or energy services company

L17 concerning the lighting systems?

1	Yes	L_MSP1
2	No	L_MSP1
88	Refused	L_MSP1
99	Don't know	L_MSP1

ASK ALL

L_MSP1 Since January 2005 have you purchased and installed any lighting on your own without any assistance from the &Utility &Program or another utility program either at this facility or at other locations?

1	Yes, only at this home facility	LSP2
2	Yes, only at other locations	LSP2
3	Yes, at this facility and other locations	LSP2
4	No	T&T
88	Refused	T&T
99	Don't know	T&T

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What type of CFLs, fixtures, ballasts or lighting controls were installed as part of this lighting retrofit? [SELECT ALL THAT APPLY, AFTER EACH RESPONSE, PROMPT]		LIGHT_TECH 1B
1	High performance T8 fluorescent fixtures (1" diameter bulbs)	High
2	T8 fluorescent fixtures (1" diameter bulbs)	High
3	T5 Fixtures (5/8" diameter)	High
4	T10 fluorescent fixtures	Base
5	T12 Fixtures (1.5" diameter bulbs)	Base
6	HID (High Density Discharge) Fixtures, Compact	High
7	Compact Fluorescent, Screw-in Modular	High
8	Compact Fluorescent, Hardwire	High
9	Incandescent	Base
10	Exit Signs, Compact Fluorescent	High
11	Exit Signs, LED	High
12	Halogen	Base
13	Install Reflectors	High
14	Electronic Ballast	Other
15	Magnetic Ballast	Other
16	Lighting Controls, Time Clock	High
17	Lighting Controls, Occupancy Sensor	High
18	Lighting Controls, Bypass/Delay Timers	High
19	Lighting Controls, Photocell	High
20	Other Fluorescent	Other
21	Fat/Thick Tubes	Other
22	Skinny/Thin Tubes	Other
77	Other (PLEASE SPECIFY)	Other
88	Refused	Other
99	Don't Know	Other

If LSP2 = (1,2,3,4,11,12,13,14,19,20,21,22,77) then loop L_MSP2 to L126 up to 3 times.

Ask If LIGHT_TECH1B = High; else skip to L117

MSP2 1 How many high efficiency <LIGHT_TECH1B> did you buy on your own only at this home facility?

1	{Record Number} at this facility	L117
88	Refused	L117
99	Don't know	L117

MSP2 3 How many high efficiency <LIGHT_TECH1B> did you buy on your own at other locations?

1	{Record Number} at another facility	L117
88	Refused	L117
99	Don't know	L117

ASK IF LIGHT_TECH1=5 ; ELSE SKIP TO L119

L117 Were the HID lamps you installed High Pressure Sodium, Metal Halide, Mercury Vapor or Incandescent?

1	High pressure sodium	L119
2	Metal Halide	L119
3	Mercury Vapor	L119
4	Incandescent	L119
88	Refused	L119
99	Don't know	L119

ASK ALL LIGHTING ADOPTERS

L119 In what year did you install <LIGHT_TECH1B>? (PROBE FOR BEST GUESS)

1	2005	L123
2	2006	L123
3	2007	L123
4	2008	L123
88	Refused	L123
99	Don't know	L123

L123 Did you receive a rebate for the purchase of the <LIGHT_TECH1B>?

1	Yes	L24
2	No	L24
88	Refused	L24
99	Don't know	L24

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L24 What type of lighting was removed and replaced when you installed <LIGHT_TECH1B>?

1	High performance T8 (1" diameter bulbs)	LI26
2	T8 fluorescent fixtures (1" diameter bulbs)	LI26
3	T5 Fixtures (5/8" diameter)	LI26
4	T10 fluorescent fixtures	LI26
5	T12 Fixtures (1.5" diameter bulbs)	LI26
6	HID (High Density Discharge) Fixtures, Compact	LI26
7	Compact Fluorescent, Screw-in Modular	LI26
8	Compact Fluorescent, Hardwire	LI26
9	Incandescent	LI26
10	Exit Signs, Compact Fluorescent	LI26
11	Exit Signs, LED	LI26
12	Halogen	LI26
13	Install Reflectors	LI26
14	Electronic Ballast	LI26
15	Magnetic Ballast	LI26
16	Lighting Controls, Time Clock	LI26
17	Lighting Controls, Occupancy Sensor	LI26
18	Lighting Controls, Bypass/Delay Timers	LI26
19	Lighting Controls, Photocell	LI26
20	Other Fluorescent	LI26
21	Fat/Thick Tubes	LI26
22	Skinny/Thin Tubes	LI26
66	NOTHING, EQUIPMENT WAS ONLY ADDED, NOT REPLACED	LI26
77	Other (PLEASE SPECIFY)	LI26
88	Refused	LI26
99	Don't know	LI26

LI26 Approximately how old was the equipment that was remove/replaced by <LIGHT_TECH1B>? Would you say...

1	Less than 5 years old	T&T
2	Between 5 and 10 years old	T&T
3	Between 10 and 15 years old	T&T
4	More than 15 years old	T&T
88	Refused	T&T
99	Don't know	T&T

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INTRODUCTION AND FINDING CORRECT RESPONDENT

Hello, this is <INTERVIEWER NAME> calling on behalf of the California Public Utilities Commission from Itron Incorporated.

OUTCOME1 May I please speak with &CONTACT, the person at this location who is most knowledgeable about your organizations' participation in &UTILITY's &Program.

[IF NEEDED] This is not a sales call.

[IF NEEDED] This is a fact-finding survey only, authorized by the California Public Utilities Commission. &UTILITY wants to better understand how businesses like yours think about and manage their energy consumption.

1	No, that person is not available right now	Appoint
2	Unable to refer someone who can help	Appoint
3	Yes, that would be me	S1
4	Yes, let me transfer you to _____.	Q1C
77	No, Other reason (specify)	Q1B
88	Refused	Q1B
99	Don't know	Q1B

Appoint [IF RECOMMENDED CONTACT IS NOT CURRENTLY AVAILABLE]
When would be a good day and time for us to call back?

77	Record day of the week, time of day and date to call back, as &APPOINT	Name
88	Refused	Thank & Terminate
99	Don't know	Name

PERSON According to our records, your organization participated in &UTILITY's &Program at your facility. Are you the person most knowledgeable about your organization's participation in this program?

1	Yes	Intro3:s
2	No	Hi
3	No one knows about the &Program	Intro3(99)

	If Person(3)	
Intro3(99)	Thank you for your time. We need to speak with the person at your organization that is most familiar with your participation in the &Program. Those are all of the questions I have for you today.	Abandoned User30

Hi Who would be the person at this location who is most knowledgeable about your organizations' participation in &UTILITY's &Program?[Enter technical Contact Name and move on.]

77	Record Name, as &CONTACT	May I
88	Refused	Thank & Terminate
99	Don't know	Ext

May I May I speak with him/her?

77	Yes	Intro3:s
88	No (not available right now@, set cb)	Abandoned Appointment

Intro3:s	Hello, this is <INTERVIEWER NAME> calling on behalf of &UTILITY from Itron Incorporated. This is not a sales call. This is a fact-finding survey only. According to our records, your organization participated in &UTILITY's &Program since 2006. I was told that you are the person most knowledgeable about this program. Is this correct?	
1	Yes	COMMENT
2	No	Thank & Terminate
99	No one knows about the &Program	Thank & Terminate

Ext Is there a phone extension or phone number you recommend we use when we call back?

77	Record Extension or Phone Number, &PHONE	Thank & Terminate
88	Refused	Thank & Terminate
99	Don't know	Thank & Terminate

Thank & Terminate Thank you for your time and help today.

END

[IF YOU ARE TRANSFERRED TO ANOTHER PERSON OTHER THAN THE BEST CONTACT]

Q1B Who would be the person at this location who is most knowledgeable about your organizations' participation in &UTILITY's &Program.

[IF NEEDED] This is not a sales call.

[IF NEEDED] This is a fact-finding survey only, and responses will not be connected with your firm in any way. The California Public Utilities Commission wants to better understand how businesses think about and manage their energy consumption.

77	There is no one here who can help you	T&T
1	Continue Q1B until you find appropriate contact person, record as &CONTACT	Q1C

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[IF BEST CONTACT IS AVAILABLE]		
Q1C	Hello Mr./Mrs. &CONTACT, this is <INTERVIEWER NAME> calling on behalf of the California Public Utilities Commission from Itron Incorporated. I understand you are the person at your location that is most knowledgeable about this program. Is this correct?	
1	Current individual is best contact	S1
2	Transferred to best contact	Repeat Q1C w/best contact
3	Given best contact's name and number	Appoint
99	Don't know/refused	T&T

Before we start, I would like to inform you that for quality control purposes, this call may be monitored by my supervisor.

Today we're conducting a very important study on the energy needs and perceptions of organizations like yours. We are interested in how organizations like yours think about and manage their energy consumption.

Your input will allow the California Public Utilities Commission to build and maintain better energy savings programs.

This is a fact-finding survey only, and responses will not be connected with your organization in any way.

SCREENER

Scrn_Addr	First, I'd like to ask you a few questions about your organization and facility. Our records show your firm is located at &SERV_ADDR in &CITY. Is that correct? [CONTINUE IF ADDRESS REPORTED BY RESPONDENT IS SIMILAR ENOUGH]	
1	Yes	S4
2	No	CORRECT
88	Refused	COMMENT
99	Don't know	COMMENT

COMMENT We were attempting to reach the customer at &ADDRESS and since you cannot confirm this address, those are all the questions that we have for you today, on behalf of the California Public Utilities Commission, thank you for your time.

CORRECT	May I have your correct address?	
&CORRECT	Corrected Address	COMPARE

COMPARE	Are these addresses similar or totally different? Computer Address - &ADDRESS Corrected Address - &CORRECT	
1	Similar	COMMENT1
2	Totally Different	COMMENT2

COMMENT2 We were attempting to reach the customer at &ADDRESS in &CITY and since that does not match your address, then we must have mis-dialed the telephone number. Those are all the questions that we have for you today, on behalf of the California Public Utilities Commission. Thank you for your time and cooperation.

COMMENT2	What type of lighting was removed and replaced when you installed &Prgm_LT1_Desc through the &Program?	CC1
-----------------	--	------------

Comment	The questions in this survey will refer to your "FACILITY," which means ALL of the buildings and tenants serviced by &UTILITY under the following billing address: &SERV_ADDR. [INTERVIEWERS SHOULD RE-READ THIS STATEMENT AS NEEDED THROUGHOUT THE SURVEY TO REMIND THE RESPONDENTS]
----------------	---

CUSTOMER CHARACTERISTICS

Now, I'd like to ask you questions regarding your facility.

CC1	How many square feet of heated or cooled floor area is your facility?	
77	Square feet	CC3a
88	Refused	CC3
99	Don't know	CC3

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IF CC1 IN (88, 99)

CC3 Would you say that the heated or cooled floor area is ...?

1	Less than 1,500 sq ft	CC3a
2	Between 1,500 - 5,000 sq ft	CC3a
3	Between 5,000 - 10,000 sq ft	CC3a
4	Between 10,000 – 25,000 sq ft	CC3a
5	Between 25,000 – 50,000 sq ft	CC3a
6	Between 50,000 – 75,000 sq ft	CC3a
7	Between 75,000 – 100,000 sq ft	CC3a
8	Over 100,000 sq ft	CC3a
88	Refused	CC3a
99	Don't know	CC3a

CC3a Is your space heated using electricity or gas?

1	Electricity	CC4
2	Gas	CC4
3	Propane	CC4
4	Both electricity and gas	CC4
5	Neither	CC4
77	OPEN\Other-RECORD	CC4
88	Refused	CC4
99	Don't know	CC4

CC4 Does your business own, lease or manage the facility?

1	Own	CC6
2	Lease/Rent	CC5a
3	Manage	CC5
88	Refused	CC5
99	Don't know	CC5

ASK IF CC4 in (3, 88, 99)

CC5 Does your company pay the electric and/or gas utility bill?

1	Yes	CC6
2	No	CC6
88	Refused	CC6
99	Don't know	CC6

ASK IF CC4 = 2

CC5a Which of the following best describes how your business pays the electric and/or gas utility bill for your space at this facility?
Would you say...[READ LIST.]

1	You pay &UTILITY directly	CC6
2	You pay a fee to your landlord that varies according to the size of the total utility bill	CC6
3	You pay a fixed fee to your landlord	CC6
4	You do not pay for electric and gas utilities	CC6
77	OPEN\SOME OTHER ARRANGEMENT\OTHER (Specify)	CC6
88	Refused	CC6
99	Don't know	CC6

ASK ALL

CC6 How active a role does your business take in making lighting and climate control equipment purchase decisions at this facility?
Would you say you are... [READ LIST.]

1	Very active – involved in all phases and have veto power	CC7
2	Somewhat active – we approve decisions and provide some input and review	CC7
3	Slightly active – we have a voice but it's not the dominant voice	CC7
4	Not active at all – we're part of a larger firm	CC7
5	Or, not active at all – our firm doesn't get involved in these issues	CC7
88	Refused	CC7
99	Don't know	CC7

ASK IF CC4 = 2; ELSE SKIP TO CC8

CC7 How long is the term of your lease?

1	1 year	CC8
2	2 years	CC8
3	3 years	CC8
4	4 years	CC8
5	5 years	CC8
6	6 years	CC8
7	7 years	CC8
8	8 years	CC8
9	9 years	CC8
10	10 years	CC8
11	Greater than 10 years	CC8
12	Month to month	CC8
13	Other (Specify)	CC8
88	Refused	CC8
99	Don't know	CC8

CC8 In what year was your facility built?

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&YRB Year	CC11
88 Refused	CC10
99 Don't know	CC10

CC10 If don't know, would you say it was...

1 After 2000	CC11
2 In the 1990's	CC11
3 1980s	CC11
4 1970s	CC11
5 1960s	CC11
6 1950	CC11
7 Before 1950	CC11
88 Refused	CC11
99 Don't know	CC11

CC11 In what year was this facility last remodeled?

&YR Year	CC12
66 Never	CC13
88 Refused	CC11a
99 Don't know	CC11a

NOTE: Get year if prior to 2003, get year and month if during or after 2003.

ASK IF CC11 in (88, 99); ELSE SKIP TO CC12

CC11a Would you say the last remodeling was done [READ RESPONSES.]

1 Between 2003 and Present	CC12a
2 Between the years 2000 and 2002	CC12a
3 During the 1990's	CC12a
4 Before the 1990's	CC12a
88 Refused	CC12a
99 Don't know	CC12a

ASK IF CC11a =1 or &YR >=2003 ; ELSE SKIP TO CC13

CC12 In which month of &YR was the remodel complete? If you can not get month, try to get the season.

1 January	CC12a
2 February	CC12a
3 March	CC12a
4 April	CC12a
5 May	CC12a
6 June	CC12a
7 July	CC12a
8 August	CC12a
9 September	CC12a
10 October	CC12a
11 November	CC12a
12 December	CC12a
13 Fall	CC12a
14 Winter	CC12a
15 Spring	CC12a
16 Summer	CC12a
88 Refused	CC12a
99 Don't know	CC12a

CC12a In what year was this business established at this location?

&YRB Year	CC13
88 Refused	CC12b
99 Don't know	CC12b

CC12b If don't know, would you say it was...

1 After 2000	CC13
2 In the 1990's	CC13
3 1980s	CC13
4 1970s	CC13
5 1960s	CC13
6 1950	CC13
7 Before 1950	CC13
88 Refused	CC13
99 Don't know	CC13

CC13 Over the past 3 years, has your organization actively considered moving from this location to a new location?

1 Yes	BC090
2 No	BC090
88 Refused	BC090
99 Don't know	BC090

ADDITIONAL FACILITY CHARACTERISTICS

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BC090 Has the square footage of the facility increased, decreased or remained the same since January 2006?		
1	Increase in square footage	BC100
2	Decrease in square footage	BC110
3	Stayed the same	FM050
88	Refused	FM050
99	Don't know	FM050

BC100 How many square feet were added?		
&SQFTA	Square feet	BC120
88	Refused	BC120
99	Don't know	BC120

BC110 By how many square feet was the facility reduced?		
&SQFTR	Square feet	BC120
88	Refused	BC120
99	Don't know	BC120

BC120 What year did this change in square feet occur? IF DON'T KNOW, ASK FOR BEST GUESS		&YRBC120
1	2005	BC120a
2	2006	BC120a
3	2007	BC120a
4	2008	BC120a
88	Refused	BC120b
99	Don't know	BC120b

BC120a And can you recall which month? If you can not get month, try to get the season. IF DON'T KNOW, ASK FOR BEST GUESS.		
1	January	FM050
2	February	FM050
3	March	FM050
4	April	FM050
5	May	FM050
6	June	FM050
7	July	FM050
8	August	FM050
9	September	FM050
10	October	FM050
11	November	FM050
12	December	FM050
13	Fall	FM050
14	Winter	FM050
15	Spring	FM050
16	Summer	FM050
88	Refused	FM050
99	Don't know	FM050

FM050 What is the main business ACTIVITY at your facility?		
1	Office	FM070
2	Retail (non-food)	FM070
3	College/University	FM070
4	School	FM070
5	Grocery Store	FM070
6	Restaurant	FM070
7	Health Care (other than Hospital)	FM070
8	Hospital	FM070
9	Hotel or Motel	FM070
10	Warehouse	FM070
11	Construction	FM070
12	Community Service/Church/Temple/ Municipality	FM070
13	Industrial Process/ Manufacturing/ Assembly	FM070
14	Condo Assoc./Apartment Mgr.	FM070
15	Greenhouse	
16	Laundry/Cleaners	
77	OPEN/Other - SPECIFY	FM070
88	Refused	FM070
99	Don't Know	FM070

FM070 How many people are currently working at the facility, including both full and part time? (IF DON'T KNOW ASK FOR BEST GUESS)		
&NUM	Number of people	FM080
88	Refused	FM080
99	Don't know	FM080

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FM080 Since January 2006 has the number of people working at this facility changed by more than 10%?		
1	Yes	FM081
2	No	PC010
88	Refused	FM100
99	Don't know	FM100

FM081 Would these changes have increased or decreased number of employees?		
1	Increased number of employees	FM100
2	Decreased number of employees	PC010
88	Refused	FM100
99	Don't know	FM100

FM100 In 2005 approximately how many people were working at this facility, including both full- or part-time employees? (IF DON'T KNOW ASK FOR BEST GUESS)		
&NUM03	Number of people	PC010
88	Refused	PC010
99	Don't know	PC010

PC010 Thinking back to 2005, were any changes made to the facility during 2005 that would change the energy consumption by more than 10%?		
1	Yes	PC020
2	No	PC030
88	Refused	PC030
99	Don't know	PC030

PC020 Would these changes have increased or decreased consumption?		
1	Increased	PC030
2	Decreased	PC030
88	Refused	PC030
99	Don't know	PC030

PC030 During what season did these changes take place?		
1	Fall	CA1
2	Winter	CA1
3	Spring	CA1
4	Summer	CA1
88	Refused	CA1
99	Don't know	CA1

CUSTOMER ATTITUDE

CA1 How important is being environmentally conscious to your business? Would you say it is		
1	Essential to your business	CA2
2	Very important	CA2
3	Somewhat important or	CA2
4	Not at all important	CA3a
88	Refused	CA3a
99	Don't know	CA3a

CA2 In marketing materials or in communications with customers, does your company highlight ways in which your business is environmentally conscious?		
1	Yes	CA3a
2	No	CA3a
77	Other (Specify)	CA3a
88	Refused	CA3a
99	Don't know	CA3a

CA3a This is a hypothetical situation, suppose your company identified an energy efficient building upgrade, such as a lighting change-out, that would pay for itself through reduced utility bills within 2 years...If the cost of this upgrade were \$2,000, how difficult would it be for your organization to find the funds to invest in this energy efficient upgrade? Would you say...

1	Very difficult, the funds would likely not be available	CAPB
2	Somewhat difficult, it would take some work, but funding could be found	CAPB
3	Not difficult, finding the funds for such an investment would be easy	CAPB
88	Refused	CAPB
99	Don't Know	CAPB

CAPB Given that it would take 2 years to recoup the initial investment through reduced utility bills, how interested would your organization be in pursuing such an investment? Would you say...		
1	Very Interested	CAPB2
2	Somewhat interested	CAPB2
3	Not at all interested	CAPB2
88	Refused	CAPB2
99	Don't know	CAPB2

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CAPB2 Energy efficient investments pay for themselves through reduced utility bills over time. Considering projects your company would approve, what is the longest period of time your organization would allow for an energy efficient investment to pay for itself?

&YRCAPB2 Years	CA4
88 Refused	CA4
99 Don't Know	CA4

CA4 Prior to 2006, had your facility ever installed equipment that involved the receipt of rebates or incentives from an energy efficiency program?

1 Yes	CA6
2 No	CA15
88 Refused	CA16
99 Don't know	CA17

CA6 What type of equipment did you install through this (these) program(s)? [READ RESPONSE CATEGORIES]

1 Indoor lighting	CA15
2 Cooling equipment	CA15
3 Natural gas equipment, such as water heater, furnace or appliances	CA15
4 Insulation or windows	CA15
5 Refrigeration	CA15
6 Industrial process equipment	CA15
7 Greenhouse heat curtains	CA15
8 Food service equipment	CA15
77 OTHER (specify)	CA15
99 Don't Know	CA15

CA15 Over the past 3 years, how would you characterize your organization's business outlook? Would you say it was ...

1 Excellent	CA15A
2 Good	CA15A
3 Fair	CA15A
4 Adequate	CA15A
8 Poor	CA15A
88 Refused	CA15A
99 Don't know	CA15A

CA15A Projecting over the NEXT 3 years, how would you characterize your business outlook? Would you say....

1 Excellent	V1
2 Good	V1
3 Fair	V1
4 Adequate	V1
5 Poor	V1
88 Refused	V1
99 Don't know	V1

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ROLE OF CONTRACTORS

Now I would like to find out, did you use a contractor to install the measures rebated through the 2006-08 &PROGRAM

V1 Program?

1 Yes	V5
2 No	PE1
99 [DO NOT READ] Don't know/No Answer	PE1

V5 Had you worked with this contractor before participating in this program?

1 Yes	V40
2 No	V40
99 [DO NOT READ] Don't know/No Answer	V40

V40 How important was the input from the contractor you worked with in deciding which specific equipment to install? Was it ...

1 Very important	PE1
2 Somewhat important	PE1
3 Not at all important	PE1
66 They did not have any input.	PE1
88 Refused	PE1
99 Don't know	PE1

PROGRAM EFFECTS

Next we would like to ask you about your program experience.
Please rate these 4 factors on your decision to purchase rebated equipment as very, somewhat, or not at all influential.
The first/next one is ...

PE1A# & rebate

PE1B# Contractor IF V1 = 1

PE1C# Your [UTILITY] representative

PE1D# Rising energy bills

PE1 **PE1E#** Global Warming

1 VERY Influential	AP9
2 SOMEWHAT Influential	AP9
3 NOT AT ALL Influential	AP9
88 Refused	AP9
99 Don't know	AP9

PROGRAM AWARENESS

Next, I'd like to ask you about various energy efficiency programs and what influenced your program participation.

Need to incorp Govt Part Q's

AP9 How did you **FIRST** learn about the **Utility's** program? [DO NOT READ]

1 Utility provided advertising--radio, newspaper, trade journal, billboard, TV	AP9a
2 Bill insert, newsletter, or other mailing from utility	AP9a
3 Utility Website	AP9a
4 Email from Utility	AP9a
5 Other utility source (SPECIFY)	AP9a
6 Local government, community or nonprofit meeting, event, workshop or training (SPECIFY)	AP9a
7 Local government/community agency (SPECIFY)	AP9a
8 Local government, community, or nonprofit advertising- radio, newspaper, trade journal, TV	AP9a
9 School, classes, energy center (SPECIFY)	AP9a
10 Building audit or assessment (SPECIFY)	AP9a
11 Flex your Power TV or radio advertising	AP9a
12 Other meeting, event or workshop training (SPECIFY)	AP9a
13 Other advertising	AP9a
14 Word of mouth: Friend/Relative/Neighbor/Co-worker	AP9a
15 Contractor	AP9a
66 No other sources	AP11
77 Other (SPECIFY)	AP9a
88 Refused	AP11
99 Don't know	AP11

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AP9a How ELSE did you learn about UTILITY's program? [DO NOT READ LIST, ACCEPT MULTIPLES]

1	Utility provided advertising--radio, newspaper, trade journal, billboard, TV	AP11
2	Bill insert, newsletter, or other mailing from utility	AP11
3	Utility Website	AP11
4	Email from Utility	AP11
5	Other utility source (SPECIFY)	AP11
6	Local government, community or nonprofit meeting, event, workshop or training (SPECIFY)	AP9b
7	Local government/community agency (SPECIFY)	AP9b
8	Local government, community, or nonprofit advertising- radio, newspaper, trade journal, TV	AP9b
9	School, classes, energy center (SPECIFY)	AP9b
10	Building audit or assessment (SPECIFY)	AP9b
11	Flex your Power TV or radio advertising	AP9b
12	Other meeting, event or workshop training (SPECIFY)	AP9b
13	Other advertising	AP9b
14	Word of mouth/Friend/Relative/Neighbor	AP11
15	Contractor	AP11
66	No other sources	AP11
77	Other (SPECIFY)	AP11
88	Refused	AP11
99	Don't know	AP11

IF AP9=6-13 or IF AP9a=6-13

You said that you received information from &AP9/AP9a [insert all response between 6-13 for AP9 and AP9a] about the &Program. How influential was this information on your decision to participate in the &Program? Please rate the influence on a scale of 1 to 5, where 1 is not at all influential and 5 is very influential.

AP9b

	RECORD RESPONSE (1-5)	AP11
88	Refused	AP11
99	Don't know	AP11

ASK IF AP9 NE 4

AP11 Did a utility representative talk to you about the Program?

1	Yes	AP11a
2	No	AP11a
88	Refused	AP11a
99	Don't know	AP11a

AP11a When did you first become aware of the Utility's Program? Would you say...

1	2005 or before	AP6a
2	Sometime during the 2006	AP6a
3	In 2007 or after	AP6a
88	Refused	AP6a
99	Don't know	AP6a

PROGRAM AWARENESS - OTHER PROGRAMS

Aside from the Program, are there other programs or resources you are aware of that are designed to promote energy efficiency for businesses like yours? [IF YES] What types of programs can you recall? [RECORD ALL MENTIONS] [After

AP6a each response prompt with "Can you recall any others?"]

1	NOT AWARE OF ANY	AP20
2	SPC / Standard Performance Contracting	AP20
3	20/20	AP20
4	Flex-your-Power	AP20
5	Distributor incentives	AP20
6	Upstream HVAC and Motors Program	AP20
7	Rebate (unspecified)	AP20
8	Nonresidential Audits or Energy Audits	AP20
77	Other programs (SPECIFY)	AP20
88	Refused	L1
99	Don't know	AP20

ASK IF AP6a NE 3; ELSE SKIP TO L11

Have you ever heard of the 20/20 Rebate Program? Each summer the governor of California promotes an energy conservation and efficiency program called the "20/20 Rebate program." Businesses that saved 20% off their electricity bill in the summer months as compared to the previous year's bill qualify for a 20% rebate on their bill.

AP20

1	Yes	AP22
2	No	L1
88	Refused	L1
99	Don't know	L1

AP22 During which summers did you attempt the 20/20 percent reduction?

1	2005	AP23
2	2006	L1
3	2007	
4	2008	
66	None of these	
88	Refused	L1
99	Don't know	L1

AP23 During which summer(s) did you attempt the 20 percent reduction? (Multiples Allowed)

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1	2005	AP24
2	2006	AP24
3	2007	AP24
4	2008	AP24
88	Refused	AP24
99	Don't know	AP24

AP24 In which year(s) were you successful in reducing your electricity bill by 20%? (Multiples Allowed)

1	2005	L11
2	2006	L11
3	2007	L11
4	2008	L11
66	None of these	
88	Refused	L11
99	Don't know	L11

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LIGHTING EQUIPMENT BATTERY

In the next section we'll be discussing the lighting systems at your facility.

What are the primary types of lighting used at your facility? [DO NOT READ, BUT PROBE TO GET SPECIFIC CATEGORIES; RECORD MULTIPLE MENTIONS BY RESPONDENT, AND SAY "ANY OTHERS" UNTIL UP TO FOUR HAVE BEEN

L11 MENTIONED]

1	High Performance T8	L12
2	T8 fluorescent fixtures (1" diameter bulbs)	L12
3	T10 fluorescent fixtures	L12
4	T12 Fixtures (1.5" diameter bulbs)	L12
5	HID (High Density Discharge) Fixtures, Compact	L13
6	Compact Fluorescent, Screw-in Modular	L13
7	Compact Fluorescent, Hardwire	L13
8	Incandescent	L13
9	Other Fluorescent	L12
10	Fat/Thick Tubes	L12
11	Skinny/Thin Tubes	L12
12	T5 Fixtures (5/8" diameter)	L12
77	Other (PLEASE SPECIFY)	L13
88	Refused	L13
99	Don't know	L13

If Linear Fluorescent (L11 in 1,2,3,4,9,10,11,12)

L12 Are the ballasts electronic or magnetic?

1	Electronic ballasts	L12a
2	Magnetic ballasts	L12a
3	Both	L12a
88	Refused	L13
99	Don't know	L13

L12a Approximately what percent of the ballasts are dimmable?

&PCTDIM	Percent	L13
101	Refused	L13
102	Don't know	L13

L13 How old is the lighting equipment currently in use at your facility? Would you say...

1	Less than 5 years old	L14
2	Between 5 and 10 years old	L14
3	Between 10 and 15 years old	L14
4	More than 15 years old	L14
88	Refused	L14
99	Don't know	L14

L14 How would you describe the condition of lights currently in use at your facility? Would you say they are...

1	In poor condition	L16
2	Fair condition, or	L16
3	Good condition	L16
88	Refused	L16
99	Don't know	L16

L16 Since January 2006 has anyone at your facility consulted with a contractor concerning the lighting systems?

1	Yes	L16a
2	No	L17
88	Refused	L17
99	Don't know	L17

L16a Did the lighting contractor recommend that you make changes to your lighting systems?

1	Yes	L17
2	No	L17
88	Refused	L17
99	Don't know	L17

L17 Since January 2006 has anyone at your facility consulted with an architect, engineer, designer or energy services company concerning the lighting systems?

1	Yes	L19
2	No	L19
88	Refused	L19
99	Don't know	L19

Comment	One way that businesses can reduce their energy use is to install more energy efficient equipment. Since one of the factors that influences energy use is the kind of equipment a business has, we would like to ask you about lighting equipment purchases you have made since January 2006.	L19
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If &Prgm_LT1_Desc ne "" then ask LI9; else skip to L_MSP1

For up to 3 Program Measures ASK LI9 THROUGH LI9D

Our records indicate that your organization installed &Prgm_LT1_Num &Prgm_LT1_Units &Prgm_LT1_Desc through the

LI9 &Program, is this correct?

1	Yes, installed that number	DEL1
2	Yes, but a different number	LI9x
3	No, did not install	Comment
88	Refused	Comment
99	Don't know	Comment

Ask if LI9 = 2

LI9x Approximately how many &Prgm_LT1_Units &Prgm_LT1_Desc were installed under the &Program?

&ClaimInstal_LT1	Record #	Calc
88	Refused	DEL1
99	Don't know	DEL1

If &ClaimInstal_LT1/&Prgm_LT1_Num <75%% then ask LI9y; else if &ClaimInstal_LT1/&Prgm_LT1_Num > 125% ask LI9z;
Calc else skip to LI90.

Perhaps you could help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Were any of these &Prgm_LT1 put into storage, perhaps installed at another facility, or never received? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match,

LI9y it would really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	DEL1
2	Did not install all of the <%LT1_UNIT>@, put some in storage	DEL1
3	Installed at another facility	DEL1
4	Did not receive all of the &Prgm_LT1	DEL1
77	Other	DEL1
88	Refused	DEL1
99	Don't know	DEL1

Perhaps you can help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Did your facility participate multiple times in the program since 2006 and maybe we don't have these other records? Did you install additional equipment outside of the program that you are including in these numbers? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would

LI9z really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	DEL1
2	Multiple participation	DEL1
3	Installed equipment outside of the program	DEL1
77	Other	DEL1
88	Refused	DEL1
99	Don't know	DEL1

Ask if DEL1=1 and Utility=-SCE. (If Utility=-SCE skip to DEL12.)

We also show that you delamped these fixtures. Is this correct? (If needed: delamping occurs when you retrofit your T12s to

DEL1 T8s and reduce the number of lamps in a fixture.)

1	Yes	DEL5
2	No	LI90
88	Refused	LI90
99	Don't know	LI90

DEL5 Is the amount of lighting better, worse, or the same than before your delamping job?

1	Better	DEL12
2	Worse	DEL11
3	Same	DEL12
88	Refused	DEL11
99	Don't know	DEL11

DEL11 Did you install additional lighting equipment to increase the amount of lighting?

1	Yes	DEL12
2	No	DEL12
88	Refused	DEL12
99	Don't know	DEL12

Ask if question DEL1=yes or if (Utility=-SCE and DEL1=1)

DEL12 How many lamps per fixture were installed prior to delamping?

1	1 lamp	DEL13
2	2 lamps	DEL13
3	3 lamps	DEL13
4	4 lamps	DEL13
77	Other	DEL13
88	Refused	DEL13
99	Don't know	DEL13

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DEL13 How many lamps per fixture are installed now?

1	1 lamp	LI90
2	2 lamps	LI90
3	3 lamps	LI90
4	4 lamps	LI90
77	Other	LI90
88	Refused	LI90
99	Don't know	LI90

Ask only for CFL = 1

LI90 What percentage of the rebated CFLs were placed in storage?

	Open Record	LI91
88	Refused	LI91
99	Don't know	LI91

Do not ask for those who said Another Facility for LI9y

Ask for all lighting parts

LI91 What percentage of the rebated &Prgm_LT1_Desc were placed installed at another facility?

	Open Record	LI9a
88	Refused	LI9a
99	Don't know	LI9a

I'd like to ask you a few questions about the equipment that was removed and replaced when you installed the &Prgm_LT1_Desc...

LI9a What type of lighting was removed and replaced when you installed &Prgm_LT1_Desc through the &Program?

1	High performance T8 (1" diameter bulbs)	LI9c
2	T8 fluorescent fixtures (1" diameter bulbs)	LI9c
3	T10 fluorescent fixtures	LI9c
4	T12 Fixtures (1.5" diameter bulbs)	LI9c
5	HID (High Density Discharge) Fixtures, Compact	LI9b
6	Compact Fluorescent, Screw-in Modular	LI9c
7	Compact Fluorescent, Hardwire	LI9c
8	Incandescent	LI9c
9	Exit Signs, Compact Fluorescent	LI9c
10	Exit Signs, LED	LI9c
11	Halogen	LI9c
12	Install Reflectors	LI9c
13	Electronic Ballast	LI9c
14	Magnetic Ballast	LI9c
15	Lighting Controls, Time Clock	LI9c
16	Lighting Controls, Occupancy Sensor	LI9c
17	Lighting Controls, Bypass/Delay Timers	LI9c
18	Lighting Controls, Photocell	LI9c
19	Other Fluorescent	LI9c
20	Fat/Thick Tubes	LI9c
21	Skinny/Thin Tubes	LI9c
22	T5 Fixtures (5/8" diameter)	LI9c
66	Did not replace anything - new equipment	Comment
77	Other (PLEASE SPECIFY)	LI9c

ASK IF LI9a=5; else skip to LI9c

LI9b Were the HID lamps you removed High Pressure Sodium, Metal Halide, Mercury Vapor or Incandescent?

1	High pressure sodium	LI9c
2	Metal Halide	LI9c
3	Mercury Vapor	LI9c
4	Incandescent	LI9c
88	Refused	LI9c
99	Don't know	LI9c

LI9c Approximately how old were the lights that were removed and replaced with &Prgm_LT1_Desc? Would you say...

1	Less than 5 years old	LI9d1
2	Between 5 and 10 years old	LI9d1
3	Between 10 and 15 years old	LI9d1
4	More than 15 years old	LI9d1
88	Refused	LI9d1
99	Don't know	LI9d1

ASK if &Install_Month <> Null

Our records indicate that your company installed the lighting equipment in &Install_MONTH &Install_YEAR through &Program,

LI9d is this correct?

1	Yes	FR1
2	No	LI9f1
88	Refused	FR1
99	Don't know	FR1

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Read if &Check_Month <= Null and &Install_Month = Null

Our records indicate that your company received a rebate for the lighting equipment installed through &Program in &Check_MONTH &Check_YEAR.

LI9f1 In what year did you install &Prgm_LT1_Desc? (PROBE FOR BEST GUESS)

1	2005	LI9f2
2	2006	LI9f2
3	2007	LI9f2
4	2008	LI9f2
88	Refused	FR1
99	Don't know	FR1

LI9f2 And what month? (If they can not recall month, try to get the season.)

1	January	FR1
2	February	FR1
3	March	FR1
4	April	FR1
5	May	FR1
6	June	FR1
7	July	FR1
8	August	FR1
9	September	FR1
10	October	FR1
11	November	FR1
12	December	FR1
13	Fall	FR1
14	Winter	FR1
15	Spring	FR1
16	Summer	FR1
88	Refused	FR1
99	Don't know	FR1

Go to SRNTG Battery

End Loop

READ Comment IF &Program LIGHTING PARTICIPANT

Comment	Thank you for discussing the new lighting equipment that you installed through the &Program. Next, I would like to discuss any lighting equipment you might have installed OUTSIDE the &Program...	L_MSP1
----------------	--	--------

ASK ALL

L_MSP1 Since January 2005 have you purchased and installed any lighting on your own without any assistance from the &Utility &Program or another utility program either at this facility or at other locations?

1	Yes, only at this home/facility	LSP2
2	Yes, only at other locations	LSP2
3	Yes, at this facility and other locations	LSP2
4	No	LI30
88	Refused	LI30
99	Don't know	LI30

LSP2 What type of fixtures, ballasts, or lighting controls were installed as part of this lighting retrofit? [SELECT ALL THAT APPLY, AFTER EACH RESPONSE, PROMPT WITH.]

**LIGHT TECH
1B**

1	High performance T8 fluorescent fixtures (1" diameter bulbs)	High
2	T8 fluorescent fixtures (1" diameter bulbs)	High
3	T10 fluorescent fixtures	Base
4	T12 Fixtures (1.5" diameter bulbs)	Base
5	HID (High Density Discharge) Fixtures, Compact	High
6	Compact Fluorescent, Screw-in Modular	High
7	Compact Fluorescent, Hardwire	High
8	Incandescent	Base
9	Exit Signs, Compact Fluorescent	High
10	Exit Signs, LED	High
11	Halogen	Base
12	Install Reflectors	High
13	Electronic Ballast	Other
14	Magnetic Ballast	Other
15	Lighting Controls, Time Clock	High
16	Lighting Controls, Occupancy Sensor	High
17	Lighting Controls, Bypass/Delay Timers	High
18	Lighting Controls, Photocell	High
19	Other Fluorescent	Other
20	Fat/Thick Tubes	Other
21	Skinny/Thin Tubes	Other
22	T5 Fixtures (5/8" diameter)	High
77	Other (PLEASE SPECIFY)	Other
88	Refused	Other
99	Don't Know	Other

Loop for first 3 mentioned L_MSP2 to LI26

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Ask If LIGHT_TECH1B = High; else skip to LI17

L_MSP2 How many high efficiency lighting products did you buy on your own at this facility and/or at another locations?

1	{Record Number} at this facility	L_MSP4
2	{Record Number} at another facility	L_MSP4
88	Refused	L_MSP4
99	Don't know	L_MSP4

I'm going to read a statement about this equipment that you purchased on your own. On a scale from 1-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

My experience with the 06-08 &Utility &Program influenced my decision to install different types of high efficiency equipment on my own.

L_MSP4

	{Record Response (0-10)}	L_MSP5
88	Refused	L_MSP5
99	Don't Know	L_MSP5

Why did you purchase this lighting without the financial assistance available through &Utility program? (DO NOT READ;

L_MSP5 INDICATE ALL THAT APPLY}

1	Too much paperwork	LI17
2	Takes too long to get approval	LI17
3	No time to participate, needed equipment immediately	LI17
4	The program had ended	LI17
5	The equipment would not qualify (PROBE: Why not?)	LI17
6	The amount of the rebate wasn't important enough	LI17
7	Did not know the program was available	LI17
8	There was no program available	LI17
77	Other (SPECIFY)	LI17
88	Refused	LI17
99	Don't know	LI17

ASK IF LIGHT_TECH1=5 ; ELSE SKIP TO LI18

LI17 Were the HID lamps you installed High Pressure Sodium, Metal Halide, Mercury Vapor or Incandescent?

1	High pressure sodium	LI19
2	Metal Halide	LI19
3	Mercury Vapor	LI19
4	Incandescent	LI19
88	Refused	LI19
99	Don't know	LI19

ASK ALL LIGHTING ADOPTERS

LI19 In what year did you install LIGHTING_TECH1? (PROBE FOR BEST GUESS)

1	2005	LI20
2	2006	LI20
3	2007	LI20
4	2008	LI20
88	Refused	LI23
99	Don't know	LI23

LI20 And can you recall which month? If you can not get month, try to get the season.

1	January	CFL1_A
2	February	CFL1_A
3	March	CFL1_A
4	April	CFL1_A
5	May	CFL1_A
6	June	CFL1_A
7	July	CFL1_A
8	August	CFL1_A
9	September	CFL1_A
10	October	CFL1_A
11	November	CFL1_A
12	December	CFL1_A
13	Fall	CFL1_A
14	Winter	CFL1_A
15	Spring	CFL1_A
16	Summer	CFL1_A
88	Refused	CFL1_A
99	Don't know	CFL1_A

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Ask if LI11 = 6

CFL_1a Where did you purchase the CFLs that were installed OUTSIDE the &Program? [ACCEPT MULTIPLES]

1	Home Depot	CFL_2
2	Costco	CFL_2
3	Orchard Supply Hardware	CFL_2
4	ACE Hardware	CFL_2
5	Lowe's	CFL_2
6	Long's	CFL_2
7	SaveMart	CFL_2
8	K-Mart	CFL_2
9	Sam's Club	CFL_2
10	Smart & Final	CFL_2
11	Albertson's	CFL_2
12	Yardbirds Home Center	CFL_2
13	Fry's Electronics	CFL_2
14	True Value	CFL_2
76	CONTRACTOR INSTALLED	CFL_2
77	OTHER [Specify:]	CFL_2
88	Refused	CFL_2
99	Don't know	CFL_2

CFL_2 Did the CFL's have a sticker indicating a &UTILITY instant rebate?

1	Yes	CFL_QTY
2	No	CFL_QTY
88	Refused	CFL_QTY
99	Don't know	CFL_QTY

CFL_QTY Approximately how many CFL bulbs have you purchased since January 2006?

&CFL_QTY	Enter number installed.	CFL_3
88	Refused	CFL_3
99	Don't Know	CFL_3

If CFL_QTY <=0

CFL_3 Were all the CFLs installed or were some of them placed in storage for later use?

1	All installed	CFL24
2	Some installed	CFL_4
3	Some in storage	CFL_4
4	All in storage	CFL_5
88	Refused	CFL24
99	Don't Know	CFL24

IF CFL_3 = 2

CFL_4 What percentage were installed?

77	Open Record	CFL_24
88	Refused	CFL_24
99	Don't know	CFL_24

IF CFL_3 = 2 OR 3

CFL_5 Why were they put in storage?

77	Open Record	CFL_24
88	Refused	CFL_24
99	Don't know	CFL_24

IF CFL_3 = 1 OR 2

CFL24 When you bought your CFLs, what kind of lamp did you replace? [ALLOW MULTIPLES]

1	Incandescent	LI18
2	CFLs	LI18
3	HID	LI18
4	Mercury vapor	LI18
5	Other [SPECIFY]	LI18
88	Refused	LI18
99	Don't Know	LI18

Ask if CFL_2 not 1; ELSE SKIP TO L24

LI23 Did you receive a rebate for the purchase of the &LIGHTING_TECH1?

1	Yes	L24
2	No	L24
88	Refused	L24
99	Don't know	L24

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Next I'd like to ask you a few questions about the equipment that was removed and replaced when you installed the &LIGHT_TECH1...

L24 What type of lighting was removed and replaced when you installed &LIGHT_TECH1?

1	High performance T8 (1" diameter bulbs)	LI25
2	T8 fluorescent fixtures (1" diameter bulbs)	LI25
3	T10 fluorescent fixtures	LI25
4	T12 Fixtures (1.5" diameter bulbs)	LI25
5	HID (High Density Discharge) Fixtures, Compact	LI25
6	Compact Fluorescent, Screw-in Modular	LI25
7	Compact Fluorescent, Hardwire	LI25
8	Incandescent	LI25
9	Exit Signs, Compact Fluorescent	LI25
10	Exit Signs, LED	LI25
11	Halogen	LI25
12	Install Reflectors	LI25
13	Electronic Ballast	LI25
14	Magnetic Ballast	LI25
15	Lighting Controls, Time Clock	LI25
16	Lighting Controls, Occupancy Sensor	LI25
17	Lighting Controls, Bypass/Delay Timers	LI25
18	Lighting Controls, Photocell	LI25
19	Other Fluorescent	LI25
20	Fat/Thick Tubes	LI25
21	Skinny/Thin Tubes	LI25
22	T5 Fixtures (5/8" diameter)	LI25
66	NOTHING, EQUIPMENT WAS ONLY ADDED, NOT REPLACED	LI25
77	Other (PLEASE SPECIFY)	LI25

Approximately how old were the lights that were removed/replaced by the lighting equipment we just discussed? Would you

LI26 say...

1	Less than 5 years old	LI50
2	Between 5 and 10 years old	LI50
3	Between 10 and 15 years old	LI50
4	More than 15 years old	LI50
88	Refused	LI50
99	Don't know	LI50

END LIGHTING MEASURE LOOP

Comment	Thank you for discussing each lighting purchase that you've made since January 2004. Please consider all of those lighting purchases when answering these next questions.	LI30
----------------	---	------

ASK IF L_MSP1=1 or LI9=1 (for any Program Lighting Measure); ELSE SKIP TO CL1

Considering all of the lighting changes we just discussed, approximately what percentage of the facility's lighting was affected by those changes?

LI30

%	Percent	OCC1
88	Refused	OCC1
99	Don't know	OCC1

OCCUPANCY SENSORS

If LI11 = 16 or &Prgm_LT1_Desc = Occupancy Sensor then skip to OCC2

OCC1 Do you have occupancy sensors at your facility?

1	Yes	OCC2
2	No	CL1
88	Refused	CL1
99	Don't know	CL1

OCC2 Earlier you mentioned you purchased Occupancy Sensors. What percentage of your lights have occupancy controls on them?

&OCCPerc	Record percent	OCC5
88	Refused	OCC5
99	Don't know	OCC5

OCC5 Before Occupancy Sensors were installed, how many hours were the lights in operation?

&OCCHRB	Record number	OCC6
88	Refused	OCC6
99	Don't know	OCC6

OCC6 After controls were installed, how many hours were the lights in operation?

&OCCHRA	Record number	CL1
88	Refused	CL1
99	Don't know	CL1

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COOLING EQUIPMENT BATTERY

Now we would like to discuss your cooling equipment.

CL1 What type of equipment is used to cool this facility? (allow multiples)

1	No A/C	R1
2	Split system (two components; compressor is separate from the supply air fan, air conditioner, or heat pump)	CL_T1
3	Packaged systems (one component; rooftop units)	CL_T1
4	Package Terminal A/C or Heat Pump (e.g., Hotel/Motel units)	CL_T1
5	Evaporative coolers (swamp coolers)	CL_T1
6	Water Chiller (Central plant)	CL_T1
7	Individual A/C or Heat Pump Units (e.g., Unitary Equipment, Central A/C with multiple units, single unit for small business) NOTE:(ask if split or package system)	CL_T1
8	Window/Wall Units	CL_T1
77	Other (Specify)	CL_T1
88	Refused	CL_T1
99	Don't Know	CL_T1

CL_T1 Did you change your thermostat set point since January 2005?

1	Yes	CL_T2
2	No	CL2
88	Refused	CL2
99	Don't Know	CL2

Ask if CL_T1 = 1

CL_T2 What changes did you make? (Probe for changes in temperature settings)

ThChanges	Record Verbatim	CL2
88	Refused	CL2
99	Don't Know	CL2

CL2 How would you describe the condition of the primary cooling equipment currently in use at your facility? Would you say the cooling equipment is in ...

1	In poor condition	CL3
2	In fair condition	CL3
3	Good condition	CL3
88	Refused	CL3
99	Don't know	CL3

CL3 How old is this cooling equipment currently in use at your facility? Would you say...

DiffInstal_RF1	1 Less than 5 years old	CL4
	2 Between 5 and 10 years old	CL4
	3 10 to 20 years old	CL4
	4 more than 20 years old	CL4
	88 Refused	CL4
	99 Don't know	CL4

CL4 What is the primary fuel used by this cooling equipment?

1	Electricity	Comment
2	Natural Gas	Comment
3	Both Electricity and Gas	Comment
77	Other (PLEASE SPECIFY)	Comment
88	Refused	Comment
99	Don't Know	Comment

Comment One way that businesses can reduce their energy use is to install more energy efficient equipment. Since one of the factors that influences energy use is the kind of equipment a business has, we would like to ask you about cooling equipment purchases you have made since January 2006.

CL9

If &Prgm_CL1_Desc ne "" then ask CL9; else skip to CL_MSP1

For up to 3 Program Measures ASK CL9 THROUGH CL9D

Our records indicate that your company installed &Prgm_CL1_Num &Prgm_CL1_Units &Prgm_CL1_Desc through the &Program, is this correct?

CL9	1 Yes	Comment
	2 Yes, but a different number	CL9x
	3 No, did not install	Comment
	88 Refused	Comment
	99 Don't know	Comment

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Ask if CL9 = 2
CL9x Approximately how many &Prgm_CL1_Units &Prgm_CL1_Desc were installed under the &Program?

ClaimInstal_CL1	Record #	Calc
88	Refused	Comment
99	Don't know	Comment

If &ClaimInstal_CL1/&Prgm_CL1_Num <75% then ask CL9y; else if &ClaimInstal_CL1/&Prgm_CL1_Num > 125% ask CL9z; else
Calc skip to CL8a.

Perhaps you could help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Were any of these &Prgm_CL1 put into storage, perhaps installed at another facility, or never received? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it

CL9y would really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	Comment
2	Put in storage	Comment
3	Installed at another facility	Comment
4	Did not receive all of the &Prgm_CL1	Comment
77	Other	Comment
88	Refused	Comment
99	Don't know	Comment

Perhaps you can help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Did your facility participate multiple times in the program since 2006 and maybe we don't have these other records? Did you install additional equipment outside of the program that you are including in these numbers? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would

CL9z really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	Comment
2	Multiple participation	Comment
3	Installed equipment outside of the program	Comment
77	Other	Comment
88	Refused	Comment
99	Don't know	Comment

Comment	I'd like to ask you a few questions about the equipment that was removed and replaced when you installed the &Prgm_CL1_Desc through the &Program...	CL8a
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CL8a What type of cooling equipment was removed and replaced when you installed &Prgm_CL1_Desc through the &Program?

1	Same as weekday lighting schedule	CL8b
2	Packaged air conditioning systems (one component)	CL8b
3	Package Terminal A/C (e.g., Hotel/Motel units)	CL8b
4	Remote Condensing Unit	CL8b
5	Evaporative coolers (swamp coolers)	CL8b
6	Water Chiller(s)	CL8b
7	Evaporative Condenser	CL8b
8	Cooling Tower	CL8b
9	Adjustable Speed Drives	CL8b
10	Energy Management System	CL8b
11	Reflective Window Film	CL8b
12	HVAC Controls: Bypass Timer	CL8b
13	HVAC Controls: Time Clock	CL8b
14	HVAC Controls: Set-Back Programmable Thermostat	CL8b
15	Thermal Energy Storage (Ice Storage, Chilled Water Storage) System	CL8b
16	Individual A/C or Heat Pump Units (e.g., Rooftop units, Unitary Equipment, Central A/C with multiple/single unit) Note: Ask if split	CL8b
17	Window/Wall Air-Conditioning Units	CL8b
66	NOTHING, EQUIPMENT ADDED NOT REPLACED	CL9d1
77	Other (SPECIFY)	CL8b
88	Refused	CL9d1
99	Don't know	CL9d1

CL8b How would you describe the condition of cooling equipment that was removed and replaced? Was it...

1	Inoperable (broken)	CL8c
2	Poor condition	CL8c
3	Fair condition	CL8c
4	Good condition	CL8c
88	Refused	CL8c
99	Don't know	CL8c

How old was the cooling equipment that was removed and replaced by the cooling equipment we just discussed? Would you
CL8c say...

1	Less than 5 years old	CL9d1
2	Between 5 and 10 years old	CL9d1
3	10 to 20 years old	CL9d1
4	more than 20 years old	CL9d1
88	Refused	CL9d1
99	Don't know	CL9d1

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ASK if &Install_Month <= Null

Our records indicate that your company installed the cooling equipment in &Install_MONTH &Install_YEAR through &Program, is this correct?

CL9d1

1	Yes	FR1
2	No	CL9f1
88	Refused	FR1
99	Don't know	FR1

Read if &Check_Month <= Null and &Install_Month = Null

Our records indicate that your company received a rebate for the cooling equipment installed through &Program in &Install_MONTH &Install_YEAR.

CL9f1 In what year did you install &Prgm_CL1_Desc? (PROBE FOR BEST GUESS)

1	2005	CL9f2
2	2006	CL9f2
3	2007	CL9f2
4	2008	CL9f2
88	Refused	FR1
99	Don't know	FR1

CL9f2 And what month? (If they can not recall month, try to get the season.)

1	January	FR1
2	February	FR1
3	March	FR1
4	April	FR1
5	May	FR1
6	June	FR1
7	July	FR1
8	August	FR1
9	September	FR1
10	October	FR1
11	November	FR1
12	December	FR1
13	Fall	FR1
14	Winter	FR1
15	Spring	FR1
16	Summer	FR1
88	Refused	FR1
99	Don't know	FR1

Go to SRNTG Battery

End Loop

READ Comment IF &Program COOLING PARTICIPANT

Comment	Thank you for discussing the new cooling equipment that you installed through the &Program. Next, I would like to discuss any cooling equipment you might have installed OUTSIDE the &Program...	CL_MSP1
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ASK ALL

CL_MSP1 Since January 2005 have you purchased and installed any cooling equipment on your own without any assistance from the &Utility &Program or another utility program either at this facility or at other locations?

1	Yes, only at this home/facility	CL10
2	Yes, only at other locations	CL10
3	Yes, at this facility and other locations	CL10
4	No	CL35
88	Refused	CL35
99	Don't know	CL35

CL10 What types of equipment were installed as part of the cooling retrofit?

&CTECH_1B

1	Split system air conditioners (Two components; compressor is separate from the supply air fan)	CL12
2	Packaged air conditioning systems (one component)	CL12
3	Package Terminal A/C (e.g. Hotel/Motel units)	CL12
4	Remote Condensing Unit	CL12
5	Evaporative coolers (Swamp coolers)	CL12
6	Water Chiller(s)	CL12
7	Evaporative Condenser	CL12
8	Cooling Tower	CL12
9	Adjustable Speed Drives	CL12
10	Energy Management System	CL12
11	Reflective Window Film	CL12
12	HVAC Controls: Bypass Timer	CL12
13	HVAC Controls: Time Clock	CL12
14	HVAC Controls: Set-Back Programmable Thermostat	CL12
15	Thermal Energy Storage (Ice Storage, Chilled Water Storage) System	CL12
16	Individual A/C or Heat Pump Units (e.g., Rooftop units, Unitary Equipment, Central A/C with multiple/single unit) NOTE: Ask if split or package system)	CL12
17	Window/Wall Air-Conditioning Units	CL12
18	Economizer	CL12

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77	Other (SPECIFY)	CL12
78	NOSCREEN OPEN - OTHER	CL12
79	NOSCREEN OPEN - OTHER	CL12
80	NOSCREEN OPEN - OTHER	CL12
81	NOSCREEN - NO OTHER	CL12
88	REFUSED	CL12
99	DON'T KNOW	CL12

For the first two other cooling measures mentioned, loop through to (and including) CL25

ASK IF COOL_TECH1 NOT in (6, 15, 10, 88, 99); ELSE SKIP TO CL13

CL12 Regarding the COOLING_TECH1 how many &C_TECH1B were installed at &SERV_ADDR outside the &Program?

&NUMCL	Number	CL13
88	Refused	CL13
99	Don't know	CL13

ASK IF CL10 IN (1, 2, 3, 5, 16, 17) ; ELSE SKIP TO CL13a

CL13 Please tell me the combined capacity, in tons, of all the new COOLING_TECH1 that were installed?

&TONSCL	Number	CL14
88	Refused	CL14
99	Don't know	CL14

ASK IF COOL_TECH1 in (4, 7, 8) ; ELSE SKIP TO CL13b

CL13a For the new &COOL_TECH1, Please tell me the combined heat rejection in BTU's.

&CHR	Number	CL14
88	Refused	CL14
99	Don't know	CL14

ASK IF COOL_TECH1 = 9 ; ELSE SKIP TO CL14

CL13b For the new Adjustable Speed Drive(s), please tell me the combined Horse-Power of the controlled motors.

&CHP	Number	CL14
88	Refused	CL14
99	Don't know	CL14

CL14 In what year did you install COOLING_TECH1?

1	2005	CL15
2	2006	CL15
3	2007	CL15
4	2008	CL15
88	Refused	CL18
99	Don't know	CL18

CL15 And can you recall which month? If you can not get the month, try to get the season.

1	January	CL18
2	February	CL18
3	March	CL18
4	April	CL18
5	May	CL18
6	June	CL18
7	July	CL18
8	August	CL18
9	September	CL18
10	October	CL18
11	November	CL18
12	December	CL18
13	Fall	CL18
14	Winter	CL18
15	Spring	CL18
16	Summer	CL18
88	Refused	CL18
99	Don't know	CL18

ASK IF COOL_TECH1 in (1, 2, 3, 16, 17, 77) ; ELSE SKIP TO CL21

CL18 Was/were the COOLING_TECH1 that you installed standard or high efficiency?

1	Standard Efficiency	CL19
2	High Efficiency	CL19
88	Refused	CL19
99	Don't know	CL19

What was the efficiency rating of COOLING_TECH1? (IF NECESSARY: Please indicate the efficiency rating and the units for that

CL19 rating (such as EER)) [RECORD VALUE]

&RAT	Rating (SPECIFY)	CL20
88	Refused	CL20A
99	Don't know	CL20A

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CL20 Do you recall the units for the efficiency rating of COOLING_TECH1 (such as EER)? [RECORD UNITS]		
1	EER (Energy Efficiency Ratio)	CL_MSP4
2	SEER (Seasonal Energy Efficiency Ratio)	CL_MSP4
77	Other (SPECIFY)	CL_MSP4
88	Refused	CL20A
99	Don't know	CL20A

ASK IF CL19 IN (88, 99) OR CL20 IN (88, 99)

CL20A How do you distinguish between high efficiency and standard efficiency?

1	Contractor	CL_MSP4
2	Utility recommendation	CL_MSP4
3	Efficiency rating	CL_MSP4
4	KW/ton	CL_MSP4
5	Coefficient of performance / COP	CL_MSP4
6	Energy efficiency ratio / EER	CL_MSP4
7	Supplier	CL_MSP4
8	Manufacturer	CL_MSP4
77	Other (SPECIFY)	CL_MSP4
99	Don't Know	CL_MSP4

I'm going to read a statement about this equipment that you purchased on your own. On a scale from 1-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

My experience with the &Utility &Program in max{&Install_Year,&Check_Year} influenced my decision to install different types of

CL_MSP4 high efficiency equipment on my own.

(Record Response (0-10)) _____		
88	Refused	CL_MSP5
99	Don't Know	CL_MSP5

Why did you purchase this cooling equipment without the financial assistance available through &Utility program? (DO NOT READ;

CL_MSP5 INDICATE ALL THAT APPLY)

1	Too much paperwork	CL21
2	Takes too long to get approval	CL21
3	No time to participate, needed equipment immediately	CL21
4	The program had ended	CL21
5	The equipment would not qualify (PROBE: Why not?)	CL21
6	The amount of the rebate wasn't important enough	CL21
7	Did not know the program was available	CL21
8	There was no program available	CL21
77	Other (SPECIFY)	CL21
88	Refused	CL21
99	Don't know	CL21

CL21 Did you receive a rebate for the purchase of the &COOLING_TECH1?

1	Yes	C23
2	No	C23
88	Refused	C23
99	Don't know	C23

ASK IF CL10 NE (10,11)

CL23 What type of cooling equipment was removed and replaced when you installed &COOLING_TECH1?

1	Split system air conditioners (Two components: compressor is separate from the supply air fan)	CL24
2	Packaged air conditioning systems (one component)	CL24
3	Package Terminal A/C (e.g., Hotel/Motel units)	CL24
4	Remote Condensing Unit	CL24
5	Evaporative coolers (swamp coolers)	CL24
6	Water Chiller(s)	CL24
7	Evaporative Condenser	CL24
8	Cooling Tower	CL24
9	Adjustable Speed Drives	CL24
10	Energy Management System	CL24
11	Reflective Window Film	CL24
12	HVAC Controls: Bypass Timer	CL24
13	HVAC Controls: Time Clock	CL24
14	HVAC Controls: Set-Back Programmable Thermostat	CL24
15	Thermal Energy Storage (Ice Storage, Chilled Water Storage) System	CL24
16	Individual A/C or Heat Pump Units (e.g., Rooftop units, Unitary Equipment, Central A/C with multiple/single unit) Note: Ask if split or package system)	CL24
17	Window/Wall Air-Conditioning Units	CL24
18	Standard (Non-programmable) Thermostat	CL24
66	NONE. EQUIPMENT WAS ONLY ADDED, NOT REPLACED	CL35
77	Other (SPECIFY)	CL24
88	Refused	CL24
99	Don't know	CL24

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CL24 How would you describe the condition of cooling equipment that was <i>removed</i> and replaced? Was it...		
1	Inoperable (broken)	CL25
2	Poor condition	CL25
3	Fair condition	CL25
4	Good condition	CL25
88	Refused	CL25
99	Don't know	CL25

Approximately how old was the cooling equipment that was *removed* and replaced by the cooling equipment we just discussed?

CL25 Would you say...		
1	Less than 5 years old	CL35
2	Between 5 and 10 years old	CL35
3	10 to 20 years old	CL35
4	more than 20 years old	CL35
88	Refused	CL35
99	Don't know	CL35

END OF LOOP FOR INDIVIDUAL COOLING EQUIPMENT PURCHASES

CL35 Does your company have any plans to install high efficiency cooling equipment within the next year?		
1	Yes	CL38
2	No	CL38
88	Refused	CL38
99	Don't Know	CL38

Ask if &Prgm_CL1_Desc = "Controls" else skip to CL42

CL38 How many square feet of your facility do the control devices that you recently installed affect/control?		
&PTSQFT	Record square feet	CL42
88	Refused	CL38a
99	Don't know	CL38a

Ask if CL38 in (88, 99)

CL38a Approximately what percentage of your facility's square footage do these recently installed devices control?		
&PTSQFTP	Record percentage	CL42
88	Refused	CL42
99	Don't know	CL42

Ask All

CL42 Do the control devices in your facility control AC, heating, or both?		
1	AC only	R1
2	Heating only	R1
3	Both	R1
77	Other	R1
88	Refused	R1
99	Don't know	R1

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REFRIGERATION EQUIPMENT BATTERY

Now I would like to ask you a couple of questions about your refrigeration equipment.

R1 What kinds of refrigeration equipment, if any, is present at your facility?

1	Residential Sized Refrigerator	R5a
2	Residential Sized Freezer	R5a
3	Larger Standard Refrigerator (>30 cubic feet)	R5a
4	Self Contained - Coffin/Horizontal Case	R5a
5	Self Contained - Vertical Case (multi shelf)	R5a
6	Single-Deck display cases - Open single-deck	R5a
7	Single-Deck display cases - Closed service case	R5a
8	Single-Deck display cases - Island coffin/tub (shop around)	R5a
9	Single-Deck display cases - Coffin/tub (one-side shopping)	R5a
10	Multi-Deck (vertical) display cases - Open/reach-in multi-deck	R5a
11	Multi-Deck (vertical) display cases - Glass-door cases	R5a
12	Walk-Ins and Preparation Areas - Freezer/Low Temp	R5a
13	Walk-Ins and Preparation Areas - Cooler/Med Temp	R5a
66	NONE	G1
77	Other Refrigeration (Specify)	R5a
88	Refused	R5a
99	Don't know	R5a

Comment	One way that businesses can reduce their energy use is to install more energy efficient equipment. Since one of the factors that influences energy use is the kind of equipment a business has, we would like to ask you about refrigeration equipment purchases you have made since January 2006.	R9
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If &Prgm_RF1_Desc ne "" then ask R9; else skip to RF_MSP1

For up to 3 Program Measures ASK R9 THROUGH R9f2

Our records indicate that your company installed &Prgm_RF1_Num &Prgm_RF1_Units &Prgm_RF1_Desc through the

R9 &Program, is this correct?

1	Yes	R5b
2	Yes, but a different number	R9x
3	No, did not install	Comment
88	Refused	Comment
99	Don't know	Comment

Ask if LI9 = 2

R9x Approximately how many &Prgm_RF1_Units &Prgm_RF1_Desc were installed under the &Program?

ClaimInstal RF1	Record #	Calc
88	Refused	R5b
99	Don't know	R5b

If &ClaimInstal_RF1/&Prgm_RF1_Num <75% then ask RF9y; else if &ClaimInstal_RF1/&Prgm_RF1_Num > 125% ask RF9z;
Calc else skip to R5b.

Perhaps you could help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Were any of these &Prgm_RF1 put into storage, perhaps installed at another facility, or never received? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it

R9y would really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	R5b
2	Put in storage	R5b
3	Installed at another facility	R5b
4	Did not receive all of the &Prgm_RF1	R5b
77	Other	R5b
88	Refused	R5b
99	Don't know	R5b

Perhaps you can help us to understand the difference between our records and what has been installed....Do you have any suggestions as to why our numbers differ? Did your facility participate multiple times in the program since 2006 and maybe we don't have these other records? Did you install additional equipment outside of the program that you are including in these numbers? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would

R9z really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	R5b
2	Multiple participation	R5b
3	Installed equipment outside of the program	R5b
77	Other	R5b
88	Refused	R5b
99	Don't know	R5b

I'd like to ask you a few questions about the equipment that was removed and replaced when you installed the &Prgm_RF1_Desc...

ASK IF REFRIGERATION PARTICIPANT

ASK R5b THROUGH R9f2 FOR UP TO THREE &PROGRAM MEASURES

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R5b What type of refrigeration equipment was removed and replaced when you installed &Prgm_RF1_Desc through the &Program?

1	Old Strip curtains	R5c
2	Older Main door cooler/freezer door gaskets	R5c
3	Older Anti-sweat heat controllers	R5c
4	Same Equipment, just newer	R5c
5	Older Display cases without doors	R5c
66	NONE - Not a replacement	R9d1
77	Other (Specify)	R5c
88	Refused	R5c
99	Don't know	R5c

R5c How would you describe the condition of refrigeration equipment that was removed and replaced? Was it...

1	Inoperable (broken)	R5d
2	Poor condition	R5d
3	Fair condition	R5d
4	Good condition	R5d
88	Refused	R5d
99	Don't know	R5d

R5d Approximately how old was the refrigeration equipment that was removed and replaced by the cooling equipment we just discussed? Would you say...

1	Less than 5 years old	R9d1
2	Between 5 and 10 years old	R9d1
3	10 to 20 years old	R9d1
4	more than 20 years old	R9d1
88	Refused	R9d1
99	Don't know	R9d1

ASK if &Install_Month <> Null

R9d1 Our records indicate that your company installed the refrigeration equipment in &MONTH &YEAR through the &Program, is this correct?

1	Yes	FR1
2	No	R9d2
88	Refused	FR1
99	Don't know	FR1

Read if &Check_Month <> Null and &Install_Month = Null

Our records indicate that your company received a rebate for the refrigeration equipment installed through &Program in &Install_MONTH &Install_YEAR.

R9f1 In what year did you install &Prgm_RF1_Desc? (PROBE FOR BEST GUESS)

1	2005	R9f2
2	2006	R9f2
3	2007	R9f2
4	2008	R9f2
88	Same as weekday lighting schedule	FR1
99	Don't know	FR1

R9f2 And what month? (If they can not recall month, try to get the season.)

1	January	FR1
2	February	FR1
3	March	FR1
4	April	FR1
5	May	FR1
6	June	FR1
7	July	FR1
8	August	FR1
9	September	FR1
10	October	FR1
11	November	FR1
12	December	FR1
13	Fall	FR1
14	Winter	FR1
15	Spring	FR1
16	Summer	FR1
88	Refused	FR1
99	Don't know	FR1

Go to SRNTG Battery

END REFRIGERATION MEASURE LOOP

READ COMMENT IF REFRIGERATION PARTICIPANT

Comment	Thank you for discussing the new refrigeration equipment that you installed through the &Program. Next, I would like to discuss any refrigeration equipment you might have installed OUTSIDE the &Program...	RF_MSP1
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If R1 <= 65, 88, 99
RF_MSP1 Since January 2005 have you purchased and installed any refrigeration equipment on your own without any assistance from the &Utility &Program or another utility program either at this facility or at other locations? This would include not only any other refrigeration equipment but also night covers, condensers, or evaporative fan coolers?

1	Yes, only at this home/facility	RFSP2
2	Yes, only at other locations	RFSP2
3	Yes, at this facility and other locations	RFSP2
4	No	R18
88	Refused	R18
99	Don't know	R18

RFSP2 Since January 2005, did you increase the total volume/capacity of your refrigeration equipment at your facility?

1	Yes	R7
2	No	R7
88	Refused	R7
99	Don't know	R7

R7 What types of refrigeration measures were installed? [DO NOT READ] [AFTER EACH RESPONSE, PROMPT WITH, "Did you install any other efficient refrigeration measures at your facility since January 2005?"]

1	Night covers for display cases	R8
2	Strip curtains	R8
3	Glass doors on vertical open display cases	R8
4	Reach in display cases	R8
5	Main door cooler/freezer door gaskets	R8
6	Auto closers for coolers/freezers	R8
7	Anti-sweat heat controllers	R8
8	Insulate bare suction pipes	R8
9	Multiplex compressor systems	R8
10	Condensers	R8
11	Floating head pressure controllers	R8
12	Evaporative fan coolers	R8
13	Vending machine controllers	R8
77	Other (specify)	R8
88	Refused (IF ONLY 88 skip to R18)	R18
99	Don't know (IF ONLY 99 skip to R18)	R18

FOR FIRST 3 MENTIONS LOOP THROUGH R8 TO R17

R8 How many high efficiency refrigeration products did you buy on your own at this facility and/or at another locations?

1	{Record Number} at this facility	RF_MSP4
2	{Record Number} at another facility	RF_MSP4
88	Refused	RF_MSP4
99	Don't know	RF_MSP4

I'm going to read a statement about this equipment that you purchased on your own. On a scale from 1-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.
 My experience with the 2006-2008 &Utility &Program influenced my decision to install different types of high efficiency equipment on my own.

RF_MSP4

{Record Response (0-10)} _____	RF_MSP5	
88	Refused	RF_MSP5
99	Don't Know	RF_MSP5

RF_MSP5 Why did you purchase this lighting without the financial assistance available through &Utility program? {DO NOT READ; INDICATE ALL THAT APPLY}

1	Too much paperwork	R19
2	Takes too long to get approval	R19
3	No time to participate, needed equipment immediately	R19
4	The program had ended	R19
5	The equipment would not qualify {PROBE: Why not?}	R19
6	The amount of the rebate wasn't important enough	R19
7	Did not know the program was available	R19
8	There was no program available	R19
77	Other {SPECIFY}	R19
88	Refused	R19
99	Don't know	R19

R19 In what year did you install REFRIG1?

1	2005	R20
2	2006	R20
3	2007	R20
4	2008	R20
88	Refused	R23
99	Don't know	R23

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R20 And can you recall which month? If you can not get the month, try to get the season.

1	January	R23
2	February	R23
3	March	R23
4	April	R23
5	May	R23
6	June	R23
7	July	R23
8	August	R23
9	September	R23
10	October	R23
11	November	R23
12	December	R23
13	Fall	R23
14	Winter	R23
15	Spring	R23
16	Summer	R23
88	Refused	R23
99	Don't know	R23

R23 Did you receive a rebate for the purchase of the new REFRIG1?

1	Yes	R15
2	No	R15
88	Refused	R15
99	Don't know	R15

R15 What type of equipment was removed and replaced when you installed the new REFRIG1?

1	Old Strip curtains	R16
2	Older Main door cooler/freezer door gaskets	R16
3	Older Anti-sweat heat controllers	R16
4	Same Equipment, just newer	R16
5	Older Display cases without doors	R16
66	NONE - Not a replacement	R16
77	Other (Specify)	R16
88	Refused	R18
99	Don't know	R18

R16 How would you describe the condition of the equipment that was removed/replaced when you installed the new REFRIG1? Was it...

1	Inoperable (broken)	R17
2	Poor condition	R17
3	Fair condition	R17
4	Good condition	R17
88	Refused	R17
99	Don't know	R17

R17 Approximately how old was the equipment that was removed/replaced by the REFRIG1? Would you say...

1	Less than 5 years old	R18
2	Between 5 and 10 years old	R18
3	Between 10 and 15 years old	R18
4	More than 15 years old	R18
88	Refused	R18
99	Don't know	R18

END OF LOOP FOR INDIVIDUAL REFRIGERATION EQUIPMENT PURCHASES

R18 Does your company have plans to install high efficiency refrigeration equipment within the next year?

1	Yes	DG4
2	No	DG4
88	Refused	DG4
99	Don't Know	DG4

DG4 If R7 =5 or &Prgm_RF1_Desc = Gasket else skip to SC1
You mentioned earlier that you purchased refrigeration door gaskets since 2006. On what equipment did you replace the door gaskets? (accept multiple) &REFEQ

1	Walk-in refrigerator	DG5
2	Upright refrigerator	DG5
3	Glass door refrigerated display cases	DG5
4	Glass door freezer display cases	DG5
5	Undercounter refrigerator	DG5
77	Other (specify)	DG5
88	Refused	DG5
99	Don't know	DG5

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Ask DG5 and DG6 for each mentioned above.

DG5 What is your best guess to what percent of the day is your &REFEQ open?

&PERDG	Record percentage	DG6
	Refused	DG6
	Don't know	DG6

DG6 What is the average size (height and width) of your &REFEQ? An approximation would be fine.

&SIZE	Record size	SC1
88	Refused	SC1
99	Don't know	SC1

**Ask this loop if R1 in (12, 13) or R7 = 2 or &Prgm_RF1_Desc = Curtains
If R7 = 2 or &Prgm_RF1_Desc = Curtains skip to SC2/Make var STRIP=1**

SC1 You mention you have walk-ins and preparation areas - for FREEZER or LOW TEMPERATURES. Do you have strip curtains for this equipment?

1	Yes	SC2
2	No	G1
88	Refused	G1
99	Don't know	G1

SC2 On what equipment do you have strip curtains?

1	WalkIn Refrigerator/Cooler	SC3
2	WalkIn Freezer	SC4
3	Both Cooler and Freezer	SC3
77	Other (specify)	SC3
88	Refused	SC3
99	Don't know	SC3

SC3 What is the temperature setting of the &SCTYPE for which you have strip curtains? An approximation would be fine.

&WITEMP	Record temperature	SC4
88	Refused	SC3a
99	Don't know	SC3a

Ask if SC3 = 88 or 99, else skip to SC4
SC3a Would you say the temperature is:

1	Low (0 - 10 degrees F)	SC4
2	Medium (30 - 40 degrees F)	SC4
77	Other (specify)	SC4
88	Refused	SC4
99	Don't know	SC4

SC4 How many hours per day is the refrigerator left open including for stocking and in and out?

&SCHRS	Record hours	SC4a
88	Refused	SC4a
99	Don't know	SC4a

SC4a When the refrigerator/freezer is NOT left open, what is the average traffic through the door per hour (# times opened per hour)?

	Record traffic	SC4b
88	Refused	SC4b
99	Don't know	SC4b

SC4b Are the strip curtains ever tied back?

1	Yes	SC5
2	No	SC5
88	Refused	SC5
99	Don't know	SC5

SC5 Where is your refrigeration equipment with the strip curtains located?

1	Indoor - conditioned space	SC6
2	Indoor - unconditioned space	SC6
3	Outdoor	SC6
77	Other (specify)	SC6
88	Refused	SC6
99	Don't know	SC6

SC6 Have the Strip Curtains been cut or altered in any way since their installation?

1	Yes	SC7
2	No	SC7
88	Refused	SC7
99	Don't know	SC7

SC7 What is the size (height and width) of your Strip Curtain? An approximation would be fine.

&SIZE	Record size	CD1
88	Refused	CD1
99	Don't know	CD1

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Display Case with Doors

If R7 = 4 or &Prgm_RF1_Desc = Doors else skip to G1

CD1 You mention you installed new Display Cases with Doors. Were these display cases replacing display cases without doors?

1	Yes	CD2
2	No	CD2
88	Refused	CD2
99	Don't know	CD2

CD2 What is the length across the front (linear feet) of your Display Case? An approximation would be fine.

&SIZE	Record size	CD3
88	Refused	CD3
99	Don't know	CD3

CD3 Does your new display case have efficient lighting (T-8 or LED lighting) installed?

1	Yes	CD4
2	No	CD4
88	Refused	CD4
99	Don't know	CD4

CD4 Does your new display case have a variable speed fan motor installed?

1	Yes	G1
2	No	G1
88	Refused	G1
99	Don't know	G1

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GAS EQUIPMENT BATTERY

if HVAC Controls = 1 or curtains=1 or infrared=1 or steamtrap=1

In the next section we'll be discussing the gas equipment present at your facility.

G1 Which of the following natural gas equipment is present at your facility?...

1	Water Heater	FR1
2	Furnace	FR1
3	Boiler	FR1
4	Stove	FR1
5	Clothes Dryer	FR1
66	NONE ... Don't use Natural Gas	GG1a
77	Other (specify)	GG1a
88	Refused	GG1a
99	Don't know	GG1a

Comment	One way that businesses can reduce their energy use is to install more energy efficient equipment. Since one of the factors that influences energy use is the kind of equipment a business has, we would like to ask you about natural gas equipment purchases you have made since January 2006.	G9
----------------	--	----

If &Prgm_G1_Desc ne "" then ask G9; else skip to G_MSP1

For up to 3 Program Measures ASK G9 THROUGH G9f2

Our records indicate that your company installed &Prgm_G1_Num &Prgm_G1_Units &Prgm_G1_Desc through the &Program, is

G9 this correct?

1	Yes	G9a
2	Yes, but a different number	G9x
3	No, did not install	Comment
88	Refused	Comment
99	Don't know	Comment

Ask if LI9 = 2

G9x Approximately how many &Prgm_G1_Units &Prgm_G1_Desc were installed under the &Program?

	Record #	Calc
88	Refused	G9a
99	Don't know	G9a

If &ClaimInstal_G1/&Prgm_G1_Num <75% then ask G9y; else if &ClaimInstal_G1/&Prgm_G1_Num > 125% ask G9z; else skip Calc to G9a.

Perhaps you could help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Were any of these &Prgm_GS1 put into storage, perhaps installed at another facility, or never received? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it

G9y would really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	G9a
2	Put in storage	G9a
3	Installed at another facility	G9a
4	Did not receive all of the &Prgm_GS1	G9a
77	Other	G9a
88	Refused	G9a
99	Don't know	G9a

Perhaps you can help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Did your facility participate multiple times in the program since 2006 and maybe we don't have these other records? Did you install additional equipment outside of the program that you are including in these numbers? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would

G9z really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	G9a
2	Multiple participation	G9a
3	Installed equipment outside of the program	G9a
77	Other	G9a
88	Refused	G9a
99	Don't know	G9a

Next I'd like to ask you a few questions about the equipment that was removed and replaced when you installed the new &Prgm_G1_Desc...

G9a What type of equipment was removed and replaced when you installed the new &Prgm_G1_Desc?

&REMEQUIP

1	Boilers	G9b
2	Water heaters	G9b
3	Furnaces	G9b
4	Gas boosters for dishwasher	G9b
5	Gas range (stove)	G9b
6	Clothes dryer	G9b
66	NONE NEW EQUIPMENT WAS AN ADDITION NOT A REPLACEMENT	G9b
77	Other (specify)	G9b
88	Refused	G9b
99	Don't know	G9b

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What type of fuel did the old &REMEQUIP that you removed use? (IF NEEDED: Did the OLD equipment also use natural gas as a fuel, or did it use a different type of fuel such as electricity or propane?)

G9b		
1	Natural Gas	G9d
2	Electricity	G9d
77	Other SPECIFY	G9d
88	Refused	G9d
99	Don't know	G9d

ASK if &Install_Month <> Null
Our records indicate that your company installed the natural gas equipment in &Install_MONTH &Install_YEAR through &Program, is this correct?

G9d		
1	Yes	FR1
2	No	G9f1
88	Refused	FR1
99	Don't know	FR1

Read if &Check_Month <> Null and &Install_Month = Null
Our records indicate that your company received a rebate for the natural gas equipment installed through &Program in &Install_MONTH &Install_YEAR.

G9f1 In what year did you install &Prgm_G1_Desc? (PROBE FOR BEST GUESS)

1	2005	G9f2
2	2006	G9f2
3	2007	G9f2
4	2008	G9f2
88	Refused	FR1
99	Don't know	FR1

G9f2 And what month? (If they can not recall month, try to get the season.)

1	January	FR1
2	February	FR1
3	March	FR1
4	April	FR1
5	May	FR1
6	June	FR1
7	July	FR1
8	August	FR1
9	September	FR1
10	October	FR1
11	November	FR1
12	December	FR1
13	Fall	FR1
14	Winter	FR1
15	Spring	FR1
16	Same as weekday lighting schedule	FR1
88	Refused	FR1
99	Don't know	FR1

Go to SRNTG Battery

End Loop
READ Comment IF &Program GAS PARTICIPANT

Comment	Thank you for discussing the new natural gas equipment that you installed through the &Program. Next, I would like to discuss any natural gas equipment you might have installed OUTSIDE the &Program...	G_MSP1
----------------	--	--------

Have you installed HVAC controls outside the program? (If needed: for example, an energy management system or boiler controls)

G7a		
1	Yes	G_MSP2
2	No	G_MSP1
3	Refused	G_MSP1
4	Don't know	G_MSP1

G_MSP1 Since January 2005 have you purchased and installed any natural gas equipment on your own without any assistance from the &Utility &Program or another utility program either at this facility or at other locations?

1	Yes, only at this home/facility	G7a
2	Yes, only at other locations	G7a
3	Yes, at this facility and other locations	G7a
4	No	G7a
88	Refused	G7a
99	Don't know	G7a

**Participant Customer Survey for
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What types of gas appliances were installed? [DO NOT READ] [AFTER EACH RESPONSE, PROMPT WITH, "Did you install any other gas appliances at your facility since January 2005?"]		GAS_TECH1B
G8		
1	Boilers	G8a
2	Water heaters	G8a
3	Furnaces	G8a
4	Gas boosters for dishwasher	G8a
5	Gas range (stove)	G8a
6	Clothes dryer	G8a
77	Other (specify)	G8a
78	Other (specify)	G8a
79	Other (specify)	G8a
80	Nothing Else	G50
88	Refused (IF ONLY 88 skip to G35)	G50
99	Don't know (IF ONLY 99 skip to G35)	G50

FOR FIRST 3 MENTIONS LOOP THROUGH G9 TO G23. PRIORITIZE WATER HEATER

G8a Is the &GAS_TECH1B a high efficiency appliance?		
1	Yes	G_MSP2
2	No	G10
88	Refused	G10
99	Don't know	G10

Ask If G8a=1; else skip to G10

G_MSP2 How many high efficiency gas appliances did you buy on your own at this facility and/or at another locations?		
1	{Record Number} at this facility	G_MSP4
2	{Record Number} at another facility	G_MSP4
88	Refused	G_MSP4
99	Don't know	G_MSP4

I'm going to read a statement about this equipment that you purchased on your own. On a scale from 1-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.
My experience with the &Utility &Program in max{&Install_Year,&Check_Year} influenced my decision to install different types of high efficiency equipment on my own.

G_MSP4 {Record Response (0-10)} _____		
88	Refused	G_MSP5
99	Don't Know	G_MSP5

Why did you purchase this equipment without the financial assistance available through &Utility program? {DO NOT READ;

G_MSP5 INDICATE ALL THAT APPLY		
1	Too much paperwork	G17
2	Takes too long to get approval	G17
3	No time to participate, needed equipment immediately	G17
4	The program had ended	G17
5	The equipment would not qualify {PROBE: Why not?}	G17
6	The amount of the rebate wasn't important enough	G17
7	Did not know the program was available	G17
8	There was no program available	G17
77	Other {SPECIFY}	G17
88	Refused	G17
99	Don't know	G17

G10 In what year did you install GAS_TECH1B?		
1	2005	G11
2	2006	G11
3	2007	G11
4	2008	G11
88	Refused	G20
99	Don't know	G20

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G11 And can you recall which month? If you cannot get month, try to get season.		
1	January	G20
2	February	G20
3	March	G20
4	April	G20
5	May	G20
6	June	G20
7	July	G20
8	August	G20
9	September	G20
10	October	G20
11	November	G20
12	December	G20
13	Fall	G20
14	Winter	G20
15	Spring	G20
16	Summer	G20
88	Refused	G20
99	Don't know	G20

G20 Did you receive a rebate for the purchase of the new GAS_TECH1B?		
1	Yes	G21
2	No	G21
88	Refused	G21
99	Don't know	G21

Next I'd like to ask you a few questions about the equipment that was removed and replaced when you installed the new &GAS_TECH1B...

G21 What type of equipment was removed and replaced when you installed the new GAS_TECH1B?		&REMEQUIP
1	Boilers	G21a
2	Water heaters	G21a
3	Furnaces	G21a
4	Gas boosters for dishwasher	G21a
5	Gas range (stove)	G21a
6	Clothes dryer	G21a
66	NONE NEW EQUIPMENT WAS AN ADDITION NOT A REPLACEMENT	GG1a
77	Other (specify)	G21a
88	Refused	G21a
99	Don't know	G21a

G21a What type of fuel did the old &REMEQUIP that you removed use? (IF NEEDED: Did the OLD equipment also use natural gas as a fuel, or did it use a different type of fuel such as electricity or propane?)

1	Natural Gas	G22
2	Electricity	G22
77	Other SPECIFY	G22
88	Refused	G22
99	Don't know	G22

G22 Since January 2005, have you made any other changes that would have increased or decreased gas usage? For example, have you switched an electric measure to a gas measure or a gas measure to an electric measure?

1	Yes, electric to gas	GG1a
2	Yes, gas to electric	GG1a
3	No	GG1a
77	Other (specify)	GG1a
88	Refused	GG1a
99	Don't know	GG1a

END OF LOOP FOR INDIVIDUAL GAS PURCHASES

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Gross and Net Impacts

GREENHOUSE HEAT CURTAINS/AGRICULTURAL GROUP

Ask only if HVAC Control = 1 and FM050 in 3, 4, 12, 13, 15 (for 15 - can you add a comment letting the surveyor decide whether to click no on their own?)

GG1a How many square feet of greenhouses do you have at your facility?

SQFT	Square feet	GG1b
88	Refused	GG1a1
99	Don't know	GG1a1

IF GG1a IN (88, 99)

GG1a1 Can you identify the appropriate size range from the following list?

1	< 1,500 sq ft	GG1b
2	1,500 - 5,000 sq ft	GG1b
3	5,000 - 10,000 sq ft	GG1b
4	10,000 - 25,000 sq ft	GG1b
5	25,000 - 50,000 sq ft	GG1b
6	50,000 - 75,000 sq ft	GG1b
7	75,000 - 100,000 sq ft	GG1b
8	> 100,000 sq ft	GG1b
88	Refused	GG1b
99	Don't know	GG1b

GG1b Approximately what percentage of the greenhouse square footage is heated?

%	Percent	GG6
88	Refused	GG6
99	Don't know	GG6

If &Prgm_GG1_Desc ne "" then ask GG9; else skip to GG_MSP1

Our records indicate that your company installed &Prgm_GG1_Num &Prgm_GG1_Units &Prgm_GG1_Desc through the

GG9 &Program, is this correct?

1	Yes	GG9d
2	Yes, but a different number	GG9x
3	No, did not install	Comment
88	Refused	Comment
99	Don't know	Comment

Ask if LI9 = 2

GG9x Approximately how many &Prgm_GG1_Units &Prgm_GG1_Desc were installed under the &Program?

ClaimInstal_GG1	Record #	Calc
88	Refused	GG9d
99	Don't know	GG9d

If &ClaimInstal_GG1/&Prgm_GG1_Num <75% then ask GG9y; else if &ClaimInstal_GG1/&Prgm_GG1_Num > 125% ask GG9z;

Calc else skip to GG9d.

DiffInstal_RF1_L

Perhaps you could help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Were any of these &Prgm_GG1 put into storage, perhaps installed at another facility, or never received? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it

GG9y would really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	GG9d
2	Put in storage	GG9d
3	Installed at another facility	GG9d
4	Did not receive all of the &Prgm_GG1	GG9d
77	Other	GG9d
88	Refused	GG9d
99	Don't know	GG9d

Perhaps you can help us to understand the difference between our records and what has been installed....Do you have any suggestions as to why our numbers differ? Did your facility participate multiple times in the program since 2006 and maybe we don't have these other records? Did you install additional equipment outside of the program that you are including in these numbers? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would

GG9z really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	GG9d
2	Multiple participation	GG9d
3	Installed equipment outside of the program	GG9d
77	Other	GG9d
88	Refused	GG9d
99	Don't know	GG9d

ASK if &Install_Month <> Null

Our records indicate that your company installed the greenhouse equipment in &Install_MONTH &Install_YEAR through

GG9d &Program, is this correct?

1	Yes	FR1
2	No	GG9f1
88	Refused	FR1
99	Don't know	FR1

**Participant Customer Survey for
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Gross and Net Impacts**

Read if &Check_Month <= Null and &Install_Month = Null

Our records indicate that your company received a rebate for the greenhouse equipment installed through &Program in &Install_MONTH &Install_YEAR.

GG9f1 In what year did you install &Prgm_GG1_Desc? (PROBE FOR BEST GUESS)

1	2005	GG9f2
2	2006	GG9f2
3	2007	GG9f2
4	2008	GG9f2
88	Refused	FR1
99	Don't know	FR1

GG9f2 And what month? (If they can not recall month, try to get the season.)

1	January	FR1
2	February	FR1
3	March	FR1
4	April	FR1
5	May	FR1
6	June	FR1
7	July	FR1
8	August	FR1
9	September	FR1
10	October	FR1
11	November	FR1
12	December	FR1
13	Fall	FR1
14	Winter	FR1
15	Spring	FR1
16	Summer	FR1
88	Refused	FR1
99	Don't know	FR1

Go to SRNTG Battery

End Loop

READ Comment IF &Program LIGHTING PARTICIPANT

Comment	Thank you for discussing the new lighting equipment that you installed through the &Program. Next, I would like to discuss any greenhouse equipment you might have installed OUTSIDE the &Program...	GG_MSP1
----------------	--	---------

GG_MSP1 Since January 2005 have you purchased and installed any greenhouse equipment on your own without any assistance from the &Utility &Program or another utility program either at this facility or at other locations?

1	Yes, only at this home/facility	GG7
2	Yes, only at other locations	GG7
3	Same as weekday lighting schedule	GG7
4	No	OT2
88	Refused	OT2
99	Don't know	OT2

GG7 How many sq ft of greenhouse heat curtains did you install?

&NUMGG	Number	GG8
88	Refused	GG8
99	Don't know	GG8

GG8 How many sq ft of Infrared film did you install?

&NUMGG	Number	GG_MSP4
88	Refused	GG_MSP4
99	Don't know	GG_MSP4

I'm going to read a statement about this equipment that you purchased on your own. On a scale from 1-10, with 0

indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

My experience with the &Utility &Program in max(&Install_Year,&Check_Year) influenced my decision to install different types of

GG_MSP4 high efficiency equipment on my own.

	{Record Response (0-10)} _____	GG_MSP5
88	Refused	GG_MSP5
99	Don't Know	GG_MSP5

**Participant Customer Survey for
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Why did you purchase this greenhouse equipment without the financial assistance available through &Utility program? (DO NOT READ; INDICATE ALL THAT APPLY)		
1	Too much paperwork	GG9
2	Takes too long to get approval	GG9
3	No time to participate, needed equipment immediately	GG9
4	The program had ended	GG9
5	The equipment would not qualify {PROBE: Why not?}	GG9
6	The amount of the rebate wasn't important enough	GG9
7	Did not know the program was available	GG9
8	There was no program available	GG9
77	Other {SPECIFY}	GG9
88	Refused	GG9
99	Don't know	GG9

GG9 In what year did you install the greenhouse heat curtains?		
1	2004	GG10
2	2005	GG10
3	2006	GG10
4	2007	GG10
88	Refused	GG13
99	Don't know	GG13

GG10 Can you recall which month? If you can not get the month, try to get the season.		
1	January	GG13
2	February	GG13
3	March	GG13
4	April	GG13
5	May	GG13
6	June	GG13
7	July	GG13
8	August	GG13
9	September	GG13
10	October	GG13
11	November	GG13
12	December	GG13
13	Fall	GG13
14	Winter	GG13
15	Spring	GG13
16	Summer	GG13
88	Refused	GG13
99	Don't know	GG13

GG13 Did you receive a rebate for the purchase of the new greenhouse heat curtains?		
1	Yes	GG14
2	No	GG14
88	Refused	GG14
99	Don't know	GG14

GG14 What type of equipment was removed and replaced when you installed the new greenhouse heat curtains?		
1	Old greenhouse gas curtains	GG16
66	NONE. NEW EQUIPMENT WAS AN ADDITION, NOT A REPLACEMENT	GG16
77	Other (specify)	GG16
88	Refused	GG17
99	Don't know	GG17

GG16 Approximately how old was the equipment that was removed/replaced by the greenhouse heat curtains? Would you say...		
1	Less than 1 year old	GG17
2	Between 1 and 3 years old	GG17
3	Between 3 and 5 years old	GG17
4	More than 5 years old	GG17
88	Refused	GG17
99	Don't know	GG17

GG17 What type of heating system is used in the green house?		
1	Unit Space Heater	GG18
2	Hot Water System	GG18
3	Steam heating System	GG18
4	Unit Radiant Heaters	GG18
5	Solar radiant Systems	GG18
5	Poly-Tube Systems	GG18
77	Other (specify)	GG18
88	Refused	GG19
99	Don't know	GG19

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GG18 Name Plate & Manufacture's information for heating type	
Record	GG19

GG19 What type of roof material is used for the green house heat curtains?	
1 Single Panel Glass	GG20
2 Double Panel glass	GG20
3 Single Layer polyethylene	GG20
4 Double Inflated Polyethylene with no Infrared Film	GG20
5 Double Inflated Polyethylene with Infrared Film	GG20
6 Single Layer Fiberglass	GG20
7 Single Layer Polycarbonate	GG20
8 Double Layer Polycarbonate	GG20
9 Other	GG20

GG20 What is the system configuration for the heat curtains?	
1 Gutter to Gutter	GG21
2 Truss to Truss	GG21
3 Other	GG21

GG21 What is the set point temperature maintained for the green house?	
Record	GG22

GG22 What type of control mechanism is used to control the temperature?	
Record	OT1

**PARTICIPANT CUSTOMER SURVEY FOR EXPRESS EFFICIENCY
AND UPSTREAM HVAC AND MOTORS PROGRAMS
GROSS AND NET IMPACT SURVEY
FOR PROGRAM YEARS 2006-2008**

STEAM TRAP BATTERY

if Steamtrap = 1

In the next section we'll be discussing the steam traps present at your facility.

Loop through ST1 and ST3 for up to 3 steamtrap measures

ST1 First, we'd like to confirm that new steam traps were installed at your facility on approximately <INSTALL DATE>.

1	Yes, continue	ST2
2	No	END
88	Refused	ST2
99	Don't know	ST2

ST3 Our records indicate that &Prgm_ST1_Num steam traps were installed at your facility. Is this about right?

1	Yes	ST3a
2	No, then how many?	ST3a
88	Refused	ST3a
99	Don't know	ST3a

END LOOP

How many steam traps are located at your facility? (Or what percentage of the steam traps at your facility were replaced at that

ST3a time?)

1	Total number of steam traps:	ST4
2	Percentage of steam traps replaced:	ST4
88	Refused	ST4
99	Don't know	ST4

ST4 What led you to install the new steam traps? (Permit more than one answer.)

1	Needed to replace some old steam traps because system efficiency had diminished.	ST5
2	Installed new steam traps to improve system efficiency.	ST5
3	Wanted to save on our energy bill.	ST5
88	Refused	ST5
99	Don't know	ST5

ST5 Who's idea was it to provide new steam traps?

1	Me or someone at my facility.	ST6
2	Contractor.	ST6
3	Utility company contact.	ST6
4	Manufacturer.	ST6
77	Other (specify)	ST6
88	Refused	ST6
99	Don't know	ST6

ST6 What condition were your steam traps in at the time of their replacement?

1	Good	ST7
2	Fair	ST7
3	Poor	ST7
4	Not a replacement	ST7
88	Refused	ST7
99	Don't know	ST7

ST7 What percentage of the steam trap cost would you estimate the Express Efficiency rebate covered?

1	Rebate covered all of the cost	ST8
2	Rebate covered most of the cost	ST8
3	Rebate covered less than half of the cost	ST8
4	Other	ST8
88	Refused	ST8
99	Don't know	ST8

ST8 How effective were the new steam traps in reducing your natural gas bill?

1	Considerable gas savings	ST8a
2	Some gas savings	ST8a
3	No noticeable savings	ST8a
88	Refused	ST8a
99	Don't know	ST8a

ST8a Have you noticed any problems with the steamtraps since their installation?

1	Yes	ST9
2	No	ST9
88	Refused	ST9
99	Don't know	ST9

**PARTICIPANT CUSTOMER SURVEY FOR EXPRESS EFFICIENCY
AND UPSTREAM HVAC AND MOTORS PROGRAMS
GROSS AND NET IMPACT SURVEY
FOR PROGRAM YEARS 2006-2008**

ST9 In your opinion, with the Express Efficiency rebate, was installing steam traps cost-effective?		
1	Yes	ST10
2	No	FR1
3	Somewhat	ST10
88	Refused	ST10
99	Don't know	ST10

ASK IF RESPONSE TO ST9 ≠ 2; ELSE SKIP TO ST11.

ST10 Without the Express Efficiency rebate, do you think you would have found installing the steam traps to be cost-effective?		
1	Yes	FR1
2	No	FR1
3	Somewhat	FR1
88	Refused	FR1
99	Don't know	FR1

Go to SRNTG Battery

ST11 What are the main uses of steam at your facility?		
1	Laundry presses	ST12
2	Other, specify:	ST12
88	Refused	ST12
99	Don't know	ST12

ST12 How many laundry presses do you have at your facility?		
1	Specify number:	ST13
88	Refused	ST13
99	Don't know	ST13

ST13 Were there other changes at your site at the time or since the new steam traps were installed? (Permit more than one response.)		
1	Added equipment	ST14
2	Decreased equipment	ST14
3	Increased hours of operation	ST14
4	Decreased hours of operation	ST14
5	Increased employees	ST14
6	Decreased employees	ST14
88	Refused	ST14
99	Don't know	ST14

**Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

MOTORS BATTERY

In the next section, we'll be discussing the motors present at your facility.

Ask if Motors=0

M1a Do you currently have any motors installed in your facility?

1	Yes	MT_MSP1
2	No	OT1
88	Refused	OT1
99	Don't know	OT1

Ask if Motors=1

M1 What two or three applications account for most of the *motor* energy used in your facility?

1	Pumping	M2
2	Fans/Blowers	M2
3	Compressed Air	M2
4	Materials handling (conveyor belts)	M2
5	Production process machinery	M2
6	Ventilation/HVAC	M2
7	Boiler fans	M2
77	Other (Specify)	M2
88	Refused	M2
99	Don't Know	M2

M2 How many motors are currently installed at your facility? Just a rough estimate would be fine.

	Number of Motors	M5
88	Refused	M5
99	Don't know	M5

"In this survey we use the term "NEMA Premium motors" to refer to very high efficiency motors that meet specific performance criteria developed by the National Electrical Manufacturers Association.

We use the term "EPAAct Motors" to refer to motors that meet current federal minimum efficiency standards contained in the Energy Policy Act; new motors installed in California must be, at a minimum, EPAAct motors.

Finally, we use the term "Standard Efficiency Motors" to refer to typically older motors that do not meet the current Federal standards.

M5 Before I provided you with this explanation, were you familiar with the term NEMA Premium motors?

1	Yes	M6
2	No	M6
88	Refused	M6
99	Don't know	M6

M6 Since January 2006 has anyone at your facility consulted with a vendor concerning the motors in use at this facility?

1	Yes	M6a
2	No	M10
88	Refused	M10
99	Don't know	M10

M6a Did the vendor recommend that you replace any motors in use at this facility?

1	Yes	M7
2	No	M7
88	Refused	M7
99	Don't know	M7

M7 How frequently do you consult with your motor vendor(s) on efficiency levels and other motor specifications? Is it...

1	In all purchase situations	M8
2	In most purchase situations	M8
3	In some purchase situations	M8
4	Never	M8
88	Refused	M8
99	Don't Know	M8

Do you consult with your vendor(s) concerning a broader range of motor systems issues, such as the application of variable speed drives, other controls or maintenance?

1	Yes	M9
2	No	M9
88	Refused	M9
99	Don't know	M9

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M9 How often does your vendor(s) provide you with an analysis of life cycle costs of motors with different efficiency ratings? Is it...		
1	In all sales situations	M10
2	In most sales situations	M10
3	In some sales situations	M10
4	Never	M10
88	Refused	M10
99	Don't Know	M10

Since January 2005 how many motors have been repaired (instead of replaced) at your facility? Just a rough estimate would be fine.

M10 #MOTORS Number of motors repaired		
88	Refused	M11
99	Don't know	M11

If &#MOTORS = 0 then M9a

M11 What criteria do you use in deciding whether to repair or replace a failed motor? [ACCEPT MULTIPLES.]		
1	Size of motor	Comment
2	Cost of new motor	Comment
3	Life-cycle cost(s)	Comment
4	Importance of motor to facility's operation	Comment
5	Custom design, problems of availability	Comment
6	Rebate is available	Comment
7	Follow policy in place	Comment
77	Other (Specify)	Comment
88	Refused	Comment
99	Don't Know	Comment

Comment	One way that businesses can reduce their energy use is to install more energy efficient equipment. Since one of the factors that influences energy use is the kind of motors a business has, we would like to ask you about motor purchases you have made since January 2006.	MT9
----------------	---	-----

If &Prgm_MT1_Desc ne "" then ask R9; else skip to MT_MSP1
For up to 3 Program Measures ASK MT9 THROUGH M9f2

Our records indicate that your company installed &Prgm_MT1_Num &Prgm_MT1_Units &Prgm_MT1_Desc through the &Program, is this correct?

MT9 &Program, is this correct?		
1	Yes	MT5b
2	Yes, but a different number	MT9x
3	No, did not install	Comment
88	Refused	Comment
99	Don't know	Comment

Ask if MT9=2

MT9x Approximately how many &Prgm_MT1_Units &Prgm_MT1_Desc were installed under the &Program?

ClaimInstal_MT1	Record #	Calc
88	Refused	MT5b
99	Don't know	MT5b

If &ClaimInstal_MT1/&Prgm_MT1_Num <75% then ask MT9y; else if &ClaimInstal_MT1/&Prgm_MT1_Num >125% ask MT9z;
Calc else skip to MT5b.

Perhaps you could help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Were any of these &Prgm_MT1 put into storage, perhaps installed at another facility, or never received? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would really help us to evaluate the program's record keeping?

MT9y match, it would really help us to evaluate the program's record keeping?		
1	Have no idea why numbers differ	MT5b
2	Put in storage	MT5b
3	Installed at another facility	MT5b
4	Did not receive all of the &Prgm_MT1	MT5b
77	Other	MT5b
88	Refused	MT5b
99	Don't know	MT5b

Perhaps you can help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Did your facility participate multiple times in the program since 2006 and maybe we don't have these other records? Did you install additional equipment outside of the program that you are including in these numbers? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would really help us to evaluate the program's record keeping?

MT9z really help us to evaluate the program's record keeping?		
1	Have no idea why numbers differ	MT5b
2	Multiple participation	MT5b
3	Installed equipment outside of the program	MT5b
77	Other	MT5b
88	Refused	MT5b
99	Don't know	MT5b

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I'd like to ask you a few questions about the equipment that was removed and replaced when you installed the &Prgm_MT1_Desc...

How would you describe the condition of the motor(s) that was/were removed and replaced when you installed the

MT5b MT_TECHMEAS1? Was it...

1	Inoperable (broken)	M9d
2	Poor condition	M9d
3	Fair condition	M9d
4	Good condition	M9d
88	Refused	M9d
99	Don't know	M9d

M9d How old was/were the motors that was/were removed and replaced by the motors we just discussed? Would you say...

1	Less than 5 years old	M9e
2	Between 5 and 10 years old	M9e
3	10 to 20 years old	M9e
4	more than 20 years old	M9e
88	Refused	M9e
99	Don't know	M9e

M9e Was that motor used to ...[READ LIST]

1	Drive a newly installed piece of equipment	M9f
2	Replace a failed motor	M9f
3	Replace a functioning motor	M9f
4	Serve as a spare	M9f
77	Or for some other reason (Specify)	M9f
88	Refused	M9f
99	Don't Know	M9f

M9f Was the motor you replaced

1	A NEMA Premium motor	M9g
2	An EPCAct motor	M9g
3	A standard efficiency motor	M9g
88	Refused	M9g
99	Don't Know	M9g

M9g Had the motor you replaced been rewound?

1	Yes	M9h
2	No	M9h
88	Refused	M9h
99	Don't know	M9h

M9h What kind of equipment does the new motor drive?

1	HVAC equipment	M9h1
2	Pump	M9h1
3	Fan	M9h1
4	Air Compressor	M9h1
5	Conveyor belt or other materials handling	M9h1
6	Production process machinery	M9h1
77	Other (specify)	M9h1
88	Refused	M9h1
99	Don't Know	M9h1

M9h1 Is the new motor controlled by a variable frequency drive (VFD)?

1	Yes	M9i
2	No	M9i
88	Refused	M9i
99	Don't know	M9i

M9i In the past month, how many hours per day did this equipment typically operate?

	[RECORD HOURS]	M9j
88	Refused	M9o
99	Don't Know	M9o

M9j And how many days per week?

	[RECORD DAYS]	M9k
88	Refused	M9o
99	Don't Know	M9o

Are there any months during the year when the operating schedule for this equipment differs significantly from what you just described?

M9k		
1	Yes	M9l
2	No	M9o
88	Refused	M9o
99	Don't know	M9o

**Participant Customer Survey for
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M9j How many hours per day does the equipment typically operate during the periods with different operating schedules?		
	[RECORD HOURS]	M9m
88	Refused	M9o
99	Don't Know	M9o

M9m And how many days per week?		
	[RECORD DAYS]	M9n
88	Refused	M9o
99	Don't Know	M9o

M9n How many months per year does the equipment run on the alternative schedule?		
	[RECORD MONTHS]	M9o
88	Refused	M9o
99	Don't Know	M9o

M9o In which part of the facility is this motor located?		
	[RECORD]	MT9d
88	Refused	MT9d
99	Don't Know	MT9d

ASK if &Install_Month <> Null

MT9d Our records indicate that your company installed the motors in &MONTH &YEAR through the &Program, is this correct?		
1	Yes	FR1
2	No	M9f1
88	Refused	FR1
99	Don't know	FR1

Read if &Check_Month <> Null and &Install_Month = Null

Our records indicate that your company received a rebate for the motors equipment installed through &Program in &Install_MONTH &Install_YEAR.

M9f1 In what year did you install &Prgm_MT1_Desc? (PROBE FOR BEST GUESS)		
1	2005	M9f2
2	2006	M9f2
3	2007	M9f2
4	2008	M9f2
88	Same as weekday lighting schedule	FR1
99	Don't know	FR1

M9f2 And what month? (If they can not recall month, try to get the season.)		
1	January	FR1
2	February	FR1
3	March	FR1
4	April	FR1
5	May	FR1
6	June	FR1
7	July	FR1
8	August	FR1
9	September	FR1
10	October	FR1
11	November	FR1
12	December	FR1
13	Fall	FR1
14	Winter	FR1
15	Spring	FR1
16	Summer	FR1
88	Refused	FR1
99	Don't know	FR1

Go to SRNTG Battery

READ COMMENT IF MOTOR PARTICIPANT

Comment	Thank you for discussing the new motor equipment that you installed through the &Program. Next, I would like to discuss any motors you might have installed OUTSIDE the &Program...	MT_MSP1
----------------	---	---------

MT_MSP1 Since January 2005 have you purchased and installed any motors on your own without any assistance from the &Utility &Program or another utility program either at this facility or at other locations?

1	Yes, only at this home/facility	MTSP2
2	Yes, only at other locations	MTSP2
3	Yes, at this facility and other locations	MTSP2
4	No	F1
88	Refused	F1
99	Don't know	F1

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MTSP2 What types of applications were these motors installed in? [READ LIST, RECORD UP TO 3 MULTIPLES].		&Application
1	Pumping	M13
2	Fans/Blowers	M13
3	Compressed Air	M13
4	Materials handling (conveyor belts)	M13
5	Ventilation/HVAC	M13
6	Boiler fans	M13
7	Production process machinery	M13
77	Other (specify)	M13
88	Refused	M13
99	Don't know	M13

FOR THE FIRST 3 APPLICATIONS NAMED BY RESPONDENT FOR MT_MSP1 LOOP THROUGH M13 TO M16

How many motors were installed for &APPLICATION at &SERV_ADDR? [REPEAT M13 THROUGH AND INCLUDING M24

M13 FOR EACH APPLICATION WHERE RESPONDENT SAID MOTORS WERE INSTALLED IN M12a]

	Number	M14
88	Refused	M14
99	Don't know	M14

M14 Please tell me the combined horsepower of the motor(s) installed for &APPLICATION.

	Combined horsepower total	MT_MSP4
88	Refused	MT_MSP4
99	Don't know	MT_MSP4

I'm going to read a statement about this equipment that you purchased on your own. On a scale from 1-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.
My experience with the &Utility &Program in max{&Install_Year,&Check_Year} influenced my decision to install different types

MT_MSP4 of high efficiency equipment on my own.

	{Record Response (0-10)}	MT_MSP5
88	Refused	MT_MSP5
99	Don't Know	MT_MSP5

Why did you purchase this equipment without the financial assistance available through &Utility program? {DO NOT READ;

MT_MSP5 INDICATE ALL THAT APPLY}

1	Our records indicate that your company received a rebate for the cooling equipment installed through &Program in &Install_MC	M15
2	Takes too long to get approval	M15
3	No time to participate, needed equipment immediately	M15
4	The program had ended	M15
5	The equipment would not qualify (PROBE: Why not?)	M15
6	The amount of the rebate wasn't important enough	M15
7	Did not know the program was available	M15
8	There was no program available	M15
77	Other (SPECIFY)	M15
88	Refused	M15
99	Don't know	M15

M15 In what year did you install the motors?

1	2004	M16
2	2005	M16
3	2006	M16
4	Other	M16
88	Refused	M18
99	Don't know	M18

M16 And can you recall which month? If cannot get month – ask for season

1	January	M18
2	February	M18
3	March	M18
4	April	M18
5	May	M18
6	June	M18
7	July	M18
8	August	M18
9	September	M18
10	October	M18
11	November	M18
12	December	M18
13	Fall	M18
14	Winter	M18
15	Spring	M18
16	Summer	M18
88	Refused	M18
99	Don't know	M18

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Was/were the motors that you installed standard EAct motors or high efficiency NEMA Premium motors? [IF NECESSARY REPEAT:		
M18 REPEAT: "In this survey we use the term "NEMA Premium motors" to refer to very high efficiency motors that meet specific performance criteria developed by the National Electrical Manufacturers Association. We use the term "EAct Motors" to refer to motors that meet current federal minimum efficiency standards contained in the Energy Policy Act; new motors installed in California must be, at a minimum, EAct motors. Finally, we use the term "Standard Efficiency Motors" to refer to typically older motors that do not meet the current Federal standards."]		
1	Yes	M19
2	No	M19
88	Refused	M19
99	Don't know	M19

M19 What is the efficiency rating of the motor purchased? [RECORD PERCENT.]		
	Percent efficiency rating	M20
88	Refused	M20
99	Don't know	M20

M20 How did you learn about NEMA Premium efficiency motors? [PROMPT IF NEEDED. ACCEPT MULTIPLES]		
1	You or someone else in your company	M21
2	Your motor dealer	M21
3	A vendor of other kinds of equipment	M21
4	Your &UTIL customer representative	M21
5	Government publications/websites	M21
6	Industry or Trade Publications/websites	M21
77	Other (specify)	M21
88	Refused	M21
99	Don't know	M21

[ASK IF M18 = 2, ELSE SKIP TO M22.]

M21 What is the main reason you did not purchase any NEMA Premium motors for &APPLICATION(S)?		
1	Cost was too high	M22
2	Not certain that energy savings justify higher costs	M22
3	Dealers did not have models to fit application	M22
4	Dealers did not have NEMA Premium motors available when needed	M22
5	Had reviewed economics and found them to be unfavorable	M22
6	It wasn't the right thing to do	M22
77	Other (SPECIFY)	M22
88	Refused	M22
99	Don't Know	M22

M22 Did you receive a rebate for the purchase of the motors outside the &Program?		
1	Yes	M23
2	No	M23
88	Refused	M23
99	Don't know	M23

M29 Does your company have a policy in regard to motor purchases or repairs?		
1	Yes	M30
2	No	F1
88	Refused	F1
99	Don't Know	F1

M30 The policy... [SELECT ONLY ONE.]		
1	Requires selection of NEMA Premium motors where technically feasible.	F1
2	Expresses a preference for selection of NEMA Premium motors where technically feasible.	F1
3	Requires economic assessment of NEMA Premium motors v. EAct motors or other alternatives.	F1
4	Requires that NEMA Premium motors be considered in replacement and new applications.	F1
77	Other (Specify)	F1
88	Refused	F1
99	Don't Know	F1

Comment	Now I'd like to ask some questions about the fleet of the motors installed in your facility, including all motors that may have been discounted or rebated through utility programs as well as those that were not.
----------------	---

Roughly how many 3-phase AC "squirrel cage" motors from 1 to 200 horsepower are currently installed in your facility? Just a F1 rough estimate will be fine.		
&MSCNUM	[RECORD NUMBER]	F2
88	Refused	F3
99	Don't Know	F3

F2 How many such motors do you keep in inventory as spares?		
	[RECORD NUMBER]	F3
88	Refused	F3
99	Don't Know	F3

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What percentage of all 3-phase AC "squirrel cage" motors either installed or in storage at this facility are NEMA Premium motors?

F3

	[RECORD PERCENTAGE]	F4
88	Refused	F4
99	Don't Know	F4

F4 two years?

	[RECORD NUMBER]	F5
88	Refused	OT1
99	Don't Know	OT1

F5 How many of those motors were NEMA Premium?

	[RECORD NUMBER]	OT1
88	Refused	OT1
99	Don't Know	OT1

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OTHER CHANGES

ASK ALL

Besides what we have already covered, since January 2005, have you added or replaced other equipment that is expected to significantly affect overall energy consumption?

OT2 significantly affect overall energy consumption?

1 Yes	OT3
2 No	HR025
88 Refused	HR025
99 Don't know	HR025

&OTHEREQUI
P1

OT3 Which of the following types of equipment were installed since January 2005? (READ FIRST FOUR THEN ASK FOR OTHER)

1 Food Service Equipment	OT5
2 Water Heating Equipment	OT5
3 Outdoor Lighting Equipment	OT5
6 Compressed Air Equipment	OT5
77 Other (SPECIFY) – 1st mention	OT5
88 Refused	HR025
99 Don't Know	HR025

For the first three equipment types mentioned in OT3, ask OT5 through OT18

OT5 Please describe the type of &OTHEREQUIP1 that was installed?

77 Record verbatim	OT6
88 Refused	OT6
99 Don't know	OT6

OT6 Please describe the quantity of &OTHEREQUIP1 that was installed?

77 Record verbatim	OT7
88 Refused	OT7
99 Don't know	OT7

OT7 Please describe the efficiency level of &OTHEREQUIP1 that was installed?

77 Record verbatim	OT10
88 Refused	OT10
99 Don't know	OT10

OT10 In what year did you install &OTHEREQUIP1?

1 2005	OT11
2 2006	OT11
3 2007	OT11
4 2008	OT11
88 Refused	OT18
99 Don't know	OT18

OT11 And can you recall which month? If cannot get month – ask for season

1 January	OT18
2 February	OT18
3 March	OT18
4 April	OT18
5 May	OT18
6 June	OT18
7 July	OT18
8 August	OT18
9 September	OT18
10 October	OT18
11 November	OT18
12 December	OT18
13 Fall	OT18
14 Winter	OT18
15 Spring	OT18
16 Summer	OT18
88 Refused	OT18
99 Don't know	OT18

Ask if in OT7 they claim high efficiency, else skip to HR025.

OT18 Did you receive a rebate for the purchase of &OTHEQUIP1?

1 Yes	OT_MSP4
2 No	OT_MSP4
88 Refused	OT_MSP4
99 Don't know	OT_MSP4

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I'm going to read a statement about this equipment that you purchased on your own. On a scale from 1-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

My experience with the &Utility &Program in max(&Install_Year,&Check_Year) influenced my decision to install different types of high efficiency equipment on my own.

OT_MSP4	{Record Response (0-10)}	OT_MSP5
88	Refused	OT_MSP5
99	Don't Know	OT_MSP5

Why did you purchase this equipment without the financial assistance available through &Utility program? (DO NOT READ;

OT_MSP5	INDICATE ALL THAT APPLY)	
1	Too much paperwork	HR025
2	Takes too long to get approval	HR025
3	No time to participate, needed equipment immediately	HR025
4	The program had ended	HR025
5	The equipment would not qualify {PROBE: Why not?}	HR025
6	The amount of the rebate wasn't important enough	HR025
7	Did not know the program was available	HR025
8	There was no program available	HR025
77	Other {SPECIFY}	HR025
88	Refused	HR025
99	Don't know	HR025

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OPERATING HOURS

Ask Everyone

Now we'd like to talk about the hours that your business is open.

HR025 Are you typically open every day, Monday through Friday?

1	Yes	HR030b
2	No	HR026a
88	Refused	HR030b
99	Don't Know	HR030b

HR026a Which days are you closed Monday through Friday?

1	Monday	HR030b
2	Tuesday	HR030b
3	Wednesday	HR030b
4	Thursday	HR030b
5	Friday	HR030b
88	Refused	HR030b
99	Don't Know	HR030b

HR030b What time do you open during the week?

&HR30F	Hours on FROM (use 24 hour format eg 0700)	HR030c
88	Refused	HR030c
99	Don't know	HR030c

HR030c What time do you close during the week?

&HR30F	Hours on UNTIL (use 24 hour format eg 0700)	HR035
88	Refused	HR035
99	Don't know	HR035

ask if HR026a^=5

HR035 Do you have a different schedule on Fridays?

1	Yes	HR035b
2	No	HR040
88	Refused	HR040
99	Don't know	HR040

ask if HR035=1

HR035b On Friday you are open from:

&HR40F	Hours on FROM (use 24 hour format eg 0700)	HR040
88	Refused	HR040
99	Don't know	HR040

HR040 How about Saturdays?

1	Open 24 Hrs	HR050
2	Never on	HR050
3	Open part of the day	HR040b
4	Same as weekday schedule	HR050
5	Open by appointment	HR050
88	Refused	HR050
99	Don't know	HR050

HR040b On Saturday you are open from:

&HR40F	Hours on FROM (use 24 hour format eg 0700)	HR040c
88	Refused	HR050
99	Don't know	HR050

HR040c On Saturday you are open until:

&HR40F	Hours on UNTIL (use 24 hour format eg 0700)	HR050
88	Refused	HR050
99	Don't know	HR050

HR050 And Sundays?

1	Open 24 Hrs	HR059
2	Closed	HR059
3	Open part of the day	HR050b
4	Same as Saturday schedule	HR059
5	Same as Weekday schedule	HR059
6	Open by appointment	HR059
88	Refused	HR059
99	Don't know	HR059

HR050b On Sunday you are open from:

&HR50F	Hours on FROM (use 24 hour format eg 0700)	HR050c
88	Refused	HR059
99	Don't know	HR059

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HR050c On Sunday you are open until:		
&HR50T	Hours on UNTIL (use 24 hour format eg 0700)	HR059
88	Refused	HR059
99	Don't know	HR059

ASK IF FM050=3 or 4, ELSE SKIP TO EER001

We realize that you may operate your facility differently when classes are not in session. Is the operating schedule for your facility

HR059 different when classes are not in session?		
1	Yes	HR060
2	No	EER001
8	Refused	EER001
9	Don't Know	EER001

I'd like to ask the same set of questions for your operating schedule when students are not in the classroom. What are the **HR060** weekday hours that your facilities are operating/open?

1	On 24 Hrs	HR062
2	Never on	HR062
3	On part of the day	HR060b
88	Refused	HR062
99	Don't know	HR062

HR060b Monday through Friday, your facility is open from:

&HR60F	Hours on FROM (use 24 hour format eg 0700)	HR060c
88	Refused	HR062
99	Don't know	HR062

HR060c Monday through Friday, your facility is open until:

&HR30F	Hours on UNTIL (use 24 hour format eg 0700)	HR060c
88	Refused	HR062
99	Don't know	HR062

HR062 How about Saturdays?

1	On 24 Hrs	HR064
2	Never on	HR064
3	On part of the day	HR062b
4	Same as weekday lighting schedule	HR064
88	Refused	HR064
99	Don't know	HR064

HR062b On Saturday your facility is open from:

&HR62F	Hours on FROM (use 24 hour format eg 0700)	HR062c
88	Refused	HR064
99	Don't know	HR064

HR062c On Saturday your facility is open until:

&HR62T	Hours on UNTIL (use 24 hour format eg 0700)	HR064
88	Refused	HR064
99	Don't know	HR064

HR064 And Sundays?

1	Never On	EER001
2	On 24 Hrs	EER001
3	On part of the day	HR064b
4	Same as Saturday lighting schedule	EER001
5	Same as Weekday lighting schedule	EER001
88	Refused	EER001
99	Don't know	EER001

HR064b On Sunday your facility is open from:

&HR64F	Hours on FROM (use 24 hour format eg 0700)	HR064c
88	Refused	EER001
99	Don't know	EER001

HR064c On Sunday your facility is open until:

&HR64T	Hours on UNTIL (use 24 hour format eg 0700)	EER001
88	Refused	EER001
99	Don't know	EER001

Participant Customer Survey for
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Self Report Free-Ridership Survey

SR FREE-RIDERSHIP

FR1 At the time that you first heard about the assistance from &Utility for this &Measure, had you...? (READ LIST)

1	Already been thinking about purchasing &product?	FR2a
2	Already begun collecting information about &product?	FR2a
3	Already selected the particular &product you were going to get?	FR2a
4	Already installed the energy efficient &product?	FR1a
77	{DON'T READ} Other:	FR2a
88	Refused	FR2a
99	Don't know	FR2a

FR1a So, the &measure was installed before you learned about the assistance from &Utility?

1	Yes	FR5
2	No	FR2a
88	Refused	FR2a
99	Don't Know	FR2a

FR2a Just to be sure I understand, did you have specific plans to install &product before learning about the assistance available through the &Program?

1	Yes	FR3
2	No	FR4a
88	Refused	FR4a
99	Don't Know	FR4a

FR3 Did you have to make any changes to your existing plans in order to receive this [assistance] through the &Program?

1	Yes	FR3a
2	No	FR4a
88	Refused	FR4a
99	Don't Know	FR4a

FR3a What changes did you make?

77	{RECORD RESPONSE}: _____	FR4a
----	--------------------------	------

{REPEAT AS NEEDED FOR FR4 PARTS A – D} If the [assistance] from the &Utility &Program had not been available, would you still have:

FR4a Purchased any &ProductType?

1	Yes	FR4b
2	No	FR5
88	Refused	FR4b
99	Don't Know	FR4b

FR4b Purchased the equipment at the same time as you did?

1	Yes	FR4c
2	No	FR4b1
88	Refused	FR4b1
99	Don't Know	FR4b1

FR4b1 Bought the &product earlier than you did, or later?

1	Earlier	FR4b2
2	Same Time	FR4c
3	Later	FR4b2
88	Refused	FR4c
99	Don't Know	FR4c

FRb2 How much [earlier/later] would you have bought the &product?

	{RECORD RESPONSE} _____ Years {and/or} _____ Months	FR4c
88	Refused	FR4c
99	Don't know	FR4c

FR4c Without the program, would you have purchased the same quantity as you did? {Probe for more or less}

1	More	FR4c1
2	Same quantity	FR4d
3	Less	FR4c1
88	Refused (SKIP TO FR4d)	FR4d
99	Don't Know (SKIP TO FR4d)	FR4d

FR4c1 How much [more/less] would you have bought?

	{RECORD RESPONSE}	FR4d
88	Refused	FR4d
99	Don't know	FR4d

**Participant Customer Survey for
06-08 Small Commercial Contract Group
Self Report Free-Ridership Survey**

Ask if IncEff = 1

FR4d Purchased the same energy efficient &Measure?

1	Yes	FR4e
2	No	FR5
88	Refused	FR4e
99	Don't Know	FR4e

FR4e If the [assistance] from the &Utility &Program had not been available, would you have done anything else differently?

1	Yes	FR4e1
2	No	FR5
88	Refused	FR5
99	Don't Know	FR5

FR4e1 What would you have done differently?

	{RECORD RESPONSE}: _____	FR5
--	--------------------------	-----

FR5 On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have bought &Measure if you had not received any [assistance] from the program?

	{RECORD RESPONSE (0-10)} _____	FR7
88	Refused	FR7
99	Don't Know	FR7

FR7 Our records indicate you received about &incentive from the &Utility &Program either directly or at the time of purchase to offset the cost of the &product. Does this sound about right?

1	Yes	FR9
2	No	FR8
88	Refused	FR9
99	Don't Know	FR9

FR8 What would you estimate to be the actual amount?

	{RECORD RESPONSE} _____ (SET = NEW AMOUNT OF PROGRAM INCENTIVE/SUBSIDY)	FR9
88	Refused	FR9
99	Don't know	FR9

I'm going to read several statements about how you came to choose your &product. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with each statement?

FR9 If I had not had any assistance from the program, I would have paid the additional &PrgmIncentive to buy the &Measure on my own.

	{Record Response (0-10)} _____	FR10
88	Refused	FR10
99	Don't know	FR10

FR10 There may have been several reasons for my purchase decision, but the assistance from the &Utility &Program was a critical factor in my decision to purchase the high efficiency/energy efficient product.

	{Record Response (0-10)} _____	FR11
88	Refused	FR11
99	Don't know	FR11

FR11 I would have bought a(n) &product within 2 years of when I did even without the [assistance] from the &Utility &Program.

	{Record Response (0-10)} _____	FR12a
88	Refused	FR12a
99	Don't know	FR12a

CONSISTENCY CHECK & RESOLUTION

DEVELOPING PROGRAMMING TO TEST FOR INCONSISTENCIES BETWEEN RESPONSES IN THE FREE-RIDERSHIP BATTERY, C1 WILL TAKE PRECEDENCE OVER INCONSISTENT RESPONSES.

- IF (FR4A or FR4D = 1) AND FR5 = 0,1 AND FR10 = 9,10 AND FR11 = 0,1;
- IF (FR4A or FR4D = 2) AND FR5 = 9,10 AND FR10 = 0,1 AND FR11 = 9,10;
- IF FR5 = 0,1 AND (FR4A or FR4D = 1) AND FR10 = 0,1 AND FR11 = 9,10;
- IF FR5 = 9,10 AND (FR4A or FR4D = 2) AND FR10 = 9,10 AND FR11 = 0,1;
- IF FR10 = 0,1 AND (FR4A or FR4D = 2) AND FR5 = 0,1 AND FR11 = 0,1;
- IF FR10 = 9,10 AND (FR4A or FR4D = 1) AND FR5 = 9,10 AND FR11 = 9,10;
- IF FR11 = 9,10 AND (FR4A or FR4D = 2) AND FR5 = 0,1 AND FR10 = 9,10;
- IF FR11 = 0,1 AND (FR4A or FR4D = 1) AND FR5 = 9,10 AND FR10 = 0,1

Let me make sure I understand you. In your own words, could you please describe how the program influenced your decision

C1a to purchase and install your new &Measure at the time you did?

77	{Record Response} _____	End
88	Refused	End
99	Don't know	End

**Participant Customer Survey for
06-08 Small Commercial Contract Group
Gross and Net Impacts**

ONSITE RECRUITING

TO SCHEDULE ONSITE VERIFICATION

As we've discussed, the &Program is an important component of the California Public Utilities Commission's ongoing efforts to save energy and reduce emissions affecting climate change. In order to improve this program's performance, the CPUC would like to make an accurate measurement of the energy savings associated with energy efficiency equipment installed by collecting and analyzing information from selected customers.

Your input to this research is extremely important. By receiving a rebate through the &PROGRAM, your firm has agreed to allow verification of the installation of the equipment rebated through the program.

COMMENT Our verification technician will need to meet a facilities representative of your company. This should be either the manager of the facility or part of the facilities staff.

OS_NAME1 May I please have the name of the person who our technician can call you to set up an appointment time?

&OS_NAME1	NAME OF PRIMARY CONTACT	OS_PHONE1
88	Refused	T&T
99	Don't know	T&T

OS_PHONE1 May I also have the best phone number for the technician to reach this person?

&OS_PHONE1	PHONE FOR PRIMARY CONTACT	OTHER
88	Refused	T&T
99	Don't know	T&T

OTHER Is there another person that the engineer might speak with at your company, if this primary person is not available?

&OTHER	Get name	OS_NAME2
88	Refused	T&T
99	Don't know	T&T

OS_NAME2 May I please have their name so our technician can call them at another time?

&OS_NAME2	Get name	OS_PHONE2
88	Refused	T&T
99	Don't know	T&T

OS_PHONE2 May I also have the best phone number for the technician to reach them?

&OS_PHONE2	Get phone number	VERIFY
88	Refused	T&T
99	Don't know	T&T

VERIFY For verification purposes only, may I please have your name?

	Get name	OS_REC
88	Refused	T&T
99	Don't know	T&T

TO SCHEDULE INSTALLATION OF LIGHTING LOGGERS

If CFL = 1 OR T-8 = 1 ASK LIGHTING LOGGER BATTERY

In order to improve this program's performance, &UTILITY would also like to make an accurate measurement of the energy savings associated with fluorescent lighting by collecting and analyzing information from selected customers.

If you agree to participate, Itron, on behalf of &UTILITY, will come to your business to install lighting logger devices on your lights to record when each light is in use. The lighting loggers would then be installed in an unobtrusive place and would be removed by us at the end of the research project. We expect the site visit to take about two hours. We'll come back and remove the logger devices after about one month. Note, the electric use data will be used strictly for the study of the &Program and will not affect your electric service at all. You will need to sign a brief participation agreement.

OS_REC Are you interested in participating in this project?

		Comment
1	Yes	
2	No	T&T
88	Refused	T&T
99	Don't know	T&T

END.	Those are all the questions I have for today. Thank you for you time and help in this important study.	
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Appendix B

Lighting Logger Field Installation

This appendix contains the information needed to install lighting loggers in commercial establishments for the CPUC Small Commercial 2006-2008 evaluation. It presents an overview of the objectives and describes the equipment and materials used, initialization and programming of the data loggers, and the procedures to be used for installing and extracting the loggers. Sections of this appendix are as follows.

- B.1 Overview, Objectives, and Theory
- B.2 Equipment and Installation Materials
- B.3 Data Logger Initialization and Programming Procedures
- B.4 Logger Installation Guidelines
- B.5 Special Logger Installation Situations
- B.6 Logger Extraction Procedures
- B.7 Additional Non-Logger Study Tasks

B.1 Overview, Objectives, and Theory

This section is not intended to be a formal part of the procedures, but is included here only to add a high-level perspective to the lighting logger study. The information contained here may be inconsistent with the final project results, but it was not updated.

Lighting loggers will be used to obtain annual equivalent full load hour estimates and load shapes for three high-impact measure (HIM) lighting technologies: CFLs, linear fluorescents, and high bay fluorescent lighting. The objective is to obtain technology-based loads shapes that represent average operation of each lighting technology at the site, at the program level, and at the portfolio level as well.

B.1.1 Lighting HIMs/Technologies/Concepts

These are the HIMs and the associated technologies being targeted by this study.

- **(Downstream) Interior Linear Fluorescents (LF).** These are non-high bay linear fluorescent fixtures, typically converted and/or delamped from T12s, but other baseline technologies (incandescent, mercury vapor, etc.) are possible.
- **(Downstream) High Bay Fluorescents (HBF).** These are typically 6 ft. or 8 ft. lamp T8 fixtures or T5HO lamps used in a high bay (ceiling at 25 ft. or higher) space. They typically replace HID lighting or HO T12s.
- **(Downstream) Interior CFLs (dCFL).** These are either screw-in CFLs or pin-based fixtures. For these measures, the counts and measure descriptions are available from the IOU tracking database.
- **Upstream Screw-In CFLs (uCFL).** Upstream CFL programs are those where IOU incentivized bulbs are sold through retailers. As such, there is no information available for the customers who purchase these bulbs, or on the number and type of bulb purchased. Therefore, unlike the other HIMs, the onsite survey will involve a lot more work all around to identify and locate the upstream CFLs. Customers for the upstream CFL logger study are blindly recruited from the entire utility frame (since purchasers are not tracked in any way). In theory, utilities would have a master list of make/model of lamps that are sold, where they are sold, etc. that we would be able to match onsite survey data to. It is also unknown if these CFLs are inside or outside, conditioned or unconditioned spaces. Also the basic question of how/if the Upstream CFL installations are very different from the downstream CFLs: participant tracking data provide us with a good indication of where downstream CFLs are being installed, but there is very little information at this time about where upstream CFLs are being installed.
- **General Approach for Downstream Measures.** For downstream site visits, *all measures at the site will be verified*, including non-lighting measures. In addition, *all lighting HIMs at a site will be logged*, regardless of the site's sample quota. For example, if a site is selected to meet the Interior CFL quota, but it also has rebated linear fluorescent measures, then both the CFLs and the linear fluorescents would be logged.
- **Pre/Post Study.** For LF and HBF measures, loggers will be installed both before and after the measures are installed. Summit Blue will be implementing this phase of the logger study, but they will coordinate with SCCG and utilize existing materials and procedures wherever possible. The pre-post study will provide logger data and fixture wattage information for both pre- and post-retrofit lighting configurations.
- **Pilot Tests.** Prior to full-scale implementation of the lighting logger study, "pilot tests" will be used to field-test the survey forms and procedures, as well as to train and evaluate the surveyors. For these test phases, each surveyor will do a handful of sites which will be thoroughly reviewed. Surveyors will have to be certified to be able proceed to the full-scale effort. Separate pilot tests will be conducted for the

downstream and upstream efforts, since the downstream measures and procedures are fairly well established, but the materials and approach for the upstream effort are completely new and untested. In fact, the entire Wave 1 of the upstream CFL study will likely end up being a pilot test.

B.1.2 Targets and Quotas and Waves

These were the initial targets and quotas established at the beginning of the project; they may change by the end of the project, but are listed here to provide a general idea of the magnitude of each aspect of the lighting logger study.

Table B-1: Lighting Logger HIM Site Targets (11/20.08 version)

HIM_SampleGroup	Pre or Post	# of Sites	Itron ²	SummitBlue ²
Downstream CFL (dCFL)	Post-only	200	85%	15%
Upstream CFL (uCFL)	Post-only	600	100%	
Linear Fluorescent (LF)	Post-only	250	93%	7%
	Pre/Post ¹	200		100%
High Bay Fluorescent (HBF)	Post-only	50	100%	0%
	Pre/Post ¹	100		X

¹ Occupancy Sensors is another HIM, assume that 45-50 of the 300 pre/post sites will have occupancy sensors.

² Rough estimates based on % of savings in SCCG vs. LGP. Generally, Itron will survey sites from SCCG programs and LGP will survey sites from non-SCCG programs. HBF is the exception, since the vast majority of savings/sites are under SCCG programs.

Installation Waves. Loggers were to be installed for anywhere from two to three months, in order to spread out the use of loggers (so they are not all needed at once). Each two to three month period was considered a wave, and was also intended to pick-up seasonal variation (summer versus shorter/darker winter days). Waves were also intended to allow for improvement in the procedures used for Waves 2 and 3, from any lessons learned during Wave 1.

Upstream CFLs, Wave 1. This will be a highly exploratory stage for upstream CFLs, probably more like a pilot test. For the initial wave of approximately 100 upstream sites, we felt that it was most likely that smaller customers would be participating upstream, so we decided to only recruit customers with *electric demand under 150kW*. Furthermore, we decided to *limit the first wave to only four market segments* that we felt were most likely to participate upstream. We decided to *focus recruitment for wave one on only small offices, small retail, motels and sit-down restaurants*. We decided to target eight sites by IOU in each of these four market segments for a total sample size of 96 for Wave 1.

B.1.3 DEER Activity Area Considerations

One of the goals of this study is to use the results to improve the load shapes and EFLH (equivalent full load hour) estimates of the DEER building prototypes *at the Activity Area level*. To satisfy that goal, whenever possible, the lighting loggers should be installed in a way that data will be available for these discrete DEER activity areas. The physical configuration of a site may prevent this—for instance if the lobby and offices are not physically separated and are served by the same lighting system—but this information might also be used to reconfigure the DEER building prototypes.

A summary of the DEER prototypes and their associated activity areas are presented for reference in Table B-2. *This table should be used as a guideline for determining the minimum number of activity areas types to be used for a particular business type.* However, the actual physical space and light fixture control/switch configurations are the primary factors to consider when setting up activity areas and logger schedule groups.

Table B-2: DEER Building Types and Activity Areas

DEER Bldg Type Code	DEER BldgType Description	DEER Activity Areas (in order from largest to smallest % of Total Area)
ASM	Assembly	Auditorium, Office
ECC	Education – Community College	Classroom/Lecture, Office (General), Dining Area
EPR	Education – Primary School	Classroom/Lecture, Dining Area, Exercising Centers and Gymnasium, Kitchen and Food Preparation
ERC	Education – Removable Classroom	Classroom/Lecture
ESE	Education – Secondary School	Classroom/Lecture, Dining Area, Exercising Centers and Gymnasium, Kitchen and Food Preparation
EUN	Education – University	Classroom/Lecture, Office (General), Hotel/Motel Guest Room (Dormitory), Comm/Ind Work (General Low Bay)
GRO	Grocery	Retail Sales Grocery, Office (General), Comm/Ind Work (Loading Dock), Refrigerated (Walk-in Cooler), Refrigerated (Food Preparation), Refrigerated (Food Preparation)
HSP	Health/Medical – Hospital	Office (General), Patient Rooms, Medical and Clinical Care, Medical Laboratory, Dining Area, Kitchen and Food Preparation ¹
HTL	Lodging – Hotel (Guest Rooms)	Hotel/Motel Guest Room (incl. toilets), Corridor, Lobby (Hotel), Office (General), Laundry
MBT	Manufacturing – Bio/Tech	Comm/Ind Work (High Tech Bio Tech Lab), Office (General), Corridor, Conference Room, Computer Room (Mainframe/Server)
MLI	Manufacturing – Light Industry	Comm/Ind Work (General High Bay), Storage (Unconditioned)
MTL	Lodging – Motel	Hotel/Motel Guest Room (incl. toilets), Corridor, Office (General), Laundry
NRS	Health/Medical – Clinic	Hotel/Motel Guest Room (incl. toilets) (Patient Rooms), Office (General), Dining Area, Corridor, Kitchen and Food Preparation
OFL	Office – Large	Office (Open Plan), Office (Executive/Private), Corridor, Lobby (Office Reception/Waiting), Conference Room
OFS	Office – Small	Office (Executive/Private), Corridor, Lobby (Office Reception/Waiting), Conference Room, Copy Room (photocopying equipment)
RFF	Restaurant – Fast Food	Dining Area, Lobby (Main Entry and Assembly), Kitchen and Food Preparation, Restrooms
RSD	Restaurant – Sit Down	Dining Area, Kitchen and Food Preparation, Lobby (Main Entry and Assembly), Restrooms
RT3	Retail – 3 Story Large	Retail Sales and Wholesale Showroom, Storage (Conditioned), Office (General)
RTL	Retail – Single Story large	Retail Sales and Wholesale Showroom, Storage (Conditioned), Office (General), Kitchen and Food Preparation
RTS	Retail – Small	Retail Sales and Wholesale Showroom, Storage (Conditioned)
SCN	Storage – Conditioned	Storage (Conditioned)
SUN	Storage – Unconditioned	Storage (Unconditioned)
WRF	Storage – Refrigerated	Refrigerated (Cooled Storage), Refrigerated (Food Preparation), Comm/Ind Work (Loading Dock)

¹ DEER Hospital prototype “Office” area is actually three distinct 24-hr and 12-hr operation sub-areas (“24-hr facilities, public space, engineering and maint.”, “12-hr admin, office/aux, occup/physical therapy”, and “24-hour nursing support”). “Medical” areas have similar sub-area splits (“24-hour wards and isolation areas”, “24-hour intensive care, emergency/lab, obstetrics”, “12-hour labs, surgery, rad. therapy, outpatient and diag”)

B.2 Equipment and Installation Materials

This section contains a description of the lighting loggers to be used for this study, and the materials needed to install them.

B.2.1 Lighting Data Loggers

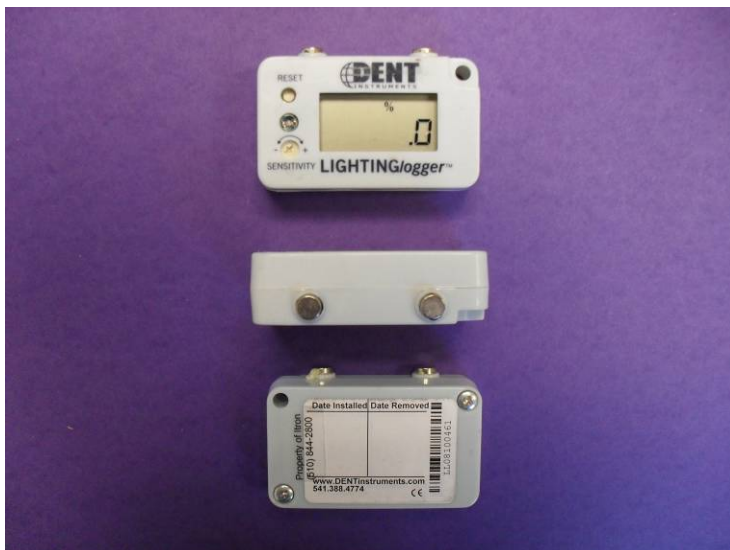
Dent Instruments (DENT) and/or Onset Computer Corporation (Onset) data loggers will be used for this study. The two data logger models that will be used are:

- DENT LIGHTINGlogger (LL or LC). This is the project default, and will be used for linear fluorescents, high bays whenever possible, and CFLs in hardwired fixtures.
- DENT CTlogger (CT). The CT (current transformer) logger will be used for CFLs in plug-in fixtures (mostly lodging situations).

Each data logger is described briefly below, however, to become completely familiar with the equipment, *all field personnel must read the user's guides provided with the lighting loggers.*

DENT LIGHTINGlogger™ (TOUL-3G). This is the default data logger used for the SCCG lighting logger study. The data logger is shown in Figure B-1. Both the photocell sensor and adjustment screw are located on the front of the logger, as is the LED indicator panel which shows total on-time in hours, percent of time on, and a light-on indicator. These loggers are equipped with magnets that can be used to attach to the lighting fixture.

Figure B-1: Dent Instruments Lighting Logger



DENT CTlogger™ (TOUCT-3G). This data logger is shown in Figure B-2. The CT logger is also a time-of-use type logger, but monitors the current through an electrical cord via a clamp-on current transformer (CT). The CT logger will be used to monitor plug-in wall-mounted and table fixtures, such as those commonly found in hotels and motels. As with the DENT lighting logger, the adjustment screw and LED indicator panel are located on the front of the logger. For most installations, a split-wire extension cord will need to be used with the CT logger. As shown in Figure B-3, one of the wires from the extension cord is wound around the prongs of the CT logger, and the CT is zip tied to ensure that it remains clamped around the wire.

Figure B-2: Dent Instruments CT Logger



Figure B-3: Dent CT Logger and Split-Wire Extension Cord



A summary of the data logger specifications is presented in Table B-3.

Table B-3: Data Logger Characteristics Summary

Logger Type	Sensitivity Range	Sensitivity Adjustment**	Event Checking Rate	Data Storage Capacity	Battery Life
		- = less sensitive + = more sensitive			
Dent LL	2 to 450 lumens/m ²	CC = -, CW = +	1 sec	8000 on/off events	5 Year
Dent CT	0.25 to 16 amps	CC = -, CW = +	1 sec	8000 on/off events	5 Year

* Note that the U9 sensitivity adjustment is the reverse of all the other loggers.

** CW = Clockwise, CC = Counter-clockwise

B.2.2 Logger Installation Tools and Materials

Materials needed specifically for lighting logger installation include the following.

- Multiple copies of the CPUC Letter of Introduction and business cards. These should be left behind at every site so that if something happens with the loggers, the site contact will know who to contact.
- Extra copies of blank logger installation and verification forms.
- Assortment of loggers (based on measures to be logged).
- Large gallon-size zip-lock plastic bags (for storing retrieved loggers or broken CFL clean-up).
- Razor blade or sharp pocket knife (for slitting painted-over fixtures to allow access to lamps and ballasts).
- Plastic zip ties, variety pack various lengths (4", 8", 14").
- 3M double-sided tape – 1" squares (3M-4026) and glass scraper (for removal).
- Hook and loop (i.e., Velcro™) tape.
- Stick-on, round Avery labels (color coding dots) for marking the location of installed loggers (something bright and easy to see, i.e., red, yellow, orange). Note that dots do not have to be used for smaller sites where the lamps are uncovered and loggers are clearly visible, and every fixture and logger location can be shown on the site sketch.
- Poster putty (removable/reusable). The best way to install a logger with putty is to put two dime to nickel sized pieces in contact with the logger and the surface.
- DENT Flexible fiber-optic attachment, various lengths.
- Split-wire extension cords for the DENT CT loggers.
- Flexible water discharge hose (used to hide and wrap installed CT loggers).
- Permanent ink fine point pen (for marking CFL lamps for retention study).

- Electrical tape and wire nuts.
- Small scissors or wire cutters (use to snip zip ties for logger extraction).

B.3 Data Logger Initialization and Programming Procedures

Prior to their use in the field, data loggers need to be initialized and/or programmed. A summary of these procedures for DENT loggers is provided in this section, but the *data logger user's guides should be reviewed for additional details*. However, one rule that applies regardless of the logger type is: All loggers used for a specific site should be synched to the same computer and this procedure should be performed just prior to visiting the site.

B.3.1 DENT Data Logger Initialization Procedures

The following steps, applicable to both the LL and CT loggers, should be taken when programming the DENT data loggers:

1. Be sure your computer clock is set to the correct time before beginning.
2. Make sure the software installed on your machine is Smartware 2008.
3. Communications cable needed is a Dent Smartlogger USB Com Cable.
4. After opening the software and plugging in a logger, choose the following:
 - A. Logger>Logger Clock>Synchronize time to match PC.
 - B. Logger>Clear Logger Memory.
5. All loggers used for a specific site must be synched to the same computer.

B.4 Logger Installation Guidelines

This section covers installation of the loggers, both how to select the fixtures and how to install and adjust the loggers.

B.4.1 Pre-Visit Preparation

Before the site visit, the information provided on the populated onsite survey form should be *thoroughly reviewed* and the surveyor should estimate the number and type of loggers needed and installation methods to be used. The measure summary, phone survey questions, and site information sections of the survey form should all be reviewed. Issues to consider are discussed below.

- **Business Type.** Is it a large or small business? Is it likely to have high bay ceilings? Are the business hours regular/consistent, or mostly by appointment? If mostly by appointment, instead of making a cold-call (the default approach) the surveyor should

call to schedule an appointment. If a school, then an appointment and possibly registration will be required if you plan on going during school hours. The DEER activity areas for this business type should also be reviewed.

- **Technology Types and Configurations.** Are the measures CFLs or linear fluorescents (LFs), and if LFs are any of them likely to be high bay fixtures? Are the CFLs likely to be downlights/cans? If so, then an optical cable might need to be used, so make sure that you bring a few and know how to use and install them. Also note that all lighting HIM present at a site will be logged.
- **Measure Summary Table.** This table contains a summary of the downstream measures that you will be logging and verifying, so review the Measure Summary table and make sure that you understand what the measures are. This should include understanding what the pre-retrofit baseline technology assumed by the IOUs was, since you will be trying to obtain that information as well. For upstream CFLs, the measure summary page is replaced by a phone survey information page (see below).
- **Phone Survey Information for Upstream CFLs.** This is the only source of information for the Upstream CFLs, so it is crucial to review this information before visiting the site. Note the number of CFLs, installation, and locations, and who is responsible for purchasing the CFLs.
- **Estimate the Number and Type of Loggers Needed...and Bring Extras!** Revisiting a site to install additional loggers is not normally an option. Therefore, be prepared and bring a variety of loggers and installation materials, and also be ready to improvise with what you have if needed. But always remember rule #1 (safety first)!

As always, if there are any questions or anticipated problems, then the surveyor should consult with one of the field survey leads for direction *before actually visiting the site*.

B.4.2 Logger Placement

The first step in deciding which fixtures to log is to assess the site and define schedule groups² for the rebated lighting fixtures. Once schedule groups have been defined, loggers should be placed in all areas that have a different time or control schedule. Several considerations factor into how and where loggers should be placed. The following guidelines will be used to determine number and location of loggers.

1. **Safety for Surveyors and Occupants Is #1!** If loggers cannot be installed safely, do not attempt to install them. It is better to lose this site and do another one than to risk

² For this study a “Schedule Group” consists of the Activity Area + Hourly Equipment Operation Schedule + Switched Circuit(s) that are to be represented by the logger.

injury installing and/or retrieving the loggers. This applies to the safety of the occupants as well: Never install a logger where it could injure someone if it falls especially if it is installed with putty, or alternately, make sure that a logger is secure if you are installing it above a space that is usually occupied (like a fixture above someone's desk).

2. **Defining Schedule Groups.** For this study, a schedule group can be considered as the Activity Area plus Hourly Equipment Operation Schedule plus Switched Circuit(s) that are to be represented by the logger. When deciding on schedule groups, keep in mind that the final, composite logger data results should produce a complete picture of how the lighting measure/technology operates at that site. As such, lights that are on all the time, as well as those that are suspected to be mostly off should also be logged. In addition, obtaining data that can be used to inform DEER models at the activity are level should be considered.
3. **Log ALL lighting HIMs found onsite, regardless of the sites sample strata.** If a site is selected because it has downstream CFLs, but there were also linear fluorescent and high bay fixtures installed, then that equipment should also be logged.
4. **Minimum of # of Loggers per Site.** Never install only one logger at a site, unless the only measure at the site is a single lamp fixture. Even the smallest sites should have at least two loggers installed, one primary logger and one backup logger, if there is only a single circuit/switch at the site.
5. **Target # of Loggers per Site.** An overall average of 10 loggers per site is the target. For individual sites - such as hotels/motels or sites with multiple private offices - that means that more than 10 can be used if needed to characterize the diversity of lighting operation at the site. For most small commercial sites, it is expected that six to eight loggers is all that will be needed, but the surveyor has the latitude to use a much larger number.
6. **Placement within Fixture: Avoid “insensitive” logger situations.** Be sure to place the logger so that the photocell eye “sees” only the lamp, and a part of the lamp that is brightest. This means checking the angle of installation as well as the position along the lamp. A symptom of incorrect placement is the logger appearing to be insensitive, that is, needing to be adjusted to maximum sensitivity to register. Situations to be avoided are:
 - **Avoid darkened tube ends.** Position the logger in the middle of the fixture and away from the tube ends, which will darken with age. This will also avoid the situation of trying to adjust a logger when the tube ends have already started to darken.
 - **Avoid highly angled mounting surfaces.** The logger should be installed such that the light sensor is aimed as directly at the light source as possible to

maximize sensitivity and avoid ambient lighting effects. In practice, this means to avoid mounting the logger on an angled surface that will cause the sensor to view more of the fixture and surroundings than the lamp. The aperture of most light sensors is very small, so if it is not pointed directly at the light source the sensitivity will need to be increased, which also makes the logger more susceptible to ambient lighting sources. If the logger has to be turned up to maximum sensitivity to register, then it is installed at too large an angle to the light source and should be re-adjusted with poster putty or moved to a different mounting surface.

7. **Back-up Loggers.** A “back-up” logger³ is a logger placed on the same switched circuit but in a different fixture. Back-up loggers should not be placed side-by-side in the exact same physical location as the primary logger. If they are placed in the same spot due to special circumstances (like inaccessible fixtures and limited options for placing loggers on horizontal or vertical surfaces) then this situation should be fully explained in comments. Additional notes include:
 - **Back-up required for Significant Loads/Number of Measures.** Schedule groups that have larger than 10 fixtures must have a backup logger installed on the groups representing the largest kW loads. The idea is that if something happens to the primary logger that these large loads will always be represented in the final analysis.
 - **Bi-level A/B Switched Fixtures.** These are fixtures where the lamps in that fixture are on two different switches, and can be used to create two different lighting levels (hence bi-level). A logger installed on the “A” side should not be recorded as a back-up (secondary logger) for the “B” side. In addition, the “A” and “B” lamp loggers should be installed in *different fixtures* to avoid any lighting spillover. If this cannot be done, then the loggers should be installed so the logger eye is right on the lamp.
8. **Single room or area served by multiple switches/circuits.** At least one fixture on every switch should receive a logger. If the lighting in this area is a significant fraction of the total rebated quantity for the site, then a back-up logger should also be installed in at least one of the circuits. The surveyor should also ask if switches are typically operated separately or all together and should note this in comments, but should not rely on this information to limit the installation of loggers on all switches/circuits, except where an inordinate number of loggers (>20) would be required otherwise.

³ Note that for the analysis, if data from both loggers is good it will be averaged together rather than just using one logger.

- **Describe Location.** The room number, office tenant name, etc. should be recorded on the logger installation comments. This information will be used during logger data QC to compare/contrast the operation of switches/fixtures within the same area.
9. **Minimum # of Similar Areas to Log.** Examples include private offices, classrooms, and lodging guest rooms. If a large number of similar activity areas is found that have varying time schedules (such as individual private offices) then ~20% should receive loggers.
- **Target # of Guest Rooms for Lodging Sites.** Surveyors should attempt to log at least five (5) guest rooms throughout the hotel/motel and representing as many different room configurations as possible. It is understood that access to guest rooms may be limited by the management staff. However, *at least two guest rooms must be monitored*, otherwise a replacement site will need to be selected.
10. **Difficult Locations: Downlight/Cans, Sealed, Inaccessible Fixtures.** Loggers do not have to be placed in the fixture. If the area is relatively free from other light sources (sunlight, task lighting, etc.) and a suitable location outside the fixture can be found, then the logger can be placed and adjusted properly for this location. Specific issues/examples are described below:
- **CFL Cans/Downlights.** The easiest way to attach loggers to CFL cans/downlights is to use several plastic cable zip ties and tie them directly to the base of the lamp itself. If loggers cannot be placed inside of the cans, poster putty, double-sided tape, Velcro™ (hook and loop) tape, or plastic cable zip ties can be used to attach them outside the fixture. Unfortunately, CFL cans are usually aluminum, but sometimes poster putty or double-sided tape will work. Try stepping back and looking at the area/room as a whole and look for a spot with minimal ambient light pollution. Work through the possibilities to choose the best situation for logging. Sometimes there are other flat surfaces where a logger can be placed, or even metal nearby (such as HVAC diffuser plates) so the loggers magnets can be used. For cans that have slits in the top and are installed in a false ceiling, consider placing the logger in the ceiling on top of the can and over the slit. A proxy fixture – as described below – might also be used. If no other options are available, the DENT Flexible fiber-optic attachment may be used. Each circumstance is unique and might require a bit of thought and creativity, but you can usually find some way to install the logger.
 - **High-Bay T8 and T5 fixtures.** Loggers can be placed on a horizontal surface (book case, shelf, etc.) away from windows and other ambient light sources and adjusted accordingly.
 - **Using a Proxy Fixture/Circuit.** Generally, only rebated fixtures and lamps should be logged. However, if rebated fixtures or lamps are inaccessible but a

suitable non-rebated fixture “proxy” is available, then loggers can be installed on that fixture/circuit. However, this approach should only be used as a last resort, and must be *thoroughly explained in comments, photographs, and diagrams if needed.*

- **Loggers just cannot be physically installed.** If loggers cannot be installed because the fixtures are outside, over a desk, etc. then that should be noted in comments and in the various survey form tables. The loggers do not need to cover 100% of the site. The final analysis will be at the market/building segment-activity area level, not at the aggregated site level, so it is still important to record the number of measures that are in each activity area, in order to develop a distribution on that basis.
11. **Place Loggers where they will not be disturbed.** An attempt should always be made to place loggers where they are not easily noticed or accessed by occupants. This prevents moving, removal, or resetting by site personnel once the logger has been placed.
 - **Consider covering the reset button.** If the loggers are visible and can be easily accessed by a customer or guest, consider covering the reset button with a piece of tape of round sticker to remove the temptation of pressing the reset button.
 12. **Do not install loggers in excessively hot environments like recessed cans.** The data loggers are only rated for 140 F, and some downlights and covered fixtures may get hot. DENT equates this to a distance of eight inches from a 100 watt incandescent bulb in free-moving air. In this situation, install the logger outside of the fixture and use a DENT with the fiber optic extension.
 13. **Do not install loggers where there is a high probability of theft.** For sites such as a rundown motel with highly transient guests, or a restaurant where the installed logger would be accessible to the customers, if the loggers cannot be installed out of site and/or you think they will likely be stolen no matter where they are installed, then do not install loggers. Just be sure to document your reason for not installing loggers in the “lost” site disposition. Enough loggers are lost at reputable sites (sometimes as high as 20% at lodging sites), so that it is better to not install loggers where theft is highly expected. Whenever possible, you should call one of the field-survey leads to confirm this approach.
 14. **Two Different Rebated Measures on the Same Switch.** Although ideally a single logger could be used to represent both of these measures, the survey form is not really set up to handle that situation: a loggerID can only be used once for a single measures in an Activity Area assignment table. Therefore, the best approach is to just install a logger on each of the measures, and do not list them as back-ups to each other, even though they really are.

Please note that *whenever there is any doubt about the correct approach to be used for a site*, Itron staff should be *immediately* consulted for guidance:

Table B-4 SCCG Field-Survey and Lighting Logger Contacts

Contact	Cell Phone	Land Line	Email
Bob Ramirez	858-692-5676	858-724-2650	bob.ramirez@itron.com
Jerry Middleton	305-607-3322	954-316-1609	gerald.middleton@itron.com
Al Lutz	510-844-2831	510-844-2831	al.lutz@itron.com

B.4.3 Logger Adjustment and Installation Procedures



There are general as well as specific adjustment procedures required for each logger, and they are addressed in this section.


DENT LL Logger Adjustment and Installation Procedures

Once the fixture locations have been decided, the following procedures should be used to properly set the logger to accurately measure lighting operation:

1. Press and hold the reset button (approximately two seconds) on the front of the logger until the word “rESEt” appears on the display, then immediately release the button.

<p>NOTE: Be sure to release the reset button as soon as “rESEt” appears. Holding the reset button for more than that - approximately five seconds - will cause “CLEAR” to appear on the LCD. This function resets the internal date to 01/01/2001 and the time to 12:00 am. If this happens while on site, you should not use this logger and you will need to resynchronize the logger’s date and time before it can be used.</p>

2. The logger should be placed at or as close as possible to the location chosen.
3. **Adjust the Sensitivity.** The sensitivity adjustment screw should be all the way toward the negative (left). Slowly adjust the sensitivity screw toward the positive (right) until the sunlight -  symbol appears on the display. Note that there will be a couple second delay before the symbol appears on the display, so turn the sensitivity screw slowly and gradually to allow for this delay. When the symbol first appears, this means that the logger is now sensing the light from the measured fixture. **Once this threshold has been reached, the sensitivity screw needs to be adjusted another ~10 degrees clockwise.** NOTE: Be careful not to allow yourself to create a shadow between the measured light source and the sensor on the logger while doing this.
4. Once the sensitivity has been adjusted, place the logger in the location chosen and verify that the  remains on in the display.

5. **Testing.** Now turn OFF the fixture/s being measured and verify that the  symbol has disappeared from the display. This means the logger is no longer sensing light and will accurately measure the lighting source ON/OFF operation. If the light can not be turned off, an easy way to test it is to face the photocell downward away from the light. Facing downward exposes the photocell to the amount of light it will see when the fixture is off.
6. Test one time further by turning ON the fixture/s and verifying that the lighting symbol appears again. If these are fixtures that are observed and/or reported to be always off, then see Section B.5.

Final Actions

7. Place a colored Avery™ dot near the logger to aid in locating the logger for removal.
8. Record the date of install and a detailed location for the logger on the survey form and site sketch.
9. Complete the verification survey form.

DENT CT Logger Adjustment and Installation Procedures

See “Hotel/Motel (and Other Lodging) Guest Rooms” sections.

B.5 Special Logger Installation Situations

There are some situations that require additional efforts, including the following.

- Fixtures/lamps that are always off.
- Hotel/motel guest rooms (and other lodging).
- High-ceiling and high-bay T5/T8 lighting.
- Using the fiber-optic cable for recessed cans.

B.5.1 Fixtures/Lamps That Are Always or Mostly Off

For some small businesses, the lights in some areas may be off more often than they are on. This can occur in areas that are rarely used, or in areas that receive adequate ambient lighting from windows, skylights, or adjacent areas. Since the logger data for these areas would look more like a logger that malfunctioned, special steps are taken during installation to ensure that we can tell that this is valid data:

- **Describe this unusual situation in comments!** Because there is essentially no energy being used and hence no savings being produced by these fixtures, this

situation should be thoroughly described in comments and a unique schedule defined. The comment must include the *reason* the lights are typically turned off (e.g., ambient light from windows/skylights is enough, staff work mostly in another room that does not have rebated measures, etc.). An estimate of the on time (hours per day, week, or month, whatever the site contact tells you) should be incorporated into the schedule and recorded in comments.

- **Test Period to validate logger operation.** Once installed, the logger should be run through a “test period” of operation; the light must be turned on and left on for at least one minute or more. If possible, you should leave the light on the whole time that you are installing loggers in other areas, which will give an even better test period/confirmation. *This process will be repeated when the logger is extracted* if the lights are off at the time of the site visit. The idea is that, even if these lights are never turned on during the monitoring period, the test period data – which can be reviewed as part of the logger data QC process - will confirm that the logger was correctly installed and operational.

As always, if there are multiple switches/circuits in a room, both need to be monitored and both should be tested.

B.5.2 Hotel/Motel (and Other Lodging) Guest Rooms

The problems that a surveyor faces with installation of loggers at a lodging site are numerous and include:

- Getting access to the guest rooms, which is typically where rebated CFLs are installed.
- Guest room CFL fixtures are typically plug-in wall, desk, and floor lamps for which CT loggers are better suited (rather than LL loggers).
- Sub-sampling is needed to deal with the sheer numbers of CFLs installed.
- Tracking burnt out CFLs or # rebated units that failed and replaced with in-kind technology, since records are not kept by the maintenance staff.
- It is usually impossible to estimate a schedule for these lights.
- Theft of the CT loggers, which requires additional efforts to hide and secure them.

NOTE: Do not install loggers at a site – especially a smaller one – if you think there is a high probability that all or most of the loggers will be stolen. Just be sure to document your reason for not installing loggers in the “lost” site disposition. Enough loggers are lost at reputable sites (typically about 20%), so that it is better to not install loggers where theft is highly expected.

This procedure attempts to address these conditions. The following approach should be followed while performing the verifications and logger installation at lodging facilities:

- **Schedule the site visit.** Unlike most small commercial sites which can be visited without scheduling, for a larger hotel it is better to schedule an appointment with the site contact. Furthermore, if the CFLs are installed in the guest rooms, then you should ask them to make available five rooms and, if possible, a variety of rooms. These would include different physical configurations, and those on different floors that are occupied frequently and not as much. You can also try to schedule your visit between typical check-in/check-out times. In case of a smaller motel site, scheduling may not be necessary, though it is always a good idea to ensure some guest rooms are accessible.
- **Use the LL Loggers whenever possible, be creative!** The LL loggers should be used wherever possible, as they are less expensive and can be used in more applications than the CT loggers. Several examples showing creative use of tie-wraps are shown in Figure B-4.

However, if needed, a CT logger can be utilized for plug-in fixtures.

- **Obtain a site plan and attach to the survey form.** Most lodging sites will have a map of the site that shows the site layout including all buildings and common areas (office/lobby, pool, gym, etc.). A copy of the site plan should be obtained and used to indicate which buildings were physically visited and what rooms the loggers were installed in.
 - **Add building identifiers if needed.** If not already identified, label each building on the site plan with a letter or number (Bldg A, Bldg 1, etc.), which can be referenced on the sketches, comments, and lighting logger installation forms.
 - **Sketch the typical room layout.** Provide a sketch of a typical room configuration showing placement of the lighting fixtures, or do a quick sketch of each room configuration that is logged, if there are significant differences. Show the bathroom as a separate area, if lighting measures are installed there.

Figure B-4: LL Logger Installation in a Downlight w/ Zip ties



Figure B-5: LL Logger Installation in a Table Lamp w/ Zip Ties



- **Logging Common Areas.** The common areas in a hotel/motel (lobby, hallways, breakfast area, offices, etc.) can typically be logged with the default DENT LL loggers. However, if needed, a CT logger can be utilized for plug-in fixtures.
- **Logging Guest Rooms.** Most of the rebated CFLs for a lodging site will be located in the guest rooms. Up to five guest rooms located on different floors and of different physical configurations should be logged. However, access to the guest rooms is

often limited by the site contact. If loggers cannot be installed in at least two guest rooms, then the site should not be logged and it should be recorded as a “lost” site.

- **Approach to Logger Installation in Guest Rooms.** Most of the CFLs in guest rooms will be installed in plug-in wall and table lamps. For these lamps, a CT logger is usually the best choice. However, as the CT loggers and associated split-wire extension cords are much more visible than the DENT LL loggers, it is important to take a few precautions during installation to avoid theft or disturbance of these units. Guidelines for installing loggers in guest rooms are as follows:
 - **Install loggers on all measures.** Install logger on all of the rebated measures in the guest room. Use the CT loggers for plug-in fixtures and LL loggers for hardwired fixtures and/or wherever they can be used.
 - **Use as many loggers as needed.** The average loggers assigned per site is 10, but it is OK – and in fact expected for lodging sites – that more than 10 loggers will be used. But do not install loggers in more than 5 guest rooms.
 - **Hide the CT loggers.** The CT loggers should be installed in such a way that they are out of sight, tucked away behind a desk, bed, table, or a television set.
 - **Anchor/Secure the CT loggers.** The CT loggers should be anchored with a zip tie to furniture or other fixed object whenever possible, as shown in Figure B-6. Again, this will help to eliminate theft of the loggers.
 - **Inform maintenance staff.** The surveyor should ask the site contact to inform the maintenance staff (head of housekeeping) about the loggers, so that they know not to disturb or unplug the logger. The surveyor should also leave his business card with the site contact so that they can call us in case the loggers are unplugged or end up in lost and found.
 - **Guest room bathroom fixtures.** The guest room bathrooms will usually have T8s or CFLs which can be logged with the LL loggers. Extra care must be taken to keep the logger out of sight so that the management does not get complaints from the guests. Create a separate Activity Area for the guest bathrooms.

Figure B-6: CT Logger Zip tied to a Bed Frame



CT Logger Installation Procedure. The CT logger detects current flowing or not flowing through the wire and records this as ON/OFF transition data. A brief description of how a CT logger should be installed to monitor a plug-in fixture is given below.

- 1) Put a split-wire extension cord between the wall outlet and the plug-in fixture containing the rebated measures.
- 2) **Adjust and test the sensitivity.** Turn the CT logger sensitivity switch all the way clockwise so it is at its highest level of sensitivity. This will ensure that the logger can detect low watt CFLs. For fixtures that have only one low-watt CFL bulb, wrap the wire around the CT clamp at least three times (as shown in Figure 7) to get the logger to register⁴. *Turn the lamp on and make sure the indicator icon is shown on the panel.* If it is not, keep wrapping until it registers as on. Also, if there are multiple lamps in the fixture that can be operated independently, *test the logger* to make sure that it registers with only one lamp on.
- 3) **Tie-wrap the CT jaws closed.** Once the logger is registering correctly, zip tie the CT closed as shown Figure B-7, make the assembly as unobtrusive as possible, and anchor the whole assembly as previously described, to avoid theft or accidental removal.
- 4) **Wrap in flexible discharge hose.** The CT logger, split-extension cord, and lighting fixture cord should be enclosed in a sleeve of flexible discharge hose. This will clean up the installation and make it less likely that the logger will be removed by cleaning staff. A photo of the completed product is shown in Figure B-9.

⁴ Minimum sensitivity is 0.25 amps, which corresponds to about 27W @ 110V.

Figure B-7: CT Logger and Split-Wire Extension Cord

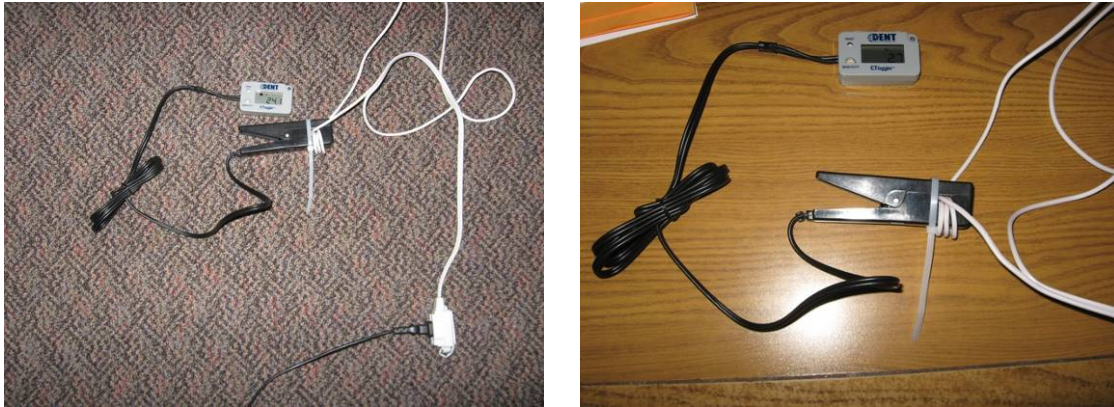
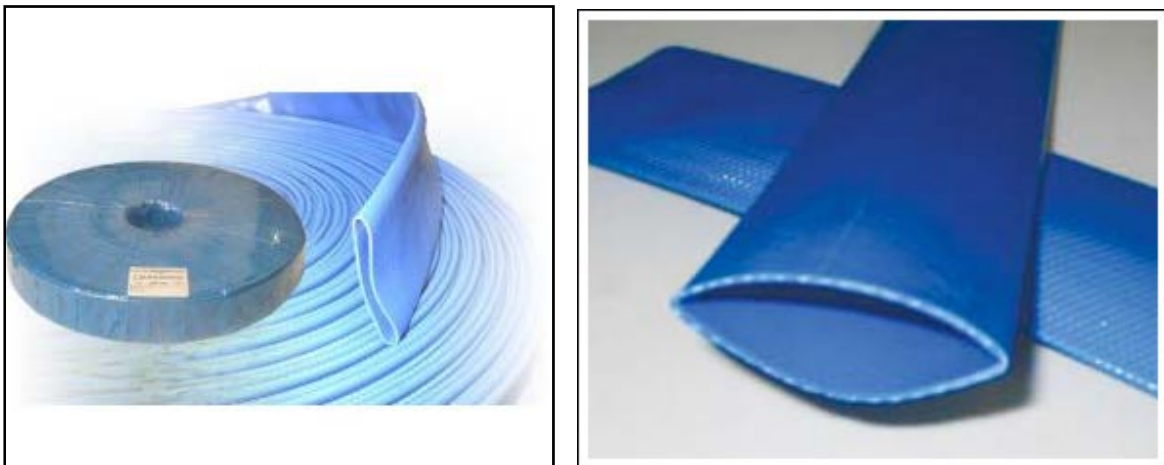


Figure B-8 : Flat Water Discharge Hose



B.5.3 Inaccessible High-Ceiling and High Bay T5/T8 Lighting

The DENT LL loggers should always be used to log these fixtures whenever possible, by using whatever local equipment is made available to the surveyor (i.e., ladders or lifts) to reach the fixtures. However, in some cases, high-ceiling and high bay fixtures will be inaccessible. If a good proxy for the inaccessible fixtures is available (i.e., a system that operates the same as the high bay system), then that approach can be used as long as it is noted as a proxy in comments. You should always ask if a lift or other method is available for accessing the fixtures. However, as always, consider your safety; do not do anything that you feel is unsafe, such as standing on a pallet lifted by a forklift, or carrying a 30 ft. ladder through an active production line.

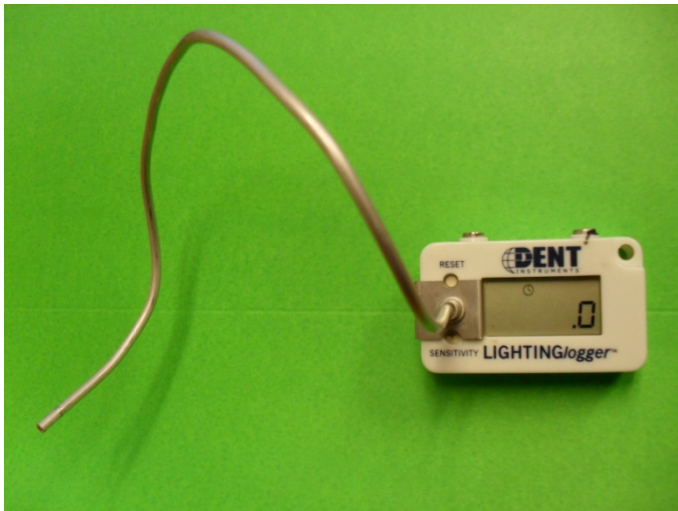
B.5.4 DENT Fiber Optic Attachment For Recessed Cans

A fiber optic attachment, shown in Figure B-9, is available for use with the DENT LL loggers. Minimum length is 1 foot, and longer lengths are available. The fiber optic

attachment can be used for situations where the lighting loggers cannot be placed inside of the lighting fixture for physical reasons, or because the logger could overheat (for instance inside an incandescent downlight). For example, for a site with recessed cans and a suspended ceiling, the logger can be placed behind one of the ceiling panels and the fiber optic attachment snaked through an opening in the can or the panel. Another use for the fiber optic attachment would be to “aim” the photocell at a high bay fixture and screen out ambient light.

One note of caution: The fiber optic attachment should not be bent at right angles to avoid cracking the housing! Bends should be gradual and curving, as shown in the figure.

Figure B-9: DENT LL Logger with Fiber Optic Attachment



B.6 Logger Extraction Procedures

Loggers are scheduled to remain in the field for 2 to 3 months. However, for the pilot study, some sites for each surveyor will be revisited within two weeks of the original logger placement for a quick download and spot-check of the logger data. Loggers will be replaced in the exact same location.

B.6.1 Pilot Study Interim Logger Data Extraction and Data Review

For the first three to five sites installed by a specific surveyor, a “pilot study” will be done to ensure that the correct logger installation method is being used. For this pilot study, a site will be revisited at least nine (9) calendar days after installation, the logger data will be downloaded, and the loggers replaced in exact locations, then the data will be reviewed and evaluated in the office. Performance of the loggers, as well as the surveyor’s approach, will be evaluated and any issues addressed and corrected before the surveyor can do any more installations.

For this task, the logger data will be downloaded while in the field so a laptop with the DENT SMARTware software will be needed. Ideally the surveyor who did the original installation will also do the extraction. The process should be as follows:

1. Prior to the site visit, obtain a copy of the completed Lighting Logger Installation form (from surveyor’s original hardcopy or the scanned copy on the network drive).
2. Record the date of the site visit in the “**Pilot Test Extraction Date**” field. As the logger will not be reset after the data extraction, this will allow the analysts to deal with the interruption of data that will occur during extraction.⁵
3. Remove each logger, download the data, and then reinstall the logger in the same location. Do NOT hit the reset button. Re-check the logger operation (switch lights on/off if possible) to ensure the logger is still working correctly.
4. If loggers have been moved, fallen, or obviously been tampered with, note this in the “**Extraction Comments**” block of the survey form and date the record (to distinguish from final extraction issues), and reinstall the logger per the installation procedure.
5. Scan the completed Lighting Logger Installation form and save on the network drive and place hardcopy place in the file folder.
6. Download, process, review, and store logger data (*.log and *.csv) on the network per logger data review process

⁵ The data for this date/period will either be left as-is, cleaned up or the entire day deleted.


B.6.2 Final Logger Extraction Procedure

Ideally the surveyor who did the original installation will also do the extraction. The type of lighting systems and loggers installed must be reviewed before visiting the site. Take a camera along to photograph problems found when the loggers are extracted or photos missed upon installation. Use a **colored pen (blue or red)** to record any extraction notes and comments so that they stand out from the text on the copied survey forms that are used for extraction and do not use a pencil! Wire cutters will be needed in loggers are installed with plastic zip ties. For magnets that separate from the loggers, a pair of pliers may be needed to remove magnets from the lighting fixtures.

The process should be as follows:

1. **Obtain a copy of the survey form.** *Prior to the site visit*, obtain a copy of the complete survey form and write “*Extraction*” across the top of the form. The copy can be made from the surveyor’s original hardcopy or the scanned copy of the survey form that is saved on the network drive. It’s typically easiest to print out the entire form. Do not use the original survey form for the extraction work! Additional instructions are:
 - On the cover sheet: Check the installation date and make sure the loggers have been in at least 2 months. Also note the surveyor’s initials and have their cell phone number handy in case you need to call them while on site.
 - Review the cover sheet, comments, logger installation sheet, and site tracking spreadsheet for notes regarding extraction (logger #'s that were missed, ballast numbers missed, retention marking needed, etc.) and especially note any additional information that needs to be obtained when re-visited.
 - Make sure the Lighting Logger Installation form is present and filled out. Note the quantity and of each type of logger installed and use this as a check when you leave the site. For some site, this page may also contain notes on actions that need to be taken when the loggers are extracted. For example, sometimes the logger numbers were not recorded correctly.
 - Review the lighting measure sheets for the type of fixtures the loggers were installed on. Review the sketch to see where the loggers were placed. Check the ceiling height recorded on the lighting measure sheets to determine if a lift or high ladder
2. **Identify the site as a “spot watt” or just a removal site.** Sites will be identified on the GPS mapping file and on the site tracking sheet as either “Ready for Removal” or “SpotWatt”. “SpotWatt” sites are those having rebated linear fluorescent lighting measures where the ballast make/model information could not be obtained. For these sites, a multimeter and CT clamp-on device will likely need to be used to measure

fixture wattage at a wall switch. The “Ready for Removal” sites do not require a spot watt measurement. SpotWatt Exception: When loggers are needed to keep the installation effort rolling or when the final extraction sweep is begun, only those teams that are equipped with spot watt equipment will need to do the spot watt measurements.

- **Double-check the linear fluorescent measure forms.** For all measures (except delamping measures) that are listed on the LINFLUOR form in the survey packet, under the “*Physical Inspection Data*” section of the form, at least one ballast make/model entry should be shown. If the ballast information fields are blank for any of the linear fluorescent measures, then the site will be tagged as needing a spot watt measurement, and, most importantly, it is only those fixtures that require a spot watt measurement to be performed.
 - **Obtain blank Spot Fixture Watt Measurement forms.** A spot watt measurement form must be used to record the spot watt measurements (volts, amps, power factor, watts) and other contextual information for the spot watt sites. A copy of the spot watt procedure should also be printed out and taken on site for reference.
3. **Prep a logger storage bag.** Prepare a zip-lock or paper bag for storage of the loggers after retrieval. Write the SiteID, date, and surveyor’s initials on both sides of a card or piece of paper and place in the bag (paper bag can also write on the outside of the bag). Please use the full SiteID, that is, use PGE_663621371 not just 663621371.
 4. **Site visit: Record extraction date and initials.** Record the date of the site visit and surveyor’s initials in the “**Extraction Date**” and “**Extraction Initials**” field. Hard scheduling the logger pick-up for a specific day is highly recommended.
 - **Multiple Extractions/Alternate Extraction Dates.** Multiple extractions are often required *for lodging sites when some guest rooms cannot be accessed*. In these situations, the “alternate extraction date” for these loggers should be recorded at the bottom of the column for that logger (see revised/latest logger installation form).
 5. **Observe the logger before removing it; Is it still in position and functional?** Observe the logger and make sure it is still *functioning correctly*. If the lights are off, turn them on briefly to see if the “lights on” indicator responds (sun symbol ). If the lights are on when you arrive, make sure the appropriate indicator is shown, then turn the lights off to make sure the off indicator responds accordingly.
 - **Low-Use Test for loggers where lights are off and show $\leq 5\%$ On time.** If the lights in a logged fixture are off when you arrive and the LED display indicates a percent on time of 5% or less, then a test is needed to show that the logger is working and was adjusted correctly. Before removing these loggers from the fixture, turn the lights on and leave them on for at least a minute, or if possible,

turn on the lights and leave them on, and extract these loggers last. This will provide a small test period that can be reviewed during the logger QC process. Extraction comment for the test should be something like “Light off, test done, logger OK” or “light on, logger OK, no test needed”.

- **Photograph any unique situations.** If the loggers are damaged or found in a unique condition that should be avoided in future installations, take a photo so that it can be shared with other field staff and/or included in the field procedures. Examples could include a logger installed in a closed fixture and overheated or melted, or hanging by a single magnet, or fallen down within a closed fixture. Turn in those photos with the loggers.

Figure B-10: Melted Lighting Logger



6. **“Logger intact?” and “Extraction Comments”.** If loggers have been moved or fallen or have obviously been tampered with, then circle “N” in the **“Logger Intact?”** field of the survey form, and describe the situation in the **“Extraction Comments”** block. If the logger appears to be functioning correctly and is as originally placed, then circle “Y” for **“Logger Intact”**. Loggers that cannot be found are recorded as “L” for Lost.

Example extraction comment for an intact, low % on-time logger: Could be something like *“4.5% On Lights Off, Test Done, Logger OK”* which translates to the lights were off when the space was entered, the lights were flipped on and left on to perform the low-use test, and the logger sensitivity was checked to make sure that the sun symbol showed when the light was turned on and disappeared when the light was turned off (or the sensor was covered by your finger).

Other instructions and issues for this section of the survey form include:

- ***Light is Off.*** If the light is off when you enter the space where the logger is installed, then you should note that in the extraction comments (or in general comments and reference the logger ID).
- ***Logger Sensitivity Check.*** Again, this should be done before you remove the logger from the fixture, and it is especially important for loggers with low % on-times, and this applies for both LL and CT loggers. If the lights are on, then the sun symbol should be displayed and it should disappear when the lights are turned off or the sensor is covered. This would get a “logger OK” comment in the extraction comments field. If the lights are off, then turn the lights on and see if the sun symbol is displayed. If the sun symbol is not displayed, then either the logger sensitivity was not set correctly, or there is some other issue with the logger. Check the current sensitivity adjustment (and the logger can probably be removed from the lighting fixture for this test. Is it turned all the way to the minimum setting or is the sensitivity adjustment stripped out (turns and doesn’t hit a stop)? If the logger is turned to the minimum setting, note this in the extraction comments because the data cannot be used (there will probably not be any data to use). If the logger was instead turned up to maximum sensitivity and pointed to a light source and still not registering, then it should be noted as a “BAD logger/insensitive” in extractions comments, and explained in general comments as well.
- ***Record the % On Time on the display.*** In the extraction comments block, record the percent on time displayed on the logger. If 0 % on time is displayed, perform the test described previously for lights that are off. If 0% is displayed and the lights are on, note this discrepancy in the extraction comments as well (the logger sensitivity was probably not correctly set).
- ***Screw-in CFLs, retention marked lamp replaced or CFL replaced by incandescent?*** For upstream and downstream screw-in CFL sites where the CFLs were marked for retention (as indicated on the Logger Installation form), as loggers are removed note in comments any marked CFLs that have been removed and what they were replaced with (incandescent or new CFLs which will be unmarked). Also note the new CFL lamp make/model and wattage (use General Comments if not enough room in the extraction comments).
- ***Lost/Missing and Pending loggers need an explanation!*** In some cases it may not be possible to locate all of the loggers, especially in lodging guest rooms where they can easily be removed by hotel guests or cleaning staff. Sometimes loggers can fall out of open fixtures where they are picked up by staff. In any case, you should ask the site contact about any loggers that appear to be missing before recording them as lost. If the problem is that they cannot be located then

call the field surveyor who did the installation to see if he can provide additional information. If they can not be located, then *please record a note in the General Comments form to explain what you did to try to locate the lost loggers.*

- ***Flickering or burnt-out lamps.*** If the linear fluorescent lamp being monitored by the logger is flickering or burnt-out, then that should be noted in the extraction comments.
7. **Remove loggers.** Remove each logger and adjust the sensitivity to its least sensitive setting (all the way to the “-“ sign), as confirmed by the sun indicator. Place in the marked zip-lock bag so that loggers don’t get separated. *This is especially important if you are picking up loggers from multiple sites in a single day.* The loggers should always be bagged and not just left loose. **Do NOT push the reset button!** This will erase all of the recorded data. Use pliers to remove any magnets that separate from the logger and remain attached to the lighting fixture.
 8. **Do spot-watt measurements if needed.** For those sites that need spot watt measurements, locate wall switches where the checks can be done, do the checks, and fill out the spot fixture watt measurement form. See the Fixture Measurement procedure document and SCCG handbook.
 9. **Before leaving the site, check quantities** (=“No loggers left behind”). Do a quick quantity by type count and make sure that you have all of the loggers that were installed. These totals by logger type will be needed for the daily site status report that is emailed to Itron. Lost loggers should also be noted in the daily status report.
 10. **Tag updated sections of the survey form.** Use post-its and highlighters to indicate the portions of the survey form that have been updated. Updates will typically be limited to the logger installation form, the general comments page, the spot watt measurement form, and possibly the photo page, but may affect other pages as well.
 11. **Return loggers and survey forms to Itron.** Extracted loggers and updated survey forms will be returned to Itron for downloading.
 12. **Download the logger data.** Download and briefly review the .log and .csv files and save in the site’s subdirectory on the network using the correct file naming convention (see section B.6.3). Record the “logger time” and “computer time” in the logger extraction comment block or in the respective data fields (two versions of the form). Review the other comments written in the extraction notes that might explain issues observed with the logger data. Update the tracking sheet (or send a status report) to show that the loggers were extracted and how many were extracted.
 - ***Check Extraction Date.*** An extraction date is critical! If the extraction date is blank then follow up with the field person who removed the loggers immediately to obtain a date.

- **Extraction on multiple dates.** If for any reason the loggers at a site are extracted on different dates, then the earliest date should be recorded on the logger installation form as the extraction date, and the later extraction date should be recorded in the Alternate Extraction Date under that logger, as well as noting in General Comments why multiple extractions were required.
- **Record Logger vs. Clock time and note differences.** If the logger time and clock time are more than 15 minutes different, the logger should be tagged as “BAD”. To check the logger time follow the following steps:
 - Open SMARTware 2008 and plug logger into computer
 - Choose Logger > Display Logger Status

This will open up a dialog box showing the current time of the logger.

 - **Daylight Savings Time (DST).** DST will be very evident; there will be a roughly 1 hour difference (maybe a few minutes off) between the logger time and computer time, and the installation/extraction period will span a DST event. For 2009, DST began March 8 and ended on November 1.
 - **False DST.** This situation occurs when the surveyor installed loggers after the March DST event that were not resynchronized after DST. When this happened, it was usually only one or two loggers at a site, so it is very easy to detect in that the majority of the other loggers are OK (logger time = computer time) and the installation date is after - and typically close to - March 8.
 - **Time-Drift Issue.** Some of these loggers will be very noticeably shifted, and not by an hour. This problem is illustrated in the SMARTware graph below.

Figure B-11: Illustration of Logger Time-Drift Issue

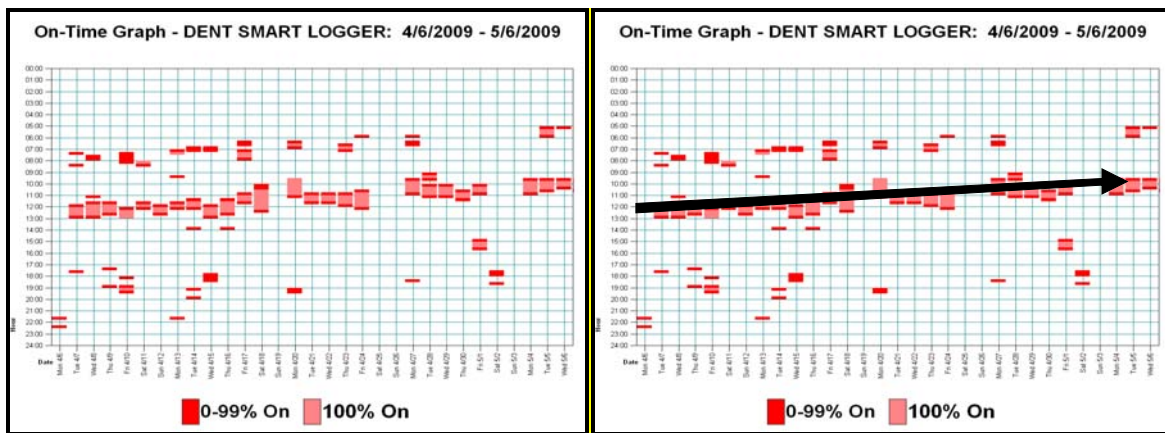
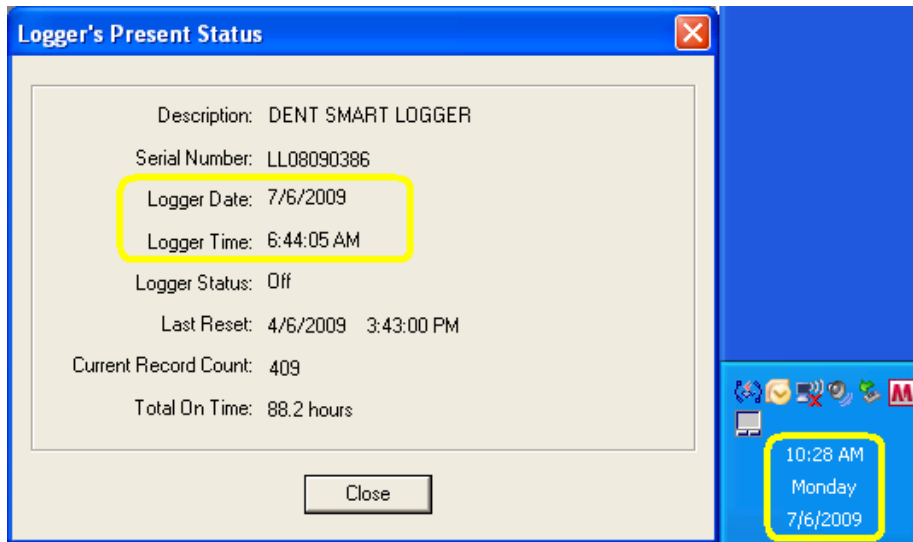


Figure B-12: Logger Time vs. Computer Time



- **Year Set to 2001.** The date should also be checked. If the Logger Date year is 2001 then write “2001” in the Extraction Comments block. The logger is likely OK, but was not either not synchronized before installation ((Last Reset year is 2001 but month/date other than 1/1) or was cleared at installation (Last Reset = 1/1/2001).
 - **Logger was “Clear”ed instead of reset on site.** The “Logger Reset” date will be 1/1/2001 and the “Data Ends” date will also be 2001. To be used for the analysis, this data will have to be re-sequenced/time-corrected.
 - **Logger was synchronized but not reset upon installation.** The “Logger Reset” date will be different than the installation date (typically will be 1/1/2001 or another 2001 date), but the “Data Ends” date/year will be consistent with the installation/extraction period (2008 or 2009).
- **Loggers with no data, 0%.** A logger that shows 0% run-time is not necessarily a BAD logger, since there are many sites where the lighting systems in some areas are not used. To test the logger, turn it all the way back to maximum sensitivity and hold it near a lighting fixture. If the indicator does not light within 2 to 3 feet of a lighting fixture, then it should be marked as BAD.
- **Loggers that lost their magnets and fell-off.** Re-attach and make sure both magnets are secure and check for other data anomalies. If it seems OK, then it can be returned to inventory.
- **Loggers exposed to too much heat.** Loggers that on extraction are found to have been overheated (melted or permanent black LED screen) or reset to 2001 should be marked as BAD and placed in the BAD LOGGERS box. If the LED screen is

black but slowly returns to normal (in a couple of hours) the logger is still good and reusable.

13. **Scan the survey form.** Scan the completed Lighting Logger Installation form and save the PDF on the network drive and place the hardcopy in the file folder. For Pilot Study sites: Move lighting logger data into an “Archive” subdirectory and rename the file extension to *.csv_Pilot.
14. **Logger Check-In (return to inventory for re-use or BAD).** Once the data has been successfully downloaded and QCed, the loggers can be checked in and returned to inventory or reset and readied for installation at another site.
 - **Good Loggers.** These should be returned to inventory and checked into the tracking spreadsheet. In the tracking spreadsheet, record the date that the logger is checked back in and under the “Person Assigned” column change from surveyors initials to “OFFICE”.
 - **BAD Loggers.** A logger will be labeled “Bad” for several reasons. It may have a time-drift issue, may have crushed/melted, or had battery failure. These are also checked into the spreadsheet, but labeled “BAD” with a description of why. The loggers that have a time-drift issue will be returned to DENT. The battery failures will be set aside to have the battery replaced, and the rest will be placed in the “bad logger” box.

B.6.3 Logger Data File Naming Conventions

The Itron viewLoggers tool will be used to review and disposition all logger data. This tool reads the logger data from the *.csv files, so the naming and format must be consistent. Naming conventions for the logger data files are as follows:

- Files must be saved in a subdirectory named for the SiteID.
- Save both the proprietary raw logger data file (*.log.), and the processed transition data file as a *.csv file.
- Both the proprietary and the processed transition data files should have the LoggerID - logger type (LL, LC, or CT) and the serial # - encoded into file name at the beginning of the file⁶. The format must be: <Serial Number>_<SiteID>.log <Serial Number>_<SiteID>.csv. An example is given below:
 - SiteID: PGE_2584148005
 - LoggerID/Serial Number: LL0807007901

⁶ Additional characters may be added to the file name if needed by the surveyor, but the LoggerID must always appear first in the file name.

- Final raw data file name => LL0807007901_PGE_2584148005.log
- Final transition data file name => LL0807007901_PGE_2584148005.csv

In creating the name, field staff should assure the following rules:

- LL, CT, and LC are capital letters
- There are no spaces in the file name
- There are no extraneous suffixes (e.g., _1, _2, ...)
- In addition, the LoggerID number must be present in the *first line* of the *.csv file itself, as shown in the examples below.

Figure B-13: DENT LL logger⁷ => LL0805097701_PGE2584148005.csv

```
Serial Number: LL08050977,,,
Description: DENT SMART LOGGER,,,
Connected Load: -1.00 KW,,,
Logger Reset: 08/26/08 12:02:02,,,
On-Time Since Reset: 145.6 hrs,,,
8/26/2008,12:02:02 PM,was ON,1
8/26/2008,12:02:03 PM,Turned OFF,0
8/26/2008,12:02:05 PM,Turned ON,1
8/26/2008,12:05:42 PM,Turned OFF,0
8/27/2008,6:25:41 AM,Turned ON,1
8/27/2008,8:27:44 AM,Turned OFF,0
```

Figure B-14: DENT CT logger⁷ => CT0708001401_PGE2584148005.csv

```
Serial Number: CT07080014,,,
Description: 659980_Unit5,,,
Connected Load: -1.00 KW,,,
Logger Reset: 09/09/08 14:14:01,,,
On-Time Since Reset: 378.0 hrs,,,
9/9/2008,2:14:01 PM,was ON,1
9/9/2008,2:15:16 PM,Turned OFF,0
9/12/2008,3:39:27 PM,Turned ON,1
9/13/2008,12:11:26 AM,Turned OFF,0
9/13/2008,6:03:11 PM,Turned ON,1
```

- NOTE: The viewLoggers tool does not use the file names, but instead relies on the text in the first line of the csv file to determine what type of logger it is, and then reads the LoggerID accordingly from the file. Examples:
 - For DENT LL and CT TOU Loggers: If first line starts with *Serial Number....* then it is a DENT LL or CT logger. The first two characters denote the logger type (LL or CT) and the next eight numbers are a unique number. This serial number is hard-wired into the logger, and the default *.log file saved by SmartWare is named as S/N01.log (as shown in the examples above).

⁷ The file name for DENT CT and LL loggers is actually the logger type (CT or LL), the serial number, and then an "01" is tacked on to the end when the data is downloaded from the SmartWare software.

B.7 Additional Non-Logger Study Tasks

This is an assortment of miscellaneous tasks that will be piggy-backed on to the lighting logger study, as described below.

B.7.1 Marking of Screw-In CFLs for Possible Retention Study

In anticipation of a future retention study being performed, all screw-in CFLs which are logged – both primary and back-up loggers - will be marked and locations noted. That is, *only the lamps or fixtures to which loggers are applied will be marked*; we will not be marking every single CFL onsite. The procedure is as follows:

- Switch the lights off (if possible) and unscrew the bulb from the fixture.
- As illustrated in Figure B-15, use a permanent ink, fine-point pen to put a 1/8 to 1/4 inch dot on the end of the bulb and write the date (MMDDYY = 11-12-08) on the base of the bulb, then screw it back in place. Make the date as unobtrusive as possible, for example, in a floor or table lamp where the ballast/base can be seen, put the date on the top edge of the base rather than on the side.
- Also write the date on a bright yellow Avery dot and place that on the ceiling (or other surface) to show which fixture has the marked bulbs. This also makes it easier to find the fixtures for the final logger extraction. Do not place the Avery dot on the lamp!
- Describe the location of the logger and marked lamp(s) on the lighting logger installation form. Remember that this description and the associated sketch will have to be detailed enough to allow someone who is unfamiliar with the site to locate the CFLs.

Over the relatively short time period being used for the study (compared to the life of the CFLs), failures and replacement should be minimal. However, when the loggers are extracted, if there are any marked lamps that have been replaced (the marked lamp is no longer present) this should be noted in comments on the on-site survey form.

Figure B-15: Retention Marking for Screw-Based CFLs



B.7.2 Ballast Make/Model for Linear Fluorescent Fixtures

Ballast manufacturer and model information will be collected for linear fluorescent fixtures at all sites that are being monitored, whenever the surveyor can safely gather that information. For pre-post sites, make and model will be collected on both the pre-existing fixtures as well as the rebated fixtures. This information will be used for verification and evaluation of these measures. Ballast make and model numbers will be used to lookup ballast factors and confirm that the installed measures meet ballast and fixture wattage eligibility requirements.

For recessed fixtures, ballasts are typically hidden beneath a cover of sheet metal in the middle of the fixture, as shown in Figure B-16. The ballast cover can usually be easily removed by squeezing the sheet metal cover to snap it out of the metal clips cut into the reflector, as shown in Figure B-17. For some fixtures, the lamps will need to be removed before the ballast cover can be removed. For other fixtures, the ballasts may be located on top of the fixture. An example of ballast labels showing make and model numbers is presented in Figure B-18.

Figure B-16: Ballast Cover in Place and Unlatched/Revealed



Figure B-17: Ballast Cover Clips



Figure B-18 Ballast Label Photos Showing Make and Model Numbers



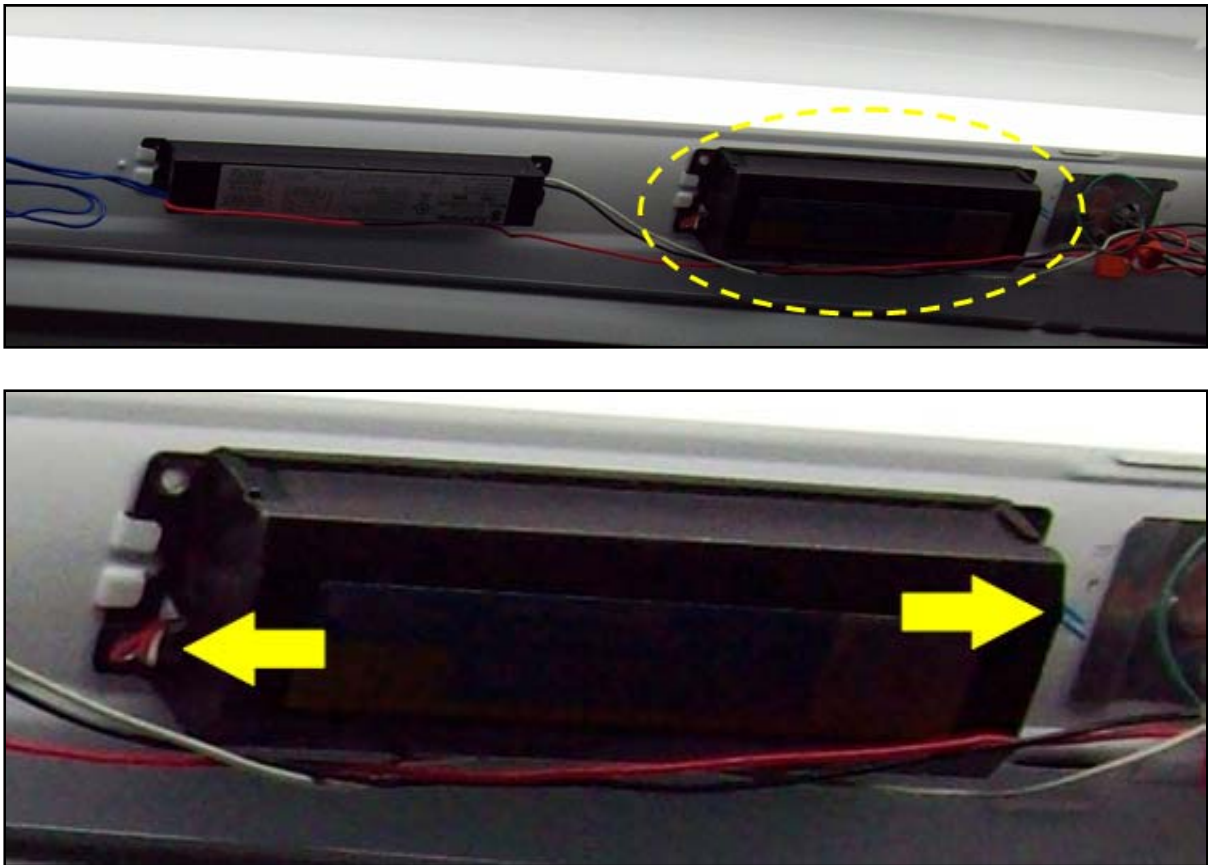
Guidelines for checking ballasts include:

- **Safety and Fixture Selection.** Ballasts should only be checked when it can be done safely (safe for surveyor and safe for business occupants) and with the customer's permission (some customers may not want their lights disassembled). Select fixtures that are as out of the way as possible to minimize disturbing the business occupants. If possible, turn off the light fixture before inspecting. Do not attempt to inspect fixtures if exposed wires are evident, or if fixtures are sealed shut by paint, wallpaper, etc. Fully describe these situations in one of the survey form comment blocks. Comments are required if the ballasts can not be inspected.
- **Check for Spare Ballasts.** Surveyors should first ask the site contact if spare ballasts are available. If they are available, ask which ballasts go with which fixtures, and focus on the rebated fixtures.
- **How Many Ballasts to Check.** Check one ballast for every rebated lighting fixture configuration (2-lamp/fixture, 4-lamp fixture, tandem-wired fixtures, etc.). If you are unsure of how to access the ballasts, ask the site contact for assistance.
- **High-Ceiling or High Bay Situations.** Only check fixtures that can be easily reached with a 4-ft. ladder (the standard size carried by the surveyors because it fits in a car trunk) or an onsite ladder or lift if made available to the surveyor (ask the site contact).
- **Removing Lamps to Access Ballasts.** For some fixtures, the lamps will need to be removed in order to access the ballast. Lamps should only be removed if it is safe to do so and will not damage the fixture or surrounding area (example: recessed fixtures that are painted over). However, a pen-knife or razor blade can be used to slit painted-over fixtures if it is clearly evident how to do so. Most importantly, the removed lamps should be placed where they will not roll off and break or can be accidentally stepped on. If possible, turn off the light fixture before inspecting the ballast.
- **Ballast Inspection Data.** As shown on the linear fluorescent lighting survey form, record the # of ballasts per fixture, the manufacturer or brand, and the model number on the onsite verification survey form. The survey form has space for two ballast make/models: a predominant and a secondary. If there are more than two fixture configurations and/or ballast types used on site, those will have to be recorded in comments and the situation fully described.
 - **Photos.** If you can access the ballast, take two photos: one that shows the ballasts in place and a close-up of the ballast label make and model number.

- **Inaccessible Fixtures.** If the fixtures and ballasts are not accessible for whatever reason, the situation must be described in comments (e.g., fixtures inaccessible, too high, etc.). Double-check for spares.
- **Restoring the Fixture.** After inspecting the ballast, be sure to put all components (ballast cover, fixture cover, etc.) back the way you found them.
- **# of Ballasts per Fixture.** Most will have only one ballast per fixture, but some fixtures will have two ballasts, and sometimes two 2-lamp fixtures that are close together will share a ballast (record 0.5 for # of ballasts for this configuration).
- **Note any old ballasts left in place.** Many of the rebated fixtures are retrofit from T12s and sometimes the old ballast may be disabled and left in place, as shown in Figure B-19. The old ballast should be very evident from the clipped wires (as shown), and the label should indicate that it is for a T12 lamp. Ballast information for the old ballast (i.e., make/model) should be noted in comments and a photo taken of the label, if possible. Its presence can also be used to verify that T12-to-T8 conversion and/or delamping measures were implemented.

On a final note: If during the ballast inspection process, any component is broken (and cannot be replaced from spares on site) or electrical problems are experienced, you should never just walk away from the problem and hope it is not discovered. The first thing you should do is take a photo of the problem and then make the site contact aware of what happened and assure them that we will fix it. Then call an Itron field survey lead (Jerry Middleton primary, Bob Ramirez secondary) to discuss and send the photos along as well. Generally, if it is a minor issue and the site contact is okay with waiting for the repair, we will send an electrician from our team out when they are next in the area. If it needs immediate attention however, we will arrange to get someone out there as soon as possible.

Figure B-19 Pre-Retrofit Disabled T12 Ballast with Clipped Wires



B.7.3 Spot Fixture-Watt Measurement

For the post-only study, spot watt measurements were only done for those sites where the ballast model information could not be obtained, and if they could be done, they were only done at the wall switch. All spot watt measurements were done at logger extraction and followed the Summit Blue procedures for spot watt measurements, with the exception that the current amplifier (donuts) were never used.

B.7.4 Investigating the Use of Existing Incandescents for CFL Baseline

Pre-post operation studies are not being conducted for CFLs, only linear fluorescents. However, for the 2006-2008 energy efficiency programs, the bulk of the IOU CFL savings is associated with the upstream program, so pre-post data would be invaluable. One proposal for obtaining baseline operation that will be explored as part of the logger effort is to use incandescent lamps that were not retrofitted with CFLs as the control group. Although there are no current plans to monitor such incandescents in the first wave of monitoring, information will be gathered at the site to help determine if this could be done in future waves, and if the data would be available to correct for hypothesized potential bias (*e.g.*, high use applicable fixture/sockets are replaced with CFLs first so that the incandescents at that

site would be a biased baseline without adjustment for this behavioral parameter). These questions are a part of the onsite survey form, and will be asked for both downstream and upstream CFLs.

**CPUC 0608 Small Commercial Evaluation
On-Site Verification Survey Form (Rev: 3/3/2009)**

General Site Information (from phone survey & IOU tracking database)

Itron SiteID		EEGA Program #	
Sample Strata		Evaluation Phase	

Corporate (Multi-Site) Name			
Business Name (Tracking Data)			
Actual Business Name			
Service Address			
City		Zip Code	

CORRECTIONS TO SITE INFORMATION

Revised Corp. (Multi-Site) Name			
Revised Business Name			
Revised Service Address			
Revised City		Revised Zip	

Site Contact Information

Phone Survey (PS) Completion Date: _____ Phone Survey Respondent: _____

	Contact Name	Phone Number	Alternate Phone	Email Address	Contacted
OS Primary					<input type="checkbox"/>
OS Back-up					<input type="checkbox"/>
OS Other					<input type="checkbox"/>

Note: Use the "Contacted" check box to indicate the actual contact(s) for the site visit.

Scheduling Notes/Special Instructions for On-site Visit: _____

Survey Tracking Information

Survey Company (Itron, KEMA, RTB, SB):		Assigned Surveyor's Initials:	
Survey Duration (24 hr clock)	Start: _____	Survey Duration (24 hr clock)	End: _____
Survey Travel Mileage:	_____ miles	Total Time (Onsite+QC+Travel)	_____ hrs

	Date:	Initials
Field survey completed:	___ / ___ / ___	___
Survey received from surveyor:	___ / ___ / ___	___
Initial QC check completed:	___ / ___ / ___	___
Survey received at Itron:	___ / ___ / ___	___
Itron QC completed:	___ / ___ / ___	___
Returned to Survey Company:	___ / ___ / ___	___
Data entry completed:	___ / ___ / ___	___

Upstream Screw-In CFL Phone Survey Summary Sheet (6/15/09)

Primary Lighting Purchaser	
Secondary Lighting Purchaser	

Detailed Area Installation Summary

Location/Area Description	# of CFLs Installed	Location/Area Description	# of CFLs Installed
Windowed Offices		Patient/Exam Room	
Non Windowed Offices		Classroom	
Hallways		Lobby	
Storage Areas		Guestroom	
Kitchen		Restroom	
Dining Area			
Retail Space			
Warehouse			

Purchases, Installed Totals, and Pre-Retrofit Information

Store Name	# of Packages Purchased	# of Bulbs per Package	Rebate/Discount?

Total CFLs Installed throughout building	
Total CFLs Purchased since 2006 (this number may not match bulbs listed above) (A)	
-- Total CFLs Installed of those purchased since 2006	
-- Total CFLs in storage of those purchased since 2006	
Are there motion sensors (anywhere in the facility)?	
Type of lamp that CFLs replaced (pre-retrofit lamp type)	

On Site vs Phone Survey CFL Quantity Comparisons (to be completed after on site survey)

Total # of Installed & Spare CFLs found on site from Form UpCFL (B)		
Total CFLs found on site (B) versus Total CFLs purchased since 2006 (A) (B - A)		
% of Total CFLs purchased since 2006 that were found on site => $100 * (B - A) / A$		
On Site vs Phone Survey Disposition Code: N = 2006 CFL purchase info not available M = MORE CFLs found on site (> +20%) L = LESS CFLs found on site (< -20%) S = About the same (less than +/- 20% different)	N M L S	
If L or M, ask site contact about the Total CFLs Purchased since 2006 (A) and record their response:		
Reason for Discrepancy: Indicate which item the free response above is most similar to. 1 = Incorrect value, must have been a typo 2 = CFLs are located at another site 3 = Majority were purchased before 2006 4 = They burnt out very quickly, have used them all 5 = Didn't like them so removed 6 = Phone response was a wild guess 7 = Don't know 8 = Other/explain		_____

IOU Tracking Data Measure Summary Sheet (8/20/09)

This is a summary of all of the measures implemented at this site as extracted from the IOU tracking database. All of the measures listed here should also be found on the measure-level verification forms.

Measure Category	Engineering EstMethod	Measure Code	IOU MeasureName	Unit Basis	Rebated # of Units

Phone Survey Self-Reported Measure Counts

CATI Measure Category-RebatedUnits-UnitBasis	Self Report # of Units	Agree? (Y/N)	Reason for Difference

Phone Survey CFL-Specific Information

CATI Measure Category	Self Report % in Storage	% Installed outside this Facility

Phone Survey Miscellaneous Measure Information

Greenhouse Measures: Roof/Wall Mat'l Type		CFLs: Self-Report # of CFLs bought Outside Program	
Heating System Type		Strip Curtains: Hours/day that walk-in doors are left open	
HtCurtain System Config		Door Gaskets: % of Time door is open	
Indoor Setpoint Temp			
HtCurtain Control			

Phone Survey Steam Trap Information

What condition were your steam traps in at the time of their replacement?	
Were there other changes [in equipment, operation, or employees] at your site at the time or since the new steam traps were installed?	

Site & Business Characteristics

Fields in this table will be populated as much as possible with data from the phone survey. However, any fields that are blank should be completed during the on-site verification. Any fields that are incorrect should also be corrected.

Electric Utility	PGE SCE SDGE SMUD LADWP OT _____
Gas Utility	PGE SCG SDGE AllElec/None Propane LBG0 SWG OT _____
Phone Survey Building Type	
What <u>year</u> was this business established at this location?	
What <u>year</u> (or decade) was the majority of the facility built?	
Total Heated/Cooled Floor Area (or range)	
Total Site Floor Area, sq ft (on-site measurement/estimate)	
Cooling Type: 1=No A/C 2=Split-System 3=PkgRooftop 4=PTAC/PTHP 5=EvapCool 6=Chiller 7=IndivAC/HP 8=WLHP OT=Other	
Heating Fuel Type: 1=Electric 2=Gas 3=Both 4=Propane 5=None OT=Other	
Observed Business/Building Type Code (Use Business/Building Type Codes table below)	
What kind of site is this? P = Part of a bldg B = Single building SM = Small multi-building CM = Campus (multi-bldg, subsampled bldgs) OT = Other _____	
For single, stand-alone buildings or partial buildings: Number of stories/floors	

Primary Product/Service (do not leave blank): Give a brief description about the type of work and/or primary product or service. What is the primary activity(ies) that occur here and what makes this site unique from other businesses of this type?

Business Type	Code	Business Type	Code	Business Type	Code
Offices (Non-Medical):		Retail Store:		Lodging:	
Administration and management	011	Department / Variety Store	041	Hotel	081
Financial / Legal	012	Retail Warehouse/Clubs	042	Motel	082
Insurance/Real Estate	013	Shop in Enclosed Mall	043	Resort	083
Data Processing/Computer Center	014	Shop in Strip Mall	044	Other Lodging	084
Mixed-Use/Multi-tenant	015	Auto Sales	045	Public Assembly:	
Lab/R&D Facility	016	Other Retail Store	046	Religious Assembly (worship only)	091
Software Development	017	Warehouse:		Religious Assembly (mixed use)	092
Government Services	018	Refrigerated Warehouse	051	Health/Fitness Center	093
Other Office	019	Unconditioned Warehouse, High Bay	052	Movie Theaters	094
Restaurant/Food Service*:		Unconditioned Warehouse, Low Bay	053	Theater / Performing Arts	095
Fast Food or Self Service	021	Conditioned Warehouse, High Bay	054	Library / Museum	096
Specialty/Novelty Food Service	022	Conditioned Warehouse, Low Bay	055	Conference/Convention Center	097
Table Service	023	Health Care:		Community Center	098
Bar/Tavern/Nightclub/Other	024	Hospital	061	Other Recreational/Public Assembly	099
Other Food Service	025	Nursing Home	062	Services:	
Food Stores :		Medical/Dental Office	063	Gas Station / Auto Repair	101
Supermarkets	031	Clinic/Outpatient Care	064	Gas Station w/Convenience Store**	102
Small General Grocery	032	Medical/Dental Lab	065	Repair (Non-Auto)	103
Specialty/Ethnic Grocery	033	Education:		Other Service Shop	104
Convenience Store**	034	Daycare or Preschool	071	Miscellaneous:	
Liquor Store	035	Elementary School	072	Assembly / Light Mfg.	111
Other Food Store	036	Middle / Secondary School	073	Police / Fire Stations	112
Agricultural:		College or University	074	Post Office	113
Commercial Greenhouse	200	Vocational or Trade School	075	Other Comm. Describe above	130
Other Ag. Describe below	210			Industrial: Use SIC or NAICS code	

* For Restaurant/Food Service businesses, note in Primary Product/Service comment which meals are served (Breakfast/Lunch/Dinner).

** Convenience stores that do not sell gasoline should be coded as 034; convenience stores that do sell gasoline should be coded as 102.

Business Hours (Normal & Seasonal Operation)

Verify or specify Business Hours for both normal and seasonal operation. Seasonal operation is a significant change in normal business hours, such as the summer break period for schools that follow a traditional schedule.

Business Hours (from phone survey)

Day of the Week	Normal Hrs/Operation	Seasonal Hrs/Operation
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Are these Business Hours correct? Yes No (If No, provide revised hours on form below)

24/7 Sites Only: Number of work shifts per day _____

Corrected Normal Business Hours

Define typical operation for all Day Types listed below and specify hours in military time (8:30 am=0830, 6:30 pm=1830). For partial (i.e. not full) operation days, also indicate the approximate % of full operation as Partial Op %. For Lodging sites: Use the Seasonal Operation and PartialOp% to capture high and low season operation and occupancy rates.

Day Type	Business Hours (24 hr clock)	Closed All Day?	Open 24 hrs?	By Appt.	PartialOp%
Monday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tuesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wednesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Thursday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Friday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Saturday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sunday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

N/A Seasonal Business Hours

If the business hours vary significantly during the year for a significant period of time (months) indicate the alternate business hours below.

Day Type	Business Hours (24hr clock)	Closed All Day?	Open 24 hrs?	By Appt.	PartialOp%
Monday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tuesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wednesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Thursday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Friday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Saturday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sunday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Seasonal Operation Periods & Holidays

Seasonal Operation Periods

N/A

If Seasonal Business Hours are defined, then specify the monthly periods to which the seasonal schedule applies. Provide a brief description of the period (e.g. "spring break", "winter break", "summer break", "extended holiday hours"), and list the beginning/ending months (1-12) and approximate days for up to three time periods.

TIME PERIOD 1			TIME PERIOD 2			TIME PERIOD 3		
Description _____			Description _____			Description _____		
Begin Month/Day			Begin Month/Day			Begin Month/Day		
End Month/Day			End Month/Day			End Month/Day		

Closed Holidays: Check all that apply below or => N/A

Number of Closed Holidays per year	_____
------------------------------------	-------

Enter "0" above if they never close. Do not read through the list below, just check the holidays that the site contact mentions or ask a general question about which holidays are closed days, and check that the number above is consistent.

New Year's Eve	<input type="checkbox"/>	July 4th Celebrated	<input type="checkbox"/>
New Year's Day	<input type="checkbox"/>	Labor Day	<input type="checkbox"/>
New Year's Day Celebrated	<input type="checkbox"/>	Columbus Day	<input type="checkbox"/>
Martin Luther King Day	<input type="checkbox"/>	Veterans Day	<input type="checkbox"/>
Presidents Day	<input type="checkbox"/>	Thanksgiving	<input type="checkbox"/>
St. Patrick's Day	<input type="checkbox"/>	Thanksgiving Friday	<input type="checkbox"/>
Easter Sunday	<input type="checkbox"/>	Christmas Eve	<input type="checkbox"/>
Memorial Day	<input type="checkbox"/>	Christmas Day	<input type="checkbox"/>
Flag Day	<input type="checkbox"/>	Christmas Day Celebrated	<input type="checkbox"/>
July 4 th	<input type="checkbox"/>	Caesar Chavez Day	<input type="checkbox"/>

Comments:

Activity Area Definitions

Activity Area ID# Assignments Identify an Area ID# for each distinct Activity Area type within the surveyed area. A maximum of eight Activity Area types can be specified. Use the codes on Form ACTAREA, and indicate each area on the Site Plan sketch. Also consider lighting system controls and operation when defining these areas.

Area ID#	Surveyor's Description of Area (include floor and Bldg identifiers if needed)	Activity Area Type Code (AA Code)	Area has Windows	Area has Skylights	Conditioned Space Type Code	Total Qty of this Area Type On-site (Ref. Only)
1			<input type="checkbox"/>	<input type="checkbox"/>		
2			<input type="checkbox"/>	<input type="checkbox"/>		
3			<input type="checkbox"/>	<input type="checkbox"/>		
4			<input type="checkbox"/>	<input type="checkbox"/>		
5			<input type="checkbox"/>	<input type="checkbox"/>		
6			<input type="checkbox"/>	<input type="checkbox"/>		
7			<input type="checkbox"/>	<input type="checkbox"/>		
8			<input type="checkbox"/>	<input type="checkbox"/>		

Conditioned Space Type Codes	
CH = Cooled & Heated	CL = Only Cooled
HT = Only Heated	ECH = EvapCooled & Heated
ECL = Only EvapCool	NU = HVAC present but not used
RF = Refrigerated	UN = Unconditioned
OU = Outside	OT = Other (describe in comments)

AA Code	Activity Area Type Description	AA Code	Activity Area Type Description	AA Code	Activity Area Type Description
1	Auditorium/Gym	22	Guest Rooms (Hotel/Motel)	42	Religious Worship
2	Auto Repair Workshop	23	Kitchen/Break room & Food Prep.	43	Residential
3	Bank/Financial	24	Laboratory	44	Restrooms
4	Bar Cocktail Lounge	25	Laundry	45	Retail Sales/Showroom
5	Barber/Beauty Shop	26	Library	46	Smoking Lounge
6	Casino/Gaming	27	Loading Dock	47	Storage (Conditioned)
7	Classroom/Lecture	28	Lobby (Hotel)	48	Storage (Unconditioned)
8	Clean Room	29	Lobby (Main Entry and Assembly)	49	Storage (Refrigerated/Freezer), Walk-in
9	Computer Room/Data Processing	30	Lobby (Office Reception/Waiting)	50	Storage (Refrigerated/Freezer), Building
10	Comm/Ind Work (General High Bay)	31	Locker and Dressing Room	51	Surgery Rooms
11	Comm/Ind Work (General Low Bay)	32	Mall Arcade and Atrium	52	Theater (Motion Picture)
12	Comm/Ind Work (Precision)	33	Mechanical/Electrical Room	53	Theater (Performance)
13	Conference Room	34	Medical Offices and Exam Rooms	54	Unknown
14	Convention and Meeting Center	35	Office (Executive/Private)	55	Vacant (Conditioned)
15	Copy Room	36	Office (General)	56	Vacant (Unconditioned)
16	Corridor / Hallways	37	Office (Open Plan)	57	Vocational Areas
17	Courtrooms	38	Patient Rooms	98	Non Rebated Area
18	Dining Area	39	Patio Area	99	Other Unlisted Activity Types
19	Dry Cleaning	40	Pool/Spa Area	0	Outside/Outdoor Area
20	Exercise Centers/Gymnasium	41	Police/Fire Station		
21	Exhibit Display Area / Museum				

COMMENTS:

Site-Plan Sketch

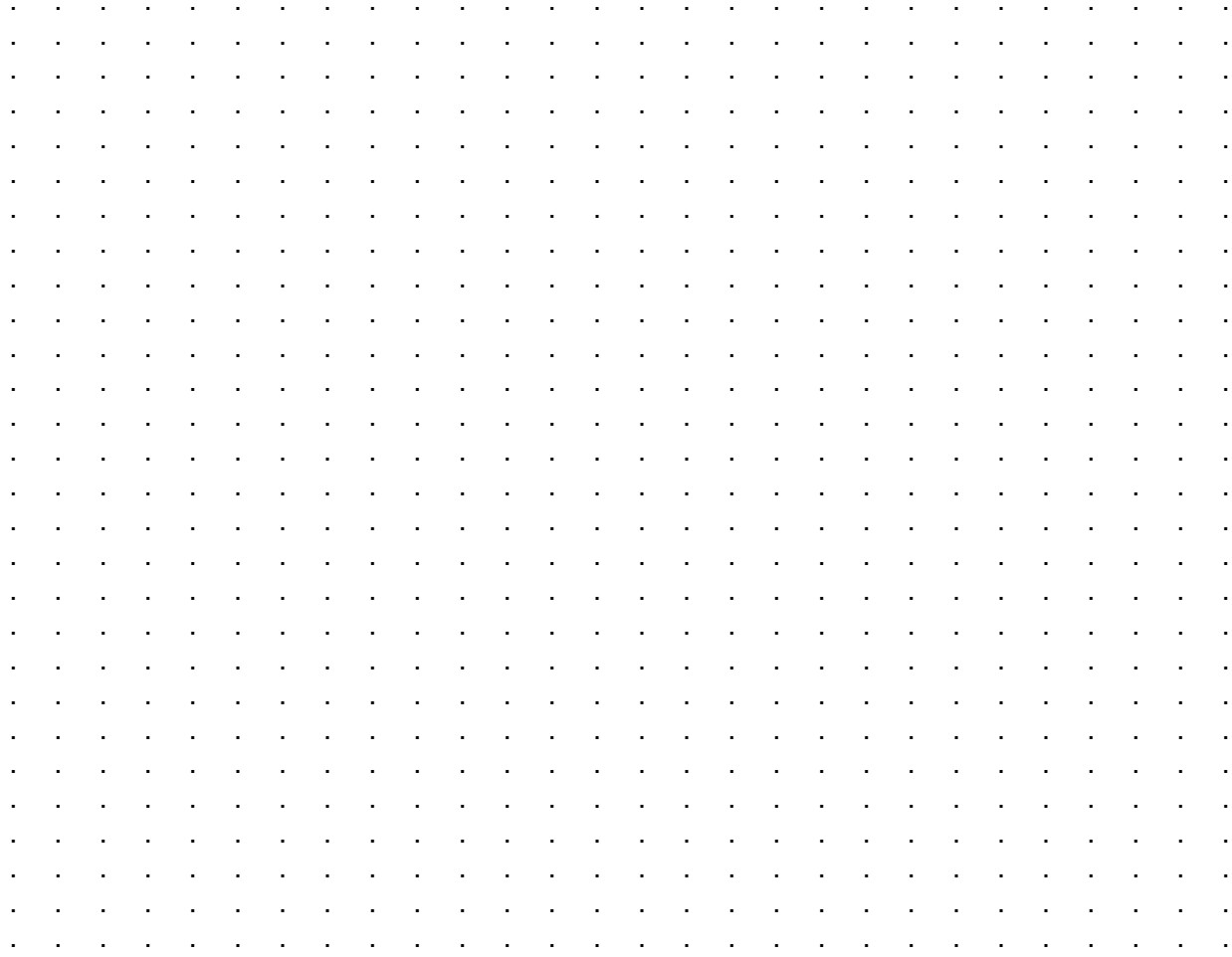
This sketch sheet must be used for the lighting logger installation plan and can also be used to indicate where the rebated measures are located. Activity Areas used for subsampling and counting should also be noted on this sketch, using the appropriate Activity Area code from Form ACTAREAS. Also indicate the orientation of the building and the primary entry/exit.

A large grid of dots for sketching a site plan. The grid consists of 20 columns and 20 rows of small, evenly spaced dots, providing a guide for drawing a site plan.

Site-Plan sketch comments (no data entry):

Site-Plan Sketch (additional)

Use this sheet if an additional sketch is required.

A large grid of dots for sketching a site plan. The grid consists of 20 columns and 20 rows of small, evenly spaced dots, providing a guide for drawing a site plan.

Site-Plan sketch comments (no data entry):

Hourly Equipment Operation Schedules

Use this form to indicate equipment operation. Circle the applicable days and define a complete week. Specify the % of equipment on or temperature in °F for all hours, and capture transition periods if known. Specify as many schedules as needed to capture equipment operation. Preface each Sched# with a letter to identify the end use (L=Lighting, M=Motors, F=Food Service, C=Cooling, H=Heating, P=Process, B=Boilers, etc.). LtgCtrlType is only required for lighting schedule and are presented in the table below.

Lighting Control Type Codes: C=Continuous/24 hour B=Bi-level Switch S=Manual on/off-switch TC=Timeclock E=EMS PC=Photocell
 PT=Photocell/Timeclock DM=Dimmer MS=Motion Sensor TW=Twist-timer DL=Daylighting controls OT=Other (describe in comments)

Hour	0-12	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
Hour	12-24	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24

Sched#: ____ SchdType (circle one): PctOn °F LtgCtrlType: ____ Description: _____

Applicable DayTypes	Percent (%) of Equipment On / Temperature °F												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												

Sched#: ____ SchdType (circle one): PctOn °F LtgCtrlType: ____ Description: _____

Applicable DayTypes	Percent (%) of Equipment On / Temperature °F												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												

Comments:

Hourly Equipment Operation Schedules (cont.)

Hour	0-12	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
Hour	12-24	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24

Sched#: ____ SchdType (circle one): PctOn °F LtgCtrlType: ____ Description: _____

Applicable DayTypes		Percent (%) of Equipment On / Temperature °F											
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												

Sched#: ____ SchdType (circle one): PctOn °F LtgCtrlType: ____ Description: _____

Applicable DayTypes		Percent (%) of Equipment On / Temperature °F											
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												

Sched#: ____ SchdType (circle one): PctOn °F LtgCtrlType: ____ Description: _____

Applicable DayTypes		Percent (%) of Equipment On / Temperature °F											
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												

For CFL Logger Sites ONLY

Use of Existing Incandescents for Baseline

This information will be used to answer the question: If there are incandescent bulbs onsite, could they be logged and the data used to estimate CFL baseline operation? The questions should be asked after the site walk through and after installing the lighting loggers.

1) Are there <u>any</u> installed incandescent lamps present onsite?	Y N
1a) If Yes to 1), how many are there (if estimated, indicate in comments)?	_____
1b) If Yes to 1), what are the incandescent lamp wattages? Spot check a few and separate different wattages by dashes, for example 75-65-60.	
2) If Yes to 1) are the incandescents installed in similar areas/fixtures/etc. as the <u>rebated</u> CFLs? (if No, then logging incandescents for baseline is not plausible and STOP)	Y N
2a) Ask the Site Contact: Did you use the incandescents that were replaced by the CFLs <u>more</u> than the incandescents that have not been replaced? For example, were high use incandescents replaced but low use incandescents like those in closets left in place?	Y N
2b) Ask the Site Contact: Why haven't you replaced the remaining incandescents?	
2c) Surveyor Assessment: Could the incandescent lamps be logged (can a logger be physically installed)?	Y N

Additional Comments:

Lighting Logger Installation Form (9/10/09)

Use this table to record information for installed measurement devices such as lighting loggers.

Installation Date		Extraction Date	
Installer's Initials		Extraction Initials	
Scheduled Extraction Date		Pilot Test Extraction Date	

Installation

Logger Serial Number					
Check if logger has a back-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Placement Area ID# (ref only)					
Lighting Tech Type (HIM)	CF LF HB	CF LF HB	CF LF HB	CF LF HB	CF LF HB
Logger Placement on Fixture	I(nt) E(xt) O(ther)	I E O	I E O	I E O	I E O
CFL: Marked for retention?	Y N	Y N	Y N	Y N	Y N
Placement Description Include building, floor, room #, etc. and be descriptive enough that it can be located for extraction. Also include schedule number (L1, L2...)					

Extraction

Logger Intact? (L=Lost/missing)	Y N L P	Y N L P	Y N L P	Y N L P	Y N L P
Extraction Comments					
Logger Date&Time (HH:MM)					
Computer Date&Time (HH:MM)					
Alternate Extraction Date					

Lighting Logger Installation Form (continued)

Use this table to record information for installed measurement devices such as lighting loggers.

Installation

Logger Serial Number					
Check if logger has a back-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Placement Area ID# (ref only)					
Lighting Tech Type (HIM)	CF LF HB	CF LF HB	CF LF HB	CF LF HB	CF LF HB
Logger Placement on Fixture	I(nt) E(xt) O(ther)	I E O	I E O	I E O	I E O
CFL: Marked for retention?	Y N	Y N	Y N	Y N	Y N
Placement Description Include building, floor, room #, etc. and be descriptive enough that it can be located for extraction. Also include schedule number (L1, L2...)					

Extraction

Logger Intact? (L=Lost/missing)	Y N L P	Y N L P	Y N L P	Y N L P	Y N L P
Extraction Comments					
Logger Date&Time (HH:MM)					
Computer Date&Time (HH:MM)					
Alternate Extraction Date					

Lighting Logger Installation Form (continued)

Use this table to record information for installed measurement devices such as lighting loggers.

Installation

Logger Serial Number					
Check if logger has a back-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Placement Area ID# (ref only)					
Lighting Tech Type (HIM)	CF LF HB	CF LF HB	CF LF HB	CF LF HB	CF LF HB
Logger Placement on Fixture	I(nt) E(xt) O(ther)	I E O	I E O	I E O	I E O
CFL: Marked for retention?	Y N	Y N	Y N	Y N	Y N
Placement Description Include building, floor, room #, etc. and be descriptive enough that it can be located for extraction. Also include schedule number (L1, L2...)					

Extraction

Logger Intact? (L=Lost/missing)	Y N L P	Y N L P	Y N L P	Y N L P	Y N L P
Extraction Comments					
Logger Date&Time (HH:MM)					
Computer Date&Time (HH:MM)					
Alternate Extraction Date					

Upstream Screw-In CFL Lighting Inventory Form (3/3/2009)

Visual Verification Data			
Item	#	#	#
Activity Area ID			
Schedule #			
Fixture Description (can/downlight, table lamp, etc.)			
Inside, Outside or Uninstalled: Spares?	I O US	I O US	I O US
Hard-wired or plug-in fixture?	HW PL	HW PL	HW PL
Total number of fixtures			
Number of sockets per fixture			
Total number of sockets			
Total # of Screw-In CFL lamps			
CFL Lamp Type Code			
Likely a rebated <i>Upstream Screw-In CFL</i> ?	Y N UNK	Y N UNK	Y N UNK
For spares: IOU rebate sticker on package?	PG&E SCE SDG&E	PG&E SCE SDG&E	PG&E SCE SDG&E
Total # of Screw-In Incandescent lamps			
Incandescent Lamp Type Code			
Total # of empty sockets			
Total # of burnt-out lamps			
Ltg Control Type Code	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT
Ltg Application Type Code	A T X TR D S P G F L OT	A T X TR D S P G F L OT	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT	R H S F A P OT	R H S F A P OT
Fixture Reflector Type: S=Specular/Metallic W=White	S W	S W	S W
Physical Inspection Data			
Lamps/fixtures are NOT accessible (Check box & explain)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of units physically inspected			
CFL Lamp Wattage			
Incandescent Lamp Wattage			
Screw-base size: M=Med. C=Candelabra I=Intermed.	M C I	M C I	M C I
CFL-Specific Data			
Make/Manufacturer			
Model #/Lamp Code			
Energy Star Observed?	Y N	Y N	Y N
Where were the CFL's purchased from?			
Baseline Lamp Type Code: What did the CFLs replace?			
Baseline lamp watts (if available on site)			
Lighting Logger Assignment			
Logger Installation Comments			
Primary Logger S/N			
Back-up Logger S/N			
General Comments (note user's experience with CFLs: success, complaints, issues): _____			

Upstream Screw-In CFL Lighting Inventory Form (3/3/2009)

Visual Verification Data			
Item	#	#	#
Activity Area ID			
Schedule #			
Fixture Description (can/downlight, table lamp, etc.)			
Inside, Outside or Uninstalled: Spares?	I O US	I O US	I O US
Hard-wired or plug-in fixture?	HW PL	HW PL	HW PL
Total number of fixtures			
Number of sockets per fixture			
Total number of sockets			
Total # of Screw-In CFL lamps			
CFL Lamp Type Code			
Likely a rebated <i>Upstream Screw-In CFL</i> ?	Y N UNK	Y N UNK	Y N UNK
For spares: IOU rebate sticker on package?	PG&E SCE SDG&E	PG&E SCE SDG&E	PG&E SCE SDG&E
Total # of Screw-In Incandescent lamps			
Incandescent Lamp Type Code			
Total # of empty sockets			
Total # of burnt-out lamps			
Ltg Control Type Code	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT
Ltg Application Type Code	A T X TR D S P G F L OT	A T X TR D S P G F L OT	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT	R H S F A P OT	R H S F A P OT
Fixture Reflector Type: S=Specular/Metallic W=White	S W	S W	S W
Physical Inspection Data			
Lamps/fixtures are NOT accessible (Check box & explain)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of units physically inspected			
CFL Lamp Wattage			
Incandescent Lamp Wattage			
Screw-base size: M=Med. C=Candelabra I=Intermed.	M C I	M C I	M C I
CFL-Specific Data			
Make/Manufacturer			
Model #/Lamp Code			
Energy Star Observed?	Y N	Y N	Y N
Where were the CFL's purchased from?			
Baseline Lamp Type: What did the CFLs replace?			
Baseline lamp watts (if available on site)			
Lighting Logger Assignment			
Logger Installation Comments			
Primary Logger S/N			
Back-up Logger S/N			
General Comments (note user's experience with CFLs: success, complaints, issues): _____			

Upstream Screw-In CFL Lighting Inventory Form (3/3/2009)

Visual Verification Data			
Item	#	#	#
Activity Area ID			
Schedule #			
Fixture Description (can/downlight, table lamp, etc.)			
Inside, Outside or Uninstalled: Spares?	I O US	I O US	I O US
Hard-wired or plug-in fixture?	HW PL	HW PL	HW PL
Total number of fixtures			
Number of sockets per fixture			
Total number of sockets			
Total # of Screw-In CFL lamps			
CFL Lamp Type Code			
Likely a rebated <i>Upstream Screw-In CFL</i> ?	Y N UNK	Y N UNK	Y N UNK
For spares: IOU rebate sticker on package?	PG&E SCE SDG&E	PG&E SCE SDG&E	PG&E SCE SDG&E
Total # of Screw-In Incandescent lamps			
Incandescent Lamp Type Code			
Total # of empty sockets			
Total # of burnt-out lamps			
Ltg Control Type Code	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT
Ltg Application Type Code	A T X TR D S P G F L OT	A T X TR D S P G F L OT	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT	R H S F A P OT	R H S F A P OT
Fixture Reflector Type: S=Specular/Metallic W=White	S W	S W	S W
Physical Inspection Data			
Lamps/fixtures are NOT accessible (Check box & explain)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of units physically inspected			
CFL Lamp Wattage			
Incandescent Lamp Wattage			
Screw-base size: M=Med. C=Candelabra I=Intermed.	M C I	M C I	M C I
CFL-Specific Data			
Make/Manufacturer			
Model #/Lamp Code			
Energy Star Observed?	Y N	Y N	Y N
Where were the CFL's purchased from?			
Baseline Lamp Type: What did the CFLs replace?			
Baseline lamp watts (if available on site)			
Lighting Logger Assignment			
Logger Installation Comments			
Primary Logger S/N			
Back-up Logger S/N			
General Comments (note user's experience with CFLs: success, complaints, issues): _____			

CFL Compact Fluorescent Lighting Measures

IOU Tracking Data	Measure Category	CFL_MeasCategory
	Engineering Estimation Method	CFL_EngEstMethod
	Measure Code	CFL_OS_MeasCode
	Measure Name	CFL_OS_MeasName
	Rebated #of Units	CFL_IOUUnitQtyRebated
	IOU Unit Basis	CFL_IOUUnitBasis
	Correct Unit Basis (only if incorrect above) Can Rebated measures be clearly identified?	Y N
Visual Verification Data	Inside or outside lighting?	I O
	Total number of fixtures	
	Number of lamps per fixture	
	Total number of lamps	
	Ltg Application Type Code	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT	
Fixture Reflector Type: S=Specular/Metallic W=White	S W	
Verification Counts	(A) Installed & Operational # of units (ex post quantity) -- Was subsampling or estimation used? -- # <u>fixtures</u> switched off (basis may be different than IOU unit basis) -- # of <u>lamps</u> burned out in partial operation fixtures	Y N
	(B) # of Non-Operable (broken/entire fixture burned-out) Units in place	
	(C) # of Units in Storage/Spares -- Utility rebate sticker observed on packages?	Y N
Physical Inspection Data	<i>Lamps/fixtures are NOT accessible (Check box & explain in comments)</i>	<input type="checkbox"/>
	Number of units physically inspected	
	Lamp Wattage	
	Make/Manufacturer	
	Model/Lamp Code	
	Energy Star Observed	
	CFL Lamp Type Code	
	Is this a reflector/flood type CFL lamp?	Y N
	Ballast configuration: M=Modular I=Integral	M I
	Base type: P=Pin-base S=Screw-base	P S
Screw-base size: M=Med. C=Candelabra I=Intermed.	M C I	
Baseline System Summary Data (Observed or Self-Reported)	Is post-installation operation the same as pre-retrofit operation? -- If pre-retrofit operation was different, specify Sched #	Y N
	Lamp Type Code	
	Watts per lamp	
	Number of lamps per fixture	
	Observed versus Rebated # of Units is: E=Equal M=More L=Less OT (describe)	E M L OT
If Disposition Not Equal: Site Contact/Self-Report Questions	Self-Reported # of rebated units onsite (probe for rebated under 06-08)	
	Others purchased since rebated units installed	
	(D) # of units located at Other Affiliated Sites	

Failed (and Replaced) Rebated Units (Indirect/Self-Report)	How long did units typically operate before failure (months)?	
	(E) # of rebated units that Failed, but replaced w/ incandescent # of rebated units that Failed but were replaced in-kind (Ref)	
Removed Rebated Units (Indirect/Self-Report)	(F) # of rebated units that were Removed and not replaced -- When were the units removed? (month/year if possible)	
(Sum A-F) Total # of units accounted for on-site		(reqd)
Total # of units (A-F) MORE than Rebated # of Units	# that were rebated by other programs/projects?	
	# that were purchased at Retailer?	
	# that were received from utility give-away program?	
Total # of units (A-F) LESS than Rebated # of Units	# of rebated units, other site contact explanation (note in comments)	
	# of rebated units, unaccounted for	

CFL – Activity Area Assignment Table

Use this table to associate CFL # of units to Activity Areas, equipment operation schedules, and lighting loggers. The values in the “Represented # of Units” column must add up to the total # of installed and operational units in the table above.

Area ID #	Sched #	Item #	Represented # of Units	% of Total Inst&Op. Units (Ref)	Primary Logger S/N	Back-up Logger S/N	Comments
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%	<= Totals # of Installed & Operational Units check (no data entry)		

Comments: _____

Linear Fluorescent Lighting Measures

IOU Tracking Data	Measure Category	LINFLUOR_MeasCategory	D E L A M P I N G
	Engineering Estimation Method	LINFLUOR_EngEstMethod	
	Measure Code	LINFLUOR_OS_MeasCode	
	Measure Name	LINFLUOR_OS_MeasName	
	Rebated #of Units	LINFLUOR_IOUUnitQtyRebated	
	IOU Unit Basis	LINFLUOR_IOUUnitBasis	
	Correct Unit Basis (only if incorrect above) Can Rebated measures be clearly identified?	Y N	
Visual Verification Data	Inside or outside lighting?	I O	D E L A M P I N G
	Ceiling height in ft		
	Total number of fixtures		
	Number of lamps per fixture		
	Total number of lamps		
	Tube Length in ft. (e.g. 1.5 2 3 4 8)		
	Tube Diameter (T5 T8 T12)	T8 T5 T12	
	Special fixture type: Delamped or Tandem?	D T	
Verification Counts	Ltg Application Code	A T X TR D S P G F L OT	D E L
	Fixture Mount type code	R H S F A P OT	
	Reflector Type: S=Specular/Metallic W=White	S W	
	(A) Installed & Operational (or delamped) # of units (ex post quantity) -- Was subsampling or estimation used? -- # fixtures switched off (basis may be different than IOU unit basis) -- # of lamps burned out in partial operation fixtures	Y N	
(B) # of Non-Operable (broken/entire fixture burned-out) Units in place		D E L	
(C) # of Units in Storage/Spares			
<i>Lamps/fixtures are NOT accessible (Check box & explain in comments)</i>	<input type="checkbox"/>		
Number of units physically inspected			
Physical Inspection Data	Lamp Wattage		D E L A M P
	Lamp Make/Manufacturer		
	Lamp Model/Lamp Code		
	Ballast type: M=Magnetic E=Electronic A=Advanced	M E A	
	Predominant Fixture Type: # of ballasts per fixture		
	Ballast Model #		
	Ballast Manufacturer/Brand		
	Secondary Fixture Type: # of ballasts per fixture		
Baseline System Summary Data (Observed or Self-Reported)	Ballast Model #		D E L A M P
	Ballast Manufacturer/Brand		
	Is post-installation operation the same as pre-retrofit operation? -- If pre-retrofit operation was different, specify Sched #	Y N	
	Lamp Type Code		
	Lamp Wattage		
	Tube Length and Diameter (e.g. 4ft T12)		
Number of lamps per fixture		D E L A M P	
Ballast type: M=Magnetic E=Electronic A=Advanced	M E A		
Observed versus Rebated # of Units is: E=Equal M=More L=Less OT (describe)		E M L OT	

If Disposition Not Equal: Site Contact/Self-Report Questions	Self-Reported # of rebated units onsite (probe for rebated under 06-08)	
	Others purchased since rebated units installed	
	(D) # of units located at Other Affiliated Sites	
Failed (and Replaced) Rebated Units (Indirect/Self-Report)	How long did units typically operate before failure (months)?	
	(E) # of rebated units that Failed, but were replaced w/different tech	
	# of rebated units that Failed but were replaced in-kind (Ref)	
Removed Rebated Units (Indirect/Self-Report)	(F) # of rebated units that were Removed and not replaced	
	-- When were the units removed? (month/year if possible)	
(Sum A-F) Total # of units accounted for on-site		(reqd)
Total # of units (A-F) MORE than Rebated # of Units	# that were rebated by other programs/projects?	
	# that were obtained from other means (explain in comments)?	
Total # of units (A-F) LESS than Rebated # of Units	# of rebated units, other site contact explanation (note in comments)	
	# of rebated units, unaccounted for	

D
E
L
A
M
P

Linear Fluorescent – Activity Area Assignment Table

Use this table to associate lighting units to Activity Areas, equipment operation schedules, and lighting loggers. The values in the “Represented # of Units” column must add up to the total # of installed and operational units in the table above.

Area ID #	Sched #	Item #	Represented # of Units	% of Total Inst&Op. Units (Ref)	Primary Logger S/N	Back-up Logger S/N	Comments
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%	<= Total # of Installed & Operational Units check (no data entry)		

Comments (for delamping, explain how counts were confirmed: tombstone shadows observed, etc.): _____

Other Lighting Measures

IOU Tracking Data	
Measure Category	OTHERLIGHTING_MeasCategory
Engineering Estimation Method	OTHERLIGHTING_EngEstMethod
Measure Code	OTHERLIGHTING_OS_MeasCode
Measure Name	OTHERLIGHTING_OS_MeasName
Rebated #of Units	OTHERLIGHTING_IOUUnitQtyRebated
IOU Unit Basis	OTHERLIGHTING_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification Data:	
Inside or outside lighting?	I O
Lamp Type Code	
Total number of fixtures	
Number of lamps per fixture	
Total number of lamps	
Ceiling height in ft	
Ltg Application Code	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT
Reflector Type: S=Specular/Metallic W=White	S W
Verification Counts	
(A) Installed & Operational # of units (ex post quantity)	
-- Was subsampling or estimation used?	Y N
-- # of <u>fixtures</u> switched off (may be different than IOU unit basis)	
-- # of <u>lamps</u> burned out in partial operation fixtures	
(B) # of Non-Operable (broken/entire fixture burned-out) Units in place	
(C) # of Units in Storage/Spares	
Physical Inspection Data	
<i>Lamps/fixtures are NOT accessible (Check box & explain in comments)</i>	<input type="checkbox"/>
Number of units physically inspected	
Lamp Wattage	
Lamp Make/Manufacturer	
Lamp Model/Lamp Code	
Ballast type: M=Magnetic E=Electronic A=Advanced	M E A
Baseline System Summary (Observed or Self-Report):	
Is post-installation operation the same as pre-retrofit operation?	Y N
-- If pre-retrofit operation was different, specify Sched #	
Lamp Type Code	
Lamp Wattage	
Tube Length and Diameter (e.g. 4ft T12)	
Number of lamps per fixture	
Ballast type	M E A
Baseline Control Type Code	
Observed versus Rebated # of Units is: E=Equal M=More L=Less OT (describe)	E M L OT
If Disposition Not Equal: Site Contact/Self-Report Questions	
Self-Reported # of rebated units onsite (probe for rebated under 06-08)	
Others purchased since rebated units installed	
(D) # of units located at Other Affiliated Sites	

Failed Rebated Units (Indirect/Self-Report)	
-- How long did units typically operate before failure (months)?	
-- (E) # of rebated units that Failed, but replaced w/different tech	
-- # of rebated units that Failed but were replaced in-kind (Ref)	
Removed Rebated Units (Indirect/Self-Report)	
(F) # of rebated units that were Removed and not replaced	
-- When were the units removed? (month/year if possible)	
(Sum A-F) Total # of units accounted for on-site	
Total # of units (A-F) MORE than Rebated # of Units (self-report):	
# that were rebated by other programs/projects?	
# that were obtained from other means (explain in comments)?	
Total # of units (A-F) LESS than Rebated # of Units (self-report):	
# of rebated units, other site contact explanation (describe in comments)	
# of rebated units, unaccounted for	

Other Lighting – Activity Area Assignment Table

Use this table to associate lighting units to Activity Areas, equipment operation schedules, and lighting loggers. The values in the “Represented # of Units” column must add up to the total # of installed and operational units in the table above.

Area ID #	Sched #	Item #	Represented # of Units	% of Total Inst&Op. Units (Ref)	Primary Logger S/N	Back-up Logger S/N	Comments
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%	<= Totals # of Installed & Operational Units check (no data entry)		

Comments: _____

Greenhouse Measures

IOU Tracking Data:	
Measure Category	GREENHOUSE_MeasCategory
Engineering Estimation Method	GREENHOUSE_EngEstMethod
Measure Code	GREENHOUSE_OS_MeasCode
Measure Name	GREENHOUSE_OS_MeasName
Rebated #of Units	GREENHOUSE_IOUUnitQtyRebated
IOU Unit Basis	GREENHOUSE_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification Data	
Units are NOT accessible (Check box & describe in comments)	<input type="checkbox"/>
Heat Curtain or Infrared Film Measure	HC IR
Total Number of Treated Greenhouses	
Year the Treated Greenhouses were Constructed (YYYY)	
Roof Shape: Q=Quonset/hoop GO=Gothic Arch GA=Gable/Truss	Q GO GA
Roof/Wall Material Type Code	
Observed Heating System Type	
Heating System Type Code:	
Make/Manufacturer	
Model #	
Night-time Indoor Setpoint Temperature, °F	
Temperature Control Type	TH TI ST CE MA OT
Other Self-Report/Site Contact Questions	
Predominant Operation Schedule #	
# of months of complete shut-down	
Pre-Retrofit Roof/Wall Material Type	
How often is roof/wall material typically replaced (years)?	
Is IR film standard practice? (explain if needed)	Y N
Are Heat Curtain Systems standard practice? (explain if needed)	Y N
HEAT CURTAIN Verification Data & Counts	
Location of Heat Curtain System: I=Interior E=Exterior	I E
Heat Curtain Config.: G=Gutter-to-gutter (width), T=Truss-to-truss (length)	G T
Operation of Heat Curtain: MA=Manual/By-hand MT=Motor-driven	MA MT
Heat Curtain Mat'l: P=Poly. Film K=Knitted white poly. C=CompositeFabric OT=Other	P K C OT
HC Condition Code: N=New G=Good F=Fair R=Ragged/Cut M=Missing/None	N G F R M
Material Make/Manufacturer	
Description/Item#/Other Identifier	
Total sq ft of Heat Curtain Installed on Active Greenhouses	
-- Was subsampling or estimation used?	Y N
Observed versus Rebated sq ft of HC: E=Equal M=More L=Less OT (describe)	E M L OT
If Total # of units is MORE than Rebated # of units:	
# that were rebated by other programs/projects	
# that were obtained from other means (explain in comments)	
If Total # of units is LESS than Rebated # of units:	
# of rebated units, site contact explanation (describe in comments)	
# of rebated units, unaccounted for	
INFRARED (IR) FILM Verification Data & Counts	
IR Film Condition Code: N=New G=Good F=Fair R=Ragged/Cut M=Missing/None	N G F R M

IR film used on: R=Roof W=Wall A=All		R	W	A
Material Make/Manufacturer				
Description/Item#/Other Identifier				
Total sq ft of IR Film Installed on Active Greenhouses				
-- Was subsampling or estimation used?		Y	N	
Observed versus Rebated sq ft of IRF: E=Equal M=More L=Less OT (describe)		E	M	L OT
If Total # of units is MORE than Rebated # of units:				
# that were rebated by other programs/projects				
# that were obtained from other means (explain in comments)				
If Total # of units is LESS than Rebated # of units:				
# of rebated units, site contact explanation (describe in comments)				
# of rebated units, unaccounted for				

Greenhouse Details Worksheet

Use this worksheet if needed to tally up totals for the verification table above.

Confi g ID	HC Confi g Type	Floor Type Code	# of Similar GHs	Roof Height	Gable Height	Width	Length	Area	Description
	G T								
	G T								
	G T								
	G T								
	G T								
	G T								

Comments: _____

Greenhouse Measure Codes

Heat Curtain Material Type Codes	Roof/Wall Material Type Codes	Temperature Control Type Codes
P = Polyethylene Film K = Knitted white polyester C = Composite fabrics OT = Other (describe in comments)	1G = Single Pane Glass 2G = Double-pane glass 1PE = 1-layer Polyethylene (PE) PIN = 2-layer Inflated PE (No IR Film) PIR = 2-layer Inflated PE (With IR Film) 1F = 1-layer Fiberglass 1PC = 1-layer Polycarbonate (clear) 2PC = 2-layer Polycarbonate (8 mm) OT = Other (describe in comments)	TH = Thermostat TI = Timers ST = Step Controls CE = Computer environment controls MA = Manual on/off OT = Other (describe in comments)
Floor Type Codes	Heating System Type Codes	
U = Un-insulated, Bare Soil B = Brick C = Concrete S = Styrofoam OT = Other (describe in comments)	UH = Unit Space Heater HW = Hot Water System ST = Steam Heating System UR = Unit Radiant Heaters	SR = Solar Radiant Systems PT = Poly-Tube Systems OT = Other (describe in comments)

Steam Traps (Industrial/Commercial)

IOU Tracking Data	
Measure Category	STEAMTRAPS_MeasCategory
Engineering Estimation Method	STEAMTRAPS_EngEstMethod
Measure Code	STEAMTRAPS_OS_MeasCode
Measure Name	STEAMTRAPS_OS_MeasName
Rebated #of Units	STEAMTRAPS_IOUUnitQtyRebated
IOU Unit Basis	STEAMTRAPS_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification Data	
Commercial or Industrial?	C I
Steam Applications (circle all that apply): CP=Clothing Press DC=Dry Cleaning SH=Space Heating CD=Clothes Dryer OT=Other (describe in comments)	CP DC SH CD OT
Other Natural Gas Applications (circle all that apply): HW=Hot Water SH=Space Heating CD=Clothes Dryer OT=Other (describe in comments)	HW SH CD OT
Steam Pipe Diameter, in. (at boiler)	
Steam Pressure, psi. (at boiler gauge)	
Steam Pipe Insulated?	Y N
Condensate Recaptured/Recovered for use?	Y N
Condensate Pipe Insulated (only if "Y" above)?	Y N
Verification Counts	
Installed and Operational # of units (ex post quantity) -- Was subsampling or estimation used?	Y N
Physical Inspection Data	
Units are NOT accessible (Check box & explain in comments)	<input type="checkbox"/>
Number of units physically inspected	
Predominant Config/Type Code (ME=Mechanical, TS=Thermostatic, TD=Thermodynamic)	ME TS TD
Predominant Make/Manufacturer	
Predominant Model #	
Additional Make/Manufacturer	
Additional Model #	
If condensate is NOT recovered: Steam being emitted from condensate pipe?	Y N
Condensate being emitted from condensate pipe?	Y N
Predominant Boiler Operation Schedule #	
Did operator observe any steam trap problems before/after their replacement?	Y: Before / After N
Since steam trap repl.: has No. of Employees or Hours of Operation changed?	Empl: ↑ ↓ N Hours: ↑ ↓ N
Since steam trap repl.: has steam eqmt. increased, decreased or been replaced?	Eqmt: ↑ ↓ R N
Normal steam trap replacement schedule (years)	
Observed versus Rebated # of units: E=Equal M=More L=Less OT (describe)	E M L OT
If Total # of units is MORE than Rebated # of units:	
# that were rebated by other programs/projects	
# that were obtained from other means (explain in comments)	
If Total # of units is LESS than Rebated # of units:	
# of rebated units, site contact explanation (describe in comments)	
# of rebated units, unaccounted for	

Comments: _____

Strip Curtains (Refrigeration)

IOU Tracking Data	
Measure Category	STRIPCURTAINS_MeasCategory
Engineering Estimation Method	STRIPCURTAINS_EngEstMethod
Measure Code	STRIPCURTAINS_OS_MeasCode
Measure Name	STRIPCURTAINS_OS_MeasName
Rebated #of Units	STRIPCURTAINS_IOUUnitQtyRebated
IOU Unit Basis	STRIPCURTAINS_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification Data	
Predominant Conditioned Space Type code (that door opens into): UN=Uncond. CH=Cooled & Heated CL=Cooled only HT= Heated only RF=Refrigerated OU=Outdoors	UN CH CL HT RF OU
Type of Walk-In: P=Prep Area C=Cooler F=Freezer	P C F
Walk-In Temperature (°F)	
Walk-in Floor Area (sq ft)	
Does walk-in have an open dairy case on one side?	Y N
Strip Curtain Condition Code: N=New G=Good F=Fair R=Ragged/Cut M=Missing/None	N G F R M
Strip Curtains tied back (as observed during on-site)?	Y N
Strip Curtain Type Code: ST=Strips SO=Solid doors OT=Other (describe in comments)	ST SO OT
Refrig. System Type: SC=Self-Contained/RCU RR=Remote Refrigeration	SC RR
Verification Counts	
Total Sq Ft of Door Opening Area covered by strip curtains	
# of Identical Doors w/ Strip Curtains	
-- Door height (inches)	
-- Door width, per door (inches)	
-- Door opening area (sq ft)	
Observed versus Rebated Sq Ft: E=Equal M=More L=Less OT (describe)	E M L OT
If Total Sq Ft is MORE than Rebated Sq Ft:	
# that were rebated by other programs/projects	
# that were obtained from other means (explain in comments)	
If Total Sq Ft is LESS than Rebated Sq Ft:	
# of rebated units, site contact explanation (describe in comments)	
# of rebated units unaccounted for	
Operation and Baseline System Summary (Self-Report)	
Hours/day that walk-in doors are left open	
Pre-Retrofit Strip Curtain Condition Code (same codes as above)	N G F R M
Are strip curtains replaced as part of standard maintenance?	Y N
If Yes, what is normal strip curtain maint. sched. (years or verbal response)	

Comments: _____

Strip Curtain Details Worksheet

Use this worksheet if needed to tally up totals for the verification table above.

Measure Code: _____ Total # of Rebated units: _____ Unit Basis: _____

Item	Type of Walk-In	Floor Area ft2	Has Reach-In Dairy Case	Refrig. System Type	SC Condition	Walk-in Temp (°F)	Door Height (in.)	Door Width (in.)	Door Opening Sq Ft	Location /Description
1	P C F		<input type="checkbox"/>	SC RR	N G F R M					
2	P C F		<input type="checkbox"/>	SC RR	N G F R M					
3	P C F		<input type="checkbox"/>	SC RR	N G F R M					
4	P C F		<input type="checkbox"/>	SC RR	N G F R M					
5	P C F		<input type="checkbox"/>	SC RR	N G F R M					
6	P C F		<input type="checkbox"/>	SC RR	N G F R M					
7	P C F		<input type="checkbox"/>	SC RR	N G F R M					
TOTAL		<input type="text"/>							TOTAL	<input type="text"/>

Door Gaskets (Refrigeration)

IOU Tracking Data	
Measure Category	DOORGASKETS_MeasCategory
Engineering Estimation Method	DOORGASKETS_EngEstMethod
Measure Code	DOORGASKETS_OS_MeasCode
Measure Name	DOORGASKETS_OS_MeasName
Rebated #of Units	DOORGASKETS_IOUUnitQtyRebated
IOU Unit Basis	DOORGASKETS_IOUUnitBasis
Can Rebated measures be clearly identified?	Y N
Visual Verification Data	
Predominant Conditioned Space Type code (that door opens into)	
Type of Equipment: C=Cooler, F=Freezer	C F
Case Temperature (°F)	
Type of door: S=Solid G=Glass	S G
Configuration of Cooler/Freezer: W=Walk-in R=Reach-In	W R
Gasket Condition Code: N=New G=Good F=Fair R=Ragged/Cut M=Missing/None	N G F R M
System Type: Self-Contained/RCU or Remote Refrigeration?	SC RR
Verification Counts	
Total Linear Feet of Gasket Installed	
# of Identical Doors w/ Gaskets	
-- Door height (inches)	
-- Door width, per door (inches)	
-- Door perimeter/gasket linear feet	
Observed versus Rebated Lin Ft: E=Equal M=More L=Less OT (describe)	E M L OT
If Total Lin Ft is MORE than Rebated Lin Ft	
# that were rebated by other programs/projects	
# that were obtained from other means (explain in comments)	
If Total Lin Ft is LESS than Rebated Lin Ft	
# of rebated units, site contact explanation (describe in comments)	
# of rebated units unaccounted for	
Other Self-Report/Site Contact Questions	
% of Time door is open	
Pre-Retrofit Gasket Condition Code	N G F R M
Are door gaskets replaced as part of standard maintenance?	Y N
Gasket replacement strategy: Replace A=All W=only worn/damaged	A W
Normal Gasket Maintenance schedule (Months or verbal response)	

Comments: _____

Door Gasket Details Worksheet

Use this worksheet if needed to tally up totals for the verification table above.

Item	Type of Equip	Type of Door	Config (WalkIn / ReachIn)	Gasket Condition	Case Temp (°F)	# of Doors	Door Height (in.)	Door Width (in.)	Gasket Perimeter per door (linear ft)	Total Gasket Linear Feet	
	C F	S G	W R	N G F R M							
	C F	S G	W R	N G F R M							
	C F	S G	W R	N G F R M							
	C F	S G	W R	N G F R M							
	C F	S G	W R	N G F R M							
	C F	S G	W R	N G F R M							
	C F	S G	W R	N G F R M							
	C F	S G	W R	N G F R M							
TOTAL						<input type="text"/>					TOTAL <input type="text"/>

Generic Verification Form for Non-High Impact Measures

IOU Tracking Data:	
Measure Category	GENERIC_MeasCategory
Engineering Estimation Method	GENERIC_EngEstMethod
Measure Code	GENERIC_OS_MeasCode
Measure Name	GENERIC_OS_MeasName
Rebated #of Units	GENERIC_IOUUnitQtyRebated
IOU Unit Basis	GENERIC_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification & Counts Data	
(A) Installed & Operational # of units (ex post quantity)	
-- Was subsampling or estimation used?	Y N
-- # units switched off	
-- # of units burned out	
-- # of units in back-up mode (may need to ask)	
(B) # of Non-Operable (broken/disconnected) Units in place	
(C) # of Units in Storage/Spares	
Physical Inspection Data	
Units are NOT accessible (Check box & describe in comments)	<input type="checkbox"/>
Number of units physically inspected	
Meets technical specifications (prem-eff, etc.)?	Y N
Size (tons, hp, watts, ft2)	
Make/Manufacturer	
Model #	
Op Hours Estimate: Predominant Equipment Operation Schedule # (if relevant)	
Baseline Summary Data:	
Baseline System Description	
Observed versus Rebated # of Units: E=Equal M=More L=Less OT (describe)	E M L OT
If Disposition Not Equal: Site Contact/Self-Report Questions	
Self-Reported # of rebated units onsite (probe for rebated under 06-08)	
Others purchased since rebated units installed	
(D) # of units located at Other Affiliated Sites	
Failed Rebated Units (Indirect/Self-Report)	
-- How long did units typically operate before failure (months)?	
-- (E) # of rebated units that Failed, but replaced w/different tech	
-- # of rebated units that Failed but were replaced in-kind (Ref)	
Removed Rebated Units (Indirect/Self-Report)	
(F) # of rebated units that were Removed and not replaced	
-- When were the units removed? (month/year if possible)	
(Sum A-F) Total # of units accounted for on-site	
Total # of units (A-F) MORE than Rebated # of Units (self-report):	
# that were rebated by other programs/projects?	
# that were obtained from other means (explain in comments)?	
Total # of units (A-F) LESS than Rebated # of Units (self-report):	
# of rebated units, other site contact explanation (describe in comments)	
# of rebated units unaccounted for	

Comments: _____

Site Photo Log

Record site photo information here including the PhotoID (i.e. digital file name) and a brief description of the photo where needed. Site Photos should include the site entrance and entire building, rebated measures, and close-up photos of nameplates, lamp codes, and other make/model identification. Refer to the training manual for more on what photos to take. Photo/file naming conventions is SiteID_Item# or SiteID 00# (e.g. PGE_056789_1.jpg, PGE_056789 001.jpg).

Item #	Description/Comments/Measure Code (no data entry)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

Lighting Logger Installation Plan & Worksheet (no data entry)

This table would be used to create a lighting logger plan. The Site Plan, Activity Area Definitions, and Schedules would be used along with the measure counts in each area and on each unique schedule. Results from this plan would then be transferred to the measure-specific forms

Item	Description	Area ID#	Measure Codes/Counts				Sched #	Logger ID#	Back-up Logger #
TOTALS									

Additional Comments:

SubSampling Worksheet (no data entry)

This form should be completed whenever subsampling is needed to develop the final verified number of rebated units. Use the following guidelines to develop the subsampling approach:

1. Divide the total number of installed units into logical sampling units (buildings, areas, guest rooms, etc.) and account for various measure sizes (i.e. a hotel might use 3 or 4 different sized heat pumps so one of each type should be verified).
2. Verify (count & visual) all of the units in at least one of each type of representative area and measure size category (=area to be subsampled).
3. Use the table below to record the subsampling method that was used (quantity and types of sampling units, # of rebated units installed in each area, etc.)
4. Record sampled measure specifications and make/model for each size/configuration in the comments section below, and identify the subsampled area they are associated with.
5. Contact Itron or KEMA with questions or for guidance.

Measure Code: _____ Total # of Rebated units: _____ Unit Basis: _____

Item	Description of Area to be Subsampled	Visual/Physical Counts			(A/B)	C*(A/B)
		(A) Total Qty of Area to be SubSampled	(B) Qty of Areas Subsampled	(C) # of Units Counted in Subsampled Area		
TOTALS						

Notes/Comments: _____

SURVEY FIELD CODE TABLES

Observed Business/Building Type Codes

Business Type	Code	Business Type	Code	Business Type	Code
Offices (Non-Medical):		Retail Store:		Lodging:	
Administration and management	011	Department / Variety Store	041	Hotel	081
Financial / Legal	012	Retail Warehouse/Clubs	042	Motel	082
Insurance/Real Estate	013	Shop in Enclosed Mall	043	Resort	083
Data Processing/Computer Center	014	Shop in Strip Mall	044	Other Lodging	084
Mixed-Use/Multi-tenant	015	Auto Sales	045	Public Assembly:	
Lab/R&D Facility	016	Other Retail Store	046	Religious Assembly (worship only)	091
Software Development	017	Warehouse:		Religious Assembly (mixed use)	092
Government Services	018	Refrigerated Warehouse	051	Health/Fitness Center	093
Other Office	019	Unconditioned Warehouse, High Bay	052	Movie Theaters	094
Restaurant/Food Service*:		Unconditioned Warehouse, Low Bay	053	Theater / Performing Arts	095
Fast Food or Self Service	021	Conditioned Warehouse, High Bay	054	Library / Museum	096
Specialty/Novelty Food Service	022	Conditioned Warehouse, Low Bay	055	Conference/Convention Center	097
Table Service	023	Health Care:		Community Center	098
Bar/Tavern/Nightclub/Other	024	Hospital	061	Other Recreational/Public Assembly	099
Other Food Service	025	Nursing Home	062	Services:	
Food Stores :		Medical/Dental Office	063	Gas Station / Auto Repair	101
Supermarkets	031	Clinic/Outpatient Care	064	Gas Station w/Convenience Store**	102
Small General Grocery	032	Medical/Dental Lab	065	Repair (Non-Auto)	103
Specialty/Ethnic Grocery	033	Education:		Other Service Shop	104
Convenience Store**	034	Daycare or Preschool	071	Miscellaneous:	
Liquor Store	035	Elementary School	072	Assembly / Light Mfg.	111
Other Food Store	036	Middle / Secondary School	073	Police / Fire Stations	112
Agricultural:		College or University	074	Post Office	113
Commercial Greenhouse	200	Vocational or Trade School	075	Other Comm. Describe below	130
Other Ag. Describe below	210			Industrial: Use SIC or NAICS code	

* For Restaurant/Food Service businesses, note in comments which meals are served (Breakfast/Lunch/Dinner).







** Convenience stores that do not sell gasoline should be coded as 034; convenience stores that do sell gasoline should be coded as 102.

Other Building Type Description: _____

Lighting Field Codes

Lamp Type Codes		CFL Lamp Type Codes	
LED = LED	F = Fluorescent	TW = Bare-MiniTwist/Screw	
Q = Quartz/Halogen	UT = Fluorescent U-tube	TU = Bare-Tube	
E = Electrodeless/Induction	OF = Other Fluorescent	AL = Covered-A-Line	
IP = Incandescent PAR	CF = Compact Fluorescent	GL = Covered-Globe	
IR = Incandescent Reflector/Flood	CIR = Circline Fluorescent	BU = Covered-Bullet/Post/Candelabra	
I = Incandescent	MV = Mercury Vapor	CIR = Circline	
ER = Self/battery powered exit signs	MH = Std Metal Halide	RF = Reflector	
N = Neon	PS = Pulse-Start Metal Halide		
OT = Other (describe in comments)	HPS = High-Pressure Sodium Vapor		
	LPS = Low-Pressure Sodium Vapor		
Ltg Control Type Codes	Fixture Mount Type Codes	Ltg Application Codes	
C = Continuous/24 hour	R = Recessed (non-can)	A = Area	T = Task
B = Bi-level Switch	H = Hanging/Suspended	X = Exit	TR = Track
S = Manual on/off-switch	S = Surface-mount (ceiling or wall)	D = Display/Advertising	
E = EMS	F = Ceiling Fan	S = General/Security	
PC = Photocell	A = Attached to bldg	P = Parking Lot	G = Parking Garage
PT = Photocell/Timelock	P = Pole	F = Bldg façade	L = Landscape
DM = Dimmer	OT = Other (describe in comments)	OT = Other (describe in comments)	
MS = Motion Sensor			
TW = Twist-timer			
DL = Daylighting controls			
OT = Other			

Screw-In CFL Configurations (Ref: Energy Star)

Bare Products		Covered Products			Reflector Products	
Mini-Spiral or Twist	Tube or Universal	Incandescent / A-line	Globe G25, G30, G40	Candelabra, Post or Bullet Shape	Indoor and Outdoor R20, R30, R40, PAR38	
						
TW	TU	AL	GL	BU	RF	

NOTE: Pin-based CFLs are almost always either tube or circline.

**CPUC 0608 Small Commercial Evaluation
On-Site Verification Survey Form (Rev: 3/3/2009)**

General Site Information (from phone survey & IOU tracking database)

Itron SiteID		EEGA Program #	
Sample Strata		Evaluation Phase	

Corporate (Multi-Site) Name			
Business Name (Tracking Data)			
Actual Business Name			
Service Address			
City		Zip Code	

CORRECTIONS TO SITE INFORMATION

Revised Corp. (Multi-Site) Name			
Revised Business Name			
Revised Service Address			
Revised City		Revised Zip	

Site Contact Information

Phone Survey (PS) Completion Date: _____ Phone Survey Respondent: _____

	Contact Name	Phone Number	Alternate Phone	Email Address	Contacted
OS Primary					<input type="checkbox"/>
OS Back-up					<input type="checkbox"/>
OS Other					<input type="checkbox"/>

Note: Use the "Contacted" check box to indicate the actual contact(s) for the site visit.

Scheduling Notes/Special Instructions for On-site Visit: _____

Survey Tracking Information

Survey Company (Itron, KEMA, RTB, SB):		Assigned Surveyor's Initials:	
Survey Duration (24 hr clock)	Start: _____	Survey Duration (24 hr clock)	End: _____
Survey Travel Mileage:	_____ miles	Total Time (Onsite+QC+Travel)	_____ hrs

	Date:	Initials
Field survey completed:	___ / ___ / ___	___
Survey received from surveyor:	___ / ___ / ___	___
Initial QC check completed:	___ / ___ / ___	___
Survey received at Itron:	___ / ___ / ___	___
Itron QC completed:	___ / ___ / ___	___
Returned to Survey Company:	___ / ___ / ___	___
Data entry completed:	___ / ___ / ___	___

Upstream Screw-In CFL Phone Survey Summary Sheet (6/15/09)

Primary Lighting Purchaser	
Secondary Lighting Purchaser	

Detailed Area Installation Summary

Location/Area Description	# of CFLs Installed	Location/Area Description	# of CFLs Installed
Windowed Offices		Patient/Exam Room	
Non Windowed Offices		Classroom	
Hallways		Lobby	
Storage Areas		Guestroom	
Kitchen		Restroom	
Dining Area			
Retail Space			
Warehouse			

Purchases, Installed Totals, and Pre-Retrofit Information

Store Name	# of Packages Purchased	# of Bulbs per Package	Rebate/Discount?

Total CFLs Installed throughout building	
Total CFLs Purchased since 2006 (this number may not match bulbs listed above) (A)	
-- Total CFLs Installed of those purchased since 2006	
-- Total CFLs in storage of those purchased since 2006	
Are there motion sensors (anywhere in the facility)?	
Type of lamp that CFLs replaced (pre-retrofit lamp type)	

On Site vs Phone Survey CFL Quantity Comparisons (to be completed after on site survey)

Total # of Installed & Spare CFLs found on site from <i>Form UpCFL</i> (B)		
Total CFLs found on site (B) versus Total CFLs purchased since 2006 (A) (B - A)		
% of Total CFLs purchased since 2006 that were found on site => $100 * (B - A) / A$		
On Site vs Phone Survey Disposition Code: N = 2006 CFL purchase info not available M = MORE CFLs found on site (> +20%) L = LESS CFLs found on site (< -20%) S = About the same (less than +/- 20% different)	N M L S	
If L or M, ask site contact about the Total CFLs Purchased since 2006 (A) and record their response:		
Reason for Discrepancy: Indicate which item the free response above is most similar to. 1 = Incorrect value, must have been a typo 2 = CFLs are located at another site 3 = Majority were purchased before 2006 4 = They burnt out very quickly, have used them all 5 = Didn't like them so removed 6 = Phone response was a wild guess 7 = Don't know 8 = Other/explain		_____

IOU Tracking Data Measure Summary Sheet (8/20/09)

This is a summary of all of the measures implemented at this site as extracted from the IOU tracking database. All of the measures listed here should also be found on the measure-level verification forms.

Measure Category	Engineering EstMethod	Measure Code	IOU MeasureName	Unit Basis	Rebated # of Units

Phone Survey Self-Reported Measure Counts

CATI Measure Category-RebatedUnits-UnitBasis	Self Report # of Units	Agree? (Y/N)	Reason for Difference

Phone Survey CFL-Specific Information

CATI Measure Category	Self Report % in Storage	% Installed outside this Facility

Phone Survey Miscellaneous Measure Information

Greenhouse Measures: Roof/Wall Mat'l Type		CFLs: Self-Report # of CFLs bought Outside Program	
Heating System Type		Strip Curtains: Hours/day that walk-in doors are left open	
HtCurtain System Config		Door Gaskets: % of Time door is open	
Indoor Setpoint Temp			
HtCurtain Control			

Phone Survey Steam Trap Information

What condition were your steam traps in at the time of their replacement?	
Were there other changes [in equipment, operation, or employees] at your site at the time or since the new steam traps were installed?	

Site & Business Characteristics

Fields in this table will be populated as much as possible with data from the phone survey. However, any fields that are blank should be completed during the on-site verification. Any fields that are incorrect should also be corrected.

Electric Utility	PGE SCE SDGE SMUD LADWP OT _____
Gas Utility	PGE SCG SDGE AllElec/None Propane LBG0 SWG OT _____
Phone Survey Building Type	
What <u>year</u> was this business established at this location?	
What <u>year</u> (or decade) was the majority of the facility built?	
Total Heated/Cooled Floor Area (or range)	
Total Site Floor Area, sq ft (on-site measurement/estimate)	
Cooling Type: 1=No A/C 2=Split-System 3=PkgRooftop 4=PTAC/PTHP 5=EvapCool 6=Chiller 7=IndivAC/HP 8=WLHP OT=Other	
Heating Fuel Type: 1=Electric 2=Gas 3=Both 4=Propane 5=None OT=Other	
Observed Business/Building Type Code (Use Business/Building Type Codes table below)	
What kind of site is this? P = Part of a bldg B = Single building SM = Small multi-building CM = Campus (multi-bldg, subsampled bldgs) OT = Other _____	
For single, stand-alone buildings or partial buildings: Number of stories/floors	

Primary Product/Service (do not leave blank): Give a brief description about the type of work and/or primary product or service. What is the primary activity(ies) that occur here and what makes this site unique from other businesses of this type?

Business Type	Code	Business Type	Code	Business Type	Code
Offices (Non-Medical):		Retail Store:		Lodging:	
Administration and management	011	Department / Variety Store	041	Hotel	081
Financial / Legal	012	Retail Warehouse/Clubs	042	Motel	082
Insurance/Real Estate	013	Shop in Enclosed Mall	043	Resort	083
Data Processing/Computer Center	014	Shop in Strip Mall	044	Other Lodging	084
Mixed-Use/Multi-tenant	015	Auto Sales	045	Public Assembly:	
Lab/R&D Facility	016	Other Retail Store	046	Religious Assembly (worship only)	091
Software Development	017	Warehouse:		Religious Assembly (mixed use)	092
Government Services	018	Refrigerated Warehouse	051	Health/Fitness Center	093
Other Office	019	Unconditioned Warehouse, High Bay	052	Movie Theaters	094
Restaurant/Food Service*:		Unconditioned Warehouse, Low Bay	053	Theater / Performing Arts	095
Fast Food or Self Service	021	Conditioned Warehouse, High Bay	054	Library / Museum	096
Specialty/Novelty Food Service	022	Conditioned Warehouse, Low Bay	055	Conference/Convention Center	097
Table Service	023	Health Care:		Community Center	098
Bar/Tavern/Nightclub/Other	024	Hospital	061	Other Recreational/Public Assembly	099
Other Food Service	025	Nursing Home	062	Services:	
Food Stores :		Medical/Dental Office	063	Gas Station / Auto Repair	101
Supermarkets	031	Clinic/Outpatient Care	064	Gas Station w/Convenience Store**	102
Small General Grocery	032	Medical/Dental Lab	065	Repair (Non-Auto)	103
Specialty/Ethnic Grocery	033	Education:		Other Service Shop	104
Convenience Store**	034	Daycare or Preschool	071	Miscellaneous:	
Liquor Store	035	Elementary School	072	Assembly / Light Mfg.	111
Other Food Store	036	Middle / Secondary School	073	Police / Fire Stations	112
Agricultural:		College or University	074	Post Office	113
Commercial Greenhouse	200	Vocational or Trade School	075	Other Comm. Describe above	130
Other Ag. Describe below	210			Industrial: Use SIC or NAICS code	

* For Restaurant/Food Service businesses, note in Primary Product/Service comment which meals are served (Breakfast/Lunch/Dinner).

** Convenience stores that do not sell gasoline should be coded as 034; convenience stores that do sell gasoline should be coded as 102.

Business Hours (Normal & Seasonal Operation)

Verify or specify Business Hours for both normal and seasonal operation. Seasonal operation is a significant change in normal business hours, such as the summer break period for schools that follow a traditional schedule.

Business Hours (from phone survey)

Day of the Week	Normal Hrs/Operation	Seasonal Hrs/Operation
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Are these Business Hours correct? Yes No (If No, provide revised hours on form below)

24/7 Sites Only: Number of work shifts per day _____

Corrected Normal Business Hours

Define typical operation for all Day Types listed below and specify hours in military time (8:30 am=0830, 6:30 pm=1830). For partial (i.e. not full) operation days, also indicate the approximate % of full operation as Partial Op %. For Lodging sites: Use the Seasonal Operation and PartialOp% to capture high and low season operation and occupancy rates.

Day Type	Business Hours (24 hr clock)	Closed All Day?	Open 24 hrs?	By Appt.	PartialOp%
Monday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tuesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wednesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Thursday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Friday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Saturday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sunday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

N/A Seasonal Business Hours

If the business hours vary significantly during the year for a significant period of time (months) indicate the alternate business hours below.

Day Type	Business Hours (24hr clock)	Closed All Day?	Open 24 hrs?	By Appt.	PartialOp%
Monday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tuesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wednesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Thursday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Friday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Saturday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sunday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Seasonal Operation Periods & Holidays

Seasonal Operation Periods

N/A

If Seasonal Business Hours are defined, then specify the monthly periods to which the seasonal schedule applies. Provide a brief description of the period (e.g. "spring break", "winter break", "summer break", "extended holiday hours"), and list the beginning/ending months (1-12) and approximate days for up to three time periods.

TIME PERIOD 1			TIME PERIOD 2			TIME PERIOD 3		
Description _____			Description _____			Description _____		
Begin Month/Day			Begin Month/Day			Begin Month/Day		
End Month/Day			End Month/Day			End Month/Day		

Closed Holidays: Check all that apply below or => N/A

Number of Closed Holidays per year	_____
------------------------------------	-------

Enter "0" above if they never close. Do not read through the list below, just check the holidays that the site contact mentions or ask a general question about which holidays are closed days, and check that the number above is consistent.

New Year's Eve	<input type="checkbox"/>	July 4th Celebrated	<input type="checkbox"/>
New Year's Day	<input type="checkbox"/>	Labor Day	<input type="checkbox"/>
New Year's Day Celebrated	<input type="checkbox"/>	Columbus Day	<input type="checkbox"/>
Martin Luther King Day	<input type="checkbox"/>	Veterans Day	<input type="checkbox"/>
Presidents Day	<input type="checkbox"/>	Thanksgiving	<input type="checkbox"/>
St. Patrick's Day	<input type="checkbox"/>	Thanksgiving Friday	<input type="checkbox"/>
Easter Sunday	<input type="checkbox"/>	Christmas Eve	<input type="checkbox"/>
Memorial Day	<input type="checkbox"/>	Christmas Day	<input type="checkbox"/>
Flag Day	<input type="checkbox"/>	Christmas Day Celebrated	<input type="checkbox"/>
July 4 th	<input type="checkbox"/>	Caesar Chavez Day	<input type="checkbox"/>

Comments:

Activity Area Definitions

Activity Area ID# Assignments Identify an Area ID# for each distinct Activity Area type within the surveyed area. A maximum of eight Activity Area types can be specified. Use the codes on Form ACTAREA, and indicate each area on the Site Plan sketch. Also consider lighting system controls and operation when defining these areas.

Area ID#	Surveyor's Description of Area (include floor and Bldg identifiers if needed)	Activity Area Type Code (AA Code)	Area has Windows	Area has Skylights	Conditioned Space Type Code	Total Qty of this Area Type On-site (Ref. Only)
1			<input type="checkbox"/>	<input type="checkbox"/>		
2			<input type="checkbox"/>	<input type="checkbox"/>		
3			<input type="checkbox"/>	<input type="checkbox"/>		
4			<input type="checkbox"/>	<input type="checkbox"/>		
5			<input type="checkbox"/>	<input type="checkbox"/>		
6			<input type="checkbox"/>	<input type="checkbox"/>		
7			<input type="checkbox"/>	<input type="checkbox"/>		
8			<input type="checkbox"/>	<input type="checkbox"/>		

Conditioned Space Type Codes	
CH = Cooled & Heated	CL = Only Cooled
HT = Only Heated	ECH = EvapCooled & Heated
ECL = Only EvapCool	NU = HVAC present but not used
RF = Refrigerated	UN = Unconditioned
OU = Outside	OT = Other (describe in comments)

AA Code	Activity Area Type Description	AA Code	Activity Area Type Description	AA Code	Activity Area Type Description
1	Auditorium/Gym	22	Guest Rooms (Hotel/Motel)	42	Religious Worship
2	Auto Repair Workshop	23	Kitchen/Break room & Food Prep.	43	Residential
3	Bank/Financial	24	Laboratory	44	Restrooms
4	Bar Cocktail Lounge	25	Laundry	45	Retail Sales/Showroom
5	Barber/Beauty Shop	26	Library	46	Smoking Lounge
6	Casino/Gaming	27	Loading Dock	47	Storage (Conditioned)
7	Classroom/Lecture	28	Lobby (Hotel)	48	Storage (Unconditioned)
8	Clean Room	29	Lobby (Main Entry and Assembly)	49	Storage (Refrigerated/Freezer), Walk-in
9	Computer Room/Data Processing	30	Lobby (Office Reception/Waiting)	50	Storage (Refrigerated/Freezer), Building
10	Comm/Ind Work (General High Bay)	31	Locker and Dressing Room	51	Surgery Rooms
11	Comm/Ind Work (General Low Bay)	32	Mall Arcade and Atrium	52	Theater (Motion Picture)
12	Comm/Ind Work (Precision)	33	Mechanical/Electrical Room	53	Theater (Performance)
13	Conference Room	34	Medical Offices and Exam Rooms	54	Unknown
14	Convention and Meeting Center	35	Office (Executive/Private)	55	Vacant (Conditioned)
15	Copy Room	36	Office (General)	56	Vacant (Unconditioned)
16	Corridor / Hallways	37	Office (Open Plan)	57	Vocational Areas
17	Courtrooms	38	Patient Rooms	98	Non Rebated Area
18	Dining Area	39	Patio Area	99	Other Unlisted Activity Types
19	Dry Cleaning	40	Pool/Spa Area	0	Outside/Outdoor Area
20	Exercise Centers/Gymnasium	41	Police/Fire Station		
21	Exhibit Display Area / Museum				

COMMENTS:

Site-Plan Sketch

This sketch sheet must be used for the lighting logger installation plan and can also be used to indicate where the rebated measures are located. Activity Areas used for subsampling and counting should also be noted on this sketch, using the appropriate Activity Area code from Form ACTAREAS. Also indicate the orientation of the building and the primary entry/exit.

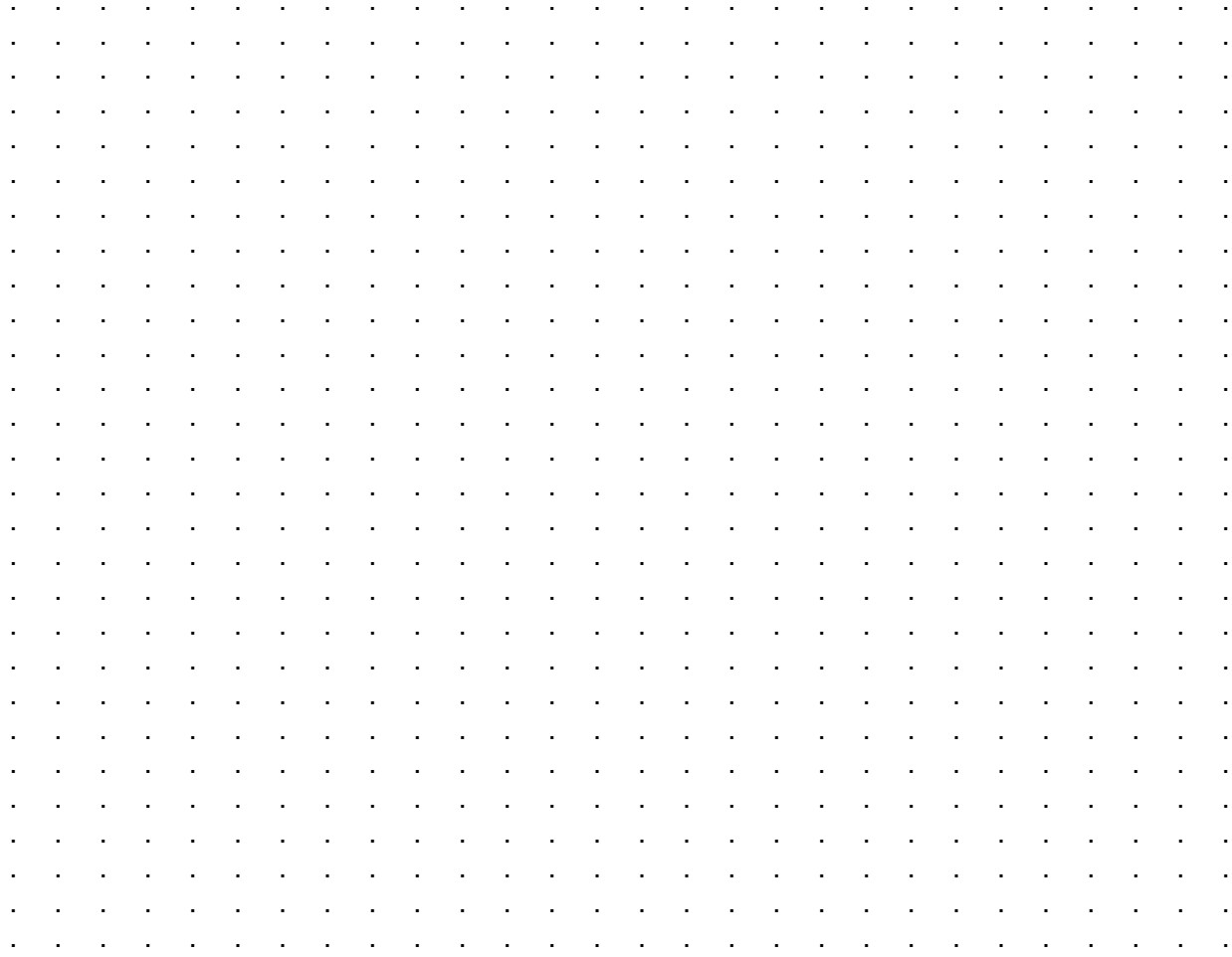
A large grid of dots for sketching, consisting of 20 columns and 20 rows of small black dots.

Site-Plan sketch comments (no data entry):

Seven horizontal lines for entering site-plan sketch comments.

Site-Plan Sketch (additional)

Use this sheet if an additional sketch is required.

A large grid of dots for sketching a site plan. The grid consists of 20 columns and 20 rows of small, evenly spaced dots, providing a guide for drawing a site plan.

Site-Plan sketch comments (no data entry):

Hourly Equipment Operation Schedules

Use this form to indicate equipment operation. Circle the applicable days and define a complete week. Specify the % of equipment on or temperature in °F for all hours, and capture transition periods if known. Specify as many schedules as needed to capture equipment operation. Preface each Sched# with a letter to identify the end use (L=Lighting, M=Motors, F=Food Service, C=Cooling, H=Heating, P=Process, B=Boilers, etc.). LtgCtrlType is only required for lighting schedule and are presented in the table below.

Lighting Control Type Codes: C=Continuous/24 hour B=Bi-level Switch S=Manual on/off-switch TC=Timeclock E=EMS PC=Photocell
 PT=Photocell/Timeclock DM=Dimmer MS=Motion Sensor TW=Twist-timer DL=Daylighting controls OT=Other (describe in comments)

Hour	0-12	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
Hour	12-24	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24

Sched#: ___ SchdType (circle one): PctOn °F LtgCtrlType: ___ Description: _____

Applicable DayTypes		Percent (%) of Equipment On / Temperature °F											
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												

Sched#: ___ SchdType (circle one): PctOn °F LtgCtrlType: ___ Description: _____

Applicable DayTypes		Percent (%) of Equipment On / Temperature °F											
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												
M T W T F S S	0-12												
	12-24												

Comments:

Hourly Equipment Operation Schedules (cont.)

Hour	0-12	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
Hour	12-24	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24

Sched#: ____ SchdType (circle one): PctOn °F LtgCtrlType: ____ Description: _____

Applicable DayTypes		Percent (%) of Equipment On / Temperature °F											
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												

Sched#: ____ SchdType (circle one): PctOn °F LtgCtrlType: ____ Description: _____

Applicable DayTypes		Percent (%) of Equipment On / Temperature °F											
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												

Sched#: ____ SchdType (circle one): PctOn °F LtgCtrlType: ____ Description: _____

Applicable DayTypes		Percent (%) of Equipment On / Temperature °F											
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												
MTWTFSS	0-12												
	12-24												

For CFL Logger Sites ONLY

Use of Existing Incandescents for Baseline

This information will be used to answer the question: If there are incandescent bulbs onsite, could they be logged and the data used to estimate CFL baseline operation? The questions should be asked after the site walk through and after installing the lighting loggers.

1) Are there <u>any</u> installed incandescent lamps present onsite?	Y N
1a) If Yes to 1), how many are there (if estimated, indicate in comments)?	_____
1b) If Yes to 1), what are the incandescent lamp wattages? Spot check a few and separate different wattages by dashes, for example 75-65-60.	
2) If Yes to 1) are the incandescents installed in similar areas/fixtures/etc. as the <u>rebated</u> CFLs? (if No, then logging incandescents for baseline is not plausible and STOP)	Y N
2a) Ask the Site Contact: Did you use the incandescents that were replaced by the CFLs <u>more</u> than the incandescents that have not been replaced? For example, were high use incandescents replaced but low use incandescents like those in closets left in place?	Y N
2b) Ask the Site Contact: Why haven't you replaced the remaining incandescents?	
2c) Surveyor Assessment: Could the incandescent lamps be logged (can a logger be physically installed)?	Y N

Additional Comments:

Lighting Logger Installation Form (9/10/09)

Use this table to record information for installed measurement devices such as lighting loggers.

Installation Date		Extraction Date	
Installer's Initials		Extraction Initials	
Scheduled Extraction Date		Pilot Test Extraction Date	

Installation

Logger Serial Number					
Check if logger has a back-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Placement Area ID# (ref only)					
Lighting Tech Type (HIM)	CF LF HB	CF LF HB	CF LF HB	CF LF HB	CF LF HB
Logger Placement on Fixture	I(nt) E(xt) O(ther)	I E O	I E O	I E O	I E O
CFL: Marked for retention?	Y N	Y N	Y N	Y N	Y N
Placement Description Include building, floor, room #, etc. and be descriptive enough that it can be located for extraction. Also include schedule number (L1, L2...)					

Extraction

Logger Intact? (L=Lost/missing)	Y N L P	Y N L P	Y N L P	Y N L P	Y N L P
Extraction Comments					
Logger Date&Time (HH:MM)					
Computer Date&Time (HH:MM)					
Alternate Extraction Date					

Lighting Logger Installation Form (continued)

Use this table to record information for installed measurement devices such as lighting loggers.

Installation

Logger Serial Number					
Check if logger has a back-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Placement Area ID# (ref only)					
Lighting Tech Type (HIM)	CF LF HB	CF LF HB	CF LF HB	CF LF HB	CF LF HB
Logger Placement on Fixture	I(nt) E(xt) O(ther)	I E O	I E O	I E O	I E O
CFL: Marked for retention?	Y N	Y N	Y N	Y N	Y N
Placement Description Include building, floor, room #, etc. and be descriptive enough that it can be located for extraction. Also include schedule number (L1, L2...)					

Extraction

Logger Intact? (L=Lost/missing)	Y N L P	Y N L P	Y N L P	Y N L P	Y N L P
Extraction Comments					
Logger Date&Time (HH:MM)					
Computer Date&Time (HH:MM)					
Alternate Extraction Date					

Lighting Logger Installation Form (continued)

Use this table to record information for installed measurement devices such as lighting loggers.

Installation

Logger Serial Number					
Check if logger has a back-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Placement Area ID# (ref only)					
Lighting Tech Type (HIM)	CF LF HB	CF LF HB	CF LF HB	CF LF HB	CF LF HB
Logger Placement on Fixture	I(nt) E(xt) O(ther)	I E O	I E O	I E O	I E O
CFL: Marked for retention?	Y N	Y N	Y N	Y N	Y N
Placement Description Include building, floor, room #, etc. and be descriptive enough that it can be located for extraction. Also include schedule number (L1, L2...)					

Extraction

Logger Intact? (L=Lost/missing)	Y N L P	Y N L P	Y N L P	Y N L P	Y N L P
Extraction Comments					
Logger Date&Time (HH:MM)					
Computer Date&Time (HH:MM)					
Alternate Extraction Date					

Upstream Screw-In CFL Lighting Inventory Form (3/3/2009)

Visual Verification Data			
Item	#	#	#
Activity Area ID			
Schedule #			
Fixture Description (can/downlight, table lamp, etc.)			
Inside, Outside or Uninstalled: Spares?	I O US	I O US	I O US
Hard-wired or plug-in fixture?	HW PL	HW PL	HW PL
Total number of fixtures			
Number of sockets per fixture			
Total number of sockets			
Total # of Screw-In CFL lamps			
CFL Lamp Type Code			
Likely a rebated <i>Upstream Screw-In CFL</i> ?	Y N UNK	Y N UNK	Y N UNK
For spares: IOU rebate sticker on package?	PG&E SCE SDG&E	PG&E SCE SDG&E	PG&E SCE SDG&E
Total # of Screw-In Incandescent lamps			
Incandescent Lamp Type Code			
Total # of empty sockets			
Total # of burnt-out lamps			
Ltg Control Type Code	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT
Ltg Application Type Code	A T X TR D S P G F L OT	A T X TR D S P G F L OT	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT	R H S F A P OT	R H S F A P OT
Fixture Reflector Type: S=Specular/Metallic W=White	S W	S W	S W
Physical Inspection Data			
Lamps/fixtures are NOT accessible (Check box & explain)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of units physically inspected			
CFL Lamp Wattage			
Incandescent Lamp Wattage			
Screw-base size: M=Med. C=Candelabra I=Intermed.	M C I	M C I	M C I
CFL-Specific Data			
Make/Manufacturer			
Model #/Lamp Code			
Energy Star Observed?	Y N	Y N	Y N
Where were the CFL's purchased from?			
Baseline Lamp Type Code: What did the CFLs replace?			
Baseline lamp watts (if available on site)			
Lighting Logger Assignment			
Logger Installation Comments			
Primary Logger S/N			
Back-up Logger S/N			
General Comments (note user's experience with CFLs: success, complaints, issues): _____			

Upstream Screw-In CFL Lighting Inventory Form (3/3/2009)

Visual Verification Data			
Item	#	#	#
Activity Area ID			
Schedule #			
Fixture Description (can/downlight, table lamp, etc.)			
Inside, Outside or Uninstalled: Spares?	I O US	I O US	I O US
Hard-wired or plug-in fixture?	HW PL	HW PL	HW PL
Total number of fixtures			
Number of sockets per fixture			
Total number of sockets			
Total # of Screw-In CFL lamps			
CFL Lamp Type Code			
Likely a rebated <i>Upstream Screw-In CFL</i> ?	Y N UNK	Y N UNK	Y N UNK
For spares: IOU rebate sticker on package?	PG&E SCE SDG&E	PG&E SCE SDG&E	PG&E SCE SDG&E
Total # of Screw-In Incandescent lamps			
Incandescent Lamp Type Code			
Total # of empty sockets			
Total # of burnt-out lamps			
Ltg Control Type Code	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT
Ltg Application Type Code	A T X TR D S P G F L OT	A T X TR D S P G F L OT	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT	R H S F A P OT	R H S F A P OT
Fixture Reflector Type: S=Specular/Metallic W=White	S W	S W	S W
Physical Inspection Data			
Lamps/fixtures are NOT accessible (Check box & explain)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of units physically inspected			
CFL Lamp Wattage			
Incandescent Lamp Wattage			
Screw-base size: M=Med. C=Candelabra I=Intermed.	M C I	M C I	M C I
CFL-Specific Data			
Make/Manufacturer			
Model #/Lamp Code			
Energy Star Observed?	Y N	Y N	Y N
Where were the CFL's purchased from?			
Baseline Lamp Type: What did the CFLs replace?			
Baseline lamp watts (if available on site)			
Lighting Logger Assignment			
Logger Installation Comments			
Primary Logger S/N			
Back-up Logger S/N			
General Comments (note user's experience with CFLs: success, complaints, issues): _____			

Upstream Screw-In CFL Lighting Inventory Form (3/3/2009)

Visual Verification Data			
Item	#	#	#
Activity Area ID			
Schedule #			
Fixture Description (can/downlight, table lamp, etc.)			
Inside, Outside or Uninstalled: Spares?	I O US	I O US	I O US
Hard-wired or plug-in fixture?	HW PL	HW PL	HW PL
Total number of fixtures			
Number of sockets per fixture			
Total number of sockets			
Total # of Screw-In CFL lamps			
CFL Lamp Type Code			
Likely a rebated <i>Upstream Screw-In CFL</i> ?	Y N UNK	Y N UNK	Y N UNK
For spares: IOU rebate sticker on package?	PG&E SCE SDG&E	PG&E SCE SDG&E	PG&E SCE SDG&E
Total # of Screw-In Incandescent lamps			
Incandescent Lamp Type Code			
Total # of empty sockets			
Total # of burnt-out lamps			
Ltg Control Type Code	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT	C B S TC PC E MS DM DL TW PT OT
Ltg Application Type Code	A T X TR D S P G F L OT	A T X TR D S P G F L OT	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT	R H S F A P OT	R H S F A P OT
Fixture Reflector Type: S=Specular/Metallic W=White	S W	S W	S W
Physical Inspection Data			
Lamps/fixtures are NOT accessible (Check box & explain)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of units physically inspected			
CFL Lamp Wattage			
Incandescent Lamp Wattage			
Screw-base size: M=Med. C=Candelabra I=Intermed.	M C I	M C I	M C I
CFL-Specific Data			
Make/Manufacturer			
Model #/Lamp Code			
Energy Star Observed?	Y N	Y N	Y N
Where were the CFL's purchased from?			
Baseline Lamp Type: What did the CFLs replace?			
Baseline lamp watts (if available on site)			
Lighting Logger Assignment			
Logger Installation Comments			
Primary Logger S/N			
Back-up Logger S/N			
General Comments (note user's experience with CFLs: success, complaints, issues): _____			

CFL Compact Fluorescent Lighting Measures

IOU Tracking Data	Measure Category	CFL_MeasCategory
	Engineering Estimation Method	CFL_EngEstMethod
	Measure Code	CFL_OS_MeasCode
	Measure Name	CFL_OS_MeasName
	Rebated #of Units	CFL_IOUUnitQtyRebated
	IOU Unit Basis	CFL_IOUUnitBasis
	Correct Unit Basis (only if incorrect above) Can Rebated measures be clearly identified?	Y N
Visual Verification Data	Inside or outside lighting?	I O
	Total number of fixtures	
	Number of lamps per fixture	
	Total number of lamps	
	Ltg Application Type Code	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT	
Fixture Reflector Type: S=Specular/Metallic W=White	S W	
Verification Counts	(A) Installed & Operational # of units (ex post quantity) -- Was subsampling or estimation used? -- # <u>fixtures</u> switched off (basis may be different than IOU unit basis) -- # of <u>lamps</u> burned out in partial operation fixtures	Y N
	(B) # of Non-Operable (broken/entire fixture burned-out) Units in place	
	(C) # of Units in Storage/Spares -- Utility rebate sticker observed on packages?	Y N
Physical Inspection Data	<i>Lamps/fixtures are NOT accessible (Check box & explain in comments)</i>	<input type="checkbox"/>
	Number of units physically inspected	
	Lamp Wattage	
	Make/Manufacturer	
	Model/Lamp Code	
	Energy Star Observed	
	CFL Lamp Type Code	
	Is this a reflector/flood type CFL lamp?	Y N
	Ballast configuration: M=Modular I=Integral	M I
	Base type: P=Pin-base S=Screw-base	P S
Screw-base size: M=Med. C=Candelabra I=Intermed.	M C I	
Baseline System Summary Data (Observed or Self-Reported)	Is post-installation operation the same as pre-retrofit operation? -- If pre-retrofit operation was different, specify Sched #	Y N
	Lamp Type Code	
	Watts per lamp	
	Number of lamps per fixture	
	Observed versus Rebated # of Units is: E=Equal M=More L=Less OT (describe)	E M L OT
If Disposition Not Equal: Site Contact/Self-Report Questions	Self-Reported # of rebated units onsite (probe for rebated under 06-08)	
	Others purchased since rebated units installed	
	(D) # of units located at Other Affiliated Sites	

Failed (and Replaced) Rebated Units (Indirect/Self-Report)	How long did units typically operate before failure (months)?	
	(E) # of rebated units that Failed, but replaced w/ incandescent # of rebated units that Failed but were replaced in-kind (Ref)	
Removed Rebated Units (Indirect/Self-Report)	(F) # of rebated units that were Removed and not replaced -- When were the units removed? (month/year if possible)	
(Sum A-F) Total # of units accounted for on-site		(reqd)
Total # of units (A-F) MORE than Rebated # of Units	# that were rebated by other programs/projects?	
	# that were purchased at Retailer?	
	# that were received from utility give-away program?	
Total # of units (A-F) LESS than Rebated # of Units	# of rebated units, other site contact explanation (note in comments)	
	# of rebated units, unaccounted for	

CFL – Activity Area Assignment Table

Use this table to associate CFL # of units to Activity Areas, equipment operation schedules, and lighting loggers. The values in the “Represented # of Units” column must add up to the total # of installed and operational units in the table above.

Area ID #	Sched #	Item #	Represented # of Units	% of Total Inst&Op. Units (Ref)	Primary Logger S/N	Back-up Logger S/N	Comments
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%	<= Totals # of Installed & Operational Units check (no data entry)		

Comments: _____

Linear Fluorescent Lighting Measures

IOU Tracking Data	Measure Category	LINFLUOR_MeasCategory	D E L A M P I N G
	Engineering Estimation Method	LINFLUOR_EngEstMethod	
	Measure Code	LINFLUOR_OS_MeasCode	
	Measure Name	LINFLUOR_OS_MeasName	
	Rebated #of Units	LINFLUOR_IOUUnitQtyRebated	
	IOU Unit Basis	LINFLUOR_IOUUnitBasis	
	Correct Unit Basis (only if incorrect above) Can Rebated measures be clearly identified?	Y N	
Visual Verification Data	Inside or outside lighting?	I O	D E L A M P I N G
	Ceiling height in ft		
	Total number of fixtures		
	Number of lamps per fixture		
	Total number of lamps		
	Tube Length in ft. (e.g. 1.5 2 3 4 8)		
	Tube Diameter (T5 T8 T12)	T8 T5 T12	
	Special fixture type: Delamped or Tandem?	D T	
Verification Counts	Ltg Application Code	A T X TR D S P G F L OT	D E L
	Fixture Mount type code	R H S F A P OT	
	Reflector Type: S=Specular/Metallic W=White	S W	
	(A) Installed & Operational (or delamped) # of units (ex post quantity) -- Was subsampling or estimation used? -- # fixtures switched off (basis may be different than IOU unit basis) -- # of lamps burned out in partial operation fixtures	Y N	
(B) # of Non-Operable (broken/entire fixture burned-out) Units in place		D E L	
(C) # of Units in Storage/Spares			
<i>Lamps/fixtures are NOT accessible (Check box & explain in comments)</i>	<input type="checkbox"/>		
Number of units physically inspected			
Physical Inspection Data	Lamp Wattage		D E L A M P
	Lamp Make/Manufacturer		
	Lamp Model/Lamp Code		
	Ballast type: M=Magnetic E=Electronic A=Advanced	M E A	
	Predominant Fixture Type: # of ballasts per fixture		
	Ballast Model #		
	Ballast Manufacturer/Brand		
	Secondary Fixture Type: # of ballasts per fixture		
Baseline System Summary Data (Observed or Self-Reported)	Ballast Model #		D E L A M P
	Ballast Manufacturer/Brand		
	Is post-installation operation the same as pre-retrofit operation? -- If pre-retrofit operation was different, specify Sched #	Y N	
	Lamp Type Code		
	Lamp Wattage		
	Tube Length and Diameter (e.g. 4ft T12)		
Number of lamps per fixture		D E L A M P	
Ballast type: M=Magnetic E=Electronic A=Advanced	M E A		
Observed versus Rebated # of Units is: E=Equal M=More L=Less OT (describe)		E M L OT	

If Disposition Not Equal: Site Contact/Self-Report Questions	Self-Reported # of rebated units onsite (probe for rebated under 06-08)	
	Others purchased since rebated units installed	
	(D) # of units located at Other Affiliated Sites	
Failed (and Replaced) Rebated Units (Indirect/Self-Report)	How long did units typically operate before failure (months)?	
	(E) # of rebated units that Failed, but were replaced w/different tech	
	# of rebated units that Failed but were replaced in-kind (Ref)	
Removed Rebated Units (Indirect/Self-Report)	(F) # of rebated units that were Removed and not replaced	
	-- When were the units removed? (month/year if possible)	
(Sum A-F) Total # of units accounted for on-site		(reqd)
Total # of units (A-F) MORE than Rebated # of Units	# that were rebated by other programs/projects?	
	# that were obtained from other means (explain in comments)?	
Total # of units (A-F) LESS than Rebated # of Units	# of rebated units, other site contact explanation (note in comments)	
	# of rebated units, unaccounted for	

D
E
L
A
M
P

Linear Fluorescent – Activity Area Assignment Table

Use this table to associate lighting units to Activity Areas, equipment operation schedules, and lighting loggers. The values in the “Represented # of Units” column must add up to the total # of installed and operational units in the table above.

Area ID #	Sched #	Item #	Represented # of Units	% of Total Inst&Op. Units (Ref)	Primary Logger S/N	Back-up Logger S/N	Comments
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%	<= Total # of Installed & Operational Units check (no data entry)		

Comments (for delamping, explain how counts were confirmed: tombstone shadows observed, etc.): _____

Other Lighting Measures

IOU Tracking Data	
Measure Category	OTHERLIGHTING_MeasCategory
Engineering Estimation Method	OTHERLIGHTING_EngEstMethod
Measure Code	OTHERLIGHTING_OS_MeasCode
Measure Name	OTHERLIGHTING_OS_MeasName
Rebated #of Units	OTHERLIGHTING_IOUUnitQtyRebated
IOU Unit Basis	OTHERLIGHTING_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification Data:	
Inside or outside lighting?	I O
Lamp Type Code	
Total number of fixtures	
Number of lamps per fixture	
Total number of lamps	
Ceiling height in ft	
Ltg Application Code	A T X TR D S P G F L OT
Fixture Mount Type Code	R H S F A P OT
Reflector Type: S=Specular/Metallic W=White	S W
Verification Counts	
(A) Installed & Operational # of units (ex post quantity)	
-- Was subsampling or estimation used?	Y N
-- # of <u>fixtures</u> switched off (may be different than IOU unit basis)	
-- # of <u>lamps</u> burned out in partial operation fixtures	
(B) # of Non-Operable (broken/entire fixture burned-out) Units in place	
(C) # of Units in Storage/Spares	
Physical Inspection Data	
<i>Lamps/fixtures are NOT accessible (Check box & explain in comments)</i>	<input type="checkbox"/>
Number of units physically inspected	
Lamp Wattage	
Lamp Make/Manufacturer	
Lamp Model/Lamp Code	
Ballast type: M=Magnetic E=Electronic A=Advanced	M E A
Baseline System Summary (Observed or Self-Report):	
Is post-installation operation the same as pre-retrofit operation?	Y N
-- If pre-retrofit operation was different, specify Sched #	
Lamp Type Code	
Lamp Wattage	
Tube Length and Diameter (e.g. 4ft T12)	
Number of lamps per fixture	
Ballast type	M E A
Baseline Control Type Code	
Observed versus Rebated # of Units is: E=Equal M=More L=Less OT (describe)	E M L OT
If Disposition Not Equal: Site Contact/Self-Report Questions	
Self-Reported # of rebated units onsite (probe for rebated under 06-08)	
Others purchased since rebated units installed	
(D) # of units located at Other Affiliated Sites	

Failed Rebated Units (Indirect/Self-Report)	
-- How long did units typically operate before failure (months)?	
-- (E) # of rebated units that Failed, but replaced w/different tech	
-- # of rebated units that Failed but were replaced in-kind (Ref)	
Removed Rebated Units (Indirect/Self-Report)	
(F) # of rebated units that were Removed and not replaced	
-- When were the units removed? (month/year if possible)	
(Sum A-F) Total # of units accounted for on-site	
Total # of units (A-F) MORE than Rebated # of Units (self-report):	
# that were rebated by other programs/projects?	
# that were obtained from other means (explain in comments)?	
Total # of units (A-F) LESS than Rebated # of Units (self-report):	
# of rebated units, other site contact explanation (describe in comments)	
# of rebated units, unaccounted for	

Other Lighting – Activity Area Assignment Table

Use this table to associate lighting units to Activity Areas, equipment operation schedules, and lighting loggers. The values in the “Represented # of Units” column must add up to the total # of installed and operational units in the table above.

Area ID #	Sched #	Item #	Represented # of Units	% of Total Inst&Op. Units (Ref)	Primary Logger S/N	Back-up Logger S/N	Comments
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%			
				%	<= Totals # of Installed & Operational Units check (no data entry)		

Comments: _____

Greenhouse Measures

IOU Tracking Data:	
Measure Category	GREENHOUSE_MeasCategory
Engineering Estimation Method	GREENHOUSE_EngEstMethod
Measure Code	GREENHOUSE_OS_MeasCode
Measure Name	GREENHOUSE_OS_MeasName
Rebated #of Units	GREENHOUSE_IOUUnitQtyRebated
IOU Unit Basis	GREENHOUSE_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification Data	
Units are NOT accessible (Check box & describe in comments)	<input type="checkbox"/>
Heat Curtain or Infrared Film Measure	HC IR
Total Number of Treated Greenhouses	
Year the Treated Greenhouses were Constructed (YYYY)	
Roof Shape: Q=Quonset/hoop GO=Gothic Arch GA=Gable/Truss	Q GO GA
Roof/Wall Material Type Code	
Observed Heating System Type	
Heating System Type Code:	
Make/Manufacturer	
Model #	
Night-time Indoor Setpoint Temperature, °F	
Temperature Control Type	TH TI ST CE MA OT
Other Self-Report/Site Contact Questions	
Predominant Operation Schedule #	
# of months of complete shut-down	
Pre-Retrofit Roof/Wall Material Type	
How often is roof/wall material typically replaced (years)?	
Is IR film standard practice? (explain if needed)	Y N
Are Heat Curtain Systems standard practice? (explain if needed)	Y N
HEAT CURTAIN Verification Data & Counts	
Location of Heat Curtain System: I=Interior E=Exterior	I E
Heat Curtain Config.: G=Gutter-to-gutter (width), T=Truss-to-truss (length)	G T
Operation of Heat Curtain: MA=Manual/By-hand MT=Motor-driven	MA MT
Heat Curtain Mat'l: P=Poly. Film K=Knitted white poly. C=CompositeFabric OT=Other	P K C OT
HC Condition Code: N=New G=Good F=Fair R=Ragged/Cut M=Missing/None	N G F R M
Material Make/Manufacturer	
Description/Item#/Other Identifier	
Total sq ft of Heat Curtain Installed on Active Greenhouses	
-- Was subsampling or estimation used?	Y N
Observed versus Rebated sq ft of HC: E=Equal M=More L=Less OT (describe)	E M L OT
If Total # of units is MORE than Rebated # of units:	
# that were rebated by other programs/projects	
# that were obtained from other means (explain in comments)	
If Total # of units is LESS than Rebated # of units:	
# of rebated units, site contact explanation (describe in comments)	
# of rebated units, unaccounted for	
INFRARED (IR) FILM Verification Data & Counts	
IR Film Condition Code: N=New G=Good F=Fair R=Ragged/Cut M=Missing/None	N G F R M

IR film used on: R=Roof W=Wall A=All		R W A
Material Make/Manufacturer		
Description/Item#/Other Identifier		
Total sq ft of IR Film Installed on Active Greenhouses		
-- Was subsampling or estimation used?		Y N
Observed versus Rebated sq ft of IRF: E=Equal M=More L=Less OT (describe)		E M L OT
If Total # of units is MORE than Rebated # of units:		
# that were rebated by other programs/projects		
# that were obtained from other means (explain in comments)		
If Total # of units is LESS than Rebated # of units:		
# of rebated units, site contact explanation (describe in comments)		
# of rebated units, unaccounted for		

Greenhouse Details Worksheet

Use this worksheet if needed to tally up totals for the verification table above.

Confi g ID	HC Confi g Type	Floor Type Code	# of Similar GHs	Roof Height	Gable Height	Width	Length	Area	Description
	G T								
	G T								
	G T								
	G T								
	G T								
	G T								

Comments: _____

Greenhouse Measure Codes

Heat Curtain Material Type Codes	Roof/Wall Material Type Codes	Temperature Control Type Codes
P = Polyethylene Film K = Knitted white polyester C = Composite fabrics OT = Other (describe in comments)	1G = Single Pane Glass 2G = Double-pane glass 1PE = 1-layer Polyethylene (PE) PIN = 2-layer Inflated PE (No IR Film) PIR = 2-layer Inflated PE (With IR Film) 1F = 1-layer Fiberglass 1PC = 1-layer Polycarbonate (clear) 2PC = 2-layer Polycarbonate (8 mm) OT = Other (describe in comments)	TH = Thermostat TI = Timers ST = Step Controls CE = Computer environment controls MA = Manual on/off OT = Other (describe in comments)
Floor Type Codes	Heating System Type Codes	
U = Un-insulated, Bare Soil B = Brick C = Concrete S = Styrofoam OT = Other (describe in comments)	UH = Unit Space Heater HW = Hot Water System ST = Steam Heating System UR = Unit Radiant Heaters	SR = Solar Radiant Systems PT = Poly-Tube Systems OT = Other (describe in comments)

Steam Traps (Industrial/Commercial)

IOU Tracking Data	
Measure Category	STEAMTRAPS_MeasCategory
Engineering Estimation Method	STEAMTRAPS_EngEstMethod
Measure Code	STEAMTRAPS_OS_MeasCode
Measure Name	STEAMTRAPS_OS_MeasName
Rebated #of Units	STEAMTRAPS_IOUUnitQtyRebated
IOU Unit Basis	STEAMTRAPS_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification Data	
Commercial or Industrial?	C I
Steam Applications (circle all that apply): CP=Clothing Press DC=Dry Cleaning SH=Space Heating CD=Clothes Dryer OT=Other (describe in comments)	CP DC SH CD OT
Other Natural Gas Applications (circle all that apply): HW=Hot Water SH=Space Heating CD=Clothes Dryer OT=Other (describe in comments)	HW SH CD OT
Steam Pipe Diameter, in. (at boiler)	
Steam Pressure, psi. (at boiler gauge)	
Steam Pipe Insulated?	Y N
Condensate Recaptured/Recovered for use?	Y N
Condensate Pipe Insulated (only if "Y" above)?	Y N
Verification Counts	
Installed and Operational # of units (ex post quantity) -- Was subsampling or estimation used?	Y N
Physical Inspection Data	
Units are NOT accessible (Check box & explain in comments)	<input type="checkbox"/>
Number of units physically inspected	
Predominant Config/Type Code (ME=Mechanical, TS=Thermostatic, TD=Thermodynamic)	ME TS TD
Predominant Make/Manufacturer	
Predominant Model #	
Additional Make/Manufacturer	
Additional Model #	
If condensate is NOT recovered: Steam being emitted from condensate pipe?	Y N
Condensate being emitted from condensate pipe?	Y N
Predominant Boiler Operation Schedule #	
Did operator observe any steam trap problems before/after their replacement?	Y: Before / After N
Since steam trap repl.: has No. of Employees or Hours of Operation changed?	Empl: ↑ ↓ N Hours: ↑ ↓ N
Since steam trap repl.: has steam eqmt. increased, decreased or been replaced?	Eqmt: ↑ ↓ R N
Normal steam trap replacement schedule (years)	
Observed versus Rebated # of units: E=Equal M=More L=Less OT (describe)	E M L OT
If Total # of units is MORE than Rebated # of units:	
# that were rebated by other programs/projects	
# that were obtained from other means (explain in comments)	
If Total # of units is LESS than Rebated # of units:	
# of rebated units, site contact explanation (describe in comments)	
# of rebated units, unaccounted for	

Comments: _____

Strip Curtains (Refrigeration)

IOU Tracking Data	
Measure Category	STRIPCURTAINS_MeasCategory
Engineering Estimation Method	STRIPCURTAINS_EngEstMethod
Measure Code	STRIPCURTAINS_OS_MeasCode
Measure Name	STRIPCURTAINS_OS_MeasName
Rebated #of Units	STRIPCURTAINS_IOUUnitQtyRebated
IOU Unit Basis	STRIPCURTAINS_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification Data	
Predominant Conditioned Space Type code (that door opens into): UN=Uncond. CH=Cooled & Heated CL=Cooled only HT= Heated only RF=Refrigerated OU=Outdoors	UN CH CL HT RF OU
Type of Walk-In: P=Prep Area C=Cooler F=Freezer	P C F
Walk-In Temperature (°F)	
Walk-in Floor Area (sq ft)	
Does walk-in have an open dairy case on one side?	Y N
Strip Curtain Condition Code: N=New G=Good F=Fair R=Ragged/Cut M=Missing/None	N G F R M
Strip Curtains tied back (as observed during on-site)?	Y N
Strip Curtain Type Code: ST=Strips SO=Solid doors OT=Other (describe in comments)	ST SO OT
Refrig. System Type: SC=Self-Contained/RCU RR=Remote Refrigeration	SC RR
Verification Counts	
Total Sq Ft of Door Opening Area covered by strip curtains	
# of Identical Doors w/ Strip Curtains	
-- Door height (inches)	
-- Door width, per door (inches)	
-- Door opening area (sq ft)	
Observed versus Rebated Sq Ft: E=Equal M=More L=Less OT (describe)	E M L OT
If Total Sq Ft is MORE than Rebated Sq Ft:	
# that were rebated by other programs/projects	
# that were obtained from other means (explain in comments)	
If Total Sq Ft is LESS than Rebated Sq Ft:	
# of rebated units, site contact explanation (describe in comments)	
# of rebated units unaccounted for	
Operation and Baseline System Summary (Self-Report)	
Hours/day that walk-in doors are left open	
Pre-Retrofit Strip Curtain Condition Code (same codes as above)	N G F R M
Are strip curtains replaced as part of standard maintenance?	Y N
If Yes, what is normal strip curtain maint. sched. (years or verbal response)	

Comments: _____

Strip Curtain Details Worksheet

Use this worksheet if needed to tally up totals for the verification table above.

Measure Code: _____ Total # of Rebated units: _____ Unit Basis: _____

Item	Type of Walk-In	Floor Area ft2	Has Reach-In Dairy Case	Refrig. System Type	SC Condition	Walk-in Temp (°F)	Door Height (in.)	Door Width (in.)	Door Opening Sq Ft	Location /Description
1	P C F		<input type="checkbox"/>	SC RR	N G F R M					
2	P C F		<input type="checkbox"/>	SC RR	N G F R M					
3	P C F		<input type="checkbox"/>	SC RR	N G F R M					
4	P C F		<input type="checkbox"/>	SC RR	N G F R M					
5	P C F		<input type="checkbox"/>	SC RR	N G F R M					
6	P C F		<input type="checkbox"/>	SC RR	N G F R M					
7	P C F		<input type="checkbox"/>	SC RR	N G F R M					
TOTAL		<input type="text"/>							TOTAL	<input type="text"/>

Door Gaskets (Refrigeration)

IOU Tracking Data	
Measure Category	DOORGASKETS_MeasCategory
Engineering Estimation Method	DOORGASKETS_EngEstMethod
Measure Code	DOORGASKETS_OS_MeasCode
Measure Name	DOORGASKETS_OS_MeasName
Rebated #of Units	DOORGASKETS_IOUUnitQtyRebated
IOU Unit Basis	DOORGASKETS_IOUUnitBasis
Can Rebated measures be clearly identified?	Y N
Visual Verification Data	
Predominant Conditioned Space Type code (that door opens into)	
Type of Equipment: C=Cooler, F=Freezer	C F
Case Temperature (°F)	
Type of door: S=Solid G=Glass	S G
Configuration of Cooler/Freezer: W=Walk-in R=Reach-In	W R
Gasket Condition Code: N=New G=Good F=Fair R=Ragged/Cut M=Missing/None	N G F R M
System Type: Self-Contained/RCU or Remote Refrigeration?	SC RR
Verification Counts	
Total Linear Feet of Gasket Installed	
# of Identical Doors w/ Gaskets	
-- Door height (inches)	
-- Door width, per door (inches)	
-- Door perimeter/gasket linear feet	
Observed versus Rebated Lin Ft: E=Equal M=More L=Less OT (describe)	E M L OT
If Total Lin Ft is MORE than Rebated Lin Ft	
# that were rebated by other programs/projects	
# that were obtained from other means (explain in comments)	
If Total Lin Ft is LESS than Rebated Lin Ft	
# of rebated units, site contact explanation (describe in comments)	
# of rebated units unaccounted for	
Other Self-Report/Site Contact Questions	
% of Time door is open	
Pre-Retrofit Gasket Condition Code	N G F R M
Are door gaskets replaced as part of standard maintenance?	Y N
Gasket replacement strategy: Replace A=All W=only worn/damaged	A W
Normal Gasket Maintenance schedule (Months or verbal response)	

Comments: _____

Door Gasket Details Worksheet

Use this worksheet if needed to tally up totals for the verification table above.

Item	Type of Equip	Type of Door	Config (WalkIn / ReachIn)	Gasket Condition	Case Temp (°F)	# of Doors	Door Height (in.)	Door Width (in.)	Gasket Perimeter per door (linear ft)	Total Gasket Linear Feet		
	C F	S G	W R	N G F R M								
	C F	S G	W R	N G F R M								
	C F	S G	W R	N G F R M								
	C F	S G	W R	N G F R M								
	C F	S G	W R	N G F R M								
	C F	S G	W R	N G F R M								
	C F	S G	W R	N G F R M								
	C F	S G	W R	N G F R M								
TOTAL						<input type="text"/>					TOTAL	<input type="text"/>

Generic Verification Form for Non-High Impact Measures

IOU Tracking Data:	
Measure Category	GENERIC_MeasCategory
Engineering Estimation Method	GENERIC_EngEstMethod
Measure Code	GENERIC_OS_MeasCode
Measure Name	GENERIC_OS_MeasName
Rebated #of Units	GENERIC_IOUUnitQtyRebated
IOU Unit Basis	GENERIC_IOUUnitBasis
Correct Unit Basis (only if incorrect above)	
Can Rebated measures be clearly identified?	Y N
Visual Verification & Counts Data	
(A) Installed & Operational # of units (ex post quantity)	
-- Was subsampling or estimation used?	Y N
-- # units switched off	
-- # of units burned out	
-- # of units in back-up mode (may need to ask)	
(B) # of Non-Operable (broken/disconnected) Units in place	
(C) # of Units in Storage/Spares	
Physical Inspection Data	
Units are NOT accessible (Check box & describe in comments)	<input type="checkbox"/>
Number of units physically inspected	
Meets technical specifications (prem-eff, etc.)?	Y N
Size (tons, hp, watts, ft2)	
Make/Manufacturer	
Model #	
Op Hours Estimate: Predominant Equipment Operation Schedule # (if relevant)	
Baseline Summary Data:	
Baseline System Description	
Observed versus Rebated # of Units: E=Equal M=More L=Less OT (describe)	E M L OT
If Disposition Not Equal: Site Contact/Self-Report Questions	
Self-Reported # of rebated units onsite (probe for rebated under 06-08)	
Others purchased since rebated units installed	
(D) # of units located at Other Affiliated Sites	
Failed Rebated Units (Indirect/Self-Report)	
-- How long did units typically operate before failure (months)?	
-- (E) # of rebated units that Failed, but replaced w/different tech	
-- # of rebated units that Failed but were replaced in-kind (Ref)	
Removed Rebated Units (Indirect/Self-Report)	
(F) # of rebated units that were Removed and not replaced	
-- When were the units removed? (month/year if possible)	
(Sum A-F) Total # of units accounted for on-site	
Total # of units (A-F) MORE than Rebated # of Units (self-report):	
# that were rebated by other programs/projects?	
# that were obtained from other means (explain in comments)?	
Total # of units (A-F) LESS than Rebated # of Units (self-report):	
# of rebated units, other site contact explanation (describe in comments)	
# of rebated units unaccounted for	

Comments: _____

Site Photo Log

Record site photo information here including the PhotoID (i.e. digital file name) and a brief description of the photo where needed. Site Photos should include the site entrance and entire building, rebated measures, and close-up photos of nameplates, lamp codes, and other make/model identification. Refer to the training manual for more on what photos to take. Photo/file naming conventions is SiteID_Item# or SiteID 00# (e.g. PGE_056789_1.jpg, PGE_056789 001.jpg).

Item #	Description/Comments/Measure Code (no data entry)
1	
2	
3	
4	
5	
6	
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8	
9	
10	
11	
12	
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30	

Lighting Logger Installation Plan & Worksheet (no data entry)

This table would be used to create a lighting logger plan. The Site Plan, Activity Area Definitions, and Schedules would be used along with the measure counts in each area and on each unique schedule. Results from this plan would then be transferred to the measure-specific forms

Item	Description	Area ID#	Measure Codes/Counts				Sched #	Logger ID#	Back-up Logger #
TOTALS									

Additional Comments:

SubSampling Worksheet (no data entry)

This form should be completed whenever subsampling is needed to develop the final verified number of rebated units. Use the following guidelines to develop the subsampling approach:

1. Divide the total number of installed units into logical sampling units (buildings, areas, guest rooms, etc.) and account for various measure sizes (i.e. a hotel might use 3 or 4 different sized heat pumps so one of each type should be verified).
2. Verify (count & visual) all of the units in at least one of each type of representative area and measure size category (=area to be subsampled).
3. Use the table below to record the subsampling method that was used (quantity and types of sampling units, # of rebated units installed in each area, etc.)
4. Record sampled measure specifications and make/model for each size/configuration in the comments section below, and identify the subsampled area they are associated with.
5. Contact Itron or KEMA with questions or for guidance.

Measure Code: _____ Total # of Rebated units: _____ Unit Basis: _____

Item	Description of Area to be Subsampled	Visual/Physical Counts			(A/B)	C*(A/B)
		(A) Total Qty of Area to be SubSampled	(B) Qty of Areas Subsampled	(C) # of Units Counted in Subsampled Area		
TOTALS						

Notes/Comments: _____

SURVEY FIELD CODE TABLES

Observed Business/Building Type Codes

Business Type	Code	Business Type	Code	Business Type	Code
Offices (Non-Medical):		Retail Store:		Lodging:	
Administration and management	011	Department / Variety Store	041	Hotel	081
Financial / Legal	012	Retail Warehouse/Clubs	042	Motel	082
Insurance/Real Estate	013	Shop in Enclosed Mall	043	Resort	083
Data Processing/Computer Center	014	Shop in Strip Mall	044	Other Lodging	084
Mixed-Use/Multi-tenant	015	Auto Sales	045	Public Assembly:	
Lab/R&D Facility	016	Other Retail Store	046	Religious Assembly (worship only)	091
Software Development	017	Warehouse:		Religious Assembly (mixed use)	092
Government Services	018	Refrigerated Warehouse	051	Health/Fitness Center	093
Other Office	019	Unconditioned Warehouse, High Bay	052	Movie Theaters	094
Restaurant/Food Service*:		Unconditioned Warehouse, Low Bay	053	Theater / Performing Arts	095
Fast Food or Self Service	021	Conditioned Warehouse, High Bay	054	Library / Museum	096
Specialty/Novelty Food Service	022	Conditioned Warehouse, Low Bay	055	Conference/Convention Center	097
Table Service	023	Health Care:		Community Center	098
Bar/Tavern/Nightclub/Other	024	Hospital	061	Other Recreational/Public Assembly	099
Other Food Service	025	Nursing Home	062	Services:	
Food Stores :		Medical/Dental Office	063	Gas Station / Auto Repair	101
Supermarkets	031	Clinic/Outpatient Care	064	Gas Station w/Convenience Store**	102
Small General Grocery	032	Medical/Dental Lab	065	Repair (Non-Auto)	103
Specialty/Ethnic Grocery	033	Education:		Other Service Shop	104
Convenience Store**	034	Daycare or Preschool	071	Miscellaneous:	
Liquor Store	035	Elementary School	072	Assembly / Light Mfg.	111
Other Food Store	036	Middle / Secondary School	073	Police / Fire Stations	112
Agricultural:		College or University	074	Post Office	113
Commercial Greenhouse	200	Vocational or Trade School	075	Other Comm. Describe below	130
Other Ag. Describe below	210			Industrial: Use SIC or NAICS code	

* For Restaurant/Food Service businesses, note in comments which meals are served (Breakfast/Lunch/Dinner).







** Convenience stores that do not sell gasoline should be coded as 034; convenience stores that do sell gasoline should be coded as 102.

Other Building Type Description: _____

Lighting Field Codes

Lamp Type Codes		CFL Lamp Type Codes	
LED = LED	F = Fluorescent	TW = Bare-MiniTwist/Screw	
Q = Quartz/Halogen	UT = Fluorescent U-tube	TU = Bare-Tube	
E = Electrodeless/Induction	OF = Other Fluorescent	AL = Covered-A-Line	
IP = Incandescent PAR	CF = Compact Fluorescent	GL = Covered-Globe	
IR = Incandescent Reflector/Flood	CIR = Circline Fluorescent	BU = Covered-Bullet/Post/Candelabra	
I = Incandescent	MV = Mercury Vapor	CIR = Circline	
ER = Self/battery powered exit signs	MH = Std Metal Halide	RF = Reflector	
N = Neon	PS = Pulse-Start Metal Halide		
OT = Other (describe in comments)	HPS = High-Pressure Sodium Vapor		
	LPS = Low-Pressure Sodium Vapor		
Ltg Control Type Codes	Fixture Mount Type Codes	Ltg Application Codes	
C = Continuous/24 hour	R = Recessed (non-can)	A = Area	T = Task
B = Bi-level Switch	H = Hanging/Suspended	X = Exit	TR = Track
S = Manual on/off-switch	S = Surface-mount (ceiling or wall)	D = Display/Advertising	
E = EMS	F = Ceiling Fan	S = General/Security	
PC = Photocell	A = Attached to bldg	P = Parking Lot	G = Parking Garage
PT = Photocell/Timelock	P = Pole	F = Bldg façade	L = Landscape
DM = Dimmer	OT = Other (describe in comments)	OT = Other (describe in comments)	
MS = Motion Sensor			
TW = Twist-timer			
DL = Daylighting controls			
OT = Other			

Screw-In CFL Configurations (Ref: Energy Star)

Bare Products		Covered Products			Reflector Products	
Mini-Spiral or Twist	Tube or Universal	Incandescent / A-line	Globe G25, G30, G40	Candelabra, Post or Bullet Shape	Indoor and Outdoor R20, R30, R40, PAR38	
						
TW	TU	AL	GL	BU	RF	

NOTE: Pin-based CFLs are almost always either tube or circline.

Appendix C

Pre-/Post-Retrofit Survey

- Pre/Post Summary Memorandum
- Pre- and Post-Retrofit Inventory and Runtime Hour Monitoring Study (survey form)
- Procedures for Installing the Data Loggers
- How to Take Spot Power Measurement with the Current Amplifier



Memorandum

To: John Cavalli and Elsia Galawish, Itron

From: Jennifer Barnes and Adam Knickelbein, Summit Blue

Date: November 6, 2009

RE: Pre/Post Summary

Summit Blue was engaged by the California Public Utilities Commission (CPUC or Commission) to conduct a statewide lighting study to gather pre- and post-retrofit field data from 200 linear fluorescent lighting, 100 high bay lighting, and 50 occupancy sensor retrofit projects (Pre/Post Study, Pre/Post, or Study) completed through various programs in the IOUs' 2006-2008 portfolio of programs. This work was a component of a broader study of linear fluorescent and high bay lighting, and occupancy sensors conducted by Itron.

This report describes the project objectives, implementation, and final disposition of the Pre/Post data collection effort. A discussion of the issues and challenges is also provided. As the field data collected through the Pre/Post was passed to Itron to be analyzed for their post-only data, there are not separate Pre/Post results.

Study Objectives

The primary objective of the Pre/Post Study was to collect primary energy use data for C&I linear fluorescent fixtures, high bay fixtures, and occupancy sensors to support an estimate of mean lifetime avoided cost savings associated with installing each of these three high-impact measures (HIMs), measured with a high level of confidence.

Secondary objectives of the Study were to:

- Collect primary energy use data to support development of hourly (8,760) load shapes for each HIM, for a number of key market segments, and for a number of space types within each market segment.

- Collect contextual data about sites in the sample, including the equipment type, wattage, operating schedules, how prior equipment was used, and an assessment of the likely wattage of prior equipment; and
- Collect field data for 200 linear fluorescent lighting, 100 high bay lighting, and 50 occupancy sensor projects installed through selected programs within the IOUs 2006-2008 portfolio of programs to include inventories of lighting fixtures, customer-reported operating schedules, spot measurements of lighting fixture wattage, and actual fixture operating schedules captured by fixture time-of-use data logging.

Program and Building Type Targets

Table 1 presents the targets within each IOU territory for each technology type. The targets for each IOU were broken down further by IOU program and DEER building type. The IOU program and building type targets are presented in Exhibit 1.

Table 1. Site Targets by IOU and Technology Type

	PG&E	SCE	SDG&E	Total
Linear Fluorescent	66	61	67	194
High Bay	34	33	33	100

Occupancy sensors projects were not specifically recruited for as it was expected that the targeted linear fluorescent and high bay installations would include occupancy sensors.

Field Requirements

The Pre/Post Study collected a robust set of pre- and post-retrofit data for each participant site. Generically, the data collected at each site included both visual observations and measurements. At each site, the field auditors observed the following:

Site information: This data included electric and gas meter numbers, basic information about the business, and basic information about the building itself. The field auditors recorded business type, ownership, and operating hours. They also recorded heating and cooling system types, total floor area, and floor area by space type.

Customer reported operating schedule: In addition to *business* operating hours, the field auditors asked the customers about the schedule for each specific lighting circuit with fixtures to be retrofit. This was recorded in detail as the percent “on” time, in each hour of every daytype.

Fixture data: Summit Blue collected detailed information for every fixture affected by the retrofit. Every unique ballast and lamp combination was defined. This information included items such as lamp manufacturer and model number, lamp quantity, lamp length and diameter (if linear fluorescent), and ballast manufacturer and model number. It also included contextual data not affecting fixture power, such as lighting application, mounting type, reflector, and floor-to-fixture height.

Lighting inventory: The final component of the field observations was the lighting inventory. This task required the field auditors to identify the lighting circuits feeding every fixture affected by the retrofit. Each lighting circuit was defined as serving one previously-defined space type, and with one customer-reported schedule. The field auditors then recorded the quantity and type of fixtures on each

of these defined circuits. The information contained in the lighting inventory provided the “load” portion of determining the 8,760 load shape for the circuit. When combined with all of the other lighting circuits at the site, the load could be aggregated at both the site and space-type level.

The other task required of the field auditors was to collect actual measurements of both fixture power data and the time-of-use for each lighting circuit defined in the lighting inventory. Specifically, the field auditors conducted:

Spot measurements: The field auditors conducted spot measurements of power for as many defined fixtures as safety and time allowed. Most often, this measurement was taken at the fixture, upstream of the ballast. When fixtures could not be accessed due to height or safety issues, the field auditors took spot measurements at the point-of-control (such as the switch), or at the electrical panel. The field auditors recorded volts, power factor, amps, and watts for every measurement, and they conducted on-the-spot quality control calculations to ensure the integrity of their measurements. Finally, the field auditors recorded the perceived condition of the fixture on which they took the measurement. These spot measurements of power are applied in the Lighting Inventory to inform the actual circuit power.

Time-of-Use Data logging: This critical measurement involved leaving data loggers in place over some period of time to capture the typical usage of each defined lighting circuit, both pre- and post-retrofit. The goal was not only to determine time-of-use for the fixtures on the lighting circuit, but to also see if the usage changed from pre- to post-retrofit. Summit Blue attempted to install at least one data logger on every circuit feeding fixtures affected by the retrofit; often, a “backup” logger was also installed in case the primary logger failed. The information provided by the logger data provides the “shape” portion of determining the 8,760 load shape for this circuit. When combined with all of the other lighting circuits at the site, the shape can be aggregated at both the site and space-type level.

Two weeks of pre-retrofit data was captured. This allowed for two data points for each day type. Ideally, more data could have been captured pre-retrofit, but two weeks was a good compromise with the retrofit programs who wanted to reduce their delay in completing the retrofit. Because there was no time pressure from the lighting installers after the retrofit was complete, thirty days of post-retrofit logging was conducted.

The Pre/Post data collection forms used to record the various data elements are presented in Exhibit 2.

Recruitment and Scheduling

It should be noted that the Pre/Post was conducted as part of the measurement and verification of the California IOU’s 2006-2008 portfolio of programs. However, because the study commenced at the end of 2008 and required recruitment of sites prior to the actual program participation, it was not possible to include sites that fell into the 2006-2008 program years.

The programs within the Pre/Post sample included IOU-run rebate and direct install programs, third-party-run direct install programs, and local government partnership (LGP) direct install programs. Each program type had unique customer recruitment and project implementation procedures, which required a customized recruitment approach for the Pre/Post. Each program type and its recruitment process are described below.

IOU-Run Direct Install. SCE manages a direct install program for small commercial customers. During 2009, SCE contracted directly with three lighting installation contractors to recruit, survey, and retrofit small commercial customers within its service territory. Each contractor was assigned a geographic

location and provided a listing of eligible customers within that region by SCE. The direct install contractor sent a recruiter door-to-door to solicit program participation and conduct a lighting inventory for those customers who agreed to participate. The lighting retrofit was free of cost to the customer and covered linear fluorescent and compact fluorescent fixtures. Within a week of the audit, the direct install contractor sends an installation crew behind the recruiter to retrofit those sites that had agreed to participate.

The SCE direct install program manager agreed to cooperate with the Pre/Post study and directed their installation contractors to send the Pre/Post team customer names and contact information after the recruiter secured the customer's participation but before the retrofit took place. The Pre/Post team contacted the customer to explain the study and offer them the participation compensation. If the customer agreed to participate, the first site visit was scheduled within two to three days. The Pre/Post team agreed to complete all the pre-retrofit work, including 14 days of data logging, with no more than a 20 day delay from the time the installation contractor provided the lead. Because of this requirement, it was not possible to schedule initial site visits out more than three days in advance. The window to retrieve the loggers (site visit #2) was usually only a day or two because it had to be made after 14 days of logger data was collected but before the 20 day mark.

Third-Party and Local Government Direct Install. The Ecology Action Right Lights, East Bay Energy Watch Smart Lights, and Fresno Local Government Partnership Program run by Richard Heath and Associates operate similarly to the SCE direct install program in that they first send a recruiter into a neighborhood to canvas it for recruitment then send an installation crew through to conduct the retrofits shortly after. However, each of these programs require the customer to pay a portion of the cost for the lighting retrofit.

These programs all agreed to participate in the Pre/Post Study and provide customer leads until the target number of sites for each program was met. Each program sent leads to the Pre/Post after the customer had agreed to participate in their programs. Like the SCE Direct Install program, the Pre/Post team agreed to complete the pre-retrofit field work within 20 days of receiving the lead.

IOU Rebate Programs. The IOU rebate programs presented the biggest challenge in recruiting customers into the Pre/Post Study and, as a result, had the lowest number of participants. The rebate programs provide a prescriptive rebate for each lighting type and configuration. The customer installs the lighting retrofit first then sends their completed rebate form and proof of purchase to the IOU for the rebate check. Therefore, the IOUs are not aware of the project until after the lighting retrofit is complete.

The rebate programs are often promoted by lighting contractors who factor the rebate amount into the project financial proposals. IOU customer account managers also promote lighting retrofits and the financial incentives available through the rebate programs to their assigned customers.

The Pre/Post team approached the IOU rebate program managers for their support in recruiting customers into the Pre/Post. The IOU program managers arranged meetings and conference calls with their best and most active lighting contractors. The IOU program managers highlighted the importance of evaluation studies in maintaining a robust set of energy efficiency programs and requested that the contractors send leads to the Pre/Post. Regular follow up calls were made by the Pre/Post team to each lighting contractor reminding them of the Pre/Post Study, the available financial compensation to themselves and their customers, and requesting that they send customers leads.

Participation Compensation

All customers were offered financial compensation to participate in the Pre/Post. This amount varied from \$300 to \$400, depending on the program, and was intended to compensate them for their time and the disruption to their operations. As a motivation for the programs and vendors to participate, a smaller amount was offered for each lead that the Pre/Post team was ultimately able to schedule. This amount ranged from \$100 to \$150, depending on the program. In order to ensure the customer's cooperation through all four site visits, their compensation was paid by check after the fourth and final site visit. Because the program and lighting vendors' obligations were complete after the lighting retrofit, their compensation was paid, by check, after they send us confirmation that the lighting retrofit was complete.

Final Results

The Pre/Post study successfully recruited and completed pre- and post-retrofit site visits for 108 sites, most of these being linear fluorescent sites. In addition, eight sites were able to provide pre-retrofit data only, which was also useful. A summary of the completed sites is provided in Table 2.

Table 2. Summary of Final Pre/Post Completions

	Linear Fluorescent	High Bay	Combination	Total	Complete with pre- retrofit data only
PG&E	37	2	0	39	0
SCE	66	0	0	66	6
SDG&E	0	2	1	3	2
TOTALS	103	4	1	108	8

A full list of the completed sites, including building type, is provided in Exhibit 3.

Issues and Challenges

This section describes the various challenges in conducting the Pre/Post study. We've grouped the challenges into those surrounding the recruitment and scheduling of sites and those with performing the actual site data collection.

Recruiting and Scheduling

The shortfall in the number of completed sites was a result of the challenges in recruiting customers into the study, particularly through the rebate programs. The completed sites were recruited from only six programs, as follow summarized in Table 3.

Table 3: Pre/Post Competes by Program

Program Name	Program Number	Fluorescent Site Target	Completed Linear Fluorescent	High Bay Site Target	Completed High Bay
East Bay LGP	PGE2020	18	16	0	0
Fresno LGP	PGE2021	3	2	0	0
Right Lights	PGE2051	17	19	0	0
Comm'l Mass Market	PGE2080	17	0	34	2
Non-Res Direct Install	SCE2511	53	66	0	0
Express Efficiency	SDGE3012 ¹	4	1	18	2
Total		-	104	-	4

The two programs above with the lowest participation, the PG&E Commercial Mass Market and the SDG&E Express Efficiency programs, are both rebate programs. The remaining programs, the SCE Non-Res Direct Install, East Bay and Fresno LGP, and the Right Lights program all committed to work with the Pre/Post study and provide leads until the target for their program was reached. The reason for the difference in participation between the LGP and third-party direct installation programs and the lighting vendors is not entirely clear. One theory is that the LGP and third-party programs are highly engaged in the energy efficiency industry in California. Both types of programs are directly funded through the IOU under the auspices of the CPUC and have direct contracts with the IOUs. As a result, they may have felt obligated to cooperate. Alternately, although the lighting vendors benefit from the IOU rebate programs, their business activities are not directly funded through them.

In addition to the challenge of securing customer leads, the Pre/Post team encountered other issues related to recruiting and scheduling customers:

- Customers were often confused about the relationship between the program and Pre/Post study. The field auditors regularly received questions and complaints from the customers on their lighting retrofits. The field auditors were instructed to gently remind the customers that they were not affiliated with the program or vendor and to suggest that they contact the program directly.
- On several occasions, the individuals within the program coordinating with the Pre/Post did not notify their installation contactors that the site was participating in the Pre/Post and should not be retrofit until after the agreed upon date.
- Customers often complained about length and number of site visits. It should be noted that, in addition to the four site visits required by the Pre/Post, these customers also underwent a lighting retrofit that requires several site walkthroughs in addition to the retrofit.
- Coordinating the field activities was challenging because of the uncertainty of site visit length. It was not possible to schedule a team for more than one site per day for the first and third site visits

¹ It should be noted that the Pre/Post team was not able to secure any documentation that the projects that we monitored for the rebate programs were ultimately submitted or approved. In the case of the SDG&E programs, we're not certain which rebate program was ultimately used.

because of the amount of data to be collected at the site. However, we were able to schedule two, and sometimes three logger pickups (2nd and 4th site visits) when the schedule allowed. Because the loggers had to be removed within the agreed upon 20 day window pre-retrofit, there wasn't the flexibility to hold these sites until they could be scheduled with others.

- Participation in the Pre/Post also presented challenges for the participating programs. The direct install contractors work geographically, canvassing a neighborhood with a recruitment crew, then and installation crew. Because participation in the Pre/Post delayed the installation by 20 days, the installation crew had often moved out of an area by the time the pre-retrofit logging was complete and had to send a team back to perform the retrofits. This sometimes caused the retrofit to be delayed if they could not get back to the customer site right way.

Field Data Collection

The Summit Blue team worked through a number of significant issues related to collecting such a comprehensive set of lighting data. Many of the issues were primarily in the domain of the pre-retrofit condition, but some affected both the pre- and post-retrofit conditions. Again, these challenges can be generically lumped into two categories: challenges with the onsite observations (how to properly document peculiar equipment configurations in the pre-retrofit case), and challenges with the measurements, especially with regard to the instrumentation.

Challenges with onsite observations

Collecting robust pre-retrofit data presents several considerable challenges, the most immediate of which is the various configurations of ballasts and lamps. Anecdotal evidence from pre- site visits suggests that small commercial customers often replace inoperable lamps with whatever they have lying around, regardless of whether the ballast is rated for the particular lamp configuration. For example, the field auditors often observed lamps of multiple wattages (i.e. 40w T12 and 34w T12) powered by a single ballast. They also observed cases of both T8 and T12 lamps in the same fixture, served by the same ballast. In addition, a pre-retrofit fixture with two ballasts would often have two *different* ballasts, including cases with both magnetic and electronic ballasts in the same fixture housing.

The commonality of these various configurations of ballasts and lamps required more customization of the onsite data collection forms than originally anticipated. Previous iterations of the forms asked the field techs to record “lamp type” and “ballast type” for the fixture, thus assuming that each individual fixture would be uniform. Instead, the field forms were systematically customized to allow for each of these improper ballast and lamp configurations.

Another issue was in deciding how best to represent bi-level switched fixtures. The comprehensive and robust nature of this data collection effort required the field auditors (and the forms) to be very specific in how they characterized the lighting conditions at the site. Instead of just counting number of fixtures by space type, for example, this effort required defining actual *lighting circuits*, each with its own load (captured via spot measurements and the lighting inventory) and its own shape (captured in the data logging).

In the case of bi-level switched fixtures, a single fixture housing contains ballasts fed by different lighting circuits. Initial versions of the forms required the field auditors to define a fixture as “everything contained within the box” (i.e., the fixture housing). However, this created a problem when the field auditors went to assign this defined fixture to a lighting circuit, since there were actually two circuits feeding the fixture. This challenge was overcome with a slight modification to the forms and instructions

to the field auditors. Instead of defining a “fixture” as everything inside the housing, a fixture must be defined as a *single ballast* with lamps attached. Thus a single fixture housing with two ballasts would actually be counted as two “fixtures”.

Another common problem with collecting pre-retrofit data is in knowing which fixtures are going to be retrofit. Having the lighting audit from the program helped in the field, but it was not foolproof. Many times, the actual post-retrofit condition was different from that shown on pre-retrofit audit. Field auditors were instructed to collect data for all fixtures included in the audit, or that the customer believed were going to be retrofit. Unfortunately, this resulted in a few sites with more time spent on the pre-retrofit field visit than necessary in cases where the fixtures were not ultimately retrofit. In a very few cases, lighting contractors also added new fixtures to a space or changed the wiring so that new lighting circuits were created that did not exist in the pre-retrofit condition. These were handled on a case-by-case basis to ensure the integrity of the data being collected.

Challenges with measurements/instrumentation

Measuring the power of fluorescent lighting presents an interesting challenge from an instrumentation standpoint. Many quality devices on the market are easy to use and accurately measure a low to high loads. Unfortunately, the current draw of a single fluorescent lighting fixture running at 120 or 277 volts is typically *very low*, and it is best measured using a laboratory grade setup under very controlled conditions. Since this was not an option for the Pre/Post study, the solution was to amplify the current to a level that gives the reading much higher accuracy.

Summit Blue built 10 current amplifiers (or “donuts”) for field teams to use when measuring single fixtures. The first donut was built then tested in a laboratory to ensure that it gave accurate readings. The remainder of the donuts were tested against this first donut to ensure that each was properly calibrated. Each donut had 40 turns wrapped around a wooden core that served to hold the wraps together and also to ensure that the bundle of wraps was held in the center of the CT. The current amplifier therefore would bring a fixture drawing a nominal 0.25 amps (such as an electronic ballast with 1 32w T8 lamp) up to 10 amps, at which point the accuracy jumped significantly.

Another common problem with the fixture spot measurements was that the pre-retrofit fixture conditions were often very poor. Many had burned out lamps, lamps that were mismatched to their ballasts, or lamps that output very low lumens. The varying condition of these fixtures made it all but impossible to get an even comparison of the manufacturer-specified input power to that as measured in the field. Even in cases where most of the fixtures were nominally the same (i.e., the ballast model and lamp quantity/watts was the same), these fixtures could be drawing a wide range of power based on their years of service and other factors. The workaround to this problem was in requiring the field techs to note the as best they could the condition of the lamps/ballasts that they measured. In the end, the appropriate baseline fixture wattage will be the average of all measurements for each combination of ballast and lamps.

The instrumentation challenges stretched beyond spot measurements of power. Initially, the Summit Blue team planned to use lighting-state data loggers to gather the time-of-use data for each lighting circuit. However, there were concerns with light source pollution that would cause false readings, such as in installations near windows or when attempting to measure usage in bi-level switched fixtures. Since this data logger measures light input to its photocell, it does not discriminate between light from intended source and light from the sun (or any other ambient source).

To solve this problem, the Summit Blue team used current-activated switches as the primary logger whenever possible and especially in cases susceptible to light pollution. This device measures time-of-use

in the same way as the lighting-state logger, but instead of measuring light, it measures current. When the current level is over a user-defined threshold, it records an “on”; when it is under, it registers an “off”. The device measures current by using a split-core current transformer (CT). They can be used at the lighting fixture by placing the CT around the hot wire coming into the ballast controlled by the switch of interest. These devices suffer virtually no chance of data pollution. Since an open circuit (light is off) draws exactly zero current, these devices can be set at maximum sensitivity without fear of recording false transitions.

Recommendations for Future Pre/Post Studies

The Summit Blue team recommends that future pre/post studies be developed as research projects rather than program verification efforts. Customers should be recruited through the general population based on desired size, building/customer type, or other desired parameters rather than trying to target through their participation in a particular program. Customers are difficult to identify pre-retrofit, especially rebate program participants. Recruiting customers into a pre/post study is also disruptive to the program and lighting vendors who agree to participate. Although the programs that worked with the Pre/Post team were very cooperative for this study, subsequent efforts may not be met with the same level of cooperation. Lastly, vendors and IOU account representatives who work with customers participating through several different programs find it unfair that certain customers qualify for the study compensation, while others conducting their retrofits through other, untargeted programs, do not.

Adequate time should be incorporated into the project schedule to run a set of pilot sites through the *entire* four-site visit cycle. Results from the pilot sites should be analyzed to identify issues that may require a change in forms, instrumentation, or field protocol. This will reduce the number of mid-project changes necessary.

EXHIBIT 1: TARGETS BY TECHNOLOGY TYPE, IOU, PROGRAM, AND BUILDING TYPE

Linear Fluorescent Targets

ProgramName:	AMBAG	Bakersfield	EastBay	Fresno	Right Lights	Energy Fitness	Comm'l Mass Market	TOTALPG&E	Non-Res Direct Install	Business Incentive Program	TOTALSCE	Express Efficiency	Small Business SuperSavers	TOTAL SDG&E	GRAND TOTAL
ProgramID:	PGE2016	PGE2017	PGE2020	PGE2021	PGE2051	PGE2054	PGE2080		SCE2511	SCE2517		SDGE3012	SDGE3020		
AllCommercial	-	-	-	-	2	-	1	3	7	2	9	2	15	17	29
Assembly	-	-	-	-	-	-	-	-	1	-	1	-	3	3	4
Grocery	0	-	1	-	1	-	1	3	4	-	4	-	2	2	9
Health/Medical-Clinic	-	-	1	-	-	-	-	1	9	-	9	-	-	-	10
Health/Medical-Hospital	3	-	-	1	-	-	1	5	-	-	-	-	-	-	5
Office-Large	-	-	1	-	-	-	5	6	-	1	1	-	-	-	7
Office-Small	-	2	4	1	4	1	2	14	6	-	6	1	16	17	37
OtherIndustrial	-	-	-	-	5	-	-	5	-	-	-	-	6	6	11
Restaurant-FastFood	-	-	1	-	-	-	-	1	3	-	3	-	2	2	6
Retail-SingleStorylarge	-	1	1	-	2	-	1	5	4	1	5	-	1	1	11
Retail-Small	-	-	6	-	-	2	2	10	16	-	16	-	4	4	30
Storage-Unconditioned	-	-	1	-	2	-	1	4	-	2	2	-	12	12	18
Education-CommunityCollege	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1
Education-PrimarySchool	-	-	-	-	-	-	1	1	-	-	-	-	-	-	1
Education-SecondarySchool	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2
Education-University	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lodging-Hotel	2	-	-	-	-	-	1	3	-	-	-	-	-	-	3
Lodging-Motel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manufacturing-LightIndustry	-	-	1	-	-	-	1	2	1	2	3	-	-	-	5
Restaurant-SitDown	-	-	1	-	-	-	-	1	1	-	1	-	1	1	3
Retail-3StoryLarge	-	-	-	1	-	-	-	1	-	-	-	-	-	-	1
SIC20Food&KindredProducts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Storage-Conditioned	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1
Storage-Refrigerated	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTALSITES	5	3	18	3	17	3	17	66	53	8	61	4	63	67	194

High Bay Targets

ProgramName:	AMBAG	Bakersfield	East Bay	Fresno	Right Lights	Energy Fitness	Comm'l Mass Market	TOTALP G&E	Non-Res Direct Install	Business Incentive Program	TOTAL SCE	Express Efficiency	Small Business Super Savers	TOTAL SDG&E	TOTAL
ProgramID:	PGE2016	PGE2017	PGE2020	PGE2021	PGE2051	PGE2054	PGE2080		SCE2511	SCE2517		SDGE3012	SDGE3020		
AllCommercial	-	-	-	-	-	-	1	1	-	8	8	1	5	6	15
Manufacturing-LightIndustry	-	-	-	-	-	-	7	7	-	9	9	-	-	-	16
OtherIndustrial	-	-	-	-	-	-	2	2	-	-	-	7	4	11	13
Retail-SingleStorylarge	-	-	-	-	-	-	5	5	-	7	7	-	-	-	12
Retail-Small	-	-	-	-	-	-	4	4	-	1	1	-	1	1	6
Storage-Conditioned	-	-	-	-	-	-	2	2	-	-	-	7	-	7	9
Storage-Refrigerated	-	-	-	-	-	-	3	3	-	1	1	-	-	-	4
Storage-Unconditioned	-	-	-	-	-	-	7	7	-	5	5	2	3	5	17
Assembly	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education-CommunityCollege	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education-PrimarySchool	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education-SecondarySchool	-	-	-	-	-	-	1	1	-	-	-	1	-	1	2
Education-University	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grocery	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Health/Medical-Clinic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Health/Medical-Hospital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lodging-Hotel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lodging-Motel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Office-Large	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1
Office-Small	-	-	-	-	-	-	1	1	-	1	1	-	2	2	4
Restaurant-FastFood	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Restaurant-SitDown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Retail-3StoryLarge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SIC20Food&KindredProducts	-	-	-	-	-	-	1	1	-	-	-	-	-	-	1
TOTAL	-	-	-	-	-	-	34	34	-	33	33	18	15	33	100

EXHIBIT 2: DATA COLLECTION FORMS

The Pre/Post Data Collection Forms are included as a separate PDF file attachment, which will be combined with the Final Report.

EXHIBIT 3: PRE/POST SITE DISPOSITION TABLE

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
Site #1	PG&E	PGE2020	Linear Fluorescent	Gas Station/Auto Repair	Community Energy Services Corporation	X			
Site #2	PG&E	PGE2020	Linear Fluorescent	Insurance/Real Estate	Community Energy Services Corporation	X			
Site #3	PG&E	PGE2020	Linear Fluorescent	Gas Station/Auto Repair	Community Energy Services Corporation	X			
Site #4	PG&E	PGE2020	Linear Fluorescent	Gas Station/Auto Repair	Community Energy Services Corporation	X			
Site #5	PG&E	PGE2020	Linear Fluorescent	Mixed Use/Multi-Tenant	Community Energy Services Corporation	X			
Site #6	PG&E	PGE2020	Linear Fluorescent	Gas Station/Auto Repair	Community Energy Services Corporation	X			
Site #7	PG&E	PGE2020	Linear Fluorescent	Financial/Legal	Community Energy Services Corporation	X			
Site #8	PG&E	PGE2020	Linear Fluorescent	Specialty/Novelty Foods	Community Energy Services Corporation	X			
Site #9	PG&E	PGE2020	Linear Fluorescent	Health/Fitness Center	Community Energy Services Corporation	X			
Site #10	PG&E	PGE2020	Linear Fluorescent	Gas Station/Auto Repair	Community Energy Services Corporation	X			
Site #11	PG&E	PGE2020	Linear Fluorescent	Shop in Strip Mall	Community Energy Services Corporation	X			
Site #12	PG&E	PGE2020	Linear Fluorescent	Medical/Dental Office	Community Energy Services Corporation	X			
Site #13	PG&E	PGE2051	Linear Fluorescent	Administration and management	Ecology Action	X			
Site #14	PG&E	PGE2020	Linear Fluorescent	Insurance/Real Estate	Community Energy Services Corporation	X			
Site #15	PG&E	PGE2051	Linear Fluorescent	Gas Station/Auto Repair	Ecology Action	X			

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
Site #16	PG&E	PGE2051	Linear Fluorescent	Other Retail Store	Ecology Action	X			
Site #17	PG&E	PGE2020	Linear Fluorescent	Office	Community Energy Services Corporation	X			
Site #18	PG&E	PGE2051	Linear Fluorescent	Other Retail Store	Ecology Action	X			
Site #19	PG&E	PGE2051	Linear Fluorescent	Medical/Dental Office	Ecology Action	X			
Site #20	PG&E	PGE2051	Linear Fluorescent	Table Service	Ecology Action	X			
Site #21	PG&E	PGE2051	Linear Fluorescent	Convenience Store	Ecology Action	X			
Site #22	PG&E	PGE2051	Linear Fluorescent	Agriculture/Office Building	Ecology Action	X			
Site #23	PG&E	PGE2020	Linear Fluorescent	Insurance/Real Estate	Community Energy Services Corporation	X			
Site #24	PG&E	PGE2051	Linear Fluorescent	Table Service	Ecology Action	X			
Site #25	PG&E	PGE2020	Linear Fluorescent	Manufacturing/Light Industrial	Community Energy Services Corporation	X			
Site #26	PG&E	PGE2021	Linear Fluorescent	Medical/Dental Office	Richard Heath and Associates	X			
Site #27	PG&E	PGE2021	Linear Fluorescent	Medical/Dental Office	Richard Heath and Associates	X			
Site #28	PG&E	PGE2051	Linear Fluorescent	Table Service	Ecology Action	X			
Site #29	PG&E	PGE2051	Linear Fluorescent	Specialty/Novelty Food Service	Ecology Action	X			
Site #30	PG&E	PGE2051	Linear Fluorescent	Specialty/Novelty Food Store	Ecology Action	X			
Site #31	PG&E	PGE2051	Linear	Fast Food	Ecology Action	X			

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
			Fluorescent	Restaurant					
Site #32	PG&E	PGE2051	Linear Fluorescent	Other Commercial (Dry Cleaning and Laundry)	Ecology Action	X			
Site #33	PG&E	PGE2051	Linear Fluorescent	Lab/R&D Facility	Ecology Action	X			
Site #34	PG&E	PGE2051	Linear Fluorescent	Other Recreational/Public Assembly	Ecology Action	X			
Site #35	PG&E	PGE2051	Linear Fluorescent	Other Commercial (Dry Cleaning and Laundry)	Ecology Action	X			
Site #36	PG&E	PGE2051	Linear Fluorescent	Administration and Management	Ecology Action	X			
Site #37	PG&E	PGE2051	Linear Fluorescent	Other Service Shop (Car wash)	Ecology Action	X			
Site #38	SCE	SCE2511	Linear Fluorescent	Other Food Service	California Retrofit	X			
Site #39	SCE	SCE2511	Linear Fluorescent	Shop in Strip Mall	FCI Management	X			
Site #40	SCE	SCE2511	Linear Fluorescent	Assembly/Light Manufacture	California Retrofit	X			
Site #41	SCE	SCE2511	Linear Fluorescent	Motel	FCI Management	X			
Site #42	SCE	SCE2511	Linear Fluorescent	Liquor Store	California Retrofit	X			
Site #43	SCE	SCE2511	Linear Fluorescent	Shop in Strip Mall	FCI Management	X			
Site #44	SCE	SCE2511	Linear Fluorescent	Administration and management	California Retrofit	X			
Site #45	SCE	SCE2511	Linear Fluorescent	Other Service Shop	FCI Management	X			

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
Site #46	SCE	SCE2511	Linear Fluorescent	Unconditioned Warehouse/Low Bay	California Retrofit	X			
Site #47	SCE	SCE2511	Linear Fluorescent	Medical/Dental Lab	FCI Management	X			
Site #48	SCE	SCE2511	Linear Fluorescent	Gas Station/Auto Repair	California Retrofit	X			
Site #49	SCE	SCE2511	Linear Fluorescent	Other Retail Store	FCI Management	X			
Site #50	SCE	SCE2511	Linear Fluorescent	Convenience Store	California Retrofit	X			
Site #51	SCE	SCE2511	Linear Fluorescent	Medical/Dental Office	FCI Management	X			
Site #52	SCE	SCE2511	Linear Fluorescent	Gas Station/Auto Repair	California Retrofit	X			
Site #53	SCE	SCE2511	Linear Fluorescent	Other Retail Store	California Retrofit	X			
Site #54	SCE	SCE2511	Linear Fluorescent	Other Office	California Retrofit	X			
Site #55	SCE	SCE2511	Linear Fluorescent	Gas Station/Auto Repair	California Retrofit	X			
Site #56	SCE	SCE2511	Linear Fluorescent	Convenience Store	California Retrofit	X			
Site #57	SCE	SCE2511	Linear Fluorescent	Other Commercial	California Retrofit	X			
Site #58	SCE	SCE2511	Linear Fluorescent	Repair (Non-Auto)	California Retrofit	X			
Site #59	SCE	SCE2511	Linear Fluorescent	Other Retail Store	California Retrofit	X			
Site #60	SCE	SCE2511	Linear Fluorescent	Gas Station/Auto Repair	FCI Management	X			
Site #61	SCE	SCE2511	Linear	Financial/Legal	FCI Management	X			

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
			Fluorescent						
Site #62	SCE	SCE2511	Linear Fluorescent	Insurance/Real Estate	FCI Management	X			
Site #63	SCE	SCE2511	Linear Fluorescent	Other Retail Store	California Retrofit	X			
Site #64	SCE	SCE2511	Linear Fluorescent	Shop in Strip Mall	FCI Management	X			
Site #65	SCE	SCE2511	Linear Fluorescent	Other office	California Retrofit	X			
Site #66	SCE	SCE2511	Linear Fluorescent	Other Retail Store	California Retrofit	X			
Site #67	SCE	SCE2511	Linear Fluorescent	Other Service Shop	California Retrofit	X			
Site #68	SCE	SCE2511	Linear Fluorescent	Shop in Strip Mall	FCI Management	X			
Site #69	SCE	SCE2511	Linear Fluorescent	Administration and management	FCI Management	X			
Site #70	SCE	SCE2511	Linear Fluorescent	Insurance/Real Estate	California Retrofit	X			
Site #71	SCE	SCE2511	Linear Fluorescent	Other Retail Store	California Retrofit	X			
Site #72	SCE	SCE2511	Linear Fluorescent	Auto Sales	FCI Management	X			
Site #73	SCE	SCE2511	Linear Fluorescent	Financial/Legal	California Retrofit	X			
Site #74	SCE	SCE2511	Linear Fluorescent	Financial/Legal	FCI Management	X			
Site #75	SCE	SCE2511	Linear Fluorescent	Auto Sales	California Retrofit	X			
Site #76	SCE	SCE2511	Linear Fluorescent	Unconditioned Warehouse/Low Bay	California Retrofit	X			

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
Site #77	SCE	SCE2511	Linear Fluorescent	Unconditioned Warehouse/High Bay	FCI Management	X			
Site #78	SCE	SCE2511	Linear Fluorescent	Nursing Home	FCI Management	X			
Site #79	SCE	SCE2511	Linear Fluorescent	Other Retail Store	FCI Management	X			
Site #80	SCE	SCE2511	Linear Fluorescent	Unconditioned Warehouse/High Bay	FCI Management	X			
Site #81	SCE	SCE2511	Linear Fluorescent	Unconditioned Warehouse/Low Bay	FCI Management	X			
Site #82	SCE	SCE2511	Linear Fluorescent	Unconditioned Warehouse/High Bay	FCI Management	X			
Site #83	SCE	SCE2511	Linear Fluorescent	Other Service Shop	FCI Management	X			
Site #84	SCE	SCE2511	Linear Fluorescent	Other Office	FCI Management	X			
Site #85	SCE	SCE2511	Linear Fluorescent	Specialty/Novelty Food Service	FCI Management	X			
Site #86	SCE	SCE2511	Linear Fluorescent	Administration and management	FCI Management	X			
Site #87	SCE	SCE2511	Linear Fluorescent	Conditioned Warehouse/Low-Bay	FCI Management	X			
Site #88	SCE	SCE2511	Linear Fluorescent	Community Center	FCI Management	X			
Site #89	SCE	SCE2511	Linear Fluorescent	Other Commercial	FCI Management	X			
Site #90	SCE	SCE2511	Linear Fluorescent	Bar/Tavern/Night Club/Other	FCI Management	X			

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
Site #91	SCE	SCE2511	Linear Fluorescent	Other Office	FCI Management	X			
Site #92	SCE	SCE2511	Linear Fluorescent	Other Office	FESS	X			
Site #93	SCE	SCE2511	Linear Fluorescent	Theatre/Performing Arts	FESS	X			
Site #94	SCE	SCE2511	Linear Fluorescent	Medical/Dental Office	FESS	X			
Site #95	SCE	SCE2511	Linear Fluorescent	Administration and Management	FESS	X			
Site #96	SCE	SCE2511	Linear Fluorescent	Shop in Strip Mall	FESS	X			
Site #97	SCE	SCE2511	Linear Fluorescent	Unconditioned Warehouse /High Bay	FESS	X			
Site #98	SCE	SCE2511	Linear Fluorescent	Gas Station/Auto Repair	FESS	X			
Site #99	SCE	SCE2511	Linear Fluorescent	Other Service Shop	FESS	X			
Site #100	SCE	SCE2511	Linear Fluorescent	Other Retail Store	FESS	X			
Site #101	SCE	SCE2511	Linear Fluorescent	Other Retail Store	FESS	X			
Site #102	SCE	SCE2511	Linear Fluorescent	Auto Sales	FESS	X			
Site #103	SCE	SCE2511	Linear Fluorescent	Shop in Strip Mall	FESS	X			
Site #104	SDG&E	SDGE3012	High Bay and Linear Fluorescent	Unconditioned Warehouse/High Bay	Eco Energy Systems	X			
Site #105	SDG&E	SDGE3012	High Bay	Unconditioned warehouse/High	Eco Energy Systems	X			

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
				Bay					
Site #106	SDG&E	SDGE3012	High Bay	Unconditioned warehouse/High Bay	Eco Energy Systems	X			
Site #107	PG&E	PGE2080	High Bay	Assembly/Light Manufacturing	Energy Retrofit Co.	X			
Site #108	PG&E	PGE2080	High Bay	Industrial: Truck Manufacturing	Energy Retrofit Co.	X			
Site #109	PG&E	PGE2020	Linear Fluorescent	N/A	Community Energy Services Corporation			X	Fixtures could not be logged.
Site #110	PG&E	PGE2021	Linear Fluorescent	Medical/Dental Office	Richard Heath and Associates			X	Study participation was cancelled by the customer. No logging was completed.
Site #111	SDG&E	SDGE3012	High Bay	Unconditioned warehouse/High Bay	Eco Energy Systems		X		Site withdrew from the retrofit, and thus will not participate further in the study. No post logging.
Site #112	SDG&E	SDGE3012	High Bay	Unconditioned warehouse/High Bay	Eco Energy Systems		X		Site not going forward with the retrofit. No post logging.
Site #113	SCE	SCE2511	Linear Fluorescent	N/A	FESS			X	Customer rescheduled the 1st site visit 3 times, and then did not show up for the appointment. No logging completed.
Site #114	SCE	SCE2511	Linear Fluorescent	N/A	FESS			X	Since there was only one linear fluorescent fixture at the site, project was cancelled during 1st site visit. No logging was completed.
Site #115	SCE	SCE2511	Linear Fluorescent	N/A	FCI Management			X	Fixtures were inaccessible/hazardous. No logging completed.

Site Name	Utility	Program Number	Technology	Building Type	Program Installation/Contractor	Complete	Complete with pre-retrofit data	Cancelled	Comments
Site #116	SCE	SCE2511	Linear Fluorescent	Other Service Shop	FCI Management		X		Customer is uncooperative with the retrofitters. Retrofit cancelled. No post logging.
Site #117	SCE	SCE2511	Linear Fluorescent	N/A	California Retrofit			X	Site was retrofitted before SBC completed the first site visit; no logging was completed.
Site #118	SCE	SCE2511	Linear Fluorescent	N/A	California Retrofit		X		Project was retrofitted before data loggers were removed. No post logging.
Site #119	SCE	SCE2511	Linear Fluorescent	N/A	FCI Management			X	Project was not approved by SCE. No site visit was completed.
Site #120	SCE	SCE2511	Linear Fluorescent	Shop in Strip Mall	FCI Management		X		Site was retrofitted before pre-logging was completed. No post logging.
Site #121	SCE	SCE2511	Linear Fluorescent	Insurance/Real Estate	FCI Management		X		The business is moving out of this office before SBC could finish post logging. No post logging.
Site #122	SCE	SCE2511	Linear Fluorescent	N/A	FCI Management		X		Not enough pre-retrofit logger data to continue with post-retrofit logger data collection. No post logging.
Site #123	SCE	SCE2511	Linear Fluorescent	Other Service Shop	California Retrofit		X		Lights cannot be retrofitted. No post logging.

EXHIBIT 4: CURRENT AMPLIFIERS

Current Amplifier



Current Amplifier with Fluke



**PRE- AND POST-RETROFIT INVENTORY & RUNTIME HOUR MONITORING STUDY
C&I Linear Fluorescents, High Bay Fixtures, & Occupancy Sensors**

A. Program & Customer Information *(pre-populated from online scheduling database)*

IOU:		Program Name:			EEGA Number:	
Corporate or Multi-Site Business Name:						
Customer/Business Name (Actual/Storefront):						
Service Address:			City:		Zip:	
Site Contact Names	Site Contact Title	Phone Number	Alternate Phone	Email		

B. 3rd-Party Implementer Information *(pre-populated from online scheduling database)*

Implementation Contractor Business Name:				
Customer Commit Date:		Date Given to Install Contractor:		Anticipated Install Date:
Contact Names	Contact Title	Phone Number	Alternate Phone	Email

C. Installation Contractor Information *(pre-populated from online scheduling database)*

Installation Contractor Business Name:				
Scheduled Installation Start Date:		Scheduled Installation Finish Date:		
Contact Names	Contact Title	Phone Number	Alternate Phone	Email

D. Installation Site Visit Scheduling *(pre-populated from online scheduling database)*

	PRE-RETROFIT INSTALLATION (#1)	POST-RETROFIT INSTALLATION (#3)
1. Assigned Field Work Company:		
2. Assigned Field Work Personnel:		
3. Scheduler:		
4. Scheduled Date & Time:		
Comment 1:		
Comment 2:		
Comment 3:		

E. Retrieval Site Visit Scheduling *(pre-populated from online scheduling database)*

	PRE-RETROFIT RETRIEVAL (#2)	POST-RETROFIT RETRIEVAL (#4)
1. Assigned Field Work Company:		
2. Assigned Field Work Personnel:		
3. Scheduler:		
4. Scheduled Date & Time:		
Comment 1:		
Comment 2:		
Comment 3:		

FIXTURE DETAILS FORM

Check Box When Form is Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
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Instructions: Each fixture at the site with a different combination of Points 1-7 must be given a unique Fixture ID. The only exception to this is when the Lamp Mfr/Model Number from one fixture is different from another fixture, but the nameplate **watts** are the same. If the lamps powered by a single ballast are different, record these as different lamp types in Point 6 below. **There should always only be one ballast per fixture.** For example, if a **single fixture housing** has 2 identical ballasts powering 4 identical lamps, there would be just one Fixture ID, and it would be defined as having 1 ballast and 2 lamps. However, it would be **counted** twice in the Lighting Inventory Form, even though it exists in the same physical fixture housing. If a fixture housing has 2 **different** ballasts and/or 4 **different** lamps, this would be given 2 different Fixture IDs. It would then be counted in the Lighting Inventory Form **once under each ID** (for a total of two times). Take a spot measurement for every defined Fixture ID, but **only on fixtures that are operating normally.**

Fixture ID: _____ Fixture Description: _____ Check Box When Complete

1. Lamp Type (circle one): F=LinFluor UT=Utube Fluor OF=Other Fluor CF=Compact Fluor CIR=Circline Fluor MV=Mercury Vapor MH=Std Metal Halide PS=Pulse-Start MH HPS=High-Pressure Sodium LPS=Low-Pressure Sodium LED=LED Q=Quartz/Halogen E=Induction IP=Incand. PAR IR=Incand. Reflector I=Incandescent Gen Service N=Neon ER=Battery-Power Exit OT=Other: _____						F UT OF CF CIR MV MH PS HPS LPS LED Q E IP IR I N ER OT		
2. Lighting Application Code (circle one): A=Area D=Display F=Bldg Façade T=Task S=Security L=Landscape X=Exit P=Parking Lot G=Parking Garage OT=Other: _____						A D F T S L X P G OT		
3. Fixture Mounting Type (circle one): H=Hanging/Suspended S=Surface-Mount F=Ceiling Fan R=Recessed, Non-Can C=Recessed Can PL=Plug-in Lamp A=Attached to Bldg P=Pole TR=Track OT=Other: _____						H S F R C PL A P TR OT		
4. Reflector Type (circle one): W=White S=Specular/Metallic N=None OT=Other: _____						W S N OT		
5. Floor-to-Fixture Height (measure from floor to reflector or ballast cover, and round to the nearest foot):								
6. Lamp Types	6a. Lamp Manufacturer	6b. Lamp Model Number	6c. Lamp Length, If Applicable (circle one)	6d. Lamp Diameter, If Applicable (circle one)	Lamp Watts (LW)	Lamp Qty (LQ)	Total Lamp Watts (TW)=[LW]*[LQ]	
Type 1:			NA 2ft 3ft 4ft 8ft OT: _____	NA T5 T8 T10 T12 OT: _____				
Type 2:			NA 2ft 3ft 4ft 8ft OT: _____	NA T5 T8 T10 T12 OT: _____				
Type 3:			NA 2ft 3ft 4ft 8ft OT: _____	NA T5 T8 T10 T12 OT: _____				
Type 4:			NA 2ft 3ft 4ft 8ft OT: _____	NA T5 T8 T10 T12 OT: _____				
Total Number of Lamps [Sum LQ] and Total Connected Lamp Wattage [Sum TW]:								
7. BALLAST INFORMATION (if no ballast, check the "NA" box to the right and skip to Spot Measurements):							<input type="checkbox"/> N/A	
7a. Ballast Type (circle one): <i>E=Electronic; M=Magnetic; A=Advanced</i>		NA E M A DK		7d. Does the ballast label indicate the expected lamp configurations? (circle one):		NA Yes No		
7b. Ballast Manufacturer:				7e. If [7d]=Yes, does the actual lamp configuration match any of the configurations from the ballast label? (circle one):		NA Yes No		
7c. Ballast Model Number:				7f. If [7e]=Yes, what is the Amps from the ballast label for the actual lamp configuration? (if amps not listed, then NA):				

Spot Measurement Data – take **ONLY** on normally-operating fixtures! Check Box if N/A or When Complete

S1. Measurement Device (circle one): F345=Fluke 345; F43B=Fluke 43B; OT=Other: _____		F345 F43B OT		S5. Measurement Location (circle one): F=At Fixture; J=At Junction Box; S=At POC; P=At Panel		F J S P	
S2. Measurement Device Serial Number:				S6. Voltage Reading: N=Line-to-Neutral; G=Line-to-Ground		N G	
S3. Current Amplifier, # of Turns (circle one):		NA 10 20 30 40 50		S7. Number of Fixtures Included in Measurement:			
S4. Current Amplifier Serial Number:							
S8. MEASUREMENTS:		WITH Current Amp (1)		NO Current Amp (2)		S10. QUALITY CONTROL CALCULATIONS:	
S8a. Volts (V):						S10a = ([Sum TW] – [S9d1]) / [Sum TW]:	
S8b. Power Factor (PF):						if absolute value of S10a > 20%, retake the measurement	
S8c. Amps (A):						S10b = ([7f] – [S9c1]) / [7f]:	
S8d. Watts (W):						if absolute value of S10b > 10%, retake the measurement	
S9. CALCULATIONS:		WITH Current Amp (1)		NO Current Amp (2)		S10c = ([S8a1] * [S8b1] * [S9c1]) – [S9d1]:	
S9a. Actual Amps = [S8c] / [S3]:						if absolute value of S10b > 1 watt, double-check readings	
S9b. Actual Watts = [S8d] / [S3]:						S10d. Describe condition of lamps/ballast (circle all that apply):	
S9c. Amps Per Fixt = [S9a] / [S7]						N L P F BO BE Z T	
S9d. Watts Per Fixt = [S9b] / [S7]							

Notes

FIXTURE DETAILS FORM

Check Box When Form is Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
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Instructions: Each fixture at the site with a different combination of Points 1-7 must be given a unique Fixture ID. The only exception to this is when the Lamp Mfr/Model Number from one fixture is different from another fixture, but the nameplate **watts** are the same. If the lamps powered by a single ballast are different, record these as different lamp types in Point 6 below. **There should always only be one ballast per fixture.** For example, if a **single fixture housing** has 2 identical ballasts powering 4 identical lamps, there would be just one Fixture ID, and it would be defined as having 1 ballast and 2 lamps. However, it would be **counted** twice in the Lighting Inventory Form, even though it exists in the same physical fixture housing. If a fixture housing has 2 **different** ballasts and/or 4 **different** lamps, this would be given 2 different Fixture IDs. It would then be counted in the Lighting Inventory Form **once under each ID** (for a total of two times). Take a spot measurement for every defined Fixture ID, but **only on fixtures that are operating normally.**

Fixture ID: _____ Fixture Description: _____ Check Box When Complete

1. Lamp Type (circle one): F=LinFluor UT=Utube Fluor OF=Other Fluor CF=Compact Fluor CIR=Circline Fluor MV=Mercury Vapor MH=Std Metal Halide PS=Pulse-Start MH HPS=High-Pressure Sodium LPS=Low-Pressure Sodium LED=LED Q=Quartz/Halogen E=Induction IP=Incand. PAR IR=Incand. Reflector I=Incandescent Gen Service N=Neon ER=Battery-Power Exit OT=Other: _____						F UT OF CF CIR MV MH PS HPS LPS LED Q E IP IR I N ER OT			
2. Lighting Application Code (circle one): A=Area D=Display F=Bldg Façade T=Task S=Security L=Landscape X=Exit P=Parking Lot G=Parking Garage OT=Other: _____						A D F T S L X P G OT			
3. Fixture Mounting Type (circle one): H=Hanging/Suspended S=Surface-Mount F=Ceiling Fan R=Recessed, Non-Can C=Recessed Can PL=Plug-in Lamp A=Attached to Bldg P=Pole TR=Track OT=Other: _____						H S F R C PL A P TR OT			
4. Reflector Type (circle one): W=White S=Specular/Metallic N=None OT=Other: _____						W S N OT			
5. Floor-to-Fixture Height (measure from floor to reflector or ballast cover, and round to the nearest foot):									
6. Lamp Types	6a. Lamp Manufacturer	6b. Lamp Model Number	6c. Lamp Length, If Applicable (circle one)		6d. Lamp Diameter, If Applicable (circle one)		Lamp Watts (LW)	Lamp Qty (LQ)	Total Lamp Watts (TW)=[LW]*[LQ]
Type 1:			NA 2ft 3ft 4ft 8ft OT: _____		NA T5 T8 T10 T12 OT: _____				
Type 2:			NA 2ft 3ft 4ft 8ft OT: _____		NA T5 T8 T10 T12 OT: _____				
Type 3:			NA 2ft 3ft 4ft 8ft OT: _____		NA T5 T8 T10 T12 OT: _____				
Type 4:			NA 2ft 3ft 4ft 8ft OT: _____		NA T5 T8 T10 T12 OT: _____				
Total Number of Lamps [Sum LQ] and Total Connected Lamp Wattage [Sum TW]:									
7. BALLAST INFORMATION (if no ballast, check the "NA" box to the right and skip to Spot Measurements):								<input type="checkbox"/> N/A	
7a. Ballast Type (circle one): <i>E=Electronic; M=Magnetic; A=Advanced</i>		NA E M A DK			7d. Does the ballast label indicate the expected lamp configurations? (circle one):		NA Yes No		
7b. Ballast Manufacturer:					7e. If [7d]=Yes, does the actual lamp configuration match any of the configurations from the ballast label? (circle one):		NA Yes No		
7c. Ballast Model Number:					7f. If [7e]=Yes, what is the Amps from the ballast label for the actual lamp configuration? (if amps not listed, then NA):				

Spot Measurement Data – take **ONLY** on normally-operating fixtures! Check Box if N/A or When Complete

S1. Measurement Device (circle one): F345=Fluke 345; F43B=Fluke 43B; OT=Other: _____		F345 F43B OT		S5. Measurement Location (circle one): F=At Fixture; J=At Junction Box; S=At POC; P=At Panel		F J S P	
S2. Measurement Device Serial Number:				S6. Voltage Reading: N=Line-to-Neutral; G=Line-to-Ground		N G	
S3. Current Amplifier, # of Turns (circle one):		NA 10 20 30 40 50		S7. Number of Fixtures Included in Measurement:			
S4. Current Amplifier Serial Number:							
S8. MEASUREMENTS:		WITH Current Amp (1)		NO Current Amp (2)		S10. QUALITY CONTROL CALCULATIONS:	
S8a. Volts (V):						S10a = ([Sum TW] – [S9d1]) / [Sum TW]:	
S8b. Power Factor (PF):						if absolute value of S10a > 20%, retake the measurement	
S8c. Amps (A):						S10b = ([7f] – [S9c1]) / [7f]:	
S8d. Watts (W):						if absolute value of S10b > 10%, retake the measurement	
S9. CALCULATIONS:		WITH Current Amp (1)		NO Current Amp (2)		S10c = ([S8a1] * [S8b1] * [S9c1]) – [S9d1]:	
S9a. Actual Amps = [S8c] / [S3]:						if absolute value of S10b > 1 watt, double-check readings	
S9b. Actual Watts = [S8d] / [S3]:						S10d. Describe condition of lamps/ballast (circle all that apply):	
S9c. Amps Per Fixt = [S9a] / [S7]						N L P F BO BE Z T	
S9d. Watts Per Fixt = [S9b] / [S7]							

Notes

LIGHTING INVENTORY FORM

Check Box When Form is Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
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Instructions: Fill out at least one Lighting Inventory Form for every unique combination of Area ID and Schedule ID. Record the quantity of fixtures by fixture type for each Point-of-Control (POC). A POC is any control point that switches all fixtures on the circuit (a 3-way switch is still 1 POC). Up to 3 different fixture types can be recorded in one POC module – if there are more, record these in a separate table with the same POC ID. Be sure to indicate how many tables make up the POC record. The “Switched State” is the one encountered at the time of the inventory. Input Control Type for each POC, and circle the appropriate HIM (circle “NA” if the fixture will not be retrofit). “Watts Per Fixture” is the spot measurement for the Fixture ID from the Fixture Details Form. “Inoperable Fixtures” have all lamps burned out; be sure not to double-count with “Lamps Burned Out”!

Area ID:		Description:	
Schedule ID:			

1. POC ID: _____ Point-of-Control Desc: _____ Table ____ of ____

Switched State:	<input type="checkbox"/> On <input type="checkbox"/> Off	Ltg Ctrl Type <i>(check one):</i>	<input type="checkbox"/> Manual Switch <input type="checkbox"/> Bi-Level Switch	<input type="checkbox"/> Timeclock <input type="checkbox"/> Photocell	<input type="checkbox"/> Occ Sensor <input type="checkbox"/> Twist-Timer	<input type="checkbox"/> Always On (24/7) <input type="checkbox"/> Daylighting Controls	<input type="checkbox"/> EMS <input type="checkbox"/> Other:	<input type="checkbox"/> Dimmer
Fixture ID	Watts Per Fixture [A]	Operable Fixt Count [B]	Connected Load [C]=A*B	HIM (NA if not to be retrofit)	Other Counts		Tally or Notes	
					Inoperable Fixtures	Lamps Burned Out		
				LF HB NA				
				LF HB NA				
				LF HB NA				
TOTAL CONNECTED LOAD [C]:								

2. POC ID: _____ Point-of-Control Desc: _____ Table ____ of ____

Switched State:	<input type="checkbox"/> On <input type="checkbox"/> Off	Ltg Ctrl Type <i>(check one):</i>	<input type="checkbox"/> Manual Switch <input type="checkbox"/> Bi-Level Switch	<input type="checkbox"/> Timeclock <input type="checkbox"/> Photocell	<input type="checkbox"/> Occ Sensor <input type="checkbox"/> Twist-Timer	<input type="checkbox"/> Always On (24/7) <input type="checkbox"/> Daylighting Controls	<input type="checkbox"/> EMS <input type="checkbox"/> Other:	<input type="checkbox"/> Dimmer
Fixture ID	Watts Per Fixture [A]	Operable Fixt Count [B]	Connected Load [C]=A*B	HIM (NA if not to be retrofit)	Other Counts		Tally or Notes	
					Inoperable Fixtures	Lamps Burned Out		
				LF HB NA				
				LF HB NA				
				LF HB NA				
TOTAL CONNECTED LOAD [C]:								

3. POC ID: _____ Point-of-Control Desc: _____ Table ____ of ____

Switched State:	<input type="checkbox"/> On <input type="checkbox"/> Off	Ltg Ctrl Type <i>(check one):</i>	<input type="checkbox"/> Manual Switch <input type="checkbox"/> Bi-Level Switch	<input type="checkbox"/> Timeclock <input type="checkbox"/> Photocell	<input type="checkbox"/> Occ Sensor <input type="checkbox"/> Twist-Timer	<input type="checkbox"/> Always On (24/7) <input type="checkbox"/> Daylighting Controls	<input type="checkbox"/> EMS <input type="checkbox"/> Other:	<input type="checkbox"/> Dimmer
Fixture ID	Watts Per Fixture [A]	Operable Fixt Count [B]	Connected Load [C]=A*B	HIM (NA if not to be retrofit)	Other Counts		Tally or Notes	
					Inoperable Fixtures	Lamps Burned Out		
				LF HB NA				
				LF HB NA				
				LF HB NA				
TOTAL CONNECTED LOAD [C]:								

4. POC ID: _____ Point-of-Control Desc: _____ Table ____ of ____

Switched State:	<input type="checkbox"/> On <input type="checkbox"/> Off	Ltg Ctrl Type <i>(check one):</i>	<input type="checkbox"/> Manual Switch <input type="checkbox"/> Bi-Level Switch	<input type="checkbox"/> Timeclock <input type="checkbox"/> Photocell	<input type="checkbox"/> Occ Sensor <input type="checkbox"/> Twist-Timer	<input type="checkbox"/> Always On (24/7) <input type="checkbox"/> Daylighting Controls	<input type="checkbox"/> EMS <input type="checkbox"/> Other:	<input type="checkbox"/> Dimmer
Fixture ID	Watts Per Fixture [A]	Operable Fixt Count [B]	Connected Load [C]=A*B	HIM (NA if not to be retrofit)	Other Counts		Tally or Notes	
					Inoperable Fixtures	Lamps Burned Out		
				LF HB NA				
				LF HB NA				
				LF HB NA				
TOTAL CONNECTED LOAD [C]:								

LIGHTING INVENTORY FORM

Check Box When Form is Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
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Instructions: Fill out at least one Lighting Inventory Form for every unique combination of Area ID and Schedule ID. Record the quantity of fixtures by fixture type for each Point-of-Control (POC). A POC is any control point that switches all fixtures on the circuit (a 3-way switch is still 1 POC). Up to 3 different fixture types can be recorded in one POC module – if there are more, record these in a separate table with the same POC ID. Be sure to indicate how many tables make up the POC record. The “Switched State” is the one encountered at the time of the inventory. Input Control Type for each POC, and circle the appropriate HIM (circle “NA” if the fixture will not be retrofit). “Watts Per Fixture” is the spot measurement for the Fixture ID from the Fixture Details Form. “Inoperable Fixtures” have all lamps burned out; be sure not to double-count with “Lamps Burned Out”!

Area ID:		Description:	
Schedule ID:			

1. POC ID: _____ Point-of-Control Desc: _____ Table ____ of ____

Switched State:	<input type="checkbox"/> On <input type="checkbox"/> Off	Ltg Ctrl Type <i>(check one):</i>	<input type="checkbox"/> Manual Switch <input type="checkbox"/> Bi-Level Switch	<input type="checkbox"/> Timeclock <input type="checkbox"/> Photocell	<input type="checkbox"/> Occ Sensor <input type="checkbox"/> Twist-Timer	<input type="checkbox"/> Always On (24/7) <input type="checkbox"/> Daylighting Controls	<input type="checkbox"/> EMS <input type="checkbox"/> Other:	<input type="checkbox"/> Dimmer
Fixture ID	Watts Per Fixture [A]	Operable Fixt Count [B]	Connected Load [C]=A*B	HIM (NA if not to be retrofit)	Other Counts		Tally or Notes	
					Inoperable Fixtures	Lamps Burned Out		
				LF HB NA				
				LF HB NA				
				LF HB NA				
TOTAL CONNECTED LOAD [C]:								

2. POC ID: _____ Point-of-Control Desc: _____ Table ____ of ____

Switched State:	<input type="checkbox"/> On <input type="checkbox"/> Off	Ltg Ctrl Type <i>(check one):</i>	<input type="checkbox"/> Manual Switch <input type="checkbox"/> Bi-Level Switch	<input type="checkbox"/> Timeclock <input type="checkbox"/> Photocell	<input type="checkbox"/> Occ Sensor <input type="checkbox"/> Twist-Timer	<input type="checkbox"/> Always On (24/7) <input type="checkbox"/> Daylighting Controls	<input type="checkbox"/> EMS <input type="checkbox"/> Other:	<input type="checkbox"/> Dimmer
Fixture ID	Watts Per Fixture [A]	Operable Fixt Count [B]	Connected Load [C]=A*B	HIM (NA if not to be retrofit)	Other Counts		Tally or Notes	
					Inoperable Fixtures	Lamps Burned Out		
				LF HB NA				
				LF HB NA				
				LF HB NA				
TOTAL CONNECTED LOAD [C]:								

3. POC ID: _____ Point-of-Control Desc: _____ Table ____ of ____

Switched State:	<input type="checkbox"/> On <input type="checkbox"/> Off	Ltg Ctrl Type <i>(check one):</i>	<input type="checkbox"/> Manual Switch <input type="checkbox"/> Bi-Level Switch	<input type="checkbox"/> Timeclock <input type="checkbox"/> Photocell	<input type="checkbox"/> Occ Sensor <input type="checkbox"/> Twist-Timer	<input type="checkbox"/> Always On (24/7) <input type="checkbox"/> Daylighting Controls	<input type="checkbox"/> EMS <input type="checkbox"/> Other:	<input type="checkbox"/> Dimmer
Fixture ID	Watts Per Fixture [A]	Operable Fixt Count [B]	Connected Load [C]=A*B	HIM (NA if not to be retrofit)	Other Counts		Tally or Notes	
					Inoperable Fixtures	Lamps Burned Out		
				LF HB NA				
				LF HB NA				
				LF HB NA				
TOTAL CONNECTED LOAD [C]:								

4. POC ID: _____ Point-of-Control Desc: _____ Table ____ of ____

Switched State:	<input type="checkbox"/> On <input type="checkbox"/> Off	Ltg Ctrl Type <i>(check one):</i>	<input type="checkbox"/> Manual Switch <input type="checkbox"/> Bi-Level Switch	<input type="checkbox"/> Timeclock <input type="checkbox"/> Photocell	<input type="checkbox"/> Occ Sensor <input type="checkbox"/> Twist-Timer	<input type="checkbox"/> Always On (24/7) <input type="checkbox"/> Daylighting Controls	<input type="checkbox"/> EMS <input type="checkbox"/> Other:	<input type="checkbox"/> Dimmer
Fixture ID	Watts Per Fixture [A]	Operable Fixt Count [B]	Connected Load [C]=A*B	HIM (NA if not to be retrofit)	Other Counts		Tally or Notes	
					Inoperable Fixtures	Lamps Burned Out		
				LF HB NA				
				LF HB NA				
				LF HB NA				
TOTAL CONNECTED LOAD [C]:								

LOGGER INSTALLATION FORM

Project ID: _____ Site Name: _____

Instructions: Fill out a separate Logger Installation Form for every data point to be metered. This could be a single DENT Lighting Logger, or a CT feeding one channel of a HOBO data logger. It is critical that the Post-Retrofit metering data point matches the Pre-Retrofit data point. Take a photo of the installation that shows perspective on where it was installed, and record a description of the placement in the notes. Record the serial numbers of all pieces of equipment to be installed.

Logger Installation Site Visits

	PRE-RETROFIT INSTALLATION (#1)	POST-RETROFIT INSTALLATION (#3)
Logger Installation (check box when data entry complete):	<input type="checkbox"/>	<input type="checkbox"/>
1a. Installation Date / 1b. Installation Time:	/	/
2. Logger Placement (circle one): P=At the Panel C=At the POC F=At the Fixture O=Other: _____	P C F O	P C F O
3. Branch Circuit ID (if P) or POC ID (if C or F):		
4. Logger Type (circle one): HCT=HOBO w/ CT DCT=DENT w/ CT DLL=DENT Lighting Logger	HCT DCT DLL	HCT DCT DLL
5. Logger Serial Number:		
6. Primary (P) or Backup (B) Logger?	P B	P B
7. If Logger Type = HCT, then:	<input type="checkbox"/> N/A	<input type="checkbox"/> N/A
7a. Logger Channel (circle one):	1 2 3 4	1 2 3 4
7b. CT Size (circle one):	20A 50A 100A 200A	20A 50A 100A 200A
7c. Sampling Interval (minutes):		
7d. CT Serial Number:		
8. If Logger Type = DCT, then:	<input type="checkbox"/> N/A	<input type="checkbox"/> N/A
8a. Logger sensitivity has been adjusted properly?	Yes No	Yes No
8b. Logger has been reset but not cleared?	Yes No	Yes No
8c. Fixture was switched on/off at installation time?	Yes No	Yes No
9. If Logger Type = DLL, then:	<input type="checkbox"/> N/A	<input type="checkbox"/> N/A
9a. Placement: I=Inside the fixture; O=Outside the fixture	I O	I O
9b. Was the Fiber Optic attachment used in the installation?	Yes No	Yes No
9c. Is it in a location that receives significant daylight or other light?	Yes No	Yes No
9d. Logger sensitivity has been adjusted properly?	Yes No	Yes No
9e. Logger has been reset but not cleared?	Yes No	Yes No
9f. Fixture was switched on/off at installation time?	Yes No	Yes No
10. Was a photo of the installation taken (circle one):	Yes No	Yes No
11. For Post-Retrofit Installation: do you feel reasonably confident that you are metering the same data point as in the Pre-Retrofit Installation? Describe why in the notes.	Not Applicable	Yes No

Describe the Logger Placement and Location:

Pre-Retrofit Installation (#1):	
Post-Retrofit Installation (#3):	

Logger Retrieval Site Visits

	PRE-RETROFIT RETRIEVAL (#2)	POST-RETROFIT RETRIEVAL (#4)
Logger Retrieval (check box when data entry complete):	<input type="checkbox"/>	<input type="checkbox"/>
1a. Retrieval Date / 1b. Retrieval Time:	/	/
2. Logger Disposition (circle one): F=Found Intact B=Found Broken M=Missing OT=Other (describe in notes)	F B M OT	F B M OT
3. If DCT or DLL, fixture was switched on/off at retrieval time?	Yes No	Yes No
4. Does logger serial number and channel match the installation?	Yes No	Yes No
5. If [4]=No, what is actual logger serial number and channel?		

Other Comments:

Pre-Retrofit Retrieval (#2):	
Post-Retrofit Retrieval (#4):	

LOGGER INSTALLATION FORM

Project ID: _____ Site Name: _____

Instructions: Fill out a separate Logger Installation Form for every data point to be metered. This could be a single DENT Lighting Logger, or a CT feeding one channel of a HOBO data logger. **It is critical that the Post-Retrofit metering data point matches the Pre-Retrofit data point.** Take a photo of the installation that shows perspective on where it was installed, and record a description of the placement in the notes. Record the serial numbers of all pieces of equipment to be installed.

Logger Installation Site Visits

	PRE-RETROFIT INSTALLATION (#1)	POST-RETROFIT INSTALLATION (#3)
Logger Installation (check box when data entry complete):	<input type="checkbox"/>	<input type="checkbox"/>
1a. Installation Date / 1b. Installation Time:	/	/
2. Logger Placement (circle one): P=At the Panel C=At the POC F=At the Fixture O=Other: _____	P C F O	P C F O
3. Branch Circuit ID (if P) or POC ID (if C or F):		
4. Logger Type (circle one): HCT=HOBO w/ CT DCT=DENT w/ CT DLL=DENT Lighting Logger	HCT DCT DLL	HCT DCT DLL
5. Logger Serial Number:		
6. Primary (P) or Backup (B) Logger?	P B	P B
7. If Logger Type = HCT, then:	<input type="checkbox"/> N/A	<input type="checkbox"/> N/A
7a. Logger Channel (circle one):	1 2 3 4	1 2 3 4
7b. CT Size (circle one):	20A 50A 100A 200A	20A 50A 100A 200A
7c. Sampling Interval (minutes):		
7d. CT Serial Number:		
8. If Logger Type = DCT, then:	<input type="checkbox"/> N/A	<input type="checkbox"/> N/A
8a. Logger sensitivity has been adjusted properly?	Yes No	Yes No
8b. Logger has been reset but not cleared?	Yes No	Yes No
8c. Fixture was switched on/off at installation time?	Yes No	Yes No
9. If Logger Type = DLL, then:	<input type="checkbox"/> N/A	<input type="checkbox"/> N/A
9a. Placement: I=Inside the fixture; O=Outside the fixture	I O	I O
9b. Was the Fiber Optic attachment used in the installation?	Yes No	Yes No
9c. Is it in a location that receives significant daylight or other light?	Yes No	Yes No
9d. Logger sensitivity has been adjusted properly?	Yes No	Yes No
9e. Logger has been reset but not cleared?	Yes No	Yes No
9f. Fixture was switched on/off at installation time?	Yes No	Yes No
10. Was a photo of the installation taken (circle one):	Yes No	Yes No
11. For Post-Retrofit Installation: do you feel reasonably confident that you are metering the same data point as in the Pre-Retrofit Installation? Describe why in the notes.	Not Applicable	Yes No

Describe the Logger Placement and Location:

Pre-Retrofit Installation (#1):	
Post-Retrofit Installation (#3):	

Logger Retrieval Site Visits

	PRE-RETROFIT RETRIEVAL (#2)	POST-RETROFIT RETRIEVAL (#4)
Logger Retrieval (check box when data entry complete):	<input type="checkbox"/>	<input type="checkbox"/>
1a. Retrieval Date / 1b. Retrieval Time:	/	/
2. Logger Disposition (circle one): F=Found Intact B=Found Broken M=Missing OT=Other (describe in notes)	F B M OT	F B M OT
3. If DCT or DLL, fixture was switched on/off at retrieval time?	Yes No	Yes No
4. Does logger serial number and channel match the installation?	Yes No	Yes No
5. If [4]=No, what is actual logger serial number and channel?		

Other Comments:

Pre-Retrofit Retrieval (#2):	
Post-Retrofit Retrieval (#4):	

OPERATING DETAILS FORM

Check Box When Form is Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
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Instructions: Fill out Operating Details for each unique Operation Schedule to be inventoried. The values in each cell of the table should be the **percentage of the hour** multiplied by the **percentage of fixtures ON**. For example, if 50% of the fixtures are ON from 9:30 to 10:00, the recorded value should be 25% (50% of the fixtures x 50% of the hour). A consistent schedule is one in which the hours do not vary much day-to-day, such as a retail operation that begins and ends at the same times. A variable schedule is one in which the hours are unpredictable (checking "Variable schedule" indicates that the recorded schedule is a best-guess from the customer).

1. Schedule ID: _____ Schedule Description: _____ Check Box When Complete

1. Daytypes (circle)	Hour Bin	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
2. Is the Normal Schedule consistent day-to-day, or is it variable?		<input type="checkbox"/> Consistent schedule				3. Does the Normal Operating Schedule vary during the year?				<input type="checkbox"/> No, it's the same year-round			
		<input type="checkbox"/> Variable schedule								<input type="checkbox"/> Yes, it varies by season (describe in notes below)			
Notes:													

2. Schedule ID: _____ Schedule Description: _____ Check Box When Complete

1. Daytypes (circle)	Hour Bin	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
2. Is the Normal Schedule consistent day-to-day, or is it variable?		<input type="checkbox"/> Consistent schedule				3. Does the Normal Operating Schedule vary during the year?				<input type="checkbox"/> No, it's the same year-round			
		<input type="checkbox"/> Variable schedule								<input type="checkbox"/> Yes, it varies by season (describe in notes below)			
Notes:													

3. Schedule ID: _____ Schedule Description: _____ Check Box When Complete

1. Daytypes (circle)	Hour Bin	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
2. Is the Normal Schedule consistent day-to-day, or is it variable?		<input type="checkbox"/> Consistent schedule				3. Does the Normal Operating Schedule vary during the year?				<input type="checkbox"/> No, it's the same year-round			
		<input type="checkbox"/> Variable schedule								<input type="checkbox"/> Yes, it varies by season (describe in notes below)			
Notes:													

OPERATING DETAILS FORM

Check Box When Form is Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
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Instructions: Fill out Operating Details for each unique Operation Schedule to be inventoried. The values in each cell of the table should be the **percentage of the hour** multiplied by the **percentage of fixtures ON**. For example, if 50% of the fixtures are ON from 9:30 to 10:00, the recorded value should be 25% (50% of the fixtures x 50% of the hour). A consistent schedule is one in which the hours do not vary much day-to-day, such as a retail operation that begins and ends at the same times. A variable schedule is one in which the hours are unpredictable (checking "Variable schedule" indicates that the recorded schedule is a best-guess from the customer).

1. Schedule ID: _____ Schedule Description: _____ Check Box When Complete

1. Daytypes (circle)	Hour Bin	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
2. Is the Normal Schedule consistent day-to-day, or is it variable?		<input type="checkbox"/> Consistent schedule				3. Does the Normal Operating Schedule vary during the year?				<input type="checkbox"/> No, it's the same year-round			
		<input type="checkbox"/> Variable schedule								<input type="checkbox"/> Yes, it varies by season (describe in notes below)			
Notes:													

2. Schedule ID: _____ Schedule Description: _____ Check Box When Complete

1. Daytypes (circle)	Hour Bin	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
2. Is the Normal Schedule consistent day-to-day, or is it variable?		<input type="checkbox"/> Consistent schedule				3. Does the Normal Operating Schedule vary during the year?				<input type="checkbox"/> No, it's the same year-round			
		<input type="checkbox"/> Variable schedule								<input type="checkbox"/> Yes, it varies by season (describe in notes below)			
Notes:													

3. Schedule ID: _____ Schedule Description: _____ Check Box When Complete

1. Daytypes (circle)	Hour Bin	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
Mo Tu We Th Fr Sa Su Hol	AM												
	PM												
2. Is the Normal Schedule consistent day-to-day, or is it variable?		<input type="checkbox"/> Consistent schedule				3. Does the Normal Operating Schedule vary during the year?				<input type="checkbox"/> No, it's the same year-round			
		<input type="checkbox"/> Variable schedule								<input type="checkbox"/> Yes, it varies by season (describe in notes below)			
Notes:													

BRANCH CIRCUIT MAPPING FORM

Check Box if Form is either N/A or Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
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Instructions: This form must only be filled out if the Panel Metering Screening from the Site Information Form has been passed. If so, use this form to trace all of the Points-of-Control (POCs) to the correct Branch Circuit at the electrical panel. If a single Branch Circuit serves more than 12 POCs, use as many Branch Circuit tables as necessary to capture them all. **If any of Q3, Q5c, Q6c, or Q7 equals "No", you cannot conduct panel metering on the branch circuit.**

1. Branch Circuit ID: _____ **Description:** _____ **Table** _____ **of** _____

1. POC IDs:											
2. Area IDs:											
3. Do all POC IDs have the same Area ID? (if No, you cannot conduct panel metering on this branch circuit – skip to On/Off metering):										Yes	No
4. Total Connected Load for all POCs on this Electrical Panel Branch Circuit ID (summed using the Lighting Inventory Form):											
5a. Watts / 5b. Amps with all POCs Switched ON:				/		5c. Is [5a] within ~10% of [4]?				Yes	No
6a. Watts / 6b. Amps with all POCs Switched OFF:				/		6c. Is [6a] less than ~5% of [4]?				Yes	No
7. Can you be reasonably sure that any loads other than those identified in [1] make up less than 5% of the total branch circuit load? (if Yes, continue with panel meter setup. If No, you cannot conduct panel metering on this branch circuit):										Yes	No
Notes:											

2. Branch Circuit ID: _____ **Description:** _____ **Table** _____ **of** _____

1. POC IDs:											
2. Area IDs:											
3. Do all POC IDs have the same Area ID? (if No, you cannot conduct panel metering on this branch circuit – skip to On/Off metering):										Yes	No
4. Total Connected Load for all POCs on this Electrical Panel Branch Circuit ID (summed using the Lighting Inventory Form):											
5a. Watts / 5b. Amps with all POCs Switched ON:				/		5c. Is [5a] within ~10% of [4]?				Yes	No
6a. Watts / 6b. Amps with all POCs Switched OFF:				/		6c. Is [6a] less than ~5% of [4]?				Yes	No
7. Can you be reasonably sure that any loads other than those identified in [1] make up less than 5% of the total branch circuit load? (if Yes, continue with panel meter setup. If No, you cannot conduct panel metering on this branch circuit):										Yes	No
Notes:											

3. Branch Circuit ID: _____ **Description:** _____ **Table** _____ **of** _____

1. POC IDs:											
2. Area IDs:											
3. Do all POC IDs have the same Area ID? (if No, you cannot conduct panel metering on this branch circuit – skip to On/Off metering):										Yes	No
4. Total Connected Load for all POCs on this Electrical Panel Branch Circuit ID (summed using the Lighting Inventory Form):											
5a. Watts / 5b. Amps with all POCs Switched ON:				/		5c. Is [5a] within ~10% of [4]?				Yes	No
6a. Watts / 6b. Amps with all POCs Switched OFF:				/		6c. Is [6a] less than ~5% of [4]?				Yes	No
7. Can you be reasonably sure that any loads other than those identified in [1] make up less than 5% of the total branch circuit load? (if Yes, continue with panel meter setup. If No, you cannot conduct panel metering on this branch circuit):										Yes	No
Notes:											

4. Branch Circuit ID: _____ **Description:** _____ **Table** _____ **of** _____

1. POC IDs:											
2. Area IDs:											
3. Do all POC IDs have the same Area ID? (if No, you cannot conduct panel metering on this branch circuit – skip to On/Off metering):										Yes	No
4. Total Connected Load for all POCs on this Electrical Panel Branch Circuit ID (summed using the Lighting Inventory Form):											
5a. Watts / 5b. Amps with all POCs Switched ON:				/		5c. Is [5a] within ~10% of [4]?				Yes	No
6a. Watts / 6b. Amps with all POCs Switched OFF:				/		6c. Is [6a] less than ~5% of [4]?				Yes	No
7. Can you be reasonably sure that any loads other than those identified in [1] make up less than 5% of the total branch circuit load? (if Yes, continue with panel meter setup. If No, you cannot conduct panel metering on this branch circuit):										Yes	No
Notes:											

BRANCH CIRCUIT MAPPING FORM

Check Box if Form is either N/A or Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
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Instructions: This form must only be filled out if the Panel Metering Screening from the Site Information Form has been passed. If so, use this form to trace all of the Points-of-Control (POCs) to the correct Branch Circuit at the electrical panel. If a single Branch Circuit serves more than 12 POCs, use as many Branch Circuit tables as necessary to capture them all. If any of Q3, Q5c, Q6c, or Q7 equals "No", you cannot conduct panel metering on the branch circuit.

1. Branch Circuit ID: _____ Description: _____ Table ____ of ____

1. POC IDs:															
2. Area IDs:															
3. Do all POC IDs have the same Area ID? (if No, you cannot conduct panel metering on this branch circuit – skip to On/Off metering):												Yes	No		
4. Total Connected Load for all POCs on this Electrical Panel Branch Circuit ID (summed using the Lighting Inventory Form):															
5a. Watts / 5b. Amps with all POCs Switched ON:					/					5c. Is [5a] within ~10% of [4]?				Yes	No
6a. Watts / 6b. Amps with all POCs Switched OFF:					/					6c. Is [6a] less than ~5% of [4]?				Yes	No
7. Can you be reasonably sure that any loads other than those identified in [1] make up less than 5% of the total branch circuit load? (if Yes, continue with panel meter setup. If No, you cannot conduct panel metering on this branch circuit):												Yes	No		
Notes:															

2. Branch Circuit ID: _____ Description: _____ Table ____ of ____

1. POC IDs:															
2. Area IDs:															
3. Do all POC IDs have the same Area ID? (if No, you cannot conduct panel metering on this branch circuit – skip to On/Off metering):												Yes	No		
4. Total Connected Load for all POCs on this Electrical Panel Branch Circuit ID (summed using the Lighting Inventory Form):															
5a. Watts / 5b. Amps with all POCs Switched ON:					/					5c. Is [5a] within ~10% of [4]?				Yes	No
6a. Watts / 6b. Amps with all POCs Switched OFF:					/					6c. Is [6a] less than ~5% of [4]?				Yes	No
7. Can you be reasonably sure that any loads other than those identified in [1] make up less than 5% of the total branch circuit load? (if Yes, continue with panel meter setup. If No, you cannot conduct panel metering on this branch circuit):												Yes	No		
Notes:															

3. Branch Circuit ID: _____ Description: _____ Table ____ of ____

1. POC IDs:															
2. Area IDs:															
3. Do all POC IDs have the same Area ID? (if No, you cannot conduct panel metering on this branch circuit – skip to On/Off metering):												Yes	No		
4. Total Connected Load for all POCs on this Electrical Panel Branch Circuit ID (summed using the Lighting Inventory Form):															
5a. Watts / 5b. Amps with all POCs Switched ON:					/					5c. Is [5a] within ~10% of [4]?				Yes	No
6a. Watts / 6b. Amps with all POCs Switched OFF:					/					6c. Is [6a] less than ~5% of [4]?				Yes	No
7. Can you be reasonably sure that any loads other than those identified in [1] make up less than 5% of the total branch circuit load? (if Yes, continue with panel meter setup. If No, you cannot conduct panel metering on this branch circuit):												Yes	No		
Notes:															

4. Branch Circuit ID: _____ Description: _____ Table ____ of ____

1. POC IDs:															
2. Area IDs:															
3. Do all POC IDs have the same Area ID? (if No, you cannot conduct panel metering on this branch circuit – skip to On/Off metering):												Yes	No		
4. Total Connected Load for all POCs on this Electrical Panel Branch Circuit ID (summed using the Lighting Inventory Form):															
5a. Watts / 5b. Amps with all POCs Switched ON:					/					5c. Is [5a] within ~10% of [4]?				Yes	No
6a. Watts / 6b. Amps with all POCs Switched OFF:					/					6c. Is [6a] less than ~5% of [4]?				Yes	No
7. Can you be reasonably sure that any loads other than those identified in [1] make up less than 5% of the total branch circuit load? (if Yes, continue with panel meter setup. If No, you cannot conduct panel metering on this branch circuit):												Yes	No		
Notes:															

SITE INFORMATION FORM

Project ID: _____ Site Name: _____

Instructions: Use this checklist for each of the 2 Logger Installation Site Visits (#1 and #3). It will help to 1) assist with pre-site visit preparation, 2) ensure that all onsite data collection activities have been completed, and 3) assist with the post-site visit QC and data entry.

Installation Site Visit Checklists

	PRE-RETROFIT INSTALLATION (#1)		POST-RETROFIT INSTALLATION (#3)	
1. Names of Surveyors/Installers:				
2. Actual Date of Inventory & Logger Installation:				
3a. Start Time / 3b. End Time / 3c. Time Onsite:				
PRE-SITE VISIT PREPARATION:	Check	Notes	Check	Notes
4. Data Collection Forms Printed and Packed?	<input type="checkbox"/>		<input type="checkbox"/>	
5. Previous Site Visit Forms and Photos Printed?	<i>Not Applicable</i>		<input type="checkbox"/>	
6. Have Obtained Directions to Site?	<input type="checkbox"/>		<input type="checkbox"/>	
7. Have All Items on the Equipment Checklist?	<input type="checkbox"/>		<input type="checkbox"/>	
8. On/Off Lighting Loggers Synced to Pacific Time?	<input type="checkbox"/>		<input type="checkbox"/>	
ONSITE DATA COLLECTION:	Check	Notes	Check	Notes
9. Site Information Form Complete?	<input type="checkbox"/>		<input type="checkbox"/>	
10. All Operating Details Forms Complete?	<input type="checkbox"/>	Qty Forms:	<input type="checkbox"/>	Qty Forms:
11. All Fixture Details Forms Complete?	<input type="checkbox"/>	Qty Forms:	<input type="checkbox"/>	Qty Forms:
12. All Lighting Inventory Forms Complete?	<input type="checkbox"/>	Qty Forms:	<input type="checkbox"/>	Qty Forms:
13. Branch Circuit Mapping Complete <i>(if required)?</i>	<input type="checkbox"/>	Qty Forms:	<input type="checkbox"/>	Qty Forms:
14. Site Metering Plan Complete?	<input type="checkbox"/>	Qty Forms:	<input type="checkbox"/>	Qty Forms:
15. All Logger Installation Forms Complete?	<input type="checkbox"/>	Qty Forms:	<input type="checkbox"/>	Qty Forms:
16. Project ID & Form Numbers Entered on all pages?	<input type="checkbox"/>		<input type="checkbox"/>	
POST-SITE VISIT ACTIVITIES:	Check	Notes	Check	Notes
17. Online Tracking Status Updated?	<input type="checkbox"/>		<input type="checkbox"/>	
18. Online Data Entry Complete?	<input type="checkbox"/>		<input type="checkbox"/>	
19. Hard-Copy Scanned and Uploaded?	<input type="checkbox"/>		<input type="checkbox"/>	
20. Site Photos Labeled and Uploaded?	<input type="checkbox"/>		<input type="checkbox"/>	

Other Comments and Notes:

Pre-Retrofit Installation (#1) Notes:	
Post-Retrofit Installation (#3) Notes:	

SITE INFORMATION FORM

Project ID: _____ Site Name: _____

Instructions: Use this checklist for each of the 2 Logger Retrieval Site Visits (#2 and #4). It will help to 1) assist with pre-site visit preparation, 2) ensure that all onsite data collection activities have been completed, and 3) assist with the post-site visit QC and data entry.

Retrieval Site Visit Checklists

	PRE-RETROFIT RETRIEVAL (#2)		POST-RETROFIT RETRIEVAL (#4)	
1. Names of Retrievers:				
2. Actual Date of Logger Retrieval:				
3. Start Time / 3b. End Time / 3c. Time Onsite:				
PRE-SITE VISIT PREPARATION:	Check	Notes	Check	Notes
4. Previous Site Visit Forms and Photos Printed?	<input type="checkbox"/>		<input type="checkbox"/>	
5. Missing Data Report Printed?	<input type="checkbox"/>		<input type="checkbox"/>	
6. Have Obtained Directions to Site?	<input type="checkbox"/>		<input type="checkbox"/>	
ONSITE DATA COLLECTION:	Check	Notes	Check	Notes
7. All Data Logger Retrieval Tables Complete?	<input type="checkbox"/>	Qty Loggers Retrieved:	<input type="checkbox"/>	Qty Loggers Retrieved:
8. All Missing Data Points Accounted For?	<input type="checkbox"/>		<input type="checkbox"/>	
POST-SITE VISIT ACTIVITIES:	Check	Notes	Check	Notes
9. Online Tracking Status Updated?	<input type="checkbox"/>		<input type="checkbox"/>	
10. All Logger Data Downloaded to PC?	<input type="checkbox"/>		<input type="checkbox"/>	
11. Logger Data Uploaded?	<input type="checkbox"/>		<input type="checkbox"/>	
12. Logger QC Report Completed?	<input type="checkbox"/>		<input type="checkbox"/>	
13. Hard-Copy Scanned and Uploaded?	<input type="checkbox"/>		<input type="checkbox"/>	

Other Comments and Notes:

Pre-Retrofit Retrieval (#2) Notes:	
Post-Retrofit Retrieval (#4) Notes:	

SITE INFORMATION FORM

Project ID: _____ Site Name: _____

Instructions: Fill out the "Electric & Gas..." and "Site & Business..." tables below. Some of the information can be collected by interviewing the customer, and some of the information will need to be observed onsite. Write "DK" for Don't Know and "NA" for Not Applicable. Electric and Gas Meter info may be taken from bill.

Electric & Gas Meter Information

Check Box When Complete

Electric Utility (circle one):	PG&E SCE SDG&E OT (if OT, thank the participant and terminate the survey)
E1a. Electric Meter Number:	E1b. Does [E1a] also record electric usage from other businesses? Yes No
E2a. Electric Meter Number:	E2b. Does [E2a] also record electric usage from other businesses? Yes No
Gas Utility (circle one):	PG&E SCG SDG&E None Propane OT: _____
G1a. Gas Meter Number:	G1b. Does [G1a] also record gas usage from other businesses? Yes No
G2a. Gas Meter Number:	G2b. Does [G2a] also record gas usage from other businesses? Yes No

Site & Business Characteristics

Check Box When Complete

1. Observed Business or Building Type Code (use codes from table below):	
2. Is the business Independently-Owned (I), Corporate-Owned (C), or a Franchise (F)? (circle one)	I C F
3. What year was the business established at this location?	
4. Is the occupied space owned or leased? O=Owned; L=Leased; OT=Other: _____	O L OT
5. What year (or decade) was the majority of the facility built?	
6. What kind of a site is this? (circle one):	
P=Part of a Bldg: business occupies part of a bldg SM=Small Multi-Bldg: business occupies multiple bldgs, all of which can be surveyed B=Single Bldg: business occupies the entire bldg CM=Campus: business occupies multiple bldgs which need to be sampled OT=Other: describe in notes	P B SM CM OT
7a. Number of stories in building / 7b. Number of stories occupied by business:	/
8. What is the total floor area of the space that the business occupies?	
9. What is the conditioned floor area of the space that the business occupies?	
10. Dominant Cooling Type for the Business (circle one):	
1=None 2=Split-System 3=PkgRooftop 4=PTAC/PTHP 5=EvapCool 6=Chiller 7=IndivAC/HP 8=WLHP 9=Other: _____	1 2 3 4 5 6 7 8 9
11. Dominant Heating Type for the Business (circle one):	
1=ElecResist 2=ElecHP 3=Gas 4=Both 5=Propane 6=None 7=Other: _____	1 2 3 4 5 6 7

Observed Business/Building Type Codes

Business Type	Code	Business Type	Code	Business Type	Code
Offices (Non-Medical):		Retail Store:		Lodging:	
Administration and management	011	Department / Variety Store	041	Hotel	081
Financial / Legal	012	Retail Warehouse/Clubs	042	Motel	082
Insurance/Real Estate	013	Shop in Enclosed Mall	043	Resort	083
Data Processing/Computer Center	014	Shop in Strip Mall	044	Other Lodging	084
Mixed-Use/Multi-tenant	015	Auto Sales	045	Public Assembly:	
Lab/R&D Facility	016	Other Retail Store	046	Religious Assembly (worship only)	091
Software Development	017	Warehouse:		Religious Assembly (mixed use)	092
Government Services	018	Refrigerated Warehouse	051	Health/Fitness Center	093
Other Office	019	Unconditioned Warehouse, High Bay	052	Movie Theaters	094
Restaurant/Food Service*:		Unconditioned Warehouse, Low Bay	053	Theater / Performing Arts	095
Fast Food or Self Service	021	Conditioned Warehouse, High Bay	054	Library / Museum	096
Specialty/Novelty Food Service	022	Conditioned Warehouse, Low Bay	055	Conference/Convention Center	097
Table Service	023	Health Care:		Community Center	098
Bar/Tavern/Nightclub/Other	024	Hospital	061	Other Recreational/Public Assembly	099
Other Food Service	025	Nursing Home	062	Services:	
Food Stores :		Medical/Dental Office	063	Gas Station / Auto Repair	101
Supermarkets	031	Clinic/Outpatient Care	064	Gas Station w/Convenience Store**	102
Small General Grocery	032	Medical/Dental Lab	065	Repair (Non-Auto)	103
Specialty/Ethnic Grocery	033	Education:		Other Service Shop	104
Convenience Store**	034	Daycare or Preschool	071	Miscellaneous:	
Liquor Store	035	Elementary School	072	Assembly / Light Mfg.	111
Other Food Store	036	Middle / Secondary School	073	Police / Fire Stations	112
Agricultural:		College or University	074	Post Office	113
Commercial Greenhouse	200	Vocational or Trade School	075	Other Comm. Describe below	130
Other Ag. Describe below	210			Industrial: Use SIC or NAICS code	

Notes:

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SITE INFORMATION FORM

Project ID: _____ Site Name: _____

Instructions: Specify Business Hours for both normal and seasonal operation. Seasonal operation is a significant change in normal business hours, such as the summer break period for schools that follow a traditional schedule. Define typical operation for all Day Types listed below and specify hours in military time (8:30 am=0830, 6:30 pm=1830). For partial (i.e. not full) operation days, also indicate the approximate % of full operation as Partial Op %. **For Lodging sites:** Use the Seasonal Operation and PartialOp% to capture high and low season operation and occupancy rates.

Normal Business Hours

Check Box When Complete

Day Type	Business Hours (24 hr clock)	Closed All Day?	Open 24 hrs?	By Appt.	PartialOp%
Monday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tuesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wednesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Thursday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Friday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Saturday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sunday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Seasonal Business Hours

Check Box if Either N/A or Complete

Day Type	Business Hours (24hr clock)	Closed All Day?	Open 24 hrs?	By Appt.	PartialOp%
Monday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tuesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wednesday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Thursday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Friday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Saturday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sunday	from _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Seasonal Operation Periods

Check Box if Either N/A or Complete

PERIOD 1 (describe):	PERIOD 2 (describe):	PERIOD 3 (describe):
Begin Month/Day:	Begin Month/Day:	Begin Month/Day:
End Month/Day:	End Month/Day:	End Month/Day:

Closed Holidays

Check Box if Either N/A or Complete

<input type="checkbox"/> New Year's Eve	<input type="checkbox"/> Easter Sunday	<input type="checkbox"/> Columbus Day	<input type="checkbox"/> Christmas Day Celebrated
<input type="checkbox"/> New Year's Day	<input type="checkbox"/> Memorial Day	<input type="checkbox"/> Veteran's Day	<input type="checkbox"/> Casear Chavez Day
<input type="checkbox"/> New Year's Day Celebrated	<input type="checkbox"/> Flag Day	<input type="checkbox"/> Thanksgiving	<input type="checkbox"/> Other 1:
<input type="checkbox"/> Martin Luther King Day	<input type="checkbox"/> Independence Day (July 4 th)	<input type="checkbox"/> Thanksgiving Friday	<input type="checkbox"/> Other 2:
<input type="checkbox"/> President's Day	<input type="checkbox"/> Independence Day Celebrated	<input type="checkbox"/> Christmas Eve	<input type="checkbox"/> Other 3:
<input type="checkbox"/> St. Patrick's Day	<input type="checkbox"/> Labor Day	<input type="checkbox"/> Christmas Day	Total Closed Holidays:

Hours and Operation Notes:

SITE INFORMATION FORM

Project ID: _____ Site Name: _____

Instructions: Identify a unique Area ID for each distinct Activity Area type within the space occupied by the business. A maximum of eight Activity Area types can be specified. Include all of the Activity Areas at the site, whether the lighting is part of the Lighting Inventory or not. Any area that is not part of the retrofit can be entered with Activity Area Code 098 (Non-rebated). Be sure also to record the sqft of each identified Activity Area. If the Area has large garage doors that are often open, check the box for "Area Has Windows".

Activity Area Definitions

Check Box When Complete

Area ID	Activity Area Code (see table)	Activity Area Description	Area Has Windows	Area Has Skylights	Area Will Be Included in Lighting Inventory	Conditioned Space Type Code	Total Sqft of Area
1			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Total (use as a dummy-check comparison against the customer-reported value):							

Conditioned Space Type Codes					
CH = Cooled & Heated	CL = Only Cooled	HT = Only Heated	ECH = EvapCooled & Heated	ECL = Only EvapCool	
NU = HVAC present but not used	RF = Refrigerated	UN = Unconditioned	OU = Outside	OT = Other (describe in comments)	

AA Code	Activity Area Type Description	AA Code	Activity Area Type Description	AA Code	Activity Area Type Description
1	Auditorium/Gym	22	Guest Rooms (Hotel/Motel)	42	Religious Worship
2	Auto Repair Workshop	23	Kitchen/Break room & Food Prep.	43	Residential
3	Bank/Financial	24	Laboratory	44	Restrooms
4	Bar Cocktail Lounge	25	Laundry	45	Retail Sales/Showroom
5	Barber/Beauty Shop	26	Library	46	Smoking Lounge
6	Casino/Gaming	27	Loading Dock	47	Storage (Conditioned)
7	Classroom/Lecture	28	Lobby (Hotel)	48	Storage (Unconditioned)
8	Clean Room	29	Lobby (Main Entry and Assembly)	49	Storage (Refrigerated/Freezer), Walk-in
9	Computer Room/Data Processing	30	Lobby (Office Reception/Waiting)	50	Storage (Refrigerated/Freezer), Building
10	Comm/Ind Work (General High Bay)	31	Locker and Dressing Room	51	Surgery Rooms
11	Comm/Ind Work (General Low Bay)	32	Mall Arcade and Atrium	52	Theater (Motion Picture)
12	Comm/Ind Work (Precision)	33	Mechanical/Electrical Room	53	Theater (Performance)
13	Conference Room	34	Medical Offices and Exam Rooms	54	Unknown
14	Convention and Meeting Center	35	Office (Executive/Private)	55	Vacant (Conditioned)
15	Copy Room	36	Office (General)	56	Vacant (Unconditioned)
16	Corridor / Hallways	37	Office (Open Plan)	57	Vocational Areas
17	Courtrooms	38	Patient Rooms	98	Non Rebated Area
18	Dining Area	39	Patio Area	99	Other Unlisted Activity Types
19	Dry Cleaning	40	Pool/Spa Area	100	Outside/Outdoor Area
20	Exercise Centers/Gymnasium	41	Police/Fire Station		
21	Exhibit Display Area / Museum				

Activity Area Definition Notes:

SITE INFORMATION FORM

Project ID: _____ Site Name: _____

Instructions: Use the Site Sketch to help identify data logger locations, map the circuits, or help direct how you approach the Lighting Inventory.

Site or Circuit Sketch (1 of 2)

Check Box When Complete

A large rectangular area filled with a fine grid of small squares, intended for drawing a site or circuit sketch. The grid is composed of solid lines forming the main structure and dotted lines for finer detail.

Site or Circuit Sketch Notes:

SITE INFORMATION FORM

Project ID: _____ Site Name: _____

Instructions: Use the Site Sketch for reference only – it may help locating data loggers, or it may simply help direct how you approach the Inventory.

Site or Circuit Sketch (2 of 2)

Check Box When Complete

Site or Circuit Sketch Notes:

SITE INFORMATION FORM

Project ID: _____ Site Name: _____

Instructions: Use the "Screening for Panel Monitoring" questions to confirm that panel monitoring should be attempted, or to document why it was not attempted at this site. Use the "Site Photo Log" to identify and describe all of the photos that will be uploaded to the online tool. Be sure to use the correct naming convention for the files, which is "ProjectID_PhotoID.jpg".

Screening for Panel Monitoring

Check Box When Complete

1. Are the electrical panels accessible, and will the customer allow you to get into them? (circle one):	Yes	No
2. Are the electrical panels clean and safe to work with? (circle one):	Yes	No
3. Are either of these true: A) the lighting is 277V; or B) you can visually trace all wiring from the Point-of-Control to the Branch Circuit?	Yes	No
4. Will the customer allow you to switch lights on and off throughout the business for several minutes at a time? (circle one):	Yes	No
If any of Q1-Q4 = NO:	<i>You cannot conduct any metering at the panel. You do not need to fill out the Branch Circuit Mapping Form.</i>	
If all of Q1-Q4 = YES:	<i>You might possibly be able to conduct metering at the panel. Leave the hot fixture wires accessible after completing the spot measurements so that you can trace the fixture to its branch circuit at the panel. You must fill out the Branch Circuit Mapping Form.</i>	
Notes:		

Site Photo Log

Photo ID	Site Visit Number <i>(circle one)</i>	Photo Description
1	1 2 3 4	
2	1 2 3 4	
3	1 2 3 4	
4	1 2 3 4	
5	1 2 3 4	
6	1 2 3 4	
7	1 2 3 4	
8	1 2 3 4	
9	1 2 3 4	
10	1 2 3 4	
11	1 2 3 4	
12	1 2 3 4	
13	1 2 3 4	
14	1 2 3 4	
15	1 2 3 4	
16	1 2 3 4	
17	1 2 3 4	
18	1 2 3 4	
19	1 2 3 4	
20	1 2 3 4	
21	1 2 3 4	
22	1 2 3 4	
23	1 2 3 4	
24	1 2 3 4	
25	1 2 3 4	

SITE METERING PLAN

Check Box if Form is either N/A or Complete:

SITE VISIT TYPE <i>(check one):</i>	<input type="checkbox"/> PRE-Retrofit <input type="checkbox"/> POST-Retrofit	Project ID:		Site Name:	
---	---	--------------------	--	-------------------	--

Instructions: *The nominal maximum quantity of loggers to install per site is 15. If the number of Points-of-Control (POCs) is sufficiently small that the number of loggers required (including backups) to monitor each POC is less than or equal to 15, all of the POCs at the site should be monitored. This form should only be used when it is necessary to prioritize the POCs for monitoring so that the logger quantity does not exceed the nominal maximum of 15 loggers.*

To fill out this form, use the data from the Lighting Inventory Forms to fill out the first part of the Site Metering Plan. All POCs in the Lighting Inventory should be represented in this plan – use more than 1 Site Metering Plan form if necessary to capture all the circuits with lighting that will be or was retrofitted. Where a backup logger is needed, it should be of a different type than the primary logger. In all cases, a CT at the Panel (CTP) should be the first choice; a CT at the Fixture or POC (CTF) should be the second choice; and a Lighting On/Off Logger (LO) should be the last resort. Guidelines for deciding which POCs to monitor:

- 1. Any circuit representing more than 10% of the connected load should be metered.*
- 2. Any circuit representing more than 25% of the connected load needs a backup logger.*
- 3. If any combination of Area ID and Schedule ID adds up to more than 10% of the connected load, then 20% of these circuits (lines) need to be metered.*

COMPLETE AFTER THE LIGHTING INVENTORY							COMPLETE AFTER BRANCH CIRCUIT MAPPING <i>(if applicable)</i>				
Index	Area ID	Sched ID	POC ID	Total Connected Load [C]	% of Connected Load [E]=C/D	Will this POC be Metered?	Branch Circuit ID <i>(if applicable)</i>	Primary Logger Type <i>(circle one)</i>	Backup Logger Type <i>(circle one)</i>	Logger Has Been Set & Recorded	
1						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
2						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
3						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
4						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
5						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
6						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
7						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
8						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
9						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
10						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
11						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
12						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
13						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
14						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
15						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
16						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
17						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
18						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
19						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
20						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
21						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
22						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
23						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
24						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
25						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
TOTAL CONNECTED LOAD [D]:											

Notes:

SITE METERING PLAN

Check Box if Form is either N/A or Complete:

SITE VISIT TYPE (check one):	<input type="checkbox"/> PRE-Retrofit	Project ID:	Site Name:
	<input type="checkbox"/> POST-Retrofit		

Instructions: *The nominal maximum quantity of loggers to install per site is 15. If the number of Points-of-Control (POCs) is sufficiently small that the number of loggers required (including backups) to monitor each POC is less than or equal to 15, all of the POCs at the site should be monitored. This form should only be used when it is necessary to prioritize the POCs for monitoring so that the logger quantity does not exceed the nominal maximum of 15 loggers.*

To fill out this form, use the data from the Lighting Inventory Forms to fill out the first part of the Site Metering Plan. All POCs in the Lighting Inventory should be represented in this plan – use more than 1 Site Metering Plan form if necessary to capture all the circuits with lighting that will be or was retrofitted. Where a backup logger is needed, it should be of a different type than the primary logger. In all cases, a CT at the Panel (CTP) should be the first choice; a CT at the Fixture or POC (CTF) should be the second choice; and a Lighting On/Off Logger (LO) should be the last resort. Guidelines for deciding which POCs to monitor:

- Any circuit representing more than 10% of the connected load should be metered.
- Any circuit representing more than 25% of the connected load needs a backup logger.
- If any combination of Area ID and Schedule ID adds up to more than 10% of the connected load, then 20% of these circuits (lines) need to be metered.

COMPLETE AFTER THE LIGHTING INVENTORY							COMPLETE AFTER BRANCH CIRCUIT MAPPING (if applicable)				
Index	Area ID	Sched ID	POC ID	Total Connected Load [C]	% of Connected Load [E]=C/D	Will this POC be Metered?	Branch Circuit ID (if applicable)	Primary Logger Type (circle one)	Backup Logger Type (circle one)	Logger Has Been Set & Recorded	
1						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
2						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
3						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
4						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
5						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
6						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
7						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
8						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
9						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
10						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
11						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
12						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
13						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
14						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
15						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
16						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
17						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
18						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
19						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
20						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
21						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
22						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
23						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
24						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
25						Yes No		CTP CTF LO	CTP CTF LO None	<input type="checkbox"/>	
TOTAL CONNECTED LOAD [D]:											

Notes:

APPENDIX E. PROCEDURES FOR INSTALLING THE DATA LOGGERS

There are three types of data loggers in use for this study. Two of the logger types are manufactured by Dent Instruments, the other by Onset Computer Corporation. Each data logger is described briefly below, however, to become completely familiar with the equipment, *all field personnel must read the user's guides provided with the lighting loggers.*

DENT LIGHTINGlogger™ (TOUL-3G). This is the default data logger used for the SCCG lighting logger study, and it is shown in Figure 1. This logger uses a photocell to determine whether the amount of light that the data logger is “seeing” is over or under a user-defined threshold. If the light level is over the threshold, the logger records the light as being “on”; if under, it records an “off”.

These types of loggers are appropriate in applications where there is little chance of other light sources polluting the data for the measured fixture (i.e. in rooms with no windows and just one switched lighting circuit). When other sources of light do exist, these data loggers are susceptible to providing false readings. Both the photocell sensor and adjustment screw are located on the front of the logger, as is the LED indicator panel which shows total on-time in hours, percent of time on, and a light-on indicator. These loggers are equipped with magnets that can be used to attach to the lighting fixture. See Figure 1 for more information about initializing the loggers.

Figure 1 Dent Instruments Lighting Logger



DENT CTlogger™ (TOUCT-3G). This device measures time-of-use in the same way as the lighting-state logger, but instead of measuring light, it measures current. When the current level is over a user-defined threshold, it records an “on”; under, an “off.” The device measures current by using a split-core current transformer (CT). They can be used at the lighting fixture by placing the CT around the hot wire coming into the ballast controlled by the switch of interest.

These devices suffer virtually no chance of data pollution. Since an open circuit (light is off) draws exactly zero current, these devices can be set at maximum sensitivity without fear of recording false transitions. As with the Dent Lighting Logger, the adjustment screw is located on the front of the logger, as is the LED indicator panel which shows total on-time in hours, percent of time on, and a current-on indicator – see Figure 2. See Figure 2 for more information about initializing the loggers.

Figure 2. Dent Instruments CT Logger



Onset CTV-A/B/C with Onset HOBO 4-Channel Data Loggers. This data logger setup is shown in Figure 4. These HOBO data loggers will be used for panel-level (circuit breaker) monitoring when many POCs feed the same the circuit breaker. It will also be used in limited cases at the fixture. This logger setup also measures current, but instead of providing a binary on/off output, it actually provides the magnitude of current. Also, this logger type requires sampling at a pre-defined interval rather than recording transitions in state. To “launch” or initialize this data logger, perform the following steps:

1. First determine how many channels of the logger will be used. If using this logger at the fixture, it will be using only one channel, unless you’re measuring a bi-level switched fixture, at which point you would use two channels. If using this logger at the panel, note how many individual circuits will be monitored and thus how many data loggers and channels of data will be needed.
2. Determine the correct CT size. If measuring at the fixture, use the smallest CT available (CTV-A, 0-20 amps). If installing at the panel, you’ll first need to conduct a spot measurement to determine the full-load amps.
3. Next, open the HOBOWare software on your laptop in the field. Plug the data logger into the laptop. To start the logger, go to the Launch function within HOBOWare™ software. For more details on the software, please refer to the software manual.
4. In the Launch screen, be sure to enable the appropriate channels and select the range within the Channels and Sensors selection window.

5. Select the correct AC current range in the Software. **Be sure that the measured full-load amps does not exceed the AC current rating of the selected CTV, otherwise the data will be corrupted.** The current range of the CTV is provided on the CTV label. Failure to select the correct range will result in inaccurate data. See Figure 3 shows the rated amperage range for each Onset CTV device:

Figure 3. Onset CTV's Amperage Range by Model Number

CTV Model Number	Amperage Range
Onset CTV-A	0 – 20 Amp
Onset CTV-B	0 – 50 Amp
Onset CTV-C	0 – 100 Amp

6. Set the sampling interval to 5 minutes.
7. Select “launch”. Your data logger is now ready to go.

Figure 4 Onset CTV-A/B/C with Onset HOBO 4-Channel Data Logger



Installing Data Loggers at the Electrical Panel

Metering at the electrical panel is the first choice, given all panel metering criteria as described in Step 2d are met. Measuring runtime hour usage at the electrical panel can be tricky but, *assuming the surveyor is careful in mapping the lighting to the branch circuits and accounting for all non-lighting loads on the circuit*, it can provide the most accurate picture of the lighting load profile at the site. Refer to Step 3f for more information on mapping POCs to the branch circuit. Keep in mind that even if the decision is made to do panel-level monitoring on number of lighting-only branch circuits, it will also likely be necessary to do fixture-level on/off logging at a site.

Referring to the initialization procedure described above, install one Onset CTV per unique branch circuit that qualifies for panel metering per the procedure outlined in Step 3f. Be sure to place the correct data loggers and CTV's on the correct branch circuits. Always wear electrical gloves rated for at least 1,000V when working in an electrical panel, and always have a buddy present.

Safety around electrical panels is CRITICAL! Please follow all appropriate safety procedures when working in or around electrical panels.

The I-bar of the CTV's can be hinged open in order to install the CTV around an individual wire carrying a single phase.

1. Rotate the I-bar open (on the CTV-D and -E units, press in the I-bar tabs to open)
2. Place the wire from the branch circuit in the CTV window
3. Snap the I-bar closed

The CTV-A, -B, and -C units are provided with a snap-on mounting plate which can be removed from the CTV and mounted separately. Mount the plate under the wire you want to monitor and, once the cable is installed into the CTV, snap the CTV/wire assembly onto the mounting plate. You can remove the CTV from the plate by opening the CTV and sliding it off the plate or gently rocking the CTV slightly and pulling up at the same time. The CTV should come out of the mounting plate. **Be sure that the current you are measuring will never exceed the maximum range of the CTV.** This would corrupt the data on all channels.

A light (LED) on the side of the logger confirms logger operation. The light should blink once every one to four seconds; the shorter the logging interval, the faster the light blinks. If the light is not blinking, or it is blinking in a different pattern, re-launch the logger to ensure proper operation.

If the customer uses the breaker as a switch, i.e. the breaker itself is a POC rather than having many POCs being fed by the breaker, it may be possible to use a Dent CT logger rather than a HOBO logger. If this is the case, follow the same safety procedures outlined above. Also be sure to adjust the sensitivity appropriately for the higher loads at the panel.

Installing Data Loggers at the Fixture

When deciding which fixtures to log, safety for the surveyors and occupants is always the first consideration! If loggers cannot be installed safely, do not attempt to install them. It is better to lose this site and do another one than to risk injury installing and/or retrieving the loggers. This applies to the safety of the occupants as well: never install a logger where it could injure someone if it falls especially if it is installed with putty, or alternately, make sure that a logger is secure if you are installing it above a space that is usually occupied (like a fixture above someone's desk).

Other considerations include:

1. **Always plan to place the Dent CT loggers before the Dent Lighting loggers.** The Dent CT loggers are the default fixture-level logger for this study, and they should always be placed ahead of lighting loggers.
2. **Place Loggers where they will not be disturbed.** An attempt should always be made to place loggers where they are not easily noticed or accessed by occupants. This prevents moving, removal, or resetting by site personnel once the logger has been placed.
3. **Placement within the fixture: avoid "insensitive" logger situations.** When using the Lighting Loggers, be sure to place the logger so that the photocell eye "sees" only the lamp, and a part of

the lamp that is brightest. This means checking the angle of installation as well as the position along the lamp. A symptom of incorrect placement is the logger appearing to be insensitive, that is, needing to be adjusted to maximum sensitivity to register. Situations to be avoided are:

- a. **Avoid darkened tube ends.** Position the logger in the middle of the fixture and away from the tube ends, which will darken with age. This will also avoid the situation of trying to adjust a logger when the tube ends have already started to darken.
 - b. **Avoid highly angled mounting surfaces.** The logger should be installed such that the light sensor is aimed as directly at the light source as possible to maximize sensitivity and avoid ambient lighting effects. In practice, this means to avoid mounting the logger on an angled surface that will cause the sensor to view more of the fixture and surroundings than the lamp. The aperture of most light sensors is very small, so if it is not pointed directly at the light source the sensitivity will need to be increased, which also makes the logger more susceptible to ambient lighting sources. If the logger has to be turned up to maximum sensitivity to register, then it is installed at too large an angle to or too far away from the light source and should be re-adjusted with poster putty or moved to a different mounting surface.
4. **Back-up Loggers.** A “back-up” logger is a logger placed on the same switched circuit but in a different fixture. *Back-up loggers should NOT be placed side-by-side in the exact same physical location as the primary logger.* If they are placed in the same spot due to special circumstances (like inaccessible fixtures and limited options for placing loggers on horizontal or vertical surfaces) then this situation should be fully explained in comments. Logger Groups that represent more than 25% of the lighting load must have a backup logger installed on the groups representing the largest kW loads. The idea is that if something happens to the primary logger that these large loads will always be represented in the final analysis.
 5. **Single room or area served by multiple switches/circuits.** At least one fixture on every switch in a single room or area should receive a logger. This does not mean that every switch at the site will receive a data logger. Instead, it is intended to ensure that single rooms or areas are accurately represented. The surveyor should also ask if switches are typically operated separately or all together and should note this in comments, but should not rely on this information to limit the installation of loggers on all switches/circuits, except where an inordinate number of loggers (>20) would be required otherwise.
 6. **Difficult Locations: High Bay, Sealed, Inaccessible Fixtures.** During the recruitment process, sites will be designated either “linear fluorescent” or “high bay”. For sites designated “high bay”, one of the following special arrangements **MUST** be made to do high bay lighting logger installation:
 - a. Customer has a lift on site, is willing to assist in its use for extended periods of time for spot measurements, and has appropriate harnesses for those hanging loggers.
 - b. Customer gives approval to the surveying team to arrange a lift to be delivered to the site to hang loggers.
 - c. If a site is designated “linear fluorescent”, and high bay fixtures or ceiling heights greater than 12’ are encountered, lighting loggers will not be installed on the high bay fixtures.

Loggers do not have to be placed in the fixture. If the area is relatively *free from other light sources* (sunlight, task lighting, etc.) and a suitable location outside the fixture can be found, then the logger can be placed and adjusted properly for this location. Please note that daylighting can change dramatically throughout the day and from day to day, so caution should be used when assessing daylighting in any window/skylight areas. Specific issues/examples are described below:



- d. **High-Bay T8 and T5 fixtures.** Loggers can be placed on a horizontal surface (book case, shelf, etc.) away from windows and other ambient light sources and adjusted accordingly.
 - e. **Loggers just cannot be physically installed.** If loggers cannot be installed because the fixtures are unreachable, over a desk, etc. then that should be noted in comments and in the various survey form tables. The loggers do not need to cover 100% of the site. The final analysis will be at the market/building segment-activity area level, not at the aggregated site level, so it is still important to record the number of measures that are in each activity area, in order to develop a distribution on that basis.
7. **Do not install loggers in excessively hot environments.** The data loggers are only rated for 140 F, and some covered fixtures may get hot. DENT equates this to a distance of 8 inches from a 100 watt incandescent bulb in free-moving air. In this situation, install the logger outside of the fixture and use a DENT with the fiber optic extension.
 8. **Do not install loggers where there is a high probability of theft.** For sites such as a rundown motel with highly transient guests, or a restaurant where the installed logger would be accessible to the customers, if the loggers cannot be installed out of sight and/or you think they will likely be stolen no matter where they are installed, then do not install loggers. Just be sure to document your reason for not installing loggers in the “lost” site disposition. Enough loggers are lost at reputable sites (typically about 20%), so that it is better to not install loggers where theft is highly expected. Whenever possible, you should call one of the field-survey leads to confirm this approach.
 9. **Fixtures/Lamps That Are Always or Mostly Off.** For some small businesses, the lights in some areas may be off more often than they are on. This can occur in areas that are rarely used, or in areas that receive adequate ambient lighting from windows, skylights, or adjacent areas. Since the logger data for these areas would look more like a logger that malfunctioned, special steps are taken during installation to ensure that we can tell that this is valid data:
 - **Record this as its own Schedule ID in the Operating Details forms.** If the customer reports that a particular set of fixtures is always off, be sure to record this as its own Schedule.
 - **Describe this unusual situation in comments!** Because there is essentially no energy being used and hence no savings being produced by these fixtures, this situation should be thoroughly described in comments and a unique schedule defined. The comment must include the *reason* the lights are typically turned off (e.g. ambient light from windows/skylights is enough, staff work mostly in another room that does not have rebated measures, etc.). An estimate of the on time (hours per day, week, or


month, whatever the site contact tells you) should be incorporated into the schedule and recorded in comments.

- **Test Period to validate logger operation.** Once installed, the logger should be run through a “test period” of operation; the light must be turned on and left on for at least one minute or more. If possible, you should leave the light on the whole time that you are installing loggers in other areas, which will give an even better test period/confirmation. *This process will be repeated when the logger is extracted* if the lights are off at the time of the site visit. The idea is that, even if these lights are never turned on during the monitoring period, the test period data – which can be reviewed as part of the logger data QC process - will confirm that the logger was correctly installed and operational.

10. Post-retrofit Logger Deployments. It is critical that the post-retrofit logger deployment is in the same location as the pre-retrofit logger deployment. The pre-retrofit location should be detailed in the logger installation form so that ANYONE reading the form in the future knows where the logger was initially installed.

Once the fixture locations have been decided, the following procedures should be used to properly set the logger to accurately measure lighting operation:

1. Press and hold the reset button on the front of the logger until the word “rESEt” appears on the display. (approximately 2 seconds)
2. Fluorescent and HID (including Metal Halide) fixtures take some time to “stabilize” after start-up. Power will typically increase until stabilization (and then sometimes start to drop a little).
 - a. Fluorescent fixtures: Wait 5 minutes for lamps to stabilize before performing any sensitivity adjustments.
 - b. HID fixtures: Wait 15 minutes for lamps to stabilize before performing any sensitivity adjustments.
3. **Install the data logger.** If using a Dent Lighting Logger, this will involve finding a suitable location along the fixture to place it so that the photocell gets light only from the lamps. Use the magnets to attach it to the fixture, but also back up the magnets with some putty. If using a Dent CT logger, clamp the hot wire coming into the ballast. Be sure that it is fully clamped and not caught open on anything, or else the data will be corrupted.
4. **Adjust the Sensitivity.** The sensitivity adjustment screw should be all the way toward the negative (left). Slowly adjust the sensitivity screw toward the positive (right) until the sunlight -  symbol appears on the display. Note that there will be a couple second delay before the symbol appears on the display, so turn the sensitivity screw slowly and gradually to allow for this delay. When the symbol first appears, this means that the logger is now reading “on”. **Once this threshold has been reached, the sensitivity screw needs to be adjusted another ~10 degrees clockwise.** NOTE: If adjusting a lighting logger, be careful not to allow yourself to create a shadow between the measured light source and the sensor on the logger while doing this.
5. Once the sensitivity has been adjusted, place the logger in the location chosen and verify that the  remains on in the display.

6. **Testing.** Now turn OFF the fixture/s being measured and verify that the  symbol has disappeared from the display. This means the logger is no longer reading "on" and will accurately measure the lighting source ON/OFF operation.
7. Test one time further by turning ON the fixture/s and verifying that the lighting symbol appears again.

Final Actions

8. Record the date and time of install and a detailed location for the logger on the survey form and site sketch.
9. Complete the verification survey form.

Retrieving the Data Loggers

Ideally the surveyor who did the original installation will also do the retrieval. The type of lighting systems and loggers installed must be reviewed before visiting the site. The process should be as follows:

1. *Prior to the site visit*, obtain a copy of the Lighting Logger Installation form that was completed when the loggers were installed. The copy can be made from the surveyor's original hardcopy or downloaded from the online tool. In addition, prepare a zip-lock bag for storage of the loggers after retrieval. Write the SiteID, date, and surveyor's initials on both sides of a card or piece of paper and place in the bag.
2. On each logger form, record the date and time that the logger was removed.
3. Observe the logger and make sure it is still *functioning correctly*. If the lights are off, turn them on briefly to see if the "lights on" indicator responds (sun symbol or green LED). If the lights are on when you arrive, make sure the appropriate indicator is shown, then turn the lights off to make sure the off indicator responds accordingly.
4. Remove each logger and adjust the sensitivity to its minimum (least sensitive) setting (all the way to the "-" sign), as confirmed by the indicator or red LED. Place in the marked zip-lock bag, so that loggers don't get separated. This is especially important if you are picking up loggers from multiple sites in a single day.
5. Record the logger disposition, and repeat this process for all loggers at the site.

In the last step before leaving the site, record any information that was missed during the logger installation site visit.



Memorandum

To: Pre/Post Field Techs
From: Adam Knickelbein (Summit Blue)
Date: June 25, 2009
RE: How to Take Spot Power Measurement with the Current Amplifier

The Fluke 345 has very high accuracy for loads over 10 amps. Unfortunately for this study, the loads being measured usually range from 0.3-1.5 amps. In order to increase the accuracy of the reading, Summit Blue has manufactured several current amplifiers (formerly known as “donuts”) for taking the measurement. The current amplifier is nothing more than a 40-turn coil of 14-gauge stranded copper wire with a wooden core that holds the wire bundle in the approximate center of the clamp; see In addition to the wooden core, each current amplifier has two wires protruding from it with a third spliced into one of the two coming from the coil. All of the wires are insulated, and the connections are soldered with electrical tape covering the joint. At the end of every wire is a sheathed banana plug. As shown in Figure 2, two of the ends have been plugged into alligator clips; if needed, the alligator clips can be removed and replaced with pointed voltage probes. The third end is a right-angle banana plug that is meant to be plugged into the voltage or hot side of the Fluke.

Figure 2. The “R” shown in Figure 1 indicates that this side of the current amplifier should be facing right when looking at the Fluke head-on. The number five (5) on the wooden core is the serial number.

Figure 1. Current Amplifier #5



In addition to the wooden core, each current amplifier has two wires protruding from it with a third spliced into one of the two coming from the coil. All of the wires are insulated, and the connections are soldered with electrical tape covering the joint. At the end of every wire is a sheathed banana plug. As shown in Figure 2, two of the ends have been plugged into alligator clips; if needed, the alligator clips can be removed and replaced with pointed voltage probes. The third end is a right-angle banana plug that is meant to be plugged into the voltage or hot side of the Fluke.

Figure 2. Current Amplifier Setup With Plugs



The hole in the center of the wooden core is meant to be clamped using the Fluke. Figure 3 and Figure 4 show the standard setup of the current amplifier. Notice in Figure 4 how the “R” is placed so that it is to the right when looking at the Fluke.

Figure 3. Standard Setup Using the Current Amplifier



Figure 4. Alternate View of the Standard Donut Setup



Taking Spot Measurements at the Fixture

Follow these steps to complete the spot measurements to be taken at the fixture:

1. **Confirm that the fixture is operating normally.** Only fixtures that appear to operating normally are eligible for a spot measurement. Normally-operating fixtures have lamps that are not burned out, with blackened ends, pulsing, flickering, or providing low lumen output. In addition, the ballast should not be buzzing or leaking tar.

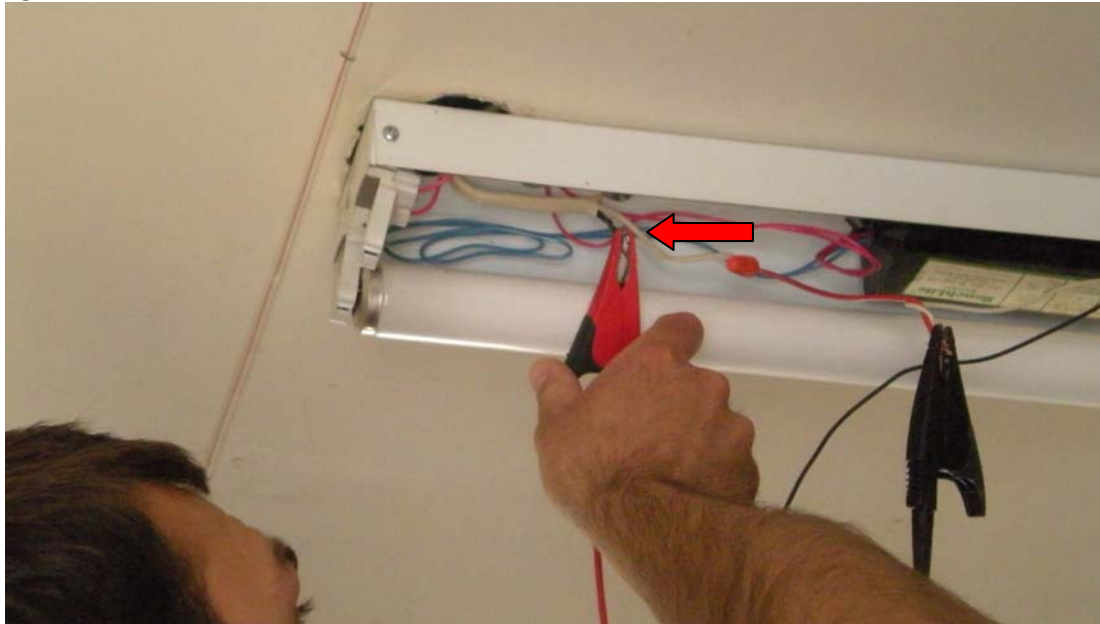
2. **Access the ballast.** In the first step, remove any lens covers over the fixture. Next, remove any lamps that are in the way of accessing the ballast. Finally, remove the ballast cover to expose the ballast and the wiring.
3. **Turn the power to the fixture off.** This procedure should not usually be attempted with live power to the fixture.
4. **Disconnect the hot ballast wire from the hot house power.** The current amplifier will be placed “in-line” (i.e. in-between the power coming from the breaker and the ballast).
5. **Remove the wirenut from the neutral line.** The neutral wire from the breaker should stay connected to the neutral wire from the ballast.
6. **Clamp the current amplifier with the Fluke.** The current amp should be automatically held in the middle of the clamp. Insert the right-angle banana plug from the coil into the hot or voltage side of the Fluke.
7. **Connect the alligator clip from the common terminal of the Fluke to the neutral wire.**

Figure 5. Connect Alligator Clip From Common Terminal to Neutral Wire



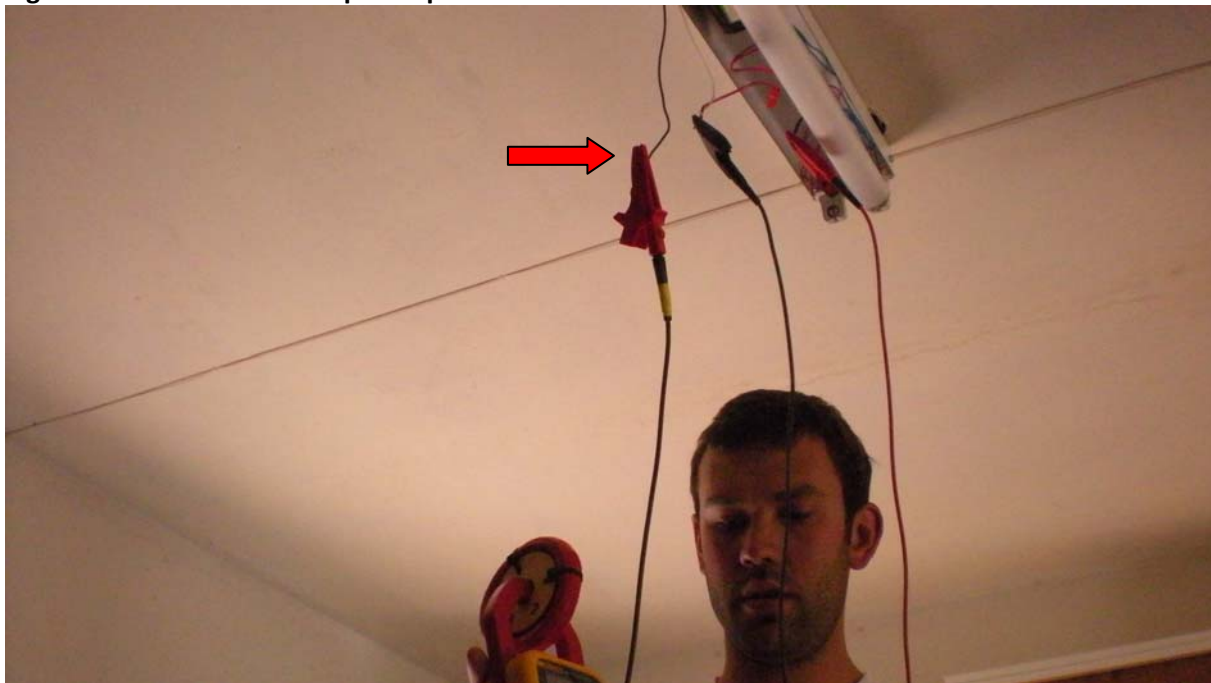
8. **Connect the current amplifier to the hot line coming from the breaker panel.** Use the alligator clip that is spliced with the right-angle banana plug to connect to the hot house power.

Figure 6. Connect Coil to Hot Line From Breaker Panel



9. **Connect the alligator clip that is NOT spliced to the line-side ballast wire.** This connection is indicated by the yellow electrical tape around the banana plug that goes to the ballast wire.

Figure 7. Connect Yellow-Taped Clip to the Hot Ballast Wire



10. **Replace the lamps, and turn the power back on.** The power from the breaker panel is now running through the 40-turn coil to get to the ballast; it has been connected "in-line".
11. **Allow the fixture to stabilize.** Fluorescent and HID (including Metal Halide) fixtures take some time to "stabilize" after start-up. Power will typically increase until stabilization (and then

sometimes start to drop a little). For fluorescent fixtures, allow at least 5 minutes before recording the reading. For HID fixtures, allow at least 15 minutes. Ideally, the fixture should stabilize and the power should not increase at the time the reading is taken.

12. **Record the volts, amps, power factor, and watts** in the Fixture Details Form under section “S8. Measurements: With Current Amp (1)”. Be sure to complete both the calculations to determine per-fixture values, and the quality control calculations.
13. **Next, remove the current amplifier from the Fluke, and take the same measurement with only the single hot wire going through the clamp.** Record these measurements in the next column under “No Current Amp (2)”. Be sure that the flow of power through the current clamp matches the arrow on the top of the Fluke body.

Figure 8. Single-Wire Measurement



14. **Replace all fixture components.** Remove the current amplifier from the circuit, use a new wirenut to connect the ballast wire to the wire coming from the breaker panel, and replace the ballast cover and lamps.
15. **Repeat Steps 1-13 for all of the fixture types (defined by their Fixture IDs) at the site.** It's critical that we get a good comparison of the measurement both with and without the donut for all of the Fixture IDs at the site.

Taking Spot Measurements at the Switch

Follow these steps to complete the spot measurements to be taken at the switch:

1. **Confirm the quantity and type of fixtures that will be included in the measurement.** Spot measurements at the switch ***can only be done*** where all of the fixtures are of the same Fixture

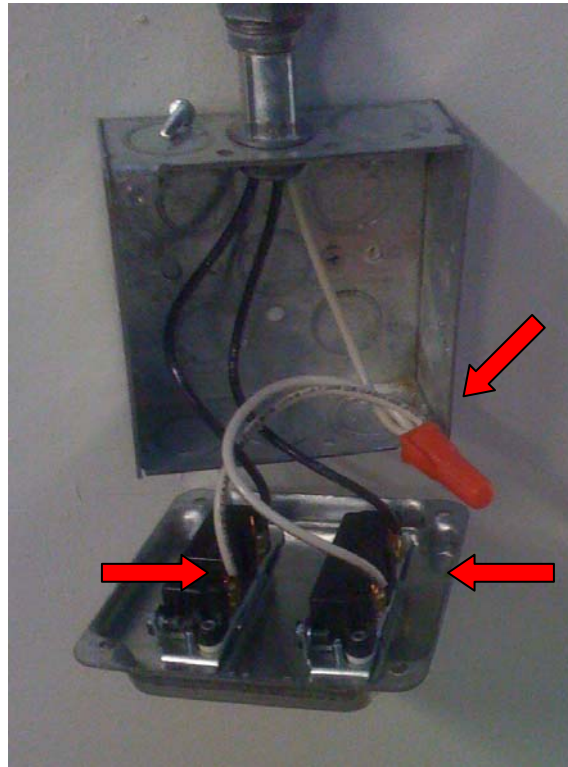
ID (i.e. there should not be fixtures with different ballasts or lamp combinations on the same switched circuit). Furthermore, only switched circuits with normally-operating lamps should be considered for this procedure. Normally-operating fixtures have lamps that are not burned out, with blackened ends, pulsing, flickering, or providing low lumen output. In addition, the ballast should not be buzzing or leaking tar. Last, it is critical that the field tech confirm that nothing else other than the accounted-for fixtures are downstream from the switch.

IMPORTANT NOTE: The power coming into the switchbox can only be turned off at the breaker. If this is not feasible to do, be aware that live leads will be exposed during the entire procedure.

2. **Gain access to the switch wires.** All switches are covered by a switchplate that needs to be removed before any measurements can be taken. The switch itself is sometimes attached to the switchbox, and other times attached to the switchplate cover. In either case, start by removing the cover. This is usually held in place by a few screws, but in some instances it may need to be “popped off” by prying gently.
3. **Orient yourself to the wiring configuration.** Figure 9 shows an example of two switches that are attached to the cover. Switches work by opening and closing the circuit to prevent or allow the flow of power. When the switch is turned on (or the circuit is closed), power flows from the breaker wire, through the switch, into the wire going to the fixtures. When the switch is turned off, the circuit is open and no power can flow.

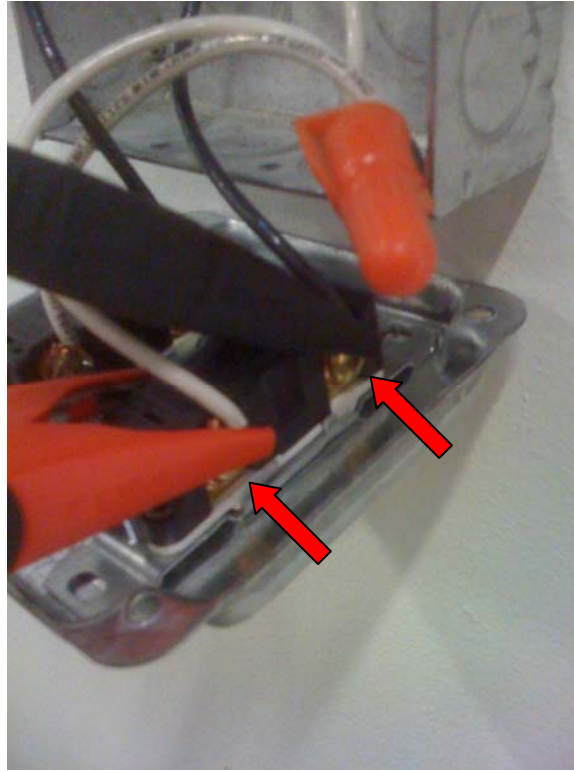
Note that the white wire (which usually denotes neutral) is coming into the box and is pig-tailed to the two switches. This is a good indication that the white wire in this case is a hot wire, and this can be double-checked with a “magic wand” that beeps or blinks in response to voltage. **Never assume that a wire is not hot simply because of its color.** The real neutral wire that provides the return path never makes the trip to the switchbox; instead, it goes directly from the breaker or junction box to the fixtures.

Figure 9. Switches Attached to Switchplate Cover



- 4. Turn the switch off.** This opens (or breaks) the circuit *through the switch*, and it allows the current amplifier to provide the closed circuit for powering the fixtures.
- 5. Connect the test leads from the Fluke to the switch.** The test wire that is spliced onto the right-angle test lead (red alligator clip in Figure 10) to the power coming in from the breaker. Clip the yellow-taped test lead (black alligator clip in Figure 10) to the power going from the switch to the fixtures. At this point, power will flow through the coil, and the fixtures will light up.

Figure 10. Connect Fluke Test Leads to the Switch



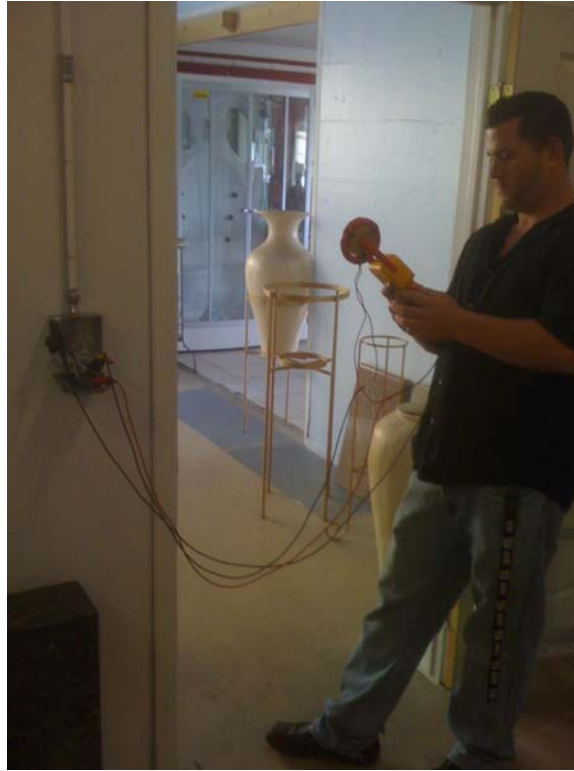
- 6. Connect the common terminal test lead from the Fluke to the neutral or a ground.** The neutral wire is usually not available in the switchbox, and finding a good ground for switch-level measurements can sometimes be difficult. If a ground wire is in the switchbox, use it. If the box itself is unpainted metal, it should be grounded according to code. If the box does not give a clean voltage reading (within about 10% of the expected voltage difference), try a nearby steel-frame door, an AC duct, a water pipe, or the neutral slot in a receptacle. If none of these are feasible options, the measurement will have to be skipped. Figure 11 shows the full test setup.

Figure 11. Setup for Switch-Level Measurements with Current Amplifier



7. **Allow the fixtures to stabilize.** Fluorescent and HID (including Metal Halide) fixtures take some time to “stabilize” after start-up. Power will typically increase until stabilization (and then sometimes start to drop a little). For fluorescent fixtures, allow at least 5 minutes before recording the reading. For HID fixtures, allow at least 15 minutes. Ideally, the fixture should stabilize and the power should not increase at the time the reading is taken.
8. **Record the volts, amps, power factor, and watts** in the Fixture Details Form under section “S8. Measurements: With Current Amp (1)”. Be sure to complete both of the calculations to determine per-fixture values, and the quality control calculations.

Figure 12. Reading the Spot Measurements



- 9. Next, remove the current amplifier from the Fluke, and take the same measurement with only the single hot wire going through the clamp.** Record these measurements in the next column under “No Current Amp (2)”. Be sure that the flow of power through the current clamp matches the arrow on the top of the Fluke body.
- 10. Remove the test leads and replace the switch and cover.** The testing procedure is now complete.

Appendix D

Guidelines for Estimating Net-To-Gross Ratios Using the Self-Report Approaches and the Self-Report Free Ridership Algorithm

D.1 Introduction

The California Public Utilities Commission (CPUC) recently adopted the *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals* (TecMarket Works, 2006) (referred to by the CPUC as the *Evaluator's Protocols*) for the measurement and evaluation (M&E) of energy efficiency (EE) programs. These guidelines focus on the critical elements of M&E such as impact evaluation, measurement and verification, process evaluation and sampling and uncertainty. These standards are understood to be minimal and are, in many cases, quite general.

A central objective of the California energy efficiency program evaluations is to identify that portion of the gross load impacts associated with a program-supported measure installation or behavior change that would not have been accomplished in the absence of the program. That portion is the net load impacts. In certain situations, the *Evaluator Protocols* allow for the use of the use of the self-report approach (SRA) to estimate the net-to-gross ratio (NTGR) for the basic and standard levels of impact evaluation rigor (see Table 3 of the *Evaluator's Protocols*). The SRA can also be used in the enhanced level of impact evaluation rigor if used in conjunction with a second approach such as participant and non-participant analysis of utility consumption data that addresses the issue of self-selection or econometric or discrete choice with participant and non-participant comparison that addresses the issue of self-selection. The SRA is a mixed methods approach that uses, to varying degrees, both quantitative and qualitative data and analysis to assess causality.¹

¹ There is wide agreement on the value of *both* qualitative and quantitative data in the evaluation of many kinds of programs. Moreover, it is inappropriate to cast either approach in an inferior position. The complexity of any decision regarding the purchase of efficient equipment can be daunting, especially in large organizations for which the savings are often among the largest. In such situations, the reliance on only quantitative data can miss some important elements of the decision. The collection and interpretation

However, while the Protocols allow for the use of the SRA, they are silent regarding basic methodological guidelines that are considered best practice.² The primary use of these SRA guidelines, which apply to assessing the influence of the program on both the direct impacts as well as any participant spillover impacts, are to make sure that evaluators working under contract to the CPUC's Energy Division are adhering to these best practices.

Of course, while one could simply ask analysts to guarantee that they adhered to the methodological guidelines contained in standard textbooks, this may not be sufficiently reassuring either to the CPUC or other stakeholders. Thus, rather than simply trust analysts to follow the guidance contained in the standard methodological textbooks, the CPUC has chosen to develop the *Guidelines for Self-Report Methods for Estimating Net DSM Program Impacts* (GSR) (a summary of which has also been prepared) that requires analysts to address certain key issues rather than to require analysts to address these issues in a specific way. This is the sort of guidance that occupies a position somewhere between the minimal standards represented by the Protocols and the highly detailed guidelines contained in basic methodological texts.

It follows that the GSR must focus on those methodological issues on which there is general agreement regarding their importance within the social science and engineering communities. The GSR will also refer analysts to texts in which more detailed guidance can be found regarding all the issues addressed. Adherence to such guidelines still allows the results to be shaped by the interaction of the situation, the data and the analyst. It is this very interaction and the resulting plethora of legitimate methodological choices that prohibited the creation of a more detailed and prescriptive set of guidelines.

Earlier, the *Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management Programs* (1998) (1998 Protocols) provided quality control guidelines in Appendix J (*Quality Assurance Guidelines For Statistical, Engineering, and Self-Report Methods for Estimating DSM Program Impacts*) that addressed, among other methodological issues, the self-report method for estimating NTGRs. More recently, the *California Evaluation Framework* (TecMarket Works et al., 2004) also addressed many of the same issues associated with the self-report approach. This GSR attempts to draw upon both of these documents.

of qualitative data can be especially useful in broadening our understanding of a program's role in this decision.

² These Protocols are also silent regarding methodological guidelines for conducting surveys in general. This is considered appropriate since there is general agreement (contained in numerous textbooks) regarding best methodological practices for designing and implementing surveys but relatively little agreement on what constitutes best methodological practices regarding the estimation of the NTGR using the SRA.

There are two features of these GSR that merit discussion. First, the issues addressed are issues that a variety of basic social science and engineering methodological texts also address. That is, there appears to be a consensus that these issues are important. Second, because some respondents may not be familiar with some of the issues addressed or the terms used, references have been provided that should provide reasonably clear explanations.

D.2 Issues Surrounding the Validity and Reliability of Self-Report Techniques

The SRA deviates from the standard approach to assessing causality, i.e., internal validity. The standard approach to assessing causality is to conduct an experiment or quasi-experiment³ in which data are collected from both participants and nonparticipants with the data being subjected to a variety of statistical analyses (Shadish, Cook, and Campbell, 2002). In the early 1970s, many began to realize that such evaluation designs were not always desirable or possible (Weiss, 1972; Weiss and Rein, 1972). As a result, many evaluators began to explore alternatives that would allow them to generate causal conclusions (Guba, 1981, 1990; Cronbach, 1986). Such approaches as the modus operandi method (Scriven, 1976), intensive case studies (Yin 1994), theory-based evaluations (Chen, 1990; Rogers, et al., 2000), and mixed methods (Tashakkori and Teddlie, 1998) have been explored as alternative ways to generate causal conclusions. The SRA fits well with this tradition.

The SRA is useful in a variety of situations. For example, in some cases, the expected magnitude of the savings for a given program might not warrant the investment in an expensive evaluation design that could involve a billing analysis or a discrete choice analysis of both participants and nonparticipants. Or, key stakeholders might not want to wait for a billing analysis to be completed. Also, if the relationship of the savings to the normal monthly variation in energy use is too small, then a billing analysis should not even be attempted owing to a lack of statistical power. Finally, in some cases, it might not be possible to identify a group of customers to serve as a comparison group since they have been exposed through prior participation or are in some other ways contaminated. So, for budgetary, timing, statistical, and research design issues, the more traditional designs and analyses must sometimes be replaced with the SRA.

More specifically, the SRA is a mixed method approach that involves asking one or more key participant decision-makers a series of structured and open-ended questions about whether they would have installed the same EE equipment in the absence of the program as well as questions that attempt to rule out rival explanations for the installation (Weiss, 1972; Scriven,

³ In the literature, evaluations of energy efficiency and conservation programs that involve the use of a true experimental design are very rare.

1976; Shadish, 1991; Wholey et al., 1994; Yin, 1994; Mohr, 1995). In the simplest case (e.g., residential customers), the SRA is based primarily on quantitative data while in more complex cases the SRA is strengthened by the inclusion of additional quantitative and qualitative data which can include, among others, in-depth, open-ended interviews, direct observation, and review of customer and program records.⁴ Many evaluators believe that additional *qualitative* data regarding the economics of the customer's decision and the decision process itself can be very useful in supporting or modifying *quantitatively*-based results (Britan, 1978; Weiss and Rein, 1972; Patton, 1987; Tashakkori and Teddlie, 1998).

Having presented a very brief history of these alternatives approaches, we move on to discuss a number of special challenges associated with the SRA that merit mentioning.

One of the problems inherent in asking program participants if they would have installed the same equipment or adopted the same energy-saving practices without the program is that we are asking them to recall what has happened in the past. Worse than that is the fact that what we are really asking them to do is report on a hypothetical situation, what they would have done in the absence of the program. In many cases, the respondent may simply not know and/or cannot know what would have happened in the absence of the program. Even if the customer has some idea of what would have happened, there is, of necessity, uncertainty about it.

The situation just described is a circumstance ripe for invalid answers (low construct validity) and answers with low reliability, where reliability is defined as the likelihood that a respondent will give the same answer to the same question whenever or wherever it is asked. It is well known in the interview literature that the more factual and concrete the information the survey requests, the more accurate responses are likely to be. Where we are asking for motivations and processes in hypothetical situations that occurred one or two years ago, there is room for bias. Bias in responses is commonly thought to stem from three origins. First is the fact that some respondents may believe that claiming no impact for the program is likely to cause the program to cease, thus removing future financial opportunities from the respondent. Closely related to this is the possibility that the respondents may want to give an answer that they think will be pleasing to the interviewer. The direction of the first bias would be to increase the NTG ratio, and the second would have an unclear effect – up or down, depending on what the respondent thinks the interviewer wants to hear.

⁴ Of course, even in the simplest cases, an evaluator is free to supplement the analysis with additional quantitative and qualitative data such as interviews with architects and engineers involved in residential new construction or HVAC installers and a review of available market share data.

The second commonly recognized motivation for biased answers is that some people will like to portray themselves in a positive light; *e.g.*, they might like to think that they would have installed energy-efficient equipment without any incentive (the socially desirable response). This type of motivation could result in an artificially low net-to-gross ratio.

The third hypothesized source of bias involves an interaction between the positive perception of taking energy efficiency actions, the often observed difference between stated intentions and actual behaviors, and the fact that the counter-factual outcome can not be viewed, by the participant or outsiders. Using a series of survey questions to ask a participant about the actions they would have taken if there had been no program to derive a free-ridership estimate is referred to as the self-report approach (SRA). More specifically, this is asking the respondent to state their intentions with respect to purchasing the relevant equipment absent the program. Bias creeps in because people may intend many things that they do not eventually accomplish.

Beyond the fact that the situations of interest have occurred in the past and judgments about them involve hypothetical circumstances, they are often complex. No one set of questions can apply to all decision processes that result in a program-induced course of action. Some installations are simple, one-unit measures, while others involve many units, many different measures, and installations taking place over time. The decision to install may be made by one person or several people in a household, an individual serving as owner/operator of a small business, or, in the case of large commercial, industrial, or agricultural installations by multiple actors at multiple sites. Some measures may have been recommended by the utility for years before the actual installation took place, and others may have been recommended by consultants and/or vendors, making degree of utility influence difficult to establish. Finally, some efficiency projects may involve reconfiguration of systems rather than simple installations of energy-efficient equipment.

Another factor that can complicate the SRA is that, in certain situations, the estimated NTGR combines (more often implicitly than explicitly) the probability of a decision/action occurring and whether the *quantity* of the equipment installed would have been the same. This can complicate the interpretation of the responses and the way in which to combine these types of questions in order to estimate the NTGR.

This type of complexity and variation across sites requires thoughtful design of survey instruments. Following is a listing and discussion of the essential issues that should be considered by evaluators using SRA, together with some recommendations on reporting the strategies used to address each issue.

These should be regarded as recommendations for minimum acceptable standards for the use of the SRA to estimate net-to-gross ratios. Much of this chapter focuses on self-report methodologies for developing NTGRs for energy efficiency improvements in all sectors regardless of the size of the expected savings and the complexity of the decision making processes. However, in a given year, energy efficiency programs targeted for industrial facilities are likely to achieve a relatively small number of installations with the potential for extremely large energy savings at each site. Residential programs often have a large number of participants in a given year, but the energy savings at each home, and often for the entire residential sector, are small in comparison to savings at non-residential sites. Moreover, large industrial customers have more complex decision making processes than residential customers. As a result, evaluators are significantly less likely to conduct interviews with multiple actors at a single residence or to construct detailed case studies for each customer – methods that are discussed in detail in the following sections. *It may not be practical or necessary to employ the more complex techniques (e.g., multiple interviews at the same site, case-specific NTGR development) in all evaluations. Specifically, Sections 2.16 and 2.17 are probably more appropriate for customers with large savings and more complex decision making processes.* Of course, evaluators are free to apply the guidelines in these sections even to customers with smaller savings and relatively simple decision making processes.

D.2.1 Timing of the Interview

In order to minimize the problem of recall, SRA interviews should be conducted with the decision maker(s) as soon after the installation of equipment as possible (Stone et al., 2000).

D.3 Identifying the Correct Respondent

Recruitment procedures for participation in an interview involving self-reported net-to-gross ratios must address the issue of how the correct respondent(s) will be identified. Complexities to be addressed include situations commonly encountered in large commercial and industrial facilities, such as:

1. Different actors have different and complementary pieces of information about the decision to install, e.g., the CEO, CFO, facilities manager, etc.;
2. Decisions are made in locations such as regional or national headquarters that are away from the installation site;
3. Significant capital decision-making power is lodged in commissions, committees, boards, or councils; and
4. There is a need for both a technical decision-maker and a financial decision-maker to be interviewed (and in these cases, how the responses are combined will be important).

An evaluation using self-report methods should employ and document rules and procedures to handle all of these situations in a way that assures that the person(s) with the authority and the knowledge to make the installation decision are interviewed.

D.4 Set-Up Questions

The decisions that the net-to-gross questions are addressing may have occurred from 1 month to as long as 24 months prior to the interview. Regardless of the magnitude of the savings or the complexity of the decision-making process, questions may be asked about the motivations for making the decisions that were made, as well as the sequence of events surrounding the decision. Sequence and timing are important elements in assessing motivation and program influence on it. Unfortunately, sequence and timing will be difficult for many respondents to recall. This makes it essential that the interviewer guide the respondent through a process of establishing benchmarks against which to remember the events of interest (Stone et al., 2000). Failure to do so could well result in, among other things, the respondent “telescoping” some events of interest to him into the period of interest to the evaluator. Set-up questions that set the mind of the respondent into the train of events that led to the installation, and that establish benchmarks, can minimize these problems. However, one should be careful to avoid wording the set-up questions in such a way so as to bias the response in the desired direction.

Set-up questions should be used at the beginning of the interview, but they can be useful in later stages as well. Respondents to self-report surveys frequently are individuals who participated in program decisions and, therefore, may tend to provide answers ex post that validate their position in those decisions. Such biased responses are more likely to occur when the information sought in questions is abstract, hypothetical, or based on future projections, and are less likely to occur when the information sought is concrete. To the extent that questions prone to bias can incorporate concrete elements, either by set-up questions or by follow-up probes, the results of the interview will be more persuasive.

An evaluation using self-report methods should employ and document a set of questions that adequately establish the set of mind of the respondent to the context and sequence of events that led to decision(s) to adopt a DSM measure or practice, including clearly identified benchmarks in the customer’s decision-making process.

D.5 Use of Multiple Questions

Regardless of the magnitude of the savings or the complexity of the decision-making process, one should assume that using multiple questionnaire items (both quantitative and qualitative) to measure a construct such as free-ridership is preferable to using only one item since reliability is increased by the use of multiple items (Blalock, 1970; Crocker & Algina, 1986; Duncan, 1984).

D.6 Validity and Reliability

The validity and reliability of *each question* used in estimating the NTGR must be assessed (Lyberg, et al., 1997). In addition, the internal consistency (reliability) of multiple-item NTGR *scales* should not be assumed and should be tested. Testing the reliability of scales includes such techniques as split-half correlations, Kuder-Richardson, and Cronbach's alpha (Netemeyer, Bearden, and Sharma, 2003; Nunnally, 1978; Crocker & Algina, 1986; Cronbach, 1951; DeVellis, 1991). An evaluation using self-report methods should employ and document some or all of these tests or other suitable tests to evaluate reliability, including a description of why particular tests were used and others were considered inappropriate.

For those sites with relatively large savings and more complex decision-making processes, both quantitative and qualitative data may be collected from a variety of sources (e.g., telephone interviews with the decision maker, telephone interviews with others at the site familiar with the decision to install the efficient equipment, paper and electronic program files, and on-site surveys). These data must eventually be integrated in order to produce a final NTGR.⁵ Of course, it is essential that all such sites be evaluated consistently using the same instrument. However, in a situation involving both quantitative and qualitative data, interpretations of the data may vary from between evaluators, which means that, in effect, the measurement result may vary. Thus, the central issue here is one of reliability, which can be defined as obtaining consistent results over repeated measurements of the same items.

To guard against such a threat at those sites with relatively large savings and more complex decision-making processes, the data for each site should be evaluated by more than one member of the evaluation team. Next, the resulting NTGRs for the projects should be compared, with the extent of agreement being a preliminary measure of the so-called inter-rater reliability. Any disagreements should be examined and resolved and all procedures for identifying and resolving inconsistencies should be thoroughly described and documented (Sax, 1974; Patton, 1987).

⁵ For a discussion of the use of qualitative data, see Section 2.14.

D.7 Consistency Checks

When multiple questionnaire items are used to calculate a free-ridership probability there is always the possibility of apparently contradictory answers. Contradictory answers indicate problems of validity and/or reliability (internal consistency). Occasional inconsistencies indicate either that the respondent has misunderstood one or more questions, or is answering according to an unanticipated logic.

Another potential problem with self-report methods is the possibility of answering the questions in a way that conforms to the perceived wishes of the interviewer, or that shows the respondent in a good light (consciously or unconsciously done). One of the ways of mitigating these tendencies is to ask one or more questions specifically to check the consistency and plausibility of the answers given to the core questions. Inconsistencies can highlight efforts to “shade” answers in socially desirable directions. While consistency checking won’t overcome a deliberate and well-thought-out effort to deceive, it will often help where the process is more subtle or where there is just some misunderstanding of a question.

An evaluation using self-report methods should employ a process for setting up checks for inconsistencies when developing the questionnaire items, and describe and document the methods chosen as well as the rationales for using or not using the techniques for mitigating inconsistencies. Before interviewing begins, one should establish rules to handle inconsistent responses. Such rules should be consistently applied to all respondents.

Based on past experience one should anticipate which questions are more likely to result in inconsistent responses (e.g., questions of what participants would have done in the absence of the program and reported importance of the program to their taking action could). For such questions, specific checks for inconsistencies along with interviewer instructions could be built into the questionnaire. Any, apparent inconsistencies can then be identified and, whenever possible, resolved before the interview is over. If the evaluator waits until the interview is over to consider these problems, there may be no chance to correct misunderstandings on the part of the respondent or to detect situations where the evaluator brought incomplete understanding to the crafting of questions. In some cases, the savings at stake may be sufficiently large to warrant a follow-up telephone call to resolve the inconsistency.

However, despite the best efforts of the interviewers, some inconsistencies may remain. When this occurs, evaluator could decide which of the two answers, in their judgment has less error, and discard the other. Or, one could weight the two inconsistent responses in a way that reflects the evaluator’s estimate of the error associated with each, i.e., a larger weight could be assigned to the response that, in their judgment, contains less error.

However any inconsistencies are handled, rules for resolving inconsistencies should be established, to the extent feasible, *before* interviewing begins.⁶ An evaluation plan using self-report methods should describe the approach to identifying and resolving apparent inconsistencies. The plan should include: 1) the key questions that will be used to check for consistency, 2) whether and how it will be determined that the identified inconsistencies are significant enough to indicate problems of validity and/or reliability (internal consistency), and 3) how the indicated problems will be mitigated. The final report should include: 1) a description of contradictory answers that were identified, 2) whether and how it was determined that the identified inconsistencies were significant enough to indicate problems of validity and/or reliability (internal consistency), and 3) how the indicated problems were mitigated.

However, the rules themselves have sometimes been found to produce biased results, eliminating these respondents (treating them as missing data) has at times been the selected course of action. Thus, whenever any of these methods are used, one must report the proportion of responses affected. One must also report the mean NTGR with and without these responses in order to assess the potential for bias.

D.8 Making the Questions Measure-Specific

It is important for evaluators to tailor the wording of central free-ridership questions to the specific technology or measure that is the subject of the question. It is not necessarily essential to incorporate the specific measure into the question, but some distinctions must be made if they would impact the understanding of the question and its potential answers. For instance, when the customer has installed equipment that is efficiency rated so that increments of efficiency are available to the purchaser, asking that respondent to indicate whether he would have installed the same equipment without the program could yield confusing and imprecise answers. The respondent will not necessarily know whether the evaluator means the exact same efficiency, or some other equipment at similar efficiency, or just some other equipment of the same general type. Some other possibilities are:

1. Installations that involve removal more than addition or replacement (e.g., delamping or removal of a second refrigerator or freezer in a residence);
2. Installations that involve increases in productivity rather than direct energy load impacts;

⁶ One might not always be able to anticipate all possible inconsistencies before interviewing begins. In such cases, rules for resolving such unanticipated inconsistencies should be established before the analysis begins.

3. Situations where the energy-efficiency aspect of the installation could be confused with a larger installation; and
4. Installation of equipment that will result in energy load impacts, but where the equipment itself is not inherently energy-efficient.

An evaluation using self-report methods should include and document an attempt to identify and mitigate problems associated with survey questions that are not measure-specific, and an explanation of whether and how those distinctions are important to the accuracy of the resulting estimate of free-ridership.

In large facilities or with decision-makers across multiple buildings or locations care must be taken to ensure that the specific pieces of equipment, or group of equipment/facility decisions, are properly identified. The interviewer and respondent need to be referring to the same things.

As part of survey development, an assessment needs to be made of whether there are important subsets within the participant pool that need to be handled differently. For example, any program that contains corporate decision-makers managing building/renovation of dozens of buildings per year requires some type of special treatment. In this case, a standard survey might ask about three randomly selected projects/buildings. Or, a case study type of interview could focus on the factors affecting their decisions in general, for what percentage of their buildings do they take certain actions, and what actions do they take in cases where no incentives are available (if a regional or national decision-making), etc. Such an approach might offer better information to apply to all the buildings they have in the program. The point is that without special attention and a customized survey instrument, such customers might find the interview too confusing and onerous.

D.9 Partial Free-Ridership

Partial free-ridership can occur when, in the absence of the program, the participant would have installed something more efficient than the program-assumed baseline efficiency but not as efficient as the item actually installed as a result of the program. When there is a likelihood that this is occurring, an evaluation using self-report methods should include and document attempts to identify and quantify the effects of such situations on net savings. Partial free-ridership should be explored for those customers with large savings and complex decision making processes.

In such a situation, it is essential to develop appropriate and credible information to establish precisely the participant's alternative choice. The likelihood that the participant would really

have chosen a higher efficiency option is directly related to their ability to clearly describe that option.

An evaluation using self-report methods should include and document attempts to identify and mitigate problems associated with partial free-ridership, when applicable.

D.10 Deferred Free-Ridership

Deferred free riders are those customers who would, in the absence of the program, have installed exactly the same equipment that they installed through the utility DSM program, but the utility induced them to install the equipment earlier than they would have otherwise. That is, the utility *accelerated* the timing installation of the equipment. Because determining the extent of utility influence on the timing of the installation is a complex process, an evaluator should avoid relying on a single question asked of the key decision-maker. Rather, an evaluator should examine all available data and determine whether the preponderance of evidence supports the conclusion of deferred free-ridership.

The point at which the length of the deferral is interpreted as meaning no free-ridership needs to be explicitly developed in the evaluation plan and should be justified given the length of the measure life (the effective useful life or EUL) and the decision-making process of that type of customer.

Data from such sources as additional closed- and open-ended questions asked of the key decision-maker, information obtained from other people at the site familiar with the decision to install the efficient equipment, and information gathered from the program paper files should also be collected and analyzed. Rules for integrating the responses to closed- and open-ended questions should be established, to the extent feasible, before the analysis begins. Details regarding the establishment and use of such rules are provided in Section 2.14.

Unfortunately, evaluation budgets may only permit such data to be collected and analyzed for those customers with larger savings. For those customers with the smaller savings, the NTGR may be based only on the responses from close-ended questions obtained from the key decision-maker. In such cases, closed-ended questions regarding utility influence on both *what* was installed and *when* it was installed could be asked. These answers could be analyzed mechanically using an algorithm. However, to the extent that closed-ended questions are unable to capture fully the complexity of the decision-making process, any resulting conclusions regarding deferred free-ridership may be biased, with the direction of the bias unknown.

D.11 Scoring Algorithms

A consequence of using multiple questionnaire items to assess the probability of free-ridership (or its complement, the NTGR) is that decisions must be made about how to combine them. Do all items have equal weight or are some more important indicators than others? How are probabilities of free-ridership assigned to each response category? Answers to these questions can have a profound effect on the final NTGR estimate. These decisions are incorporated into the algorithm used to combine all pieces of information to form a final estimate of the NTGR. All such decisions must be described and justified by evaluators.

In some cases, each of the responses in the series of questions is assigned an ad hoc probability for the expected net savings. These estimates are then combined (additively or multiplicatively) into a participant estimate. The participant estimates are subsequently averaged (or weighted averaged given expected savings) to calculate the overall free-ridership estimate. The assignments of the probabilities are critical in the final outcome. At the same time, there is little evidence of what these should be and they are often assigned and justified given a logical argument. With this, however, a multiple number of different probability assignments have been shown to be justified and accepted by various evaluations and regulators. However, we recognize that this can make the comparability and reliability of survey-based estimates problematic.

Finally, evaluators must also conduct sensitivity analyses (e.g., changing weights, changing the questions used in estimating the NTGR, changing the probabilities assigned to different response categories, etc.) to assess the stability and possible bias of the estimated NTGR. A preponderance of evidence approach is always better than relying solely on a weighted algorithm and sophisticated weighting that is not transparent and logically conclusive should be avoided.

D.12 Handling Non-Responses and “Don’t Knows”

In some cases, some customers selected for the evaluation sample refuse to be interviewed (unit nonresponse). In other cases, some customers do not complete an attempted interview, complete the interview but refuse to answer all of the questions, or provide a “don’t know” response to some questions (item nonresponse). Insoluble contradictions fall into the latter category. Evaluators must explain in advance how they will address each type of problem.

Consider those who choose not to respond to the questionnaire or interview (unit nonresponse). Making no attempt to understand and correct for nonresponse in effect assumes that the non-respondents would have answered the questions at the mean. Thus, their net-to-gross ratios would assume the mean NTGR value. Because this might not always be a reasonable assumption, one should always assess the possibility of non-response bias.

To assess the possibility of non-response bias, one should, at a minimum, using information available on the population, describe any differences between those who responded and those who didn't and attempt to explain whether any of these differences are likely to affect one's answers to the NTGR battery of questions. If non-response bias is suspected, one should, whenever possible, explore the possibility of correcting for non-response bias. When not possible, one should explain why not (e.g., timing or budget constraints) and provide one's best estimate of the magnitude of the bias.

When some respondents terminate the interview, complete the interview but refuse to answer all the questions, or who provide a "don't know" response to some questions (item nonresponse), decisions must be made as to whether one should treat such cases as missing data or whether one should employ some type of missing data imputation. For example, early methods to handle responses of "Don't Know," missing data, and inconsistent answers involved assuming a 35% or 50% free-ridership rate for these participants (as they might be less likely to have taken actions if they hadn't thought about it or made opposing reactions). These methods, however, were found to create a centrality tendency (the tendency to avoid extremely low scores or extremely high scores) in the overall free-ridership estimate, i.e., driving it towards 35% or 50%.

In all cases, one should always make a special effort to avoid "don't know" responses when conducting interviews. However, some survey methods and procedures have been used that do not allow a "don't know" response where that might be the best response a respondent can provide. Forcing a response can distort the respondent's answer and introduce bias. Such a possibility needs to be recognized and avoided to extent possible.

D.13 Weighting the NTGR

The Protocols require estimates of the NTGR at the program or program component levels (as determined by the CPUC). Of course, such an NTGR must take into account the size of the impacts at the customer or project level. Consider two large industrial sites with the following characteristics. The first involves a customer whose self-reported NTGR is .9 and whose estimated annual savings are 200,000 kWh. The second involves a customer whose self-reported NTGR is .15 and whose estimated savings are 1,000,000 kWh. One could calculate an unweighted NTGR across both customers of .53. Or, one could calculate a weighted NTGR of .28. Clearly, the latter calculation is the appropriate one.

D.14 Ruling Out Rival Hypotheses

An evaluator should attempt to rule out rival hypotheses regarding the reasons for installing the efficient equipment (Scriven, 1976). For example, to reduce the possibility of socially

desirable responses, one could ask an *open-ended question* (i.e., a list of possible reasons is **not** read to the respondent) regarding other possible reasons for installing the efficient equipment. A listing by the interviewer of such reasons such as global warming, Flex Your Power, the price of electricity, concern for future generations, and the need for the US to reduce oil dependency might elicit socially desirable responses which would have the effect of artificially reducing the NTGR. The answers to such questions about other possible influences can be factored into the estimation of the NTGR.

In addition to obtaining the respondent's assess of other possible causes, the evaluator can independently assesses the evidence supporting any alternative hypotheses. For example, if there is a corporate policy regarding the purchase of efficient equipment, the evaluator should examine this document to verify its contents and the date on which this policy was established and also attempt to assess compliance with this policy. In addition, they could decide to interview industry experts to determine whether certain equipment has become standard practice in an industry. Or, they could review available market share data to determine whether a particular market for a specific technology has been transformed or is on its way to being transformed.

D.15 Precision of the Estimated NTGR

Most of the discussion thus far has been focused on the accuracy of the NTGR estimate and not the precision of the estimate. The calculation of the achieved relative precision of the NTGRs (for program-related measures and practices and non-program measures and practices) is usually straightforward, relying on the standard error and the level of confidence. For example, when estimating NTGRs in the residential sector, one typically interviews one decision maker in each household with the NTGR estimate based on multiple questions. In such a situation, one could report the mean, standard deviation, the standard error, and the relative precision of the NTGR based on the sample at the 90 percent levels of confidence.

However, in the nonresidential sector, things can get much more complicated since the NTGR at a given site can be based on such information as: 1) multiple interviews (end users as well as those upstream from the end user that might have been involved in the decision), 2) other more qualitative information such as standard purchasing policies that require a specific corporate rate of return or simple payback (*e.g.*, the rate of return for the investment in the energy efficiency measure can be calculated with and without the rebate to obtain another point estimate of the influence of the program), or 3) a vendor, involved in the installation of the efficient equipment, who might have been influenced by a utility training programs. In such a situation, a NTGR will be estimated that uses all of this information. However, one must recognize that the propagation of errors across multiple respondents and

other sources of quantitative and qualitative data cannot adequately be reflected in the resulting standard error of NTGR estimate.

D.16 Pre-Testing Questionnaire

Of course, as with any survey, a pre-test should be conducted to reveal any problems such as ambiguous wording, faulty skip patterns, leading questions, faulty consistency checks, and incorrect sequencing of questions. Modifications should be made prior to the official launch of the survey.

D.17 The Incorporation of Additional Quantitative and Qualitative Data in Estimating the NTGR

When one chooses to complement a mixed methods (quantitative and qualitative) analysis of free-ridership with additional data, there are a few very basic concerns that one must keep in mind.

D.17.1 Data Collection

Use of Multiple Respondents

In situations with relatively large savings and more complex decision-making processes, one should use, to the extent possible, information from more than one person familiar with the decision to install the efficient equipment or adopt energy-conserving practices or procedures (Patten, 1987; Yin, 1994).

It is important to inquire about the decision-making process and the roles of those involved for those cases with relatively large savings and with multiple steps or decision-makers. If the customer has a multi-step process where there are go/no-go decisions made at each step, then this process should be considered when using the responses to estimate the firm's NTGR. There have been program evaluations whose estimates have been called into question when these factors were not considered, tested and found to be important. For example, a municipal program serving cities with financial issues where a department's facility engineer could say without bias that he definitely intended to install the same measure in the absence of the program and that he had requested that the city manager request the necessary funds from the City Council. However, one might discover that in the past the city manager, due to competing needs, only very rarely include the engineer's requests in his budget submitted to the to City Council. Similarly, there are cases where a facility engineer continues to recommend efficiency improvements but never manages to get management approval until the efficiency program provides the information in a way that

meets the financial decision-makers needs in terms of information or independent verification or leverage by obtaining “free” funds.

These interviews might include interviews with third parties who were involved in the decision to install the energy efficient equipment. Currently, there is no standard method for capturing the influence of third parties on a customer’s decision to purchase energy efficient equipment. Third parties who may have influence in this context include market actors such as store clerks, manufacturers (through promotional literature, demonstrations, and in-person marketing by sales staff), equipment distributors, installers, developers, engineers, energy consultants, and architects. Yet, these influences can be important and possibly more so in the continually changing environment with greater attention on global warming and more overlapping interventions. When one chooses to measure the effect of third parties, one should keep the following principles in mind: 1) the method chosen should be balanced. That is, the method should allow for the possibility that the third-party influence can increase or decrease the NTGR that is based on the customer’s self report, 2) the rules for deciding which customers will be examined for potential third party influence should be balanced. That is, the pool of customers selected for such examination should not be biased towards ones for whom the evaluator believes the third-party influence will have the effect of influencing the NTGR in only one direction, 3) the plan for capturing third-party influence should be based on a well-conceived causal framework. The onus is on the evaluator to build a compelling case using a variety of quantitative and/or qualitative data for estimating a customer’s NTGR

Other Site- and Market-Level Data

Information relevant to the purchase and installation decision can include:

1. Program paper files (correspondence between DSM program staff and the customer, evidence of economic feasibility studies conducted by the utility or the customer, correspondence among the customer staff, other competing capital investments planned by the customer)
2. Program electronic files (*e.g.*, program tracking system data, past program participation)
3. Interviews with other people at the site who are familiar with the program and the choice (*e.g.*, operations staff)
4. Open-ended questions on structured interviews with the key decision-maker and other staff who may have been involved with the decision.
5. Incremental costs of the equipment
6. Estimates of the equipment’s market share

7. The diffusion (saturation) of the equipment in the market place

Where appropriate, for example, in the case of large-scale commercial and industrial sites, these data should be organized and analyzed in the form of a case study.

D.17.2 Establishing Rules for Data Integration

In cases where multiple interviews are conducted eliciting both quantitative and qualitative data and a variety of program documentation has been collected, one will need to integrate all of this information into an internally consistent and coherent story that supports a specific NTGR.

Before the analysis begins, one should establish, to the extent feasible, rules for the integration of the quantitative and qualitative data. These rules should be as specific as possible and be strictly adhered to throughout the analysis. Such rules might include instructions regarding when the NTGR based on the quantitative data should be overridden based on qualitative data, how much qualitative data is needed to override the NTGR based on quantitative data, how to handle contradictory information provided by more than one person at a given site, how to handle situations when there is no decision-maker interview, when there is no appropriate decision-maker interview, or when there is critical missing data on the questionnaire, and how to incorporate qualitative information on deferred free-ridership.

One must recognize that it is difficult to anticipate all the situations that one may encounter during the analysis. As a result, one may refine existing rules or even develop new ones during the initial phase of the analysis. One must also recognize that it is difficult to develop algorithms that effectively integrate the quantitative and qualitative data. It is therefore necessary to use judgment in deciding how much weight to give to the quantitative versus qualitative data and how to integrate the two. The methodology and estimates, however, must contain methods to support the validity of the integration methods through preponderance of evidence or other rules/procedures as discussed above.

D.17.3 Analysis

A case study is one method of assessing both quantitative and qualitative data in estimating a NTGR. A case study is an organized presentation of all these data available about a particular customer site with respect to all relevant aspects of the decision to install the efficient equipment. When a case study approach is used, the first step is to pull together the data relevant to each case and write a discrete, holistic report on it (the case study). In preparing the case study, redundancies are sorted out, and information is organized topically. *This information should be contained in the final report.*

The next step is to conduct a content analysis of the qualitative data. This involves identifying coherent and important examples, themes, and patterns in the data. The analyst looks for quotations or observations that go together and that are relevant to the *customer's decision to install the efficient equipment*. Guba (1978) calls this process of figuring out what goes together “convergence,” *i.e.*, the extent to which the data hold together or dovetail in a meaningful way. Of course, the focus here is on evidence related to the degree of program influence in installing the efficient equipment. Identifying and ruling out rival explanations for the installation of the efficient equipment is a critical part of the analysis (Scriven, 1976).

Sometimes, *all* the quantitative and qualitative data will clearly point in the same direction while, in others, the *preponderance* of the data will point in the same direction. Other cases will be more ambiguous. In all cases, in order to maximize reliability, it is essential that more than one person be involved in analyzing the data. Each person must analyze the data separately and then compare and discuss the results. Important insights can emerge from the different ways in which two analysts look at the same set of data. Ultimately, differences must be resolved and a case made for a particular NTGR.

Finally, it must be recognized that there is no single right way to conduct qualitative data analysis:

The analysis of qualitative data is a creative process. There are no formulas, as in statistics. It is a process demanding intellectual rigor and a great deal of hard, thoughtful work. Because different people manage their creativity, intellectual endeavors, and hard work in different ways, there is no one right way to go about organizing, analyzing, and interpreting qualitative data. (p. 146)

Ultimately, if the data are systematically collected and presented in a well-organized manner, and if the arguments are clearly presented, any independent reviewer can understand and judge the data and the logic underlying any NTGR. Equally important, any independent reviewers will have all the essential data to enable them to replicate the results, and if necessary, to derive their own estimates.

D.18 Qualified Interviewers

For the basic SRA in the residential and small commercial sectors, the technologies discussed during the interview are relatively straightforward (e.g., refrigerators, CFLS, T-8 lamps, air conditioners). In such situations, using the trained interviewers working for companies that conduct telephone surveys is adequate. However, in more complicated situations such as industrial process and large commercial HVAC systems, the level of technical complexity is

typically beyond the abilities of such interviewers. In such situations, engineers familiar with these more complicated technologies should be trained to collect the data by telephone or in person.

D.19 References

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Figure D-1: Simple Residential/Small Commercial Free-Ridership Algorithm

Simple Res./Small Commercial Free-Ridership Algorithm, November 2009
Page 1 of 3 -- Yes/No Series

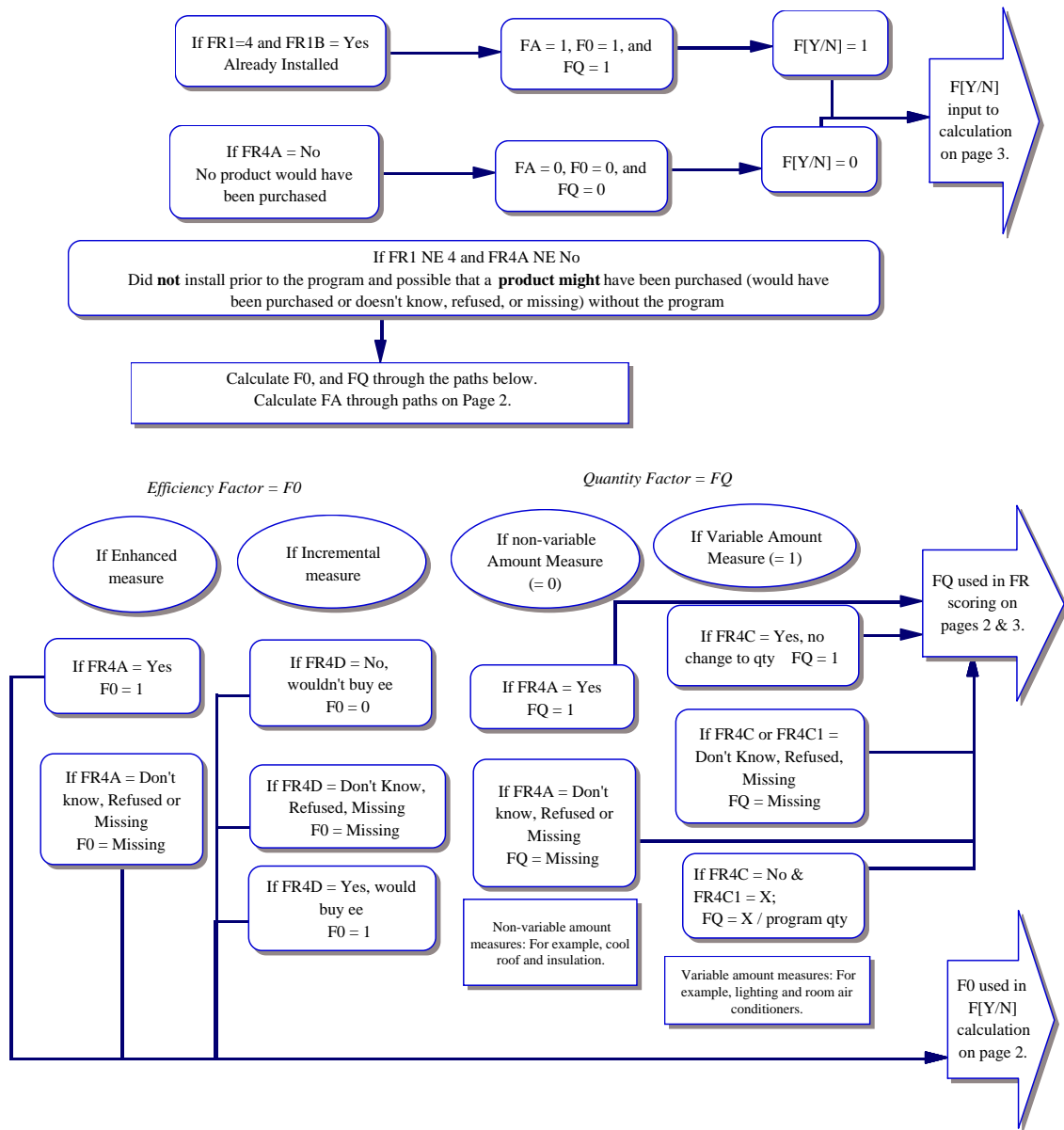


Figure D-1 (cont'd.): Simple Residential/Small Commercial Free-Ridership Algorithm

Simple Res./Small Commercial Free-Ridership Algorithm, November 2009
Page 2 of 3 -- Yes/No Series (Continued)

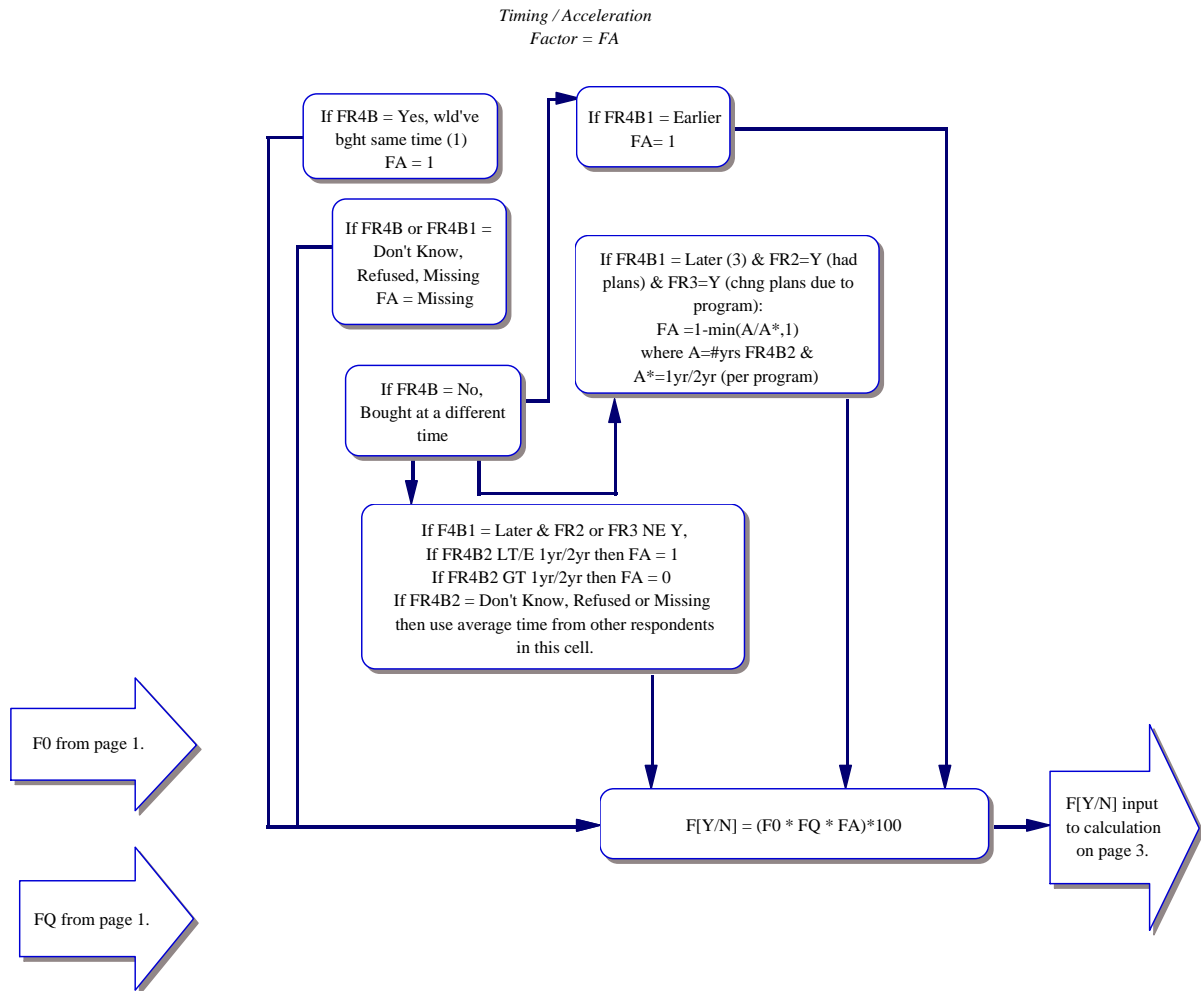


Figure D-1 (cont'd.): Simple Residential/Small Commercial Free-Ridership Algorithm

Simple Res./Small Commercial Free-Ridership Algorithm, November 2009
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