

Non-Residential New Construction (NRNC) Programs Impact Evaluation

California Investor-Owned Utilities' Non-Residential
New Construction Program Evaluation for Program
Years 2006-2008

Study ID: CPU0030.05 NRNC Appendices Part 2
Final Evaluation Report

Appendices to Volume II (Part 2)

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For the
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Energy Division

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Appendix H. On-Site Survey Instrument

This instrument was used during non-residential new construction site visits. The data gathered included occupancy history, schedules and controls for heating and cooling, and HVAC operations, and was used to produce computer models simulating building annual energy use.

General Information

Site ID:					Primary Contact:	
Address 1:					Phone 1:	
Address 2:					Phone 2:	
City:		State: CA	Zip:		Phone 3:	
Account Number:			Install Date:	/ /	Email:	
Application ID:			Quantity:		Secondary Contact:	
Annual Savings:			Measure Name:			
SITE NOTES:						
Building Type:			Industry Type:			
Inspector Initials:		Site Visit Date:	/ /	Site Visit Time:		
		Inspection Date:	/ /	Inspection Time:	Start:	End:
Scheduling Notes:						

Interview Questions

The following interview questions will be used to help us identify unobservable aspects of your building. These aspects include occupancy history, schedules, and heating and cooling controls. Answers to these questions will be coupled with data collected from our walk-through audit to produce a computer model which simulates the annual energy use of the building.

Building Overview

Q1. What is the overall building floor area? _____SF

Q2. How many floors? _____

Q3. What is the floor area of the new construction?

- o same as overall building floor area
- o _____SF

Q4. Characterize the site by circling the appropriate description:

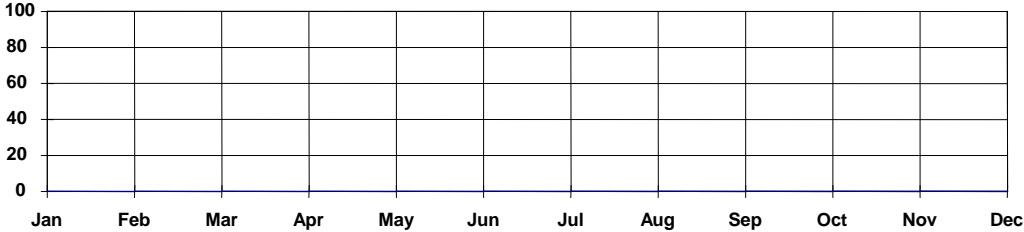
1. New building (“green field”)
2. Alteration of existing building
3. Addition to existing building
4. Alteration of existing building and addition to existing building

Q5. Circle the appropriate building type description:

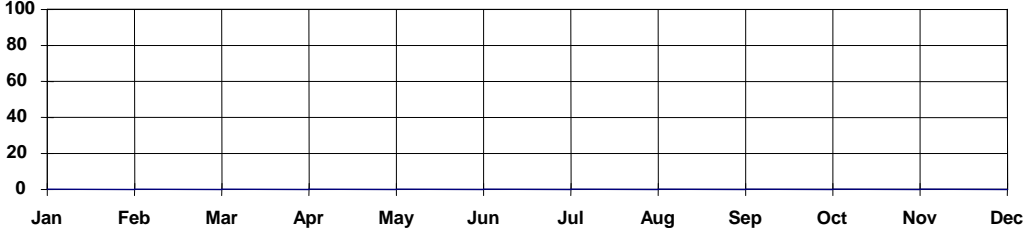
1	Small office	11	Hotel
2	Large office	12	Small school
3	Small retail	13	Large school
4	Multi-story large retail	14	Community college
5	Single story large retail	15	Large university
6	Grocery	16	Assembly
7	Quick service restaurant	17	Hospital
8	Full-service restaurant	18	Lt. Manufacturing
9	Conditioned warehouse	19	Bio/Tech Manufacturing
10	Uncond. warehouse		

Building Start-up

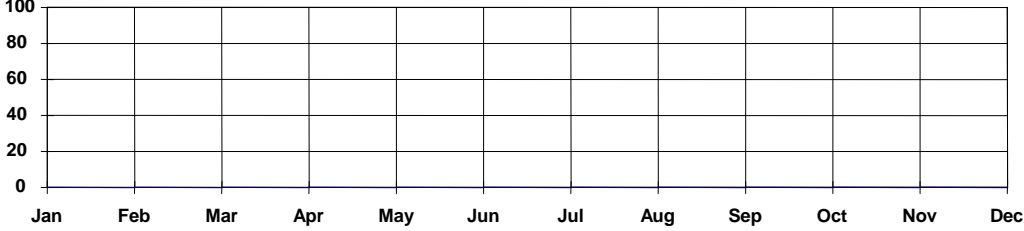
Q6. Draw a line that indicates the percentage of the **new construction** that was occupied (% of floor area) for 2006, 2007, & 2008.



2006

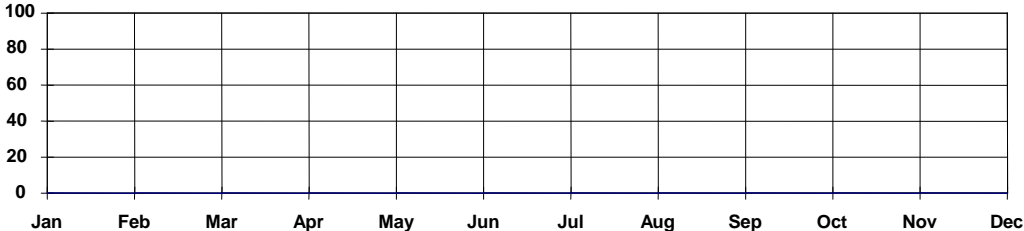


2007

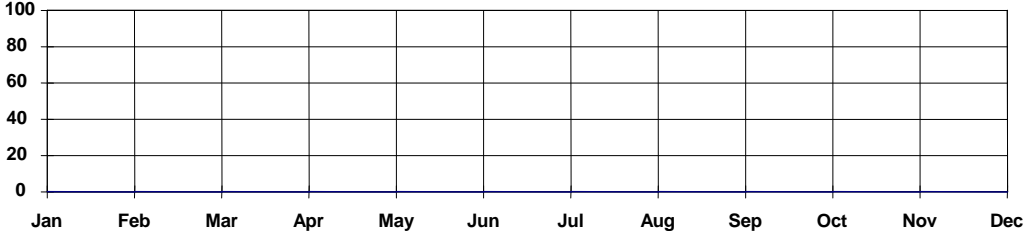


2008

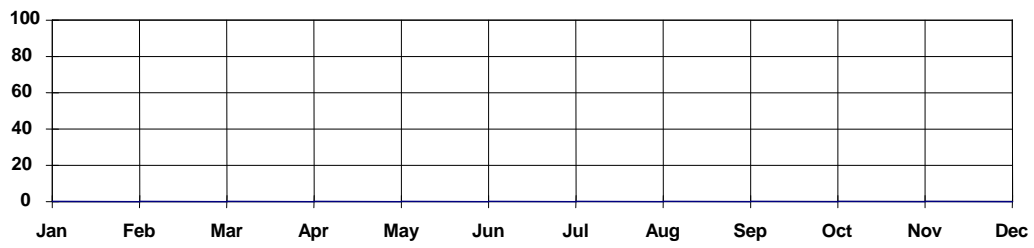
Q7. Draw a line that indicates the percentage of the **new construction** that was conditioned (% of floor area) during 2006, 2007, & 2008.



2006



2007



2008

Building Areas

Q8. How many individual tenants (businesses) occupy this building? _____

Q9. Do the majority of tenants have their own electric meter? Y N

Q10. Which statement best describes the operation of the building?

- The entire building operates on *basically* the same schedule
- There are areas of the building (departments, tenants, etc.) that have *substantially* different operating schedules

Q11. If different areas of the building (departments, tenants, etc.) have *substantially* different operational schedules, divide the building into up to five areas with differing schedules, and provide a name for each area:

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

Notes:

o **Building-Wide** - or -

Area #___ and Area Name

(fill out only one page)

(fill out one page per area)

Schedules

The following questions will help us establish schedules for the building.

Q12. What would be the best way to group the days of the week to describe the operation of this area? One of the three operation levels must be assigned to each day of the week.

	M	Tu	W	Th	F	Sa	Su	Holiday
Full operation:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Light operation:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Closed:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q13. What are the operating hours of this facility (when are they open for business)?

	Hours
Full Operation	
Light Operation	
Closed	

Q14. When do employees first begin arriving to the facility and when do they leave?

	Hours
Full Operation	
Light Operation	
Closed	

Q15. Are there different employee shifts and are they staffed equally?

	Hours
Full Operation	
Light Operation	
Closed	

Q16. Do the lights run on the same schedule as the occupancy? Y N DK
If not, what is that schedule?

	Hours
Full Operation	
Light Operation	
Closed	

<input type="radio"/> Building-Wide - or -	Area #___ and Area Name <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>
(fill out only one page)	(fill out one page per area)

Q17. Does the miscellaneous equipment run on the same schedule as the occupancy? Y N
 DK

If not, what is that schedule?

	Hours
Full Operation	
Light Operation	
Closed	

Q18. Is there a commercial kitchen at the facility?

If yes, what is the kitchen schedule?

	Hours				
	Off	Idle	Low	Medium	High
Full Operation					
Light Operation					
Closed					

Q19. Are there any months that this area has higher or lower than normal operating hours?

Indicate months of increased or decreased operating hours. Normal (100%) is assumed for blank entries.

	Lighting	HVAC	Equip and Process
	% of Normal	% of Normal	% of Normal
Jan	____%	____%	____%
Feb	____%	____%	____%
Mar	____%	____%	____%
Apr	____%	____%	____%
May	____%	____%	____%
Jun	____%	____%	____%
Jul	____%	____%	____%
Aug	____%	____%	____%

Sep	_____%	_____%	_____%
Oct	_____%	_____%	_____%
Nov	_____%	_____%	_____%
Dec	_____%	_____%	_____%

Q20. Which holidays are observed (check all that apply)

- New Years day
- MLK day
- Presidents' day
- Easter _____ days
- Memorial day
- July 4th
- Labor day
- Columbus day
- Veteran's day
- Thanksgiving _____ days
- Christmas _____ days

o **Building-Wide** - or -

Area #___ and Area Name

(fill out only one page)

(fill out one page per area)

Room Thermostat Setpoints

Q21. Enter the values for heating and cooling thermostat setpoints during normal (occupied) and setback (unoccupied) periods

Period*	Heating Setpoint	Cooling Setpoint
Occupied		
Unoccupied		

*Note that these setpoints are defined by Area not virtual system

Q22. Are room temperatures in this area controlled by the building EMS? Y N DK

Q23. Does the setback schedule in this area follow the fan on/off schedule? Y N DK

If the answer is N or DK, define the setback schedule below:

Q24. What are the setpoint schedules for a *full operation, light operation and closed day*?

	Hours		
	Full Operation	Light Operation	Closed
Occupied			
Unoccupied			

Building-Wide

Exterior Lighting

Q25. How are the exterior lights controlled? Time clock Photocell DK

Q26. If the exterior lights are controlled with a time clock, what is the schedule of operation.

	Hours		
	Full Operation	Light Operation	Closed
On			
Off			

Exterior Miscellaneous Equipment

Q27. Provide a schedule for miscellaneous equipment **not** in the conditioned space for a *full operation, light operation, and closed day*.

	Hours
Full Operation	
Light Operation	
Closed	

<input type="radio"/> Building-Wide - or -	Virtual System #___ and Name
_____ (fill out only one page)	(fill out one page per system)

HVAC Fan System Operation

This section is used to establish the fan system schedule. List the hours that the fans are “on” or “off.” “On” indicates occupied mode, where the fans run continuously. “Off” indicates unoccupied mode, where the fans cycle on only if needed to satisfy space temperature needs, or are shut off regardless of space temperature.

Q28. Describes the fan system operation schedule for a *full operation, light operation, and closed day*.

	Hours*		
	Full Operation	Light Operation	Closed
On			
Off			

**This schedule must be defined for each HVAC system if they are controlled differently*

Q29. Is the fan system described above controlled by the building EMS? Y N DK

Q30. Is the fan system described above controlled using an optimum start algorithm? Y N
DK

Note: For fans with optimal start/stop, indicate the building occupancy schedule - e.g. the time when the building needs to be at normal operating temperature.

Q31. List the nighttime (off cycle) control strategy for the fan system described above:

- Stay off regardless of room temperature
- Cycle on if any room requires heating or cooling
- DK

Q32. What is the minimum cooling supply air temperature setpoint _____°F DK

Q33. How is the supply air temperature controlled?
EMS?

- Fixed

- o Reset based on outside air temp
- o Reset based on zone temp
- o DK

Q34. If the system is VAV, how is the flow rate determined? o
EMS?

- o Duct static pressure
- o Measured air flow at the zone VAV boxes
- o DK

Q35. Are CO₂ sensors used to control outdoor air quantities? Y N DK oM? o
EMS?

Q36. Does the system utilize a humidistat to maintain space humidity? Y N DK o
EMS?

Q37. If yes, indicate minimum and maximum relative humidity: Min RH(%)_____ Max
RH(%)_____

**List all air handling units, and/or packaged HVAC systems that run on this schedule
below:**

Central HVAC Design and Control

The following questions will help us to understand how the HVAC systems operate in the building. (These questions are designed to be answered by someone familiar with the operation of the building mechanical and control systems.)

Q38. Does the building have a central energy management system (EMS)? Y N DK

Q39. What is the minimum condenser water setpoint temperature? _____°F DK

Q40. What is the minimum cooling tower approach setpoint temperature? _____°F DK

Q41. How is the condenser water setpoint temperature controlled? EMS?

- Fixed
- Reset based on outside temp
- DK

Q42. If the building has chillers and cooling towers, is the system equipped with a water-side economizer? Y N DK

Q43. If yes, what type of water-side economizer is used?

- Strainer cycle
- Thermosyphon
- Plate-frame heat exchanger
- DK

Q44. Circle the months of the year when the water-side economizer system is typically used:

J F M A M J J A S O N D DK

Q45. Is the heating system turned off (locked out) on a seasonal basis? Y N DK

Q46. If yes, indicate the months when the heating system is typically available:

J F M A M J J A S O N D DK

Shades and Blinds

Q47. If there are shades or blinds on windows, which **best** describes their general use?

- Always open
- Always closed
- Operated by occupants to control comfort
- Open when space is occupied, closed otherwise

Swimming Pools

Q48. If the building has a heated swimming pool, what water temperature is maintained?
_____ °F DK

Q49. If the building has a heated swimming pool, is a pool cover used? Y N DK

Q50. If a cover is used, at what time is it normally put on the pool? _____

Q51. If a cover is used, at what time is it normally removed from the pool? _____

Spas

Q52. If the building has a spa, what water temperature is maintained? _____ °F DK

Q53. If the building has a spa, is a cover used? Y N DK

Q54. If a cover is used, at what time is it normally put on the spa? _____

Q55. If a cover is used, at what time is it normally removed from the spa? _____

Building-Wide Power Generation

Q56. Do you have an emergency back-up generator? Y N DK

Q57. Do you have a cogeneration system? Y N DK

Q58. Are either of these systems used for peak load reduction? Y N DK

Thermal Energy Storage, If yes fill out supplemental TES form

Q59. Does the building have a thermal energy storage (TES) system? Y N DK

Q60. Is the TES system used for peak load reduction? Y N DK

Refrigeration System

Q61. Does the building have a refrigeration system with remote condensers? Y N DK
If no or DK skip the remaining questions pertaining to refrigeration systems.

Q62. What refrigerants are used in each circuit of the system?

a. Low temp (Ice cream) R-_____ DK

b. Med temp (Frozen food) R-_____ DK

c. High temp (All others) R-_____ DK

Q63. What is the minimum condensing temperature setpoint? _____°F, DK

Q64. What is condenser fan control strategy? Fixed Temp Wet Bulb Offset _____°F DK

Q65. What is the suction pressure control strategy? Fixed Floating DK

Q66. For each circuit temperature, what type of defrost cycle and defrost control are typically used?

a. Low temp (Ice cream) defrost electric hot gas time off DK
defrost control time clock demand DK

b. Med temp (Frozen food) defrost electric hot gas time off DK
defrost control time clock demand DK

c. High temp (All others) defrost electric hot gas time off DK
defrost control time clock demand DK

Q67. Are the anti-sweat heaters controlled on store humidity? Y N DK

Q68. If Q52 is yes, list setpoints: RH off _____ % RH on _____ % DK

Q69. List the name and phone number of the refrigeration system service company

Name: _____

Phone: _____

Operations and Maintenance

Q70. Please list any equipment or system operating problems that cause thermal discomfort or excessive energy consumption?

Problem	Equipment and/or Systems Affected
System under or oversized	
Insufficient or excess air flow	
Faulty control sensors	
Improper control sensor installation or location	
Insufficient sensor points for control and/or monitoring	
Improper EMS or control system programming	
Control systems "locked out" (left in manual position)	
Faulty valve or damper linkage or actuator	
Loose fan belts and / or improper alignment	
Improper ductwork installation or leakage	
Leaky valves, pipes, or fittings	
Defective major components (compressors, pumps, fans, etc.)	
Refrigerant leakage	
Fouled evaporative cooler media	
Water treatment problems (corrosion or bacterial growth)	

Other (list)

Title 24

Q71. Under what code did the building comply?

2001 2005

Q72. Circle the method used for Title 24 compliance?

Envelope (ENV): Component Overall envelope Performance DK
 Mechanical (MECH): Prescriptive Performance DK
 Lighting (LTG): Complete building Area category Tailored Performance DK

- If new construction complied using the **performance method**, or **tailored lighting** approach, copy the PERF or LTG compliance reports, or obtain the name and phone number of the firm that did the compliance analysis:

Name:

Phone:

Notes:

Built-Up HVAC Systems*

*Indicate if backup or stand-by equipment

Chillers/ Large Split DX

o Serves more than the surveyed area

	CH-	CH-	CH-
Equipment Name	o existing? o M?	o existitng? o M?	o existing? o M?
Location			
Quantity			
Manufacturer			
Model Number			
Serial Number			
Size (tons)			
Chiller Type*			
Full-load efficiency	kW/ton COP	kW/ton COP	kW/ton COP
Condenser Type	Air / Water	Air / Water	Air / Water
Air-Cooled Cond. Fan hp**			

*Chiller type: 1=recip; 2=screw/scroll; 3=cent; 4=sngl eff absorp; 5=dbl eff ind fired absorp; 6=dbl eff dir fired absorp; 7=gas eng

**Enter condenser fan hp only if not included in equipment efficiency rating

Towers/ Evaporative Condensers

	T-	T-	T-
Equipment Name	o existing? o M?	o existing? o M?	o existing? o M?
Location			
Quantity			
Manufacturer			
Model Number			
Rated Capacity (kBtuh)			
Rated Ambient WB Temp			
Rated Cond Water Temp			
Fan Control	1-Sp / 2-Sp / o M? Pony / VSD/ DK	1-Sp / 2-Sp / o M? Pony / VSD/ DK	1-Sp / 2-Sp / o M? Pony / VSD/ DK
Aux motor type (circle)*	Fan / Pump	Fan / Pump	Fan / Pump
Quantity			
Hp			
Phase / RPM (circle)	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
Motor efficiency	o M?	o M?	o M?
Aux motor type (circle)	Fan / Pump	Fan / Pump	Fan / Pump

Quantity			
Hp			
<i>Phase / RPM (circle)</i>	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
<i>Motor efficiency</i>	o M?	o M?	o M?
Aux motor type (circle)	Fan / Pump	Fan / Pump	Fan / Pump
Quantity			
Hp			
<i>Phase / RPM (circle)</i>	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
<i>Motor efficiency</i>	o M?	o M?	o M?
Aux motor type (circle)	Fan / Pump	Fan / Pump	Fan / Pump
Quantity			
Hp			
<i>Phase / RPM (circle)</i>	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
<i>Motor efficiency</i>	o M?	o M?	o M?

*Enter each fan and pump motor surveyed.

Heating System

	HS-	HS-	HS-
Equipment Name	<input type="checkbox"/> existing? <input type="checkbox"/> M?	<input type="checkbox"/> existing? <input type="checkbox"/> M?	<input type="checkbox"/> existing? <input type="checkbox"/> M?
Location			
Quantity			
Make			
Model Number			
Capacity	KW / kBtuh	KW / kBtuh	KW / kBtuh
Type	Steam / HW / Duct Htr	Steam / HW / Duct Htr	Steam / HW / Duct Htr
Fuel	Electric / Gas / Other	Electric / Gas / Other	Electric / Gas / Other
Efficiency (%)			

Pumps

Pump	Name	Existing ?	HP	Phase	RPM	Motor effic %	M?	Control	M?	EMS ?	Location	Loop	Use
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec
P-		<input type="checkbox"/>					<input type="checkbox"/>	CV / VSD	<input type="checkbox"/>	<input type="checkbox"/>		CHW / Cond / HW	Pri / Sec

Central Air Handlers

Name	AH-	AH-	AH-
Equipment Name	<input type="checkbox"/> existing? <input type="checkbox"/> M?	<input type="checkbox"/> existing? <input type="checkbox"/> M?	<input type="checkbox"/> existing? <input type="checkbox"/> M?
Location			
Quantity			
Type (circle one)	Single Duct Dual Duct Multi-Zone	Single Duct Dual Duct Multi-Zone	Single Duct Dual Duct Multi-Zone
Evaporative System Type (circle one)	None / Direct <input type="checkbox"/> M? Ind / Ind-Dir	None / Direct <input type="checkbox"/> M? Ind / Ind-Dir	None / Direct <input type="checkbox"/> M? Ind / Ind-Dir
Supply Fan Type (circle one)	CV / VAV	CV / VAV	CV / VAV
Supply Fan Control (circle one)	CV: Constant / Cycles VAV: VSD / Inlet/ Disch <input type="checkbox"/> M?	CV: Constant / Cycles VAV: VSD / Inlet/ Disch <input type="checkbox"/> M?	CV: Constant / Cycles VAV: VSD / Inlet/ Disch <input type="checkbox"/> M?
EMS control of supply fan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supply Fan Flow Rate (cfm)			
Fan motor type (circle)	Supply / Return	Supply / Return	Supply / Return
Motor HP			
Phase / RPM (circle)	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
Motor efficiency	<input type="checkbox"/> M?	<input type="checkbox"/> M?	<input type="checkbox"/> M?
Fan motor type (circle)	Supply / Return	Supply / Return	Supply / Return
Motor HP			
Phase / RPM (circle)	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
Motor efficiency	<input type="checkbox"/> M?	<input type="checkbox"/> M?	<input type="checkbox"/> M?
Fan motor type (circle)	Supply / Return	Supply / Return	Supply / Return
Motor HP			
Phase / RPM (circle)	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
Motor efficiency	<input type="checkbox"/> M?	<input type="checkbox"/> M?	<input type="checkbox"/> M?
Fan motor type (circle)	Supply / Return	Supply / Return	Supply / Return

Motor HP			
Phase / RPM (circle)	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
Motor efficiency	oM?	oM?	oM?
OA Control (circle one)	Fixed / Temp / Enth oM?	Fixed / Temp / Enth oM?	Fixed / Temp / Enth oM?
EMS control of OA?	0	0	0
Min OA Fraction	DK	DK	DK

Packaged / Split HVAC Systems

	AC-	AC-	AC-
Equipment Name	<input type="checkbox"/> existing? <input type="checkbox"/> M?	<input type="checkbox"/> existing? <input type="checkbox"/> M?	<input type="checkbox"/> existing? <input type="checkbox"/> M?
Location			
Quantity			
System Type			
Manufacturer			
Model No. (outdoor - all)			
Serial No. (outdoor – all)			
Model No (indoor if split)			
Serial No. (indoor if split)			
Cooling Capacity (ton)			
Cooling Efficiency (circle units)	EER <input type="checkbox"/> M? SEER	EER <input type="checkbox"/> M? SEER	EER <input type="checkbox"/> M? SEER
Supply CFM			
Heating Fuel (circle one)	Elec / Gas / Other	Elec / Gas / Other	Elec / Gas / Other
Heating Capacity (kBtuh) (heating capacity for heat pumps is for compressor only)			
Heating Efficiency (circle COP or HSPF for heat pumps, AFUE for gas heat)	COP <input type="checkbox"/> M? HSPF AFUE	COP <input type="checkbox"/> M? HSPF AFUE	COP <input type="checkbox"/> M? HSPF AFUE
Condenser Type (circle one)	Dry Coil / Evap. Cond. <input type="checkbox"/> M? Pad pre-cooler	Dry Coil / Evap. Cond. <input type="checkbox"/> M? Pad pre-cooler	Dry Coil / Evap. Cond. <input type="checkbox"/> M? Pad pre-cooler
Evaporative System Type (circle one)	None / Direct <input type="checkbox"/> M? Ind / Ind-Dir	None / Direct <input type="checkbox"/> M? Ind / Ind-Dir	None / Direct <input type="checkbox"/> M? Ind / Ind-Dir
System Type (circle one)	CV / VAV	CV / VAV	CV / VAV
Supply Fan Control (circle one)	CV: Constant / Cycles VAV: VSD / Inlet/ Disch <input type="checkbox"/> M?	CV: Constant / Cycles VAV: VSD / Inlet/ Disch <input type="checkbox"/> M?	CV: Constant / Cycles VAV: VSD / Inlet/ Disch <input type="checkbox"/> M?
EMS control of Supply Fan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supply Fan HP / Eff.			

Return/Relief Fan HP / Eff.			
OA Control	Fixed / Temp / Enth oM? Single Point / Differential	Fixed / Temp / Enth oM? Single Point / Differential	Fixed / Temp / Enth oM? Single Point / Differential
EMS control of OA?	O	O	O
Min OA Fraction	DK	DK	DK

Ducts Outside Conditioned Space

Type	Location	System #	Stories served	Dia or L x W (in)	Lineal Ft	% total default area	Construction	R-Value	Notes
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		
o Supply o Return	o Plenum o Outside						o Sheet Metal o Flex o Duct Board		

Refrigeration Plant

Compressors / Compressor Racks

Name	Make	Model	Old Const?	Comp Code	Circuit	AHU Ht. Rec	M?	Mech Subcool
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0
CR-			0		LT / MT / HT	Y / N	0	0

LT circuit is for ice cream cases (product code 1), MT is for frozen food cases (product code 2) and HT is for all others
 Supply evaporator tons and rack suction temperature (SST) if known

Comp Code	Compressor type	Comp Code	Compressor type
1	Stand-alone	3	Parallel equal multiplex
2	Stand-alone w/ VSD	4	Parallel unequal multiplex

Refrigeration Condenser

	RC-	RC-	RC-	RC-
Equipment Name				
Old Construction?	o	o	o	o
Location				
Type	Air / Water	Air / Water	Air / Water	Air / Water
Manufacturer				
Model Number				
Compressors served				
Rated Cap (kBtuh)	M?o	M?o	M?o	M?o
Outdoor Temp @ rating	WB DB	WB DB	WB DB	WB DB
Cond Temp @ rating				
Fan Control	1-Sp / 2-Sp / Pony VSD M?o	1-Sp / 2-Sp / Pony VSD M?o	1-Sp / 2-Sp / Pony VSD M?o	1-Sp / 2-Sp / Pony VSD M?o
Aux motor type (circle)	Fan / Pump	Fan / Pump	Fan / Pump	Fan / Pump
Quantity				
Hp				
Phase / RPM (circle)	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
Motor efficiency	M?o	M?o	M?o	M?o
Aux motor type (circle)	Fan / Pump	Fan / Pump	Fan / Pump	Fan / Pump

Quantity				
Hp				
<i>Phase / RPM (circle)</i>	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
<i>Motor efficiency</i>	M?o	M?o	M?o	M?o
Aux motor type (circle)	Fan / Pump	Fan / Pump	Fan / Pump	Fan / Pump
Quantity				
Hp				
<i>Phase / RPM (circle)</i>	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
<i>Motor efficiency</i>	M?o	M?o	M?o	M?o
Aux motor type (circle)	Fan / Pump	Fan / Pump	Fan / Pump	Fan / Pump
Quantity				
Hp				
<i>Phase / RPM (circle)</i>	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600	1 3 / 1200 1800 3600
<i>Motor efficiency</i>	M?o	M?o	M?o	M?o

Zone*

***Note that each zone must be associated with a specific area and virtual HVAC system.**

Name _____ Zone Multiplier _____ HVAC zoning by Y N exposure?

Exterior Walls

Assembly Name	Existing?	Wall Type	Insul R or U- value	HC	M?	Orientation (N, NE, E, etc.)	H (ft)	W (ft)
	o		R U		o			
	o		R U		o			
	o		R U		o			
	o		R U		o			
	o		R U		o			

Height and width are gross dimensions, including windows
Enter "0" for R-value if uninsulated, leave blank if unknown

	Wall Construction Type
1	Face Brick + Brick
2	Face Brick + Poured Concrete
3	Face Brick + Concrete Block

	Wall Construction Type
4	Poured Concrete + Finish
5	Concrete Block + Finish
6	Wood Frame Wall

	Wall Construction Type
7	Metal Frame Wall
8	Curtain Wall
9	Open

Interior Walls

Assembly Name	Type	Area	H (ft)	W (ft)	Next to Zone	Notes
	Solid Air					
	Solid Air					

Survey only if non-adiabatic

Roof

Assembly Name Existing ? Roof Type Surf Type Surf Color Reflec Emitt M ? Ceil Insul **Roof** M ? H (ft) W (ft) Plen H (ft) Plen Wall R Ret Air

	o						o	R U	R U	o					o
	o						o	R U	R U	o					o
	o						o	R U	R U	o					o
	o						o	R U	R U	o					o

Height and width are gross dimensions, including skylights
Enter "0" for R-value if uninsulated, leave blank if unknown

Roof Construction Type	
10	Concrete Deck Roof.
11	Wood Frame Roof
12	Metal Frame Roof

Roof Surface	
1	Paint
2	Elastomeric coating
3	Single ply membrane

Roof Surface	
4	Metal roofing
5	Asphalt shingles or roll
6	Gravel (ballast)

Window/Skylight Types

Ref. No.	Assembly Name	No. Panes	Glazing Type	Frame Type	Features (circle)	Meas.Trans.	SHGC	U- value
1	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
2	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
3	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
4	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
5	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
6	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
7	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
8	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
9	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			
10	<input type="radio"/> existing? <input type="radio"/> M?				Low e / gas fill			

	Glass Type
1	Clear
2	Tinted
3	Reflective
4	Fritted (diffusing)

	Plastic Type
5	Clear Plastic
6	Tinted Plastic
7	White Plastic
8	Translucent

	Window Frame Type
1	Standard Metal Frame
2	Thermally Broken Frame
3	Wood/Vinyl Frame

	Skylight Frame Type
4	Standard Metal Frame w/ Curb
5	Thermally Broken Frame w/ Curb
6	Standard Metal Frame w/o Curb
7	Thermally Broken Frame w/o Curb

Window/Skylight Geometry

Ref No. (from above)	Orient (N, NE, .. H)	H (ft)	W (ft)	Qty	Int. Shade Type	Otr Ex Shd%	Window OH Offset	Window OH Proj	Skylight Shape

Otr Ex Shd% refers to exterior shading from adjacent buildings, building self-shading, thick vegetation, hillsides etc.

Interior Shade Type: 1 = Blinds; 2 = Light Shades or Drapes; 3 = Dark Shades or Drapes

Skylight Shape: 1 = Domed; 2= Flat; 3= Pyramid; 4= Ridge; 5= Vault

Zone-Level HVAC Equipment (Not Central, Not Packaged)

Name Type Qty Fan CFM Heat Make Model Capacity M?
 Code Hp Source

					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				
					None / Elec. / Other				

					Other				
--	--	--	--	--	-------	--	--	--	--

Zone-Level HVAC Equipment

Type Code	Zone-Level HVAC Equipment Description
1	Baseboard or radiant heater
2	Two-pipe fan coil
3	Four-pipe fan coil
4	Two pipe induction terminal
5	Four pipe induction terminal
6	Unit heater

Type Code	Zone-Level HVAC Equipment Description
7	Unit ventilator
8	Non-powered VAV terminal
9	Series fan-powered VAV terminal
10	Parallel fan-powered VAV terminal
11	Computer equipment cooler
12	Exhaust fan

16	Ice Maker	CF	0.04
17	Residential Reach-in Refrigerator	CF	0.03
18	Residential Reach-in Freezer	CF	0.03
19	Residential Closed Coffin Freezer	CF	0.03
20	Refrigerated Vending Machine	CF	0.03
21	Water cooler	each	0.5
22	Slurpee, frappuccino machine	each	
23	Other	kBtuh	

8	Quadruple glazed, no heaters
---	------------------------------

Light Code	Lighting Type
1	None
2	T-12 w/ magnetic ballast
3	T-12 w/ electronic ballast
4	T-8

Kitchen Equipment

Appliance Name	Qty	Type Code	Fuel	KW or	Volts / Amps or	kBtuh Input or	Trade Size	Hi-Effic	Hood	M
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o
			Elec. / Other		/			Y / N	Y / N	o

Hoods

Name	Type	Size (SF)	Flow (cfm)	Fan hp	Makeup Air Source
	Canopy / Island Canopy / Backshelf				Cond / Uncond
	Canopy / Island Canopy / Backshelf				Cond / Uncond
	Canopy / Island Canopy / Backshelf				Cond / Uncond
	Canopy / Island Canopy / Backshelf				Cond / Uncond
	Canopy / Island Canopy / Backshelf				Cond / Uncond
	Canopy / Island Canopy / Backshelf				Cond / Uncond

Type Code	Description	Trade size	Default kW/unit
1	Broiler (include cheesemelter)	ft	1.7
2	Char Broiler	ft	3.7
3	Griddle, single sided	ft	4.5

Type Code	Description	Trade size	Default kW/unit
15	Oven, convection, combi, or retherm	doors	3.8
16	Food warmer	ft	0.6
17	Heated display case	ft	0.5

4	Griddle, clam shell	ft	7.5
5	Fryer, countertop	lb	0.3
6	Fryer, free-standing	lb	0.3
7	Fryer, pressure	lb	0.3
8	Fryer, donut	lb	0.3
9	Kettle, Pasta cooker	qt	0.25
10	Heat lamps	lamps	0.5
11	Range top	ft	5.
12	Oven, pizza or bake	decks	7.
13	Oven, conveyor	decks	13.
14	Oven, range	ft	2.

18	Microwave oven		1.7
19	Toaster, pop-up		1.8
20	Toaster, conveyor		4.6
21	Coffee pot	burners	1.
22	Steam table	ft	0.6
23	Dishwasher, single tank	racks/hr	0.3
24	Dishwasher, conveyor	racks/hr	0.1
25	Steam jacketed kettle	qt	0.4
26	Braising pan/skillet	qt	0.1
27	Other	kW	

Space*

***Note that each space must be associated with a specific zone.**

Name _____

Floor Area _____ SF

Corridor/Restroom/Support Area _____%

Space

Multiplier _____

Circle appropriate occupancy code:

LPD Measure o

- | | | | |
|-------------------------------|------------------------------|----------------------------|-------------------------|
| 1 Auditorium | 14 Office - Other | 26 Hotel function | 39 Gymnasium |
| 2 Church /chapel | 15 Computer center | 27 Hotel guest room | 40 Library |
| 3 Convention, meeting | 16 EEG/EKG/MRI/Radiation | 28 Hotel lobby | 41 Locker room |
| 4 Courtroom | 17 Hospital - Emergency | 29 Barber, beauty shop | 42 School shop |
| 5 Exhibit | 18 Hospital general area | 30 Bowling alley | 43 Swimming pool |
| 6 Main entry lobby | 19 Hospital laboratory | 31 Coin op laundry | 44 Aircraft hanger |
| 7 Motion picture theater | 20 Hosp.patient rm/ nursery | 32 Comm'l dry cleaners | 45 Auto repair workshop |
| 8 Performance theater | 21 Hosp. therapy (OT, PT) | 33 Grocery | 46 General C&I work |
| 9 Bars, lounge, casino | 22 Hospital Pharmacy | 34 Mall, arcade, atrium | 47 Precision C&I work |
| 10 Dining | 23 Hospital Radiology | 35 Retail, whlse sales flr | 48 Storage, warehouse |
| 11 Kitchen | 24 Hospital Recovery | 36 Classroom | 49 Other (Describe) |
| 12 Bank/financial institution | 25 Hosp. Surgical & OB suite | 37 Day care | |
| 13 Medical / clinical office | | 38 Dormitory | |

Note: Codes 16 – 25 are for hospitals only

Lighting

Name	Fixture Code	Fixture Count	Mou nt. Type	Trac k Leng th	Controls (circle all that apply)	% fix ctrl	% ctrl oper
					1 / 2 / 3 / 4	o EMS? o M?	

					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		
					1 / 2 / 3 / 4	o EMS? o M?		

Lighting Control Codes

1 = Occupancy sensor 2 = Daylight - contin. dimming 3 = Daylighting - stepped 4 = Lumen maintenance

Fixture Mounting Type Codes

1 = Rec 2 = Dir 3 = Ind 4 = Ind-Dir 5 = Plug-in Task 6 = Furn. Int. Task. 7 = Track 8 = Exempt

Light level measurements

Test Area Description	Floor Area Percentage Represented	FC Under fixture	FC Between fixtures	Fixture Code

Average value _____ Min _____ Max _____ -

Notes:

	Gasoline pump	15	0.7
	ATM	16	.5
	Video game	17	.5
	Exercise equipment	18	.5

	Battery Charger	35	1.5
	Machine Tools	36	
	Motor	37	
Misc.	Other	38	

Hot Water

Conventional Water Heating Equipment

Name	Make	Model #	Location	Type Code	Old Cost?	Storage Cap (gal)	Fuel	Effic	Pump hp	M?
					0		Elec / Other			0
					0		Elec / Other			0
					0		Elec / Other			0
					0		Elec / Other			0

Solar Water Heating Equipment

Name	Location	System Type Code	Collector Area (SF)	Tilt (deg, horiz =0)	Storage Cap (gal)	M?
						0
						0
						0

Pools/ Spas

Name	Location	Surface Area (SF)	Filter Motor hp	Heating System
	Outside / Inside			None / PH-__
	Outside / Inside			None / PH-__
	Outside / Inside			None / PH-__
	Outside / Inside			None / PH-__

Pool/Spa Heating System

Name	Location	Fuel Code	Effic	Solar Collector Type	Collector Area (SF)	Tilt (deg, horiz =0)	Heat Recovery	M ?

PH-1		Elec / Other		Glazed / Unglazed			Y / N	O
PH-2		Elec / Other		Glazed / Unglazed			Y / N	O
PH-3		Elec / Other		Glazed / Unglazed			Y / N	O
PH-4		Elec / Other		Glazed / Unglazed			Y / N	O

WH Type Code	Water Heater Description
1	Storage
2	Instantaneous
3	Heat Pump

SWH Type Code	Solar Water Heater Description
1	Active flat plate
2	Passive flat plate
3	Integral Collector/Storage
4	Active evacuated tube
5	Active concentrating E-W tracking
6	Active concentrating N-S tracking

Exterior

Exterior Lighting

Name	Old	Fixture Code	Count	Application	Allowed Area	M?
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0

	0			Parking lot Auto sales Gas station canopy Other		0
	0			Parking lot Auto sales Gas station canopy Other		0

Collect only if connected to electric meter serving occupied space

Miscellaneous Exterior Electric Loads

Name	Equip Code	Quantity	kW/unit or	Hp/unit

Collect only if connected to electric meter serving occupied space

Equipment Description	Equipment Code	Default kW
Misc. Appliance	1	
Washer	2	0.5
Dryer	3	4.
Cash Register	4	0.15
Box Crusher	5	10.
Gasoline pump	6	0.7
Air Compressor	7	

Equipment Description	Equipment Code	Default kW
Welder	8	
Battery Charger	9	1.5
Machine Tools	10	
Motor	11	
Refrig vending machine	12	
Ice merchandizer	13	
Other	14	

Miscellaneous

Interior Transformers

Name Location Qty Manuf. Model No. kVA Temp Rise (°C) Cooling Fan?

							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N
							Y / N

Survey only if measure

Vertical Transportation

Name Type Qty Motor hp Elevator Number of Floors Escalator Width (ft) Rise (ft) Run (ft)

	Elev / Esc							
	Elev / Esc							
	Elev / Esc							
	Elev / Esc							
	Elev / Esc							
	Elev / Esc							

Incidents

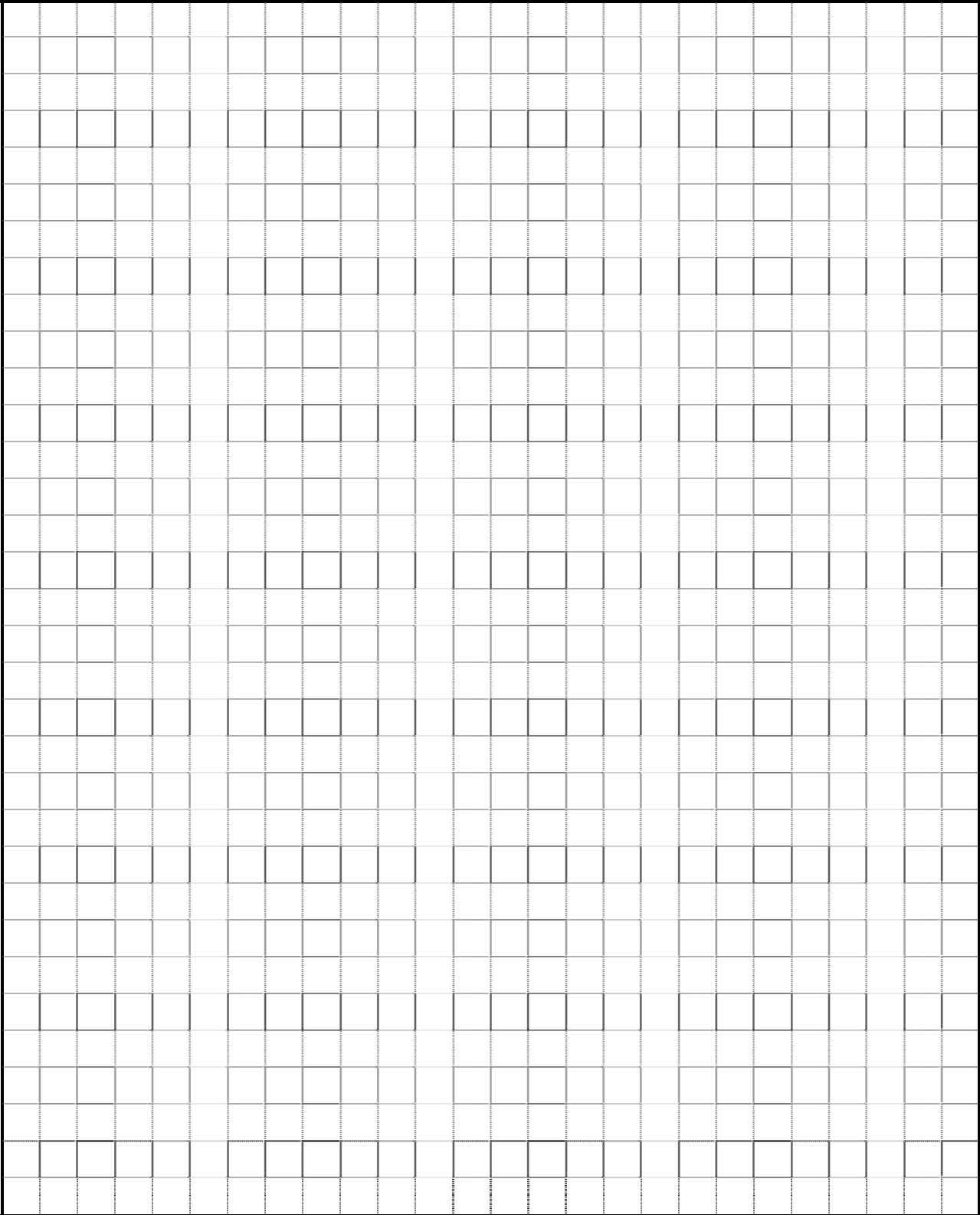
Circle any incidents as applicable:

- | | | | |
|---|---|----|---|
| 1 | None to report | 7 | Contact person unavailable or unaware of survey appointment |
| 2 | Complaint about rates | 8 | Customer expressed dissatisfaction with survey (list reason(s)) |
| 3 | Complaint about energy costs or lack of savings | 9 | Property damage occurred during on-site survey |
| 4 | Complaint about outages or power quality | 10 | Personal injury occurred during on-site survey |
| 5 | Complaint about technology reliability | 11 | Other (list) |
| 6 | Complaint about utility customer service | | |

Meter Numbers

	Utility Name	Meter Number
Electric1		
Electric2		
Electric3		
Electric4		
Gas1		
Gas2		
Gas3		
Gas4		

Sketch of Building Floor Plan



Be sure to include dimensions, North arrow, and zone and HVAC equipment locations

Appendix I. Refrigerated Warehouse On-site Survey Instrument

This instrument was used at site visits to refrigerated warehouse facilities. Data collection includes building characteristics, door qualities, receiving volumes and schedules, cooling loads and schedules, among other information.

General Information

Site ID #

Surveyor Name:	Building Name:
----------------	----------------

Date:	Primary Contact:	Phone:
-------	------------------	--------

Building Address:	
City	Zip

Facility Overview

What is the total square footage of this facility? _____ sq. ft.

Which statement best describes the operation of the facility?

- long-term storage short-term storage
 distribution seasonal

Which statement best describes the operation of the facility?

- The entire facility operates on *basically* the same temperature and schedule.
 There are areas of the facility that have *substantially* different temperatures and operational schedules.

If different storage temperatures and operational schedules exist, divide the building into areas with differing schedules, and provide a name for each area:

1 _____
2 _____
3 _____
4 _____
5 _____

1b _____
2b _____
3b _____
4b _____
5b _____

Area 1 2 3 4 5 (Fill out pages 2-7 for each different area, and indicate on p.14)

Name _____ Floor Area _____ S _____ F _____ Temp _____ deg F _____

Occupancy _____ people RH _____ %

Space Type/Usage _____

Surfaces

Name	Construction Description	Orient	Tilt (0=horiz)	H (ft)	W (ft)	Adjacent to area
S-1		N S E W H				
S-2		N S E W H				
S-3		N S E W H				
S-4		N S E W H				
S-5		N S E W H				
S-6		N S E W H				
S-7		N S E W H				
S-8		N S E W H				
S-9		N S E W H				

Doors

ID	D-1	D-2	D-3	D-4	D-5
Make					
Model					
Quantity					
Size (L×W) or (L) for Strip Curtains					
Opens to (space name or outside ambient)					
Type					
Door material					
Door thickness (in.)					
Seal condition					
Cycle time(min)					
Peak cycles / hr					

Locate doors on sketch (see pages 14 and 15).

Doors—continued

Describe wind exposure and/or other infiltration conditions:

Products

Product	P-1	P-2	P-3	P-4
Description				
Receiving Temp				
Receiving Condition				
Final Temp				
Container type				
Container wt.				
Cooldown time (hr)				
Cooldown %				
Cooldown temperature				

Average Daily Receiving Volume

WD = Weekdays, WEH = Weekends and

Holidays

Month	P-1		P-2		P-3		P-4	
	WD	WEH	WD	WEH	WD	WEH	WD	WEH
Jan								
Feb								
Mar								
Apr								
May								

Experience you can trust.

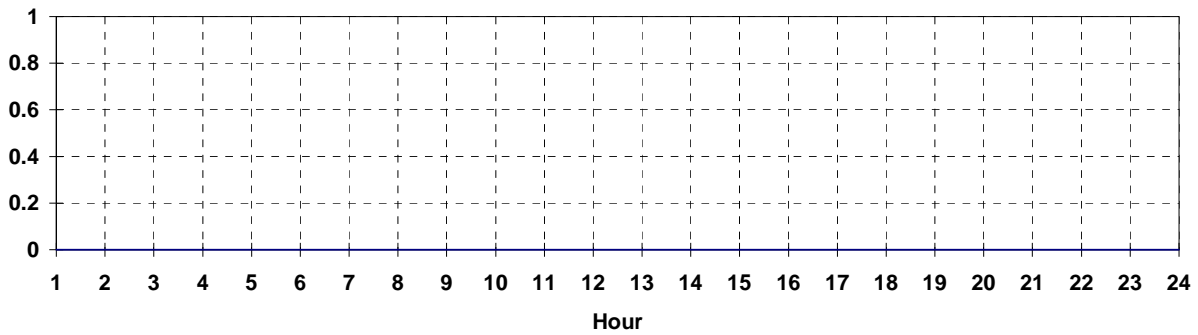
Jun								
Jul								
Aug								
Sep								
Oct								
Nov								
Dec								

Be sure to indicate units

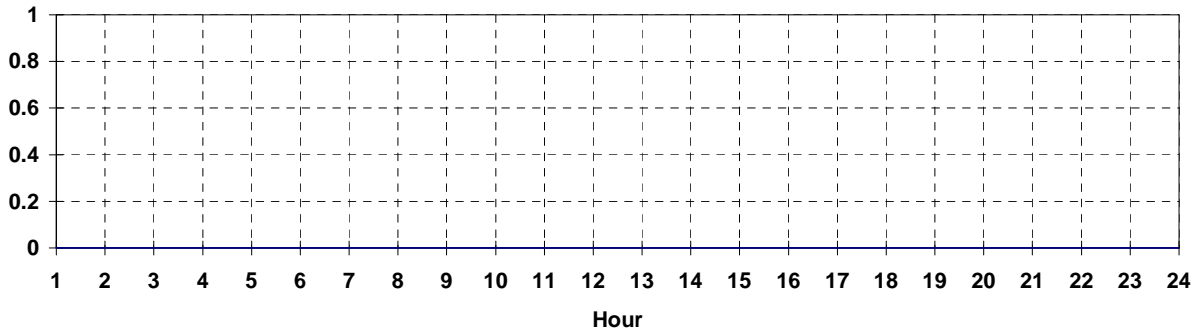
Receiving Schedules

Indicate daily receiving schedule (% of max. hourly product amount) for each of the above products.

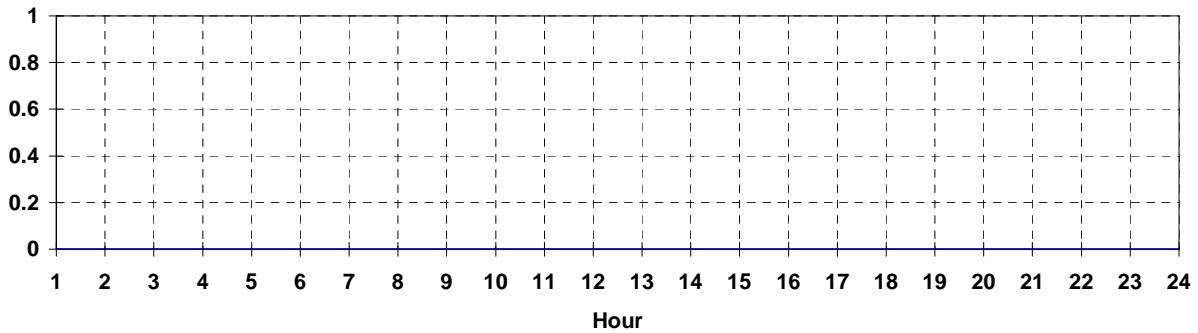
P - 1 **Month** (circle): J F M A M J J A S O N D **Daytype** (circle) WD
WEH



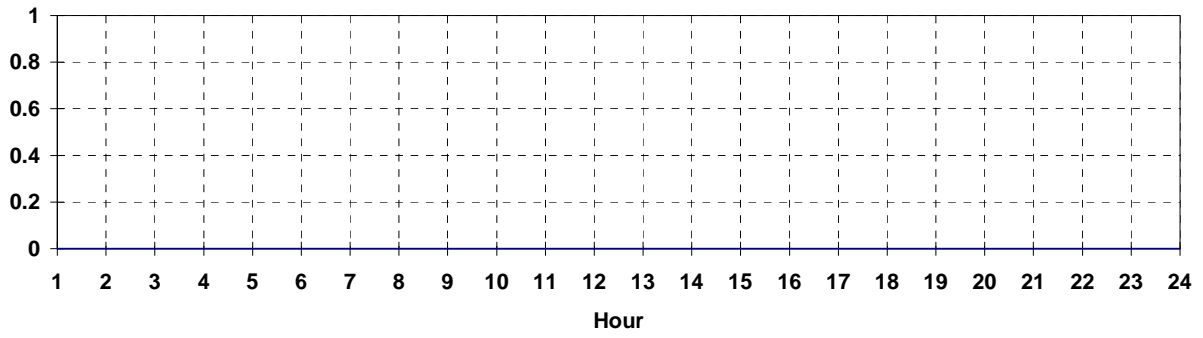
P-____ **Month** (circle): J F M A M J J A S O N D **Daytype** (circle) WD
WEH



P-____ **Month** (circle): J F M A M J J A S O N D **Daytype** (circle) WD
WEH



P-____ **Month** (circle): J F M A M J J A S O N D **Daytype** (circle) WD
WEH



Total Product Stored

Month	P-1	P-2	P-3	P-4
Jan				
Feb				
Mar				
Apr				
May				
Jun				
Jul				
Aug				
Sep				
Oct				
Nov				
Dec				

Be sure to indicate units

Notes (record additional comments on p.13):

Evaporators

ID	EV-1	EV-2	EV-3	EV-4	EV-5
Make					
Model					
Quantity					
Capacity (ton)					
Liquid feed					
Fan hp					

Fan efficiency					
Fan control type					
Defrost type					
Schedule					
Duration					
Defrost power usage					
Condensate pan heat					

Record additional comments on p.13

Lighting

Name	Fixture Code	Quantity	Schedule
L-1			
L-2			
L-3			
L-4			
L-5			
L-6			

Miscellaneous Packing and Processing Equipment

Name	Description	Count	kW/ Unit or	Motor HP or	kBtuh Input	Schedule of Operation
E-1						
E-2						
E-3						
E-4						
E-5						
E-6						
E-7						
E-8						
E-9						

Vehicles

	Description	Make	Model	Volts	Am p-hr	hp	Qty.	Schedule of Use
V-1								
V-2								
V-3								
V-4								

V-5								
V-6								

Describe vehicle usage (record additional comments on p.13):

Process Cooling Loads

ID	PCL-1	PCL-2	PCL-3	PCL-4
Type				
Make				
Model Number				
Auxiliary hp				
Product				
Entering Temp				
Leaving Temp				
Cycle length (min)				

Average Daily Process Volume

WD = Weekdays, WEH = Weekends and

Holidays

Month	PCL-1		PCL-2		PCL-3		PCL-4	
	WD	WEH	WD	WEH	WD	WEH	WD	WEH
Jan								
Feb								
Mar								
Apr								
May								
Jun								
Jul								
Aug								
Sep								
Oct								
Nov								
Dec								

Experience you can trust.

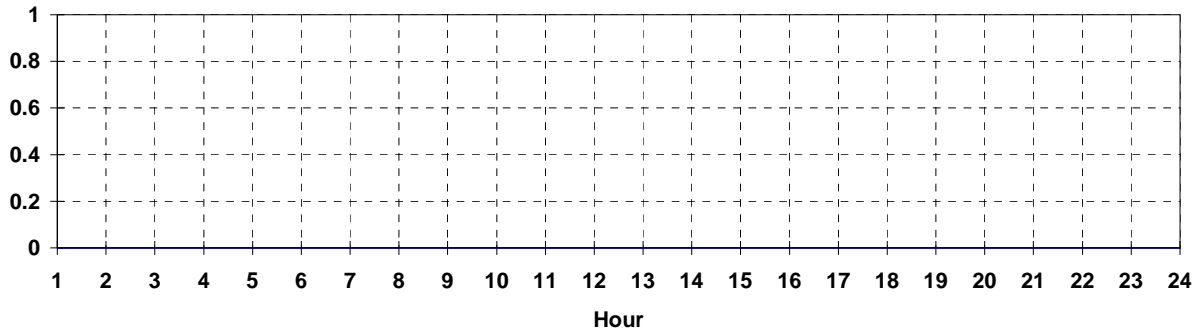
Be sure to indicate units

Any process load scheduling or sequencing information that cannot be recorded on the following page should be noted here (record additional comments on p.13):

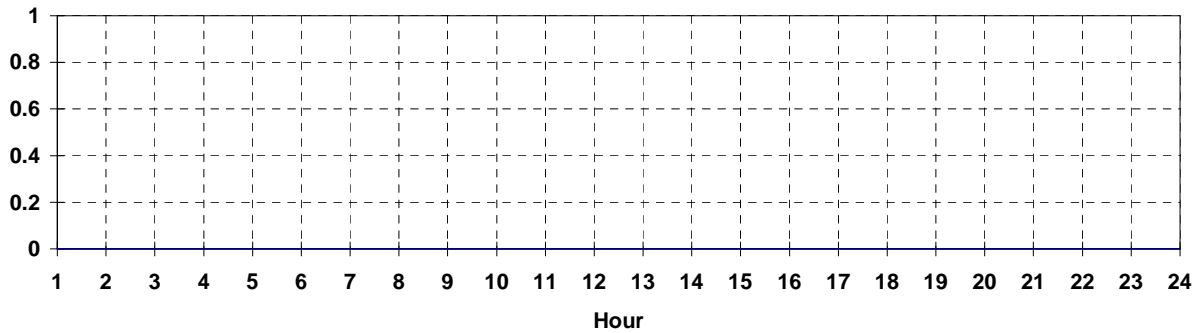
Process Cooling Schedules

Indicate average daily process schedule (% of max. hourly total amount) for each process load.

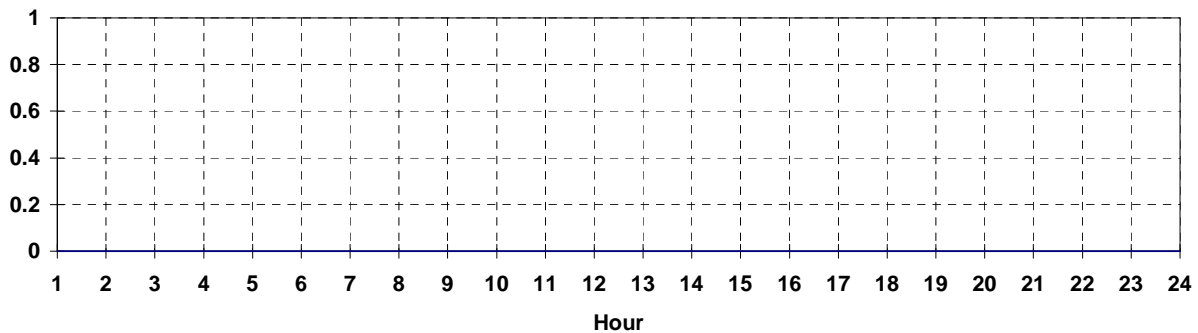
PCL - 1 : Month (circle): J F M A M J J A S O N D **Daytype** (circle) WD
WEH



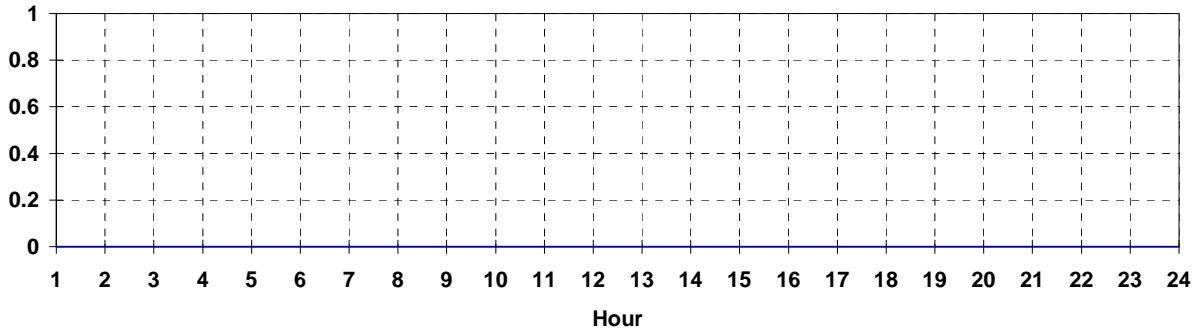
PCL-____ : Month (circle): J F M A M J J A S O N D **Daytype** (circle) WD
WEH



PCL-____ : Month (circle): J F M A M J J A S O N D **Daytype** (circle) WD
WEH



PCL-____ : Month (circle): J F M A M J J A S O N D **Daytype** (circle) WD
WEH



Refrigeration Plant

Compressors

ID	C-1	C-2	C-3	C-4	C-5
Make					
Model Number					
Serial Number					
Refrigerant type					
Application					
Suction setpoint					
Discharge setpoint					
Min capacity %					
Max capacity %					
Motor Make					
Model No.					
hp					
Efficiency					
RPM					
Type					

Condensers

Name	RC-1	RC-2	RC-3	RC-4
Make				
Model				
Type	Air / Evap	Air / Evap	Air / Evap	Air / Evap
Fan hp				
type	ODP / TEFC	ODP / TEFC	ODP / TEFC	ODP / TEFC
RPM				
η				
control	1Sp / 2Sp / VSD	1Sp / 2Sp / VSD	1Sp / 2Sp / VSD	1Sp / 2Sp / VSD
control type				
Pump hp				
type	ODP / TEFC	ODP / TEFC	ODP / TEFC	ODP / TEFC
RPM				
η				

Condensers—continued

Describe compressor and condenser fan sequencing for each system:

Refrigerant Vessels

ID	Description	Length (in.)	Diameter (in.)	Insulation
RV-1				
RV-2				
RV-3				
RV-4				
RV-5				
RV-6				
RV-7				
RV-8				

Notes (record additional comments on p.13):

Heat Exchangers for Subcooling, Desuperheat

ID	Application	HX Type	Flow Type
HX-1			
HX-2			
HX-3			
HX-4			
HX-5			
HX-6			

Notes (record additional comments on p.13):

Equipment / Load Association

	Circuit					
		1	2	3	4	5
Area	1					
	2					
	3					
	4					
	5					
	1b					
	2b					
	3b					
	4b					
	5b					
Process	PCL-1					
	PCL-2					
	PCL-3					
	PCL-4					
Compressor	C-1					
	C-2					
	C-3					
	C-4					
	C-5					
	C-1b					
	C-2b					
	C-3b					
	C-4b					
	C-5b					
Condenser	RC-1					
	RC-2					
	RC-3					
	RC-4					
Refrigerant Vessel	RV-1					
	RV-2					
	RV-3					
	RV-4					
	RV-5					

	RV-6					
	RV-7					
	RV-8					
Heat Exchanger	HX-1					
	HX-2					
	HX-3					
	HX-4					
	HX-5					
	HX-6					
Condensate Pump	CP-1					
	CP-2					
	CP-3					
	CP-4					
	CP-5					

Record total nameplate hp of condensate pump(s) under the appropriate circuit column

Exterior Lighting

Name	Fixture Code	Count	Control	Schedule
XLT-1				
XLT-2				
XLT-3				
XLT-4				
XLT-5				

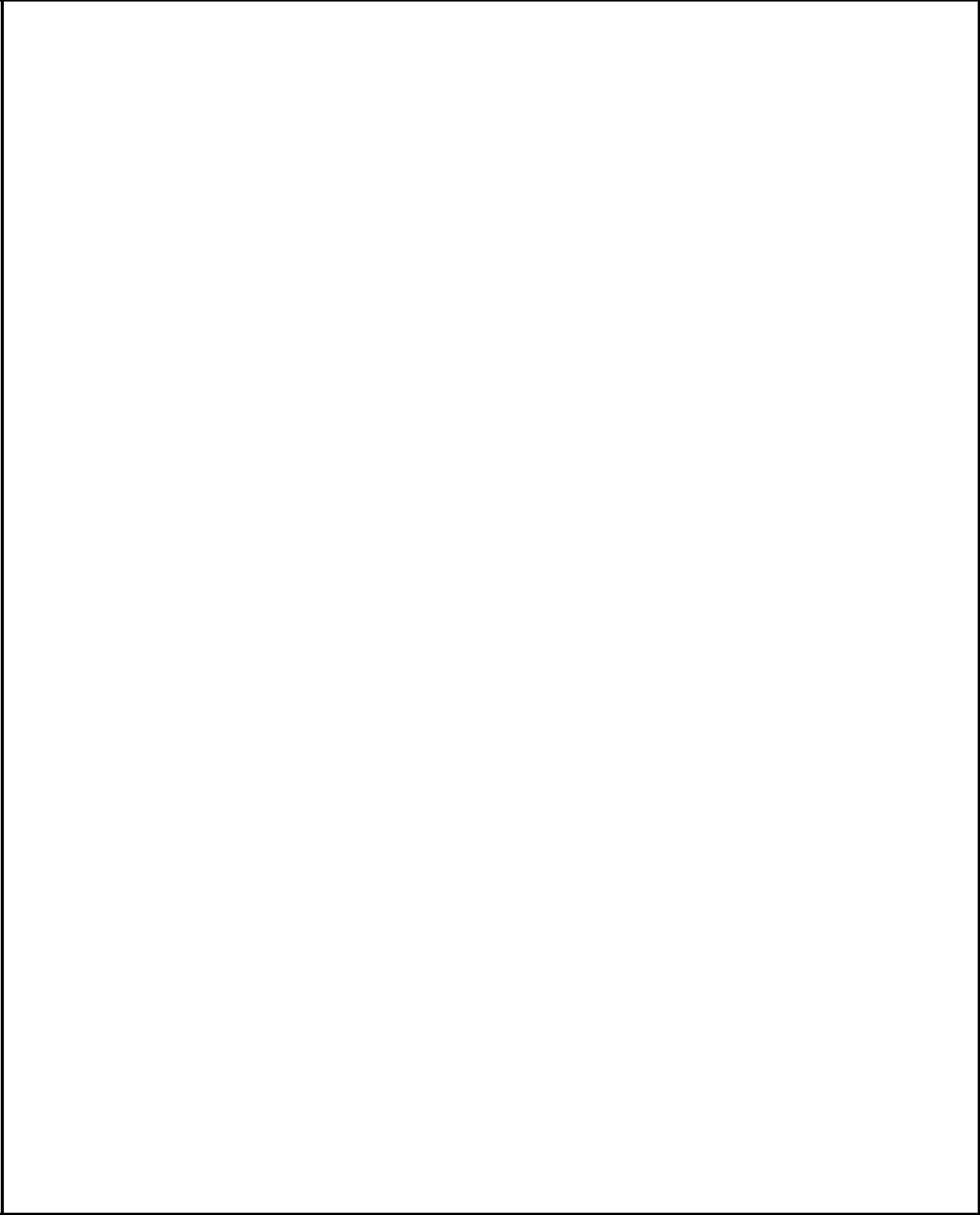
Battery Chargers

Name	Make	Model	Qty.	Volts In	Amps In	Volts Out	Amps Out	Charging schedule
BC-1								
BC-2								
BC-3								
BC-4								
BC-5								
BC-6								

Miscellaneous Exterior Electric Loads

Name	Description	Qty.	kW/unit	Hp/unit	Schedule
MC-1					
MC-2					
MC-3					
MC-4					
MC-5					
MC-6					

Sketch of Building Floor Plan

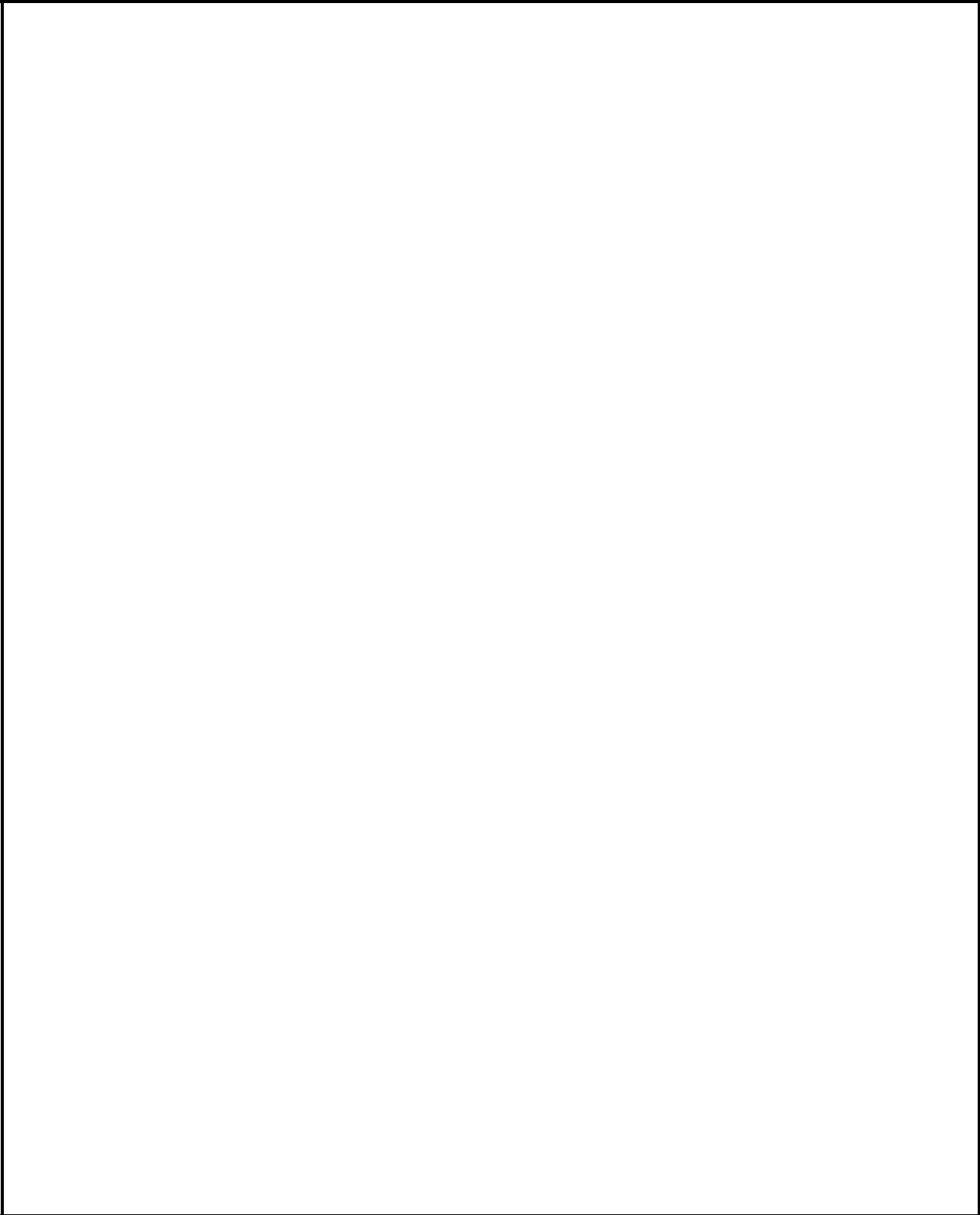


Be sure to include dimensions, North arrow, and zone and HVAC equipment locations

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Envelope Sketch

Sketch elevations, exterior wall, interior wall, roof, and floor sections



Appendix J. Dust Collection System On-site Survey Instrument

This survey instrument collects information on VSDs on dust collection systems at NRNC site facilities. Data collected includes VSD nameplate information and operating schedule and is used to inform the following:

1. Measure parameters that are influential in determining equipment performance and energy savings.
2. Confirm the daily, weekly and annual operating hours of the end users.
3. Perform engineering analysis to estimate the energy consumption and compared with the baseline consumption to calculate the energy savings.



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Dust Collection System Onsite Survey Instrument

Project Information

Site ID Number	
Building Name	
Address	
Contact Name	
Phone	

Goals and Objectives

- 1 Measure parameters that are influential in determining equipment performance and energy savings.
- 2 Confirm the daily, weekly and annual operating hours of the end users.
- 3 Perform engineering analysis to estimate the energy consumption and compared with the baseline consumption to calculate the energy savings.

Engineer On-Site:

Date of Visit:

Measure Details:

1. VSD on dust collection system

Project:		Date:		
Building:				
Panel/Circuit:		Equipment:		
Location:		Time:		
	Phase A	Phase B	Phase C	Notes
V (ph to grnd)				
Amps				
kW				
PF				
Datalogger amps				
Panel/Circuit:		Equipment:		
Location:		Time:		
	Phase A	Phase B	Phase C	Notes
V (ph to grnd))				
Amps				
kW				
PF				
Datalogger amps				
Panel/Circuit:		Equipment:		
Location:		Time:		
	Phase A	Phase B	Phase C	Notes
V (ph to grnd)				
Amps				
kW				
PF				
Datalogger amps				

Panel/Circuit:		Equipment:		
Location:		Time:		
	Phase A	Phase B	Phase C	Notes
V (ph to grnd))				
Amps				
kW				
PF				
Datalogger amps				

Appendix K. Compressed Air System On-Site Survey Instrument

This survey instrument is at site visits for compressed air system measures in which a VSD air compressor, TMS dryer, and no air loss valve was installed, and air compressor discharge was reduced. The instrument collects air compressor system data, schedules, and operating times. The data seeks to inform the following objectives:

1. Measure parameters that are influential in determining equipment performance and energy savings.
2. Confirm the daily, weekly and annual operating hours of the end users.
3. Perform Air Master simulation on all compressed air end users to estimate the energy consumption and compared with the baseline consumption to calculate the energy savings.

Compressed Air System Onsite Survey Instrument

Project Information

Site ID Number	
Building Name	
Address	
Contact Name	
Phone	

Goals and Objectives

- 1 Measure parameters that are influential in determining equipment performance and energy savings.
- 2 Confirm the daily, weekly and annual operating hours of the end users.
- 3 Perform Air Master simulation on all compressed air end users to estimate the energy consumption and compared with the baseline consumption to calculate the energy savings.

Engineer On-Site:

Date of Visit:

Measures Descriptions:

- Install a ____hp VSD air compressor
- Install a TMS Dryer
- Install no air loss valve
- Reduce the air compressor discharge pressure

Air Compressor System						
Compressor Type	Single Stage lubricant injected rotary screw	Two Stage lubricant injected rotary screw	Two Stage lubricant free injected rotary screw	Single Stage reprocating	Two Stage reprocating	Multi-staged Centrifugal
Make						
Model No.						
Serial Number						
Compressor Control						
Output Power (hp)						
Voltage						
FLA						
Power Factor						
Nom. Efficiency						
RPM						
Full Load Operating Pressure (psig)						
Rated Capacity at Full Load Operating Pressure Acfm						
Compressor Location						
Control Type	Load/Unload, Inlet Modulation without unloading, Inlet Modulation with unloading, Multistep unloading, Start/Stop					
After Cooling	Water Cooled or Air Cooled					
Fan motor hp						
Unloading Control						
Unload Point % Capacity						
Number of Unload Steps						
Unloaded Sump Pressure (psig)						
Automatic Shutdown Timer						
Average Temperature at inlet air compressor inlet						
Atmospheric pressure (psia)						
Compressor Performance Points						
Discharge Pressure at rated performance condition						
Power used by air compressor at rated performance condition						

System Data		
System Elevation, ft		
Air Storage Capacity, cu ft		
Sequenced (If they have Multiple System)	Cascade Pressure or Target pressure	

End User's Data				
Location	Required air flow, acfm	Regulated	Required Pressure, psig	Measured Pressure, psig(from the facility Gauge)

Annual Operating Hours												
Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Season												
Off Season												

Hourly Weekday Schedule	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Peak Season Schedule																								
ACFM																								
Off Season Schedule																								
ACFM																								

Hourly Weekend Schedule	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Peak Season Schedule																								
ACFM																								
Off Season Schedule																								
ACFM																								

TMS Dryer	
Make	
Model No.	
Serial Number	
Rated kW	
Rated CFM	

Project:		Date:		
Building:				
Panel/Circuit:		Equipment:		
Location:		Time:		
	Phase A	Phase B	Phase C	Notes
V (ph to grnd)				
Amps				
kW				
PF				
Datalogger amps				
Panel/Circuit:		Equipment:		
Location:		Time:		
	Phase A	Phase B	Phase C	Notes
V (ph to grnd))				
Amps				
kW				
PF				
Datalogger amps				
Panel/Circuit:		Equipment:		
Location:		Time:		
	Phase A	Phase B	Phase C	Notes
V (ph to grnd)				
Amps				
kW				
PF				
Datalogger amps				
Panel/Circuit:		Equipment:		
Location:		Time:		

Appendix K. Whole Building Savings Summary

The following tables include the ex-ante, ex-post gross, and ex-post net savings values for kWh, kW, and therms aggregated to the site level for each measure in the sample.

In this appendix the reader will note that there are a few projects where the net-to-gross ratio for therm savings is greater than one. A net-to-gross ratio greater than one means that the net savings is greater than the gross savings, which at first glance, does not seem possible. These counter intuitive results are attributable to the interactive effects with electrical savings measures. For example, within the building energy simulation model, when we de-rate lighting LPD when the NTG analysis determines that a portion (or all) of the lighting measure installation was not due to the program, this reduces the need for additional gas heating below that which would have resulted if the program caused all of the LPD gains. Likewise, de-rating glazing SHGC for NTG increases passive solar heating, thereby, reducing the gas heating load. If there are no gas measures being de-rated by the NTG analysis, these interactive effects will drive the NTGR above one. So, there are several cases where the NTG for gas was high, but the lower NTG for electric savings interacted to create net savings better than the apparent gross savings.

Site D62797 was dropped from the gas analysis because the model was producing an unreasonable estimate of savings for which we were unable to diagnose the cause of.

The site names were created with a prefix to represent each utility, P for PG&E, D for SDG&E, S for SCE, and G for SoCalGas. The site numbers are identifiers from each utilities tracking database. For PG&E the field is project_code, for SCE the field is coupon_num, and for SDG&E and SoCalGas the field is site_nbr. Sites with an X postfix denote sites that were collapsed either because they had multiple buildings at a location or multiple locations within a single campus. Site P52886X is composed of site P52886 and P74687. Site 19029X is composed of site S19029 and S18132.

All Sites

Site ID	Ex-Ante Savings			Ex-Post Gross Savings			Ex-Post Net Savings			Site Net to Gross Ratio		
	kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms	kWh	kW	Therms
D61295	831,145	427	3,454	412,561	166.9	6,069	178,512	71.2	6,273	43.3%	42.6%	103.4%
D61588	1,047,190	926	-866	1,445,662	243.9	177	287,308	45.1	205	19.9%	18.5%	116.0%
D61590	244,457	37	-	255,662	38.9	-	132,092	20.1	-	51.7%	51.7%	-
D61703	245,403	160	628	127,417	23.4	4	79,498	6.6	5	62.4%	28.3%	111.1%
D62109X	282,125	45	505	165,901	69.7	-146	95,639	10	-26	57.6%	14.3%	-
D62147	221,265	24	-482	124,859	15.1	20	108,592	12.1	20	87.0%	80.0%	97.0%
D62232	20,909	7	-60	5,198	1.3	-	1,502	0.7	-	28.9%	51.0%	-
D62388X	235,664	35	-	179,668	27.3	-	62,884	9.6	-	35.0%	35.0%	-
D62401	351,002	73	-13,261	237,941	42.8	0	158,474	26.8	0	66.6%	62.8%	11.9%
D62544	13,840	8	-	18,858	13.7	-	11,936	8.7	-	63.3%	63.3%	-
D62549	34,231	16	-	28,078	5.8	-	23,268	4.6	-	82.9%	79.4%	-
D62567	514,262	282	-41	390,826	80.6	139	-249,404	-49.9	139	-63.8%	-61.9%	100.0%
D62594	511,475	58	-	597,905	85.4	-	448,429	64.1	-	75.0%	75.0%	-
D62627	211,150	33	1,084	205,623	38	3,824	141,114	23.4	3,568	68.6%	61.5%	93.3%
D62669	52,991	45	1,064	58,102	22.9	-23	52,227	20.4	-22	89.9%	89.1%	-
D62692	596,739	125	52,159	-188,228	-29.6	1,384	-50,857	-15.2	695	-	-	50.2%
D62736	386,529	174	1,512	303,780	117	1,631	274,498	107.6	1,923	90.4%	92.0%	117.9%
D62744	21,408	5	-139	13,394	3.1	-12	7,193	1.7	-8	53.7%	53.1%	-
D62760	578,116	144	-	570,977	142.6	-	553,847	137.8	-	97.0%	96.7%	-
D62762	676,295	210	-535	241,028	64.7	-25	164,179	38.1	-20	68.1%	58.9%	-
D62774	63,341	21	30	48,879	18.8	-3	10,864	3	0	22.2%	16.0%	-
D62797	762,569	147	58,319	801,091	101	13,171	779,887	96.4	16,558	97.4%	95.4%	125.7%
D62807	391,524	61	1	8,776	-1.6	-	549	-0.1	-	6.3%	-	-
D62826	1,032,510	118	-	778,702	114.5	-	441,264	64.9	-	56.7%	56.7%	-
D62878	114,468	37	-113	58,842	16.6	-10	33,774	9.5	-7	57.4%	57.3%	-
D62879	39,361	13	-45	24,013	7.1	-11	13,652	4	-6	56.9%	56.5%	-
D62885	120,033	14	-	57,873	6.6	-	50,156	5.7	-	86.7%	86.7%	-
D62938	16,010	12	-	16,641	7.7	-1	9,255	4.3	-1	55.6%	55.1%	-
D62956	390,132	59	51,180	123,219	14.1	3,826	-	-	-	0.0%	0.0%	0.0%
D62974	277,687	33	-1,455	328,005	67.1	-	268,453	54.4	-	81.8%	81.2%	-
D62979	941,329	108	-	1,189,459	136.1	-	515,432	59	-	43.3%	43.3%	-
D62980	284,264	37	-7,269	196,023	23	150	179,320	18.8	154	91.5%	81.8%	102.9%
D62989	539,872	74	-	742,368	105	-	173,219	24.5	-	23.3%	23.3%	-
D62993	312,571	33	24,654	170,496	21.5	20,592	169,893	21.3	20,609	99.6%	99.1%	100.1%
D62995	60,443	18	-178	51,316	14.4	-2	30,163	8.5	-1	58.8%	59.3%	-
D63017	133,060	14	667	177,672	24.9	13,547	154,092	21.7	13,547	86.7%	87.0%	100.0%
D63025	252,519	42	-	242,040	51	-	145,224	30.6	-	60.0%	60.0%	-
D63028	136,404	-5	-34	122,836	1.6	-12	106,220	0.5	-12	86.5%	32.5%	-
D63031	44,479	20	21	33,389	0.1	1,038	25,622	0.1	1,040	76.7%	100.8%	100.2%
D63035	60,942	7	-	47,059	5.4	-	35,295	4	-	75.0%	75.0%	-
D63038	67,684	27	-263	13,083	2.2	-	12,892	2.1	-	98.5%	95.4%	-
D63043	201,477	231	138	362,847	153.6	-160	361,317	95.6	9,126	99.6%	62.2%	-
D63073	10,563	4	-	10,255	3.3	0	6,297	1.3	0	61.4%	38.1%	-
D63075	338,031	39	-	129,885	38.6	-	56,283	16.7	-	43.3%	43.3%	-
D63187	58,155	18	224	60,601	14.9	-72	49,653	13.1	42	81.9%	88.1%	-
D63199	416,605	70	-	415,602	47.4	-	360,189	41.1	-	86.7%	86.7%	-
D63233	45,467	19	-	53,498	2.4	-	51,042	1.6	-	95.4%	68.1%	-
D63257	505,112	50	40,326	482,197	84	25,374	482,197	84	25,374	100.0%	100.0%	100.0%
G120001	-	-	95,337	-	-	48,516	-	-	31,535	-	-	65.0%
G120006	-	-	41,685	-	-	15,480	-	-	6,708	-	-	43.3%

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G120008	-	-	178,130	-	-	389	-	0	-443	-	-	-113.9%
G120012	-	-	17,181	-	-	19,375	-	-	17,437	-	-	90.0%
G120013	-	-	240,007	-	-	216,301	-	-	194,671	-	-	90.0%
G120015X	-	-	3,233,460	-	-	3,310,781	-	-	2,335,139	-	-	70.5%
G20217	-	-	8,521	-	-	5	-	-	5	-	-	100.0%
G20464	-	-	1,467	-	0	59	-	0	59	-	100.0%	100.0%
G20471	-	-	1,008	-	-	249	-	-	249	-	-	100.0%
G20488	-	-	109,590	-	-	17,073	-	-	9,954	-	-	58.3%
G20515	-	-	21,329	-	-	4,252	-	-	-	-	-	0.0%
G20516	-	-	91,841	-	-	107,992	-	-	61,195	-	-	56.7%
G20526	-	-	613,300	-	-	291,942	-	-	170,299	-	-	58.3%
G20548	-	-	198,334	-	-	-	-	-	-	-	-	-
G70010	-	-	6,312	-	-	7,875	-	-	5,250	-	-	66.7%
G70011	-	-	1,209	-	-	-	-	-	-	-	-	-
P29205	45,826	-	-	-	-	-	-	-	-	-	-	-
P30386	28,186	17	-25	22,563	21.4	0	21,159	18.9	0	93.8%	88.3%	-16.3%
P30462	85,204	46	-22	62,783	37.3	0	57,623	34.3	0	91.8%	91.9%	150.3%
P34352	310,724	166	9,763	241,121	108.2	5,733	150,604	69.3	5,925	62.5%	64.0%	103.3%
P34570	280,639	216	1,673	272,158	93.2	2,022	244,550	69.3	10,235	89.9%	74.3%	506.1%
P36334	401,190	85	-	339,575	42.3	-	312,409	38.9	-	92.0%	92.0%	-
P40920	682,375	80	-13	607,159	72.3	-13	405,252	48.4	-12	66.7%	66.9%	-
P41214	236,976	150	-	191,255	77.7	0	94,518	43	0	49.4%	55.3%	73.6%
P41498X	620,285	-	-	606,939	29	-	213,584	10.3	-	35.2%	35.6%	-
P41556	-	-	23,496	-394,156	-75.2	24,177	-249,632	-47.6	15,312	-	-	63.3%
P42456	79,638	-	12,348	60,733	7.9	8,961	45,550	5.9	4,481	75.0%	75.0%	50.0%
P42874	62,373	14	28,366	19,016	2.7	2,429	11,271	0.3	36	59.3%	10.4%	1.5%
P43314	81,679	27	2,659	73,834	36.5	2,753	-	-	-	0.0%	0.0%	0.0%
P43520	872,243	1,227.00	8,863	491,623	219.9	34,089	449,228	199.6	34,149	91.4%	90.8%	100.2%
P47557	367,067	228	-	255,214	67.2	1,081	199,099	36	1,081	78.0%	53.6%	100.0%
P47814	625,471	85	-	566,945	11.3	-69	526,681	10.5	-63	92.9%	92.9%	-
P48014	83,691	25	-	39,593	13.3	-5	39,593	13.3	-5	100.0%	100.0%	-
P48118	23,893	8	698	24,654	6.8	-311	11,325	3.1	-131	45.9%	45.2%	-
P48215	212,355	127	-334	197,650	79.8	0	123,770	59.7	0	62.6%	74.8%	-
P48486	38,056	4	-	39,540	5.3	-	11,862	1.6	-	30.0%	30.0%	-
P48571	14,150	10	433	3,884	1.5	370	1,451	0.7	380	37.4%	43.1%	102.5%
P49006	293,918	41	-	242,832	32.8	-	192,060	24.9	-	79.1%	75.9%	-
P50027	3,719,449	450	-	3,289,163	369.3	-	812,247	91.4	-	24.7%	24.7%	-
P50606	1,359,199	154	-	1,331,200	140	-	1,114,253	110.2	-	83.7%	78.7%	-
P50646	5,261	4	-	4,424	2.9	0	497	0.3	0	11.2%	11.5%	100.0%
P50706	698,708	58	-	224,975	71.7	-4	202,718	64.6	-4	90.1%	90.1%	-
P50966	93,776	8	-	132,145	14.5	-	70,037	7.7	-	53.0%	53.0%	-
P52066	131,955	182	-1,961	77,648	27.9	270	147,747	23.8	2,599	190.3%	85.3%	961.9%
P52291	555,477	127	-4,082	713,793	75.7	112	497,012	25.7	3	69.6%	34.0%	2.4%
P52886X	141,371	124	1,355	133,147	54	73	133,147	54	73	100.0%	100.0%	100.0%
P53586	3,108,518	376	-	2,246,248	412.1	-	2,138,350	392.3	-	95.2%	95.2%	-
P54486	49,961	45	6,680	30,332	2.1	1,432	550	-8.4	1,643	1.8%	-401.2%	114.8%
P55808	209,766	634	6,219	255,583	98.6	6,439	213,508	81.6	6,474	83.5%	82.7%	100.5%
P57266	463,004	71	-12,410	548,117	68.7	-	513,225	66.7	-	93.6%	97.1%	-
P57286	465,922	75	-13,648	503,432	66	0	476,283	64.9	0	94.6%	98.4%	-
P57373	415,348	172	-	308,758	64.9	-	63,494	13.3	-	20.6%	20.5%	-
P57451	762,115	178	-7,707	850,581	172	217	-104,216	-67.2	216	-12.3%	-39.1%	99.7%
P57906	543,656	152	-2,136	540,876	144.6	0	43,881	28.7	0	8.1%	19.9%	100.0%
P58326	118,124	22	-659	215,376	55.7	-1,208	89,613	22.5	-456	41.6%	40.3%	-

P59926	1,690,617	122	-	1,422,139	82.8	-	1,183,957	67.5	-	83.3%	81.5%	-
P60806	1,052,365	-	-	23,022	2.6	1,738	-	-	-	0.0%	0.0%	0.0%
P61766	22,115	19	27	10,864	7.8	1,520	8,828	6.4	1,558	81.3%	81.7%	102.5%
P61867	552,660	-	101,796	433,816	49.5	145,072	-	-	-	0.0%	0.0%	0.0%
P62326	176,830	66	1,966	116,836	53.7	2,813	50,611	37.3	2,865	43.3%	69.4%	101.9%
P62766	821,004	221	-8,337	707,729	232.5	38	90,096	42.8	47	12.7%	18.4%	122.8%
P63626	15,757	-	-	63,139	4	-	33,464	2.1	-	53.0%	53.0%	-
P64746	405,697	188	626	322,349	69	-781	292,461	60	-818	90.7%	87.0%	-
P65106	89,601	15	-	64,452	9.7	-	45,116	6.8	-	70.0%	70.0%	-
P65966	919,908	769	14,424	298,996	269.2	2,219	-50,871	172.8	700	-17.0%	64.2%	31.6%
P69506	1,639,902	297	-73	1,428,181	287.4	-1,664	1,187,008	187.7	-1,963	83.1%	65.3%	-
P69566	348,189	74	-6,533	316,973	58.1	-15	315,866	55.4	-17	99.7%	95.3%	-
P70226	726,074	198	1,529	807,534	216.9	2,136	226,991	55.9	2,143	28.1%	25.8%	100.3%
P70686	1,232,601	447	-7,608	987,011	244.3	-17	986,896	244.1	-17	100.0%	99.9%	-
P71966	158,183	14	-	92,869	28.2	-	75,843	23.1	-	81.7%	81.7%	-
P72707	728,362	224	1,547	1,080,753	326.2	2,265	121,984	57.6	2,273	11.3%	17.7%	100.4%
P75627	396,685	123	-	366,898	89.3	-	220,708	53.8	-	60.2%	60.3%	-
P81166	47,554	25	-	70,011	8.8	-27	44,056	2.4	-13	62.9%	27.1%	-
S18005	168,504	20	-14	148,121	29.3	2	127,599	25.2	3	86.1%	86.0%	203.6%
S18009	601,401	190	-72	504,150	136.5	-76	441,066	110.6	-76	87.5%	81.0%	-
S18010	637,709	205	-	668,166	105.4	135	536,196	66.1	135	80.2%	62.7%	100.1%
S18011	34,552	9	-	32,362	9.1	-475	27,997	7.9	-419	86.5%	86.5%	-
S18012	745,741	264	-1,059	566,215	140.4	16	465,120	102.8	16	82.1%	73.2%	100.0%
S18014	981,214	75	37,926	1,044,398	428.9	40,364	653,167	270.1	25,564	62.5%	63.0%	63.3%
S18016	676,296	210	-535	983,378	289.2	0	928,954	270.2	0	94.5%	93.4%	-
S18018	562,273	56	-	1,280,663	280.9	133	928,361	204.4	0	72.5%	72.7%	0.0%
S18021	17,831	5	-	32,582	6.3	-9	5,788	1.2	-7	17.8%	19.5%	-
S18022	355,557	58	-	253,343	57.5	-	238,675	54.3	-	94.2%	94.5%	-
S18044	18,158	5	-	14,792	4.8	0	1,671	0.5	0	11.3%	11.3%	-
S18077	405,062	46	-	404,694	46.2	-	-	-	-	0.0%	0.0%	-
S18079	387,017	44	-	326,676	37.3	-	-	-	-	0.0%	0.0%	-
S18080	346,370	40	-	759,276	86.7	-	-	-	-	0.0%	0.0%	-
S18081	399,806	46	-	361,684	41.3	-	-	-	-	0.0%	0.0%	-
S18082	400,332	46	-	635,697	72.6	-	-	-	-	0.0%	0.0%	-
S18084	380,885	44	-	597,238	68.2	-	-	-	-	0.0%	0.0%	-
S18086	401,734	46	-	682,958	78	-	-	-	-	0.0%	0.0%	-
S18088	388,506	44	-	486,963	55.6	-	-	-	-	0.0%	0.0%	-
S18089	390,871	45	-	808,587	92.3	-	-	-	-	0.0%	0.0%	-
S18093	381,936	44	-	896,958	102.4	-	-	-	-	0.0%	0.0%	-
S18101	315,185	36	-	186,393	21.3	-	-	-	-	0.0%	0.0%	-
S18103	405,062	46	-	590,737	67.4	-	-	-	-	0.0%	0.0%	-
S18109	312,995	36	-	352,132	40.2	-	-	-	-	0.0%	0.0%	-
S18112	1,978,538	-	-	1,815,577	203.5	-	1,724,798	193.3	-	95.0%	95.0%	-
S18114	293,269	89	204	368,470	82.5	-32	223,047	45.2	-32	60.5%	54.9%	-
S18117	1,207	1	-	574	0.1	-	-555	-0.2	-	-96.6%	-155.6%	-
S18118	10,938	6	-	13,838	5.7	-1	8,257	3.4	-1	59.7%	59.4%	-
S18119	599,762	129	-	400,678	131.8	-	348,782	117.1	-	87.0%	88.8%	-
S18120	789,995	187	-	546,400	96.3	-	522,302	92.8	-	95.6%	96.3%	-
S18125	567,434	127	-	406,963	152.4	-	42,467	13.8	-	10.4%	9.0%	-
S18129	37,727	12	-163	-25,212	-2.9	2	-26,906	-3.7	2	-	-	100.0%
S18152	4,833	4	-	3,580	1.6	0	3,036	1.4	0	84.8%	85.6%	-
S18162	610,961	131	-2,477	700,601	126.7	49	547,634	80	49	78.2%	63.2%	100.0%
S19003	347,959	167	1,302	251,583	87.9	820	269,243	89.4	186	107.0%	101.7%	22.6%
S19010	31,863	10	-123	10,527	5.8	-19	5,209	4.7	38	49.5%	81.1%	-
S19015	290,296	53	-129	303,964	63.9	-33	79,239	24.6	-33	26.1%	38.5%	-
S19018	571,926	160	-	1,467,459	308	239	597,295	123.8	173	40.7%	40.2%	72.1%

S19019	37,130	7	2,634	66,463	11.6	-	58,309	10.2	-	87.7%	87.7%	-
S19021	1,887,914	337	-	1,875,382	368.4	-	1,226,667	239.5	-	65.4%	65.0%	-
S19023	401,744	91	7,914	448,998	96	1,317	241,039	80.2	1,454	53.7%	83.6%	110.4%
S19029X	411,422	37	-	122,942	10.6	53	103,138	8.2	53	83.9%	77.3%	100.0%
S19045	450,661	79	-6,435	529,056	57.7	-3	492,121	53.4	-3	93.0%	92.5%	-
S19065	26,529	12	-	978	4.2	-46	-5,061	1.2	-29	-517.7%	29.4%	-
S19066	3,713	3	-	-7,815	-2	-1	-12,435	-3.8	-1	-	-	-
S19083	300,590	64	-	173,136	45.6	-	17,729	3.7	-	10.2%	8.0%	-
S19088	523,507	136	-	580,553	28.8	-5	115,400	-46.6	-2	19.9%	-161.5%	-
S19094	1,774,739	229	-	1,759,916	228.1	-	1,009,186	123.3	-	57.3%	54.1%	-
S19097	799,472	95	-	846,924	131.1	-	624,070	96.2	-	73.7%	73.4%	-
S19098	1,566,373	287	282	1,654,301	353.3	282	1,284,910	266	161	77.7%	75.3%	57.3%
S19104	4,351,133	1	-	-	-	-	-	-	-	-	-	-
S19105	26,260	9	-	16,337	9.2	-	3,446	1.2	-	21.1%	12.9%	-
S19108	3,586,696	11	-	2,247,168	399.6	-	1,161,037	206.4	-	51.7%	51.7%	-
S19109	227,698	55	-	204,441	73.8	-	204,214	73.8	-	99.9%	100.0%	-
S19111	1,006,965	175	-	1,356,009	273.8	-	1,144,496	244.4	-	84.4%	89.2%	-
S19112	291,110	32	-7,107	157,800	17	0	-5,747	-7.3	0	-3.6%	-43.1%	-
S19114	745,471	264	-	480,537	110.1	902	450,855	97.9	901	93.8%	88.9%	99.9%
S19121	686,835	223	-2,969	625,004	130.7	92	558,502	113	92	89.4%	86.5%	100.0%
S19125	321,721	216	-	358,697	215.5	0	265,814	160.8	0	74.1%	74.6%	-
S19134	199,256	33	-3,957	466,647	54.5	2,135	426,043	46.7	2,135	91.3%	85.7%	100.0%
S19151	481,001	130	-	317,827	2.7	-	121,601	0.6	-	38.3%	20.7%	-
S19152	780,261	202	-7,899	851,847	218.2	-18	227,831	37.5	-19	26.7%	17.2%	-
S19176	172,936	27	108	124,127	17.3	-	129,982	17.8	-	104.7%	102.9%	-
S19186	2,784,748	383	-	4,114,741	673.3	-	1,963,989	316	-	47.7%	46.9%	-
S19187	499,068	198	-	475,453	163.7	-	311,811	113.9	-	65.6%	69.6%	-
S19189	683,476	87	-	612,695	112.2	-	612,695	112.2	-	100.0%	100.0%	-
S19192	47,605	26	-	17,637	9.4	-	-1,380	-0.5	-	-7.8%	-5.3%	-
S20021	172,457	27	-713	224,469	28.4	0	214,306	27.5	0	95.5%	96.7%	104.4%
S20046	158,580	24	65	253,602	27.5	-27	246,588	26.5	-27	97.2%	96.5%	-
S20066	25,131	8	-	-	-	-	-	-	-	-	-	-



Appendix M. Commercial Whole Building Site Characteristics

The following document is a complete list of the parametric results generated by the Survey-IT software used for building analysis. The results show the existing parameters and Title 24 baseline, ex-post gross and net savings, and the net-to-gross (NTG) realization rates for each of the 120 commercial sites. Also included are field notes taken at site visits. Each site is given an ID by IOU; sites IDs that begin with D belong to SDG&E, G is SCG, P is PG&E, and S is SCE.

D61295.....	cv
D61703.....	cvii
D62109X.....	cix
D62147.....	cxi
D62232.....	cxiii
D62401.....	cxv
D62544.....	cxvii
D62549.....	cxix
D62567.....	cxxi
D62627.....	cxxiii
D62669.....	cxxv
D62692.....	cxxv
D62692.....	cxxvi
D62736.....	cxxviii
D62744.....	cxxix
D62762.....	cxxxi
D62774.....	cxxxiii
D62797.....	cxxxv
D62878.....	cxxxvii
D62879.....	cxxxviii
D62938.....	cxxxix
D62974.....	cxli
D62980.....	cxliii
D62993.....	cxlv
D62995.....	cxlvii
D63017.....	cxlviii
D63028.....	cl
D63031.....	cli
D63038.....	cliii
D63043.....	clv
D63073.....	clvi
D63187.....	clviii
D63233.....	clx
D63257.....	clxi
G02471.....	clxiii
G12008.....	clxvi
G20217.....	clxviii
G20464.....	clxx

G20471	clxxii
G120008	clxxiv
P30386	clxxvi
P30462	clxxviii
P34352	clxxx
P34570	clxxxii
P41214	clxxxiii
P42874	clxxxiv
P43314	clxxxvi
P43520	clxxxviii
P47557	cxc
P47814	cxcii
P48014	cxciv
P48118	cxcvi
P48215	cxcviii
P48571	cxcix
P50646	cci
P50706	cciii
P52066	ccv
P52291	ccvii
P52886X	ccviii
P53586	ccix
P54486	ccx
P55808	ccxii
P57266	ccxiv
P57286	ccxv
P57451	ccxvi
P57906	ccxvii
P57986	ccxix
P58326	ccxxi
P61766	ccxxii
P62326	ccxxiii
P64746	ccxxiv
P65966	ccxxvi
P69566	ccxxvii
P70226	ccxxviii
P70686	ccxxix
P72707	ccxxx

P81166.....	ccxxxii
S18005.....	ccxxxiv
S18010.....	ccxxxvi
S18011.....	ccxxxviii
S18012.....	ccxxxix
S18016.....	ccxli
S18018.....	ccxlii
S18021.....	ccxliv
S18044.....	ccxlvi
S18114.....	ccxlviii
S18117.....	ccl
S18118.....	cclii
S18119.....	ccliv
S18120.....	cclvi
S18125.....	cclviii
S18129.....	cclx
S18152.....	cclxii
S18162.....	cclxiv
S19003.....	cclxvi
S19010.....	cclxviii
S19015.....	cclxx
S19018.....	cclxxi
S19019.....	cclxxii
S19023.....	cclxxiii
S19029X.....	cclxxvi
S19045.....	cclxxviii
S19065.....	cclxxx
S19066.....	cclxxxii
S19083.....	cclxxxiv
S19088.....	cclxxxvi
S19105.....	cclxxxviii
S19109.....	cclxxxix
S19111.....	ccxci
S19112.....	ccxciii
S19114.....	ccxcv
S19121.....	ccxcvii
S19125.....	ccxcviii
S19134.....	ccc

S19152.....	cccii
S19176.....	ccciv
S19186.....	cccvi
S19187.....	cccviii
S19189.....	cccix
S19192.....	cccxi
S20021.....	cccxi
S20046.....	cccxiv

D61295
Climate Zone: 7
Title 24 Bldg School

Climate Site: San Diego AP
Conditioned Area: 248,889
Sizing Ratio: 0.903

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.98	2.07	278
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.5	MIXED	0.000	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.349	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	61.0	0.0
0.0	61.0	0.0	

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.35	2.07	278
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	MIXED	0.000	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.651	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 1 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex Post Net/Ex-Post Gross)
Peak kW	427.00	166.91	71.07	42.58%
kWh	831,145.00	412,560.88	178,600.50	43.29%
Therms	3,454.00	6,068.70	6,249.84	102.98%

Building Overview Notes

Data Entry Notes

-Occupied/conditioned Aug07/Aug07

-Building 300 has a measured square footage from plans that is 13% more than what ws used by utilities. I believe the

value they

used is incorrect based on similar buildings at the facility. I am using the values measured on the architectural plans.

-No cool roof found on any of the buildings despite claims

-Unsure of economizer type on packaged units, but using utilities assumptions. EER found on spec sheets & mechanical schedule don't match manufacturer's specs (very off), using values found on manufacturer's specs. All else matches for packaged systems

-There is a multiplier for zones in building 400 by 3x, but there is an issue with the orientation of the windows. The buildings are

identical but they are built like mirror reflections along the x-axis I am splitting up the north face windows in a 1:2 ratio to reflect the

actual distribution of windows when the program multiplies out the zones. Same thing with the south facing windows since these

are the only ones affected.

-Overall, our model for the shell is more reliable than the utilities. Noticed the orientation of the glazings were done incorrectly and

incorrect values for glazing (at least for the gym) in their calc sheets.

-Exterior lights not entered but are in plans.

D61703
Climate Zone: 7
Title 24 Bldg School

Climate Site: San Diego AP
Conditioned Area: 67,573
Sizing Ratio: 0.876

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.88	1.27	233
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.2	PSZ	0.070	0.034
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.304	0.316	9.5	2.096
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.870	0.9	70.9	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.17	1.27	233
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.9	PSZ	0.110	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.671	9.5	2.232
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.9	0.0	0.0

Table 2 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex Post Net/Ex-Post Gross)
Peak kW	160.00	23.36	6.62	28.34%
kWh	245,403.00	127,416.50	79,497.75	62.39%
Therms	628.00	4.25	4.72	111.08%

Building Overview Notes

Data Entry Notes:

- Building occupied beginning Sept07 at 80%, 100% at Sept08 onwards, conditioned since Aug07 100%
- Used spec sheet from manufacturer for HVAC systems, assuming a 15% OSA per unit

D62109X
Climate Zone: 7
Title 24 Bldg School

Climate Site: San Diego AP
Conditioned Area: 77,427
Sizing Ratio: 1.007

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.19	0.98	224
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.1		0.144	0.030
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.352	0.412	18.9	0.711
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.695	0.3	62.8	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.09	0.98	224
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.1		0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.691	18.9	1.958
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.344	0.3	0.0	0.0

Table 3 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	45.00	17.36	9.51	54.79%
kWh	282,125.00	146,536.70	95,639.47	65.27%
Therms	505.00	146,536.70	(26.21)	-0.02%

Building Overview Notes

Data Entry Notes:

- Building occupied/conditioned in August '06 (not '05 as entered)
- Onsite host claims that building operates on same schedule, but since this is mixed-use building, schedule will vary.
- Fan coils and condenser units claimed in the project file were not found onsite, although mechanical plans show it.
- The building's cooling needs are supplied by the central plant which serves entire campus
- Incented HHW pump efficiency (91%) does not match found on site (87.5%)
- Assumed SHGC=0.4, U=.6 for skylights (not incented)
- Exhaust fan CFM had to be reduced to match OA% from mechanical plans
- **Confident in LPD as entered, triple checked areas and interior lightings

*Due to the data being a combined site (parking garage plus SOLES building), I separated the savings by project to get a clear

picture of where the discrepancies are.

The utilities treated the entire building as one area whereas we divided ours based on occupancy type. They also used lighting

fixture wattages that do not reflect the ones found on the lighting plans. Ours is a much better reflection of what was actually

installed. The savings for the HVAC equipment are within QC parameters, but those for lighting due to the reasons above came out

as negative. Also, utilities inspector failed to do a complete count of all lights in garage giving us these results.

D62147
Climate Zone: 7
Title 24 Bldg School

Climate Site: Chula Vista
Conditioned Area: 68,491
Sizing Ratio: 0.882

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.85	0.63	284
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.146	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.927	0.547	9.0	2.228
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	0.1	89.9	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.19	0.63	282
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.7	PSZ	0.430	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.682	9.0	1.971
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.1	0.0	0.0

Table 4 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	24.00	15.09	12.07	80.01%
kWh	221,265.00	124,858.56	108,591.56	86.97%
Therms	(482.00)	124,858.56	19.58	0.02%

Building Overview Notes

Data Entry Notes:

- Building occupied Sept07, conditioned Jun07
- Overall LPD in line with utility estimates (0.85 versus 0.83)

D62232
Climate Zone: 7
Title 24 Bldg School

Climate Site: Carlsbad
Conditioned Area: 24,220
Sizing Ratio: 1.036

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.88	2.22	269
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.140	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.832	19.7	1.473
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.260	0.3	90.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.14	2.22	267
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.224	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.662	19.7	1.964
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.3	0.0	0.0

Table 5 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	7.00	1.35	0.69	51.04%
kWh	20,909.00	5,197.64	1,501.73	28.89%
Therms	(60.00)	5,197.64	-	0.00%

Building Overview Notes

Lighting measures only.

Utility claimed savings of 20,909 kWh based on 52-week year. Measure-only realization on 52-week calendar is 70%, but on actual academic calendar is only 53% (9,439 kWh).

D62401

Climate Zone: 7

Title 24 Bldg Grocery Store

Climate Site: Chula Vista

Conditioned Area: 54,613

Sizing Ratio: 0.917

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.95	9.72	888
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.0	PSZ	0.439	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.091	0.940	0.7	1.339
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.373	3.3	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.47	9.72	886
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.8	PSZ	0.430	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.883	0.700	0.7	1.510
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.655	3.3	0.0	0.0

Table 6 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	73.00	42.84	26.87	62.73%
kWh	351,002.00	237,081.00	157,862.50	66.59%
Therms	(13,261.00)	237,081.00	0.01	0.00%

Building Overview Notes

All RTU's EER 12.0

D62544
Climate Zone: 8
Title 24 Bldg Office

Climate Site: Mission Viejo
Conditioned Area: 38,692
Sizing Ratio: 1.094

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.81	5.51	260
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.0	PSZ	0.104	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.370	0.290	33.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	80.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.22	5.51	256
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
8.8	PSZ	0.189	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.883	0.476	33.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 7 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	8.00	13.71	9.54	69.56%
kWh	13,840.00	18,857.81	12,043.88	63.87%
Therms	-	18,857.81	-	0.00%

Building Overview Notes

HVAC measures only. Model 2TWR4048A1 (6 units) and model 2TWR4060A1 (3 units) not eligible.

Building has been at 67% occupancy since opening.

This building is certified LEED Gold.

D62549
Climate Zone: 7
Title 24 Bldg School

Climate Site: San Diego AP
Conditioned Area: 14,527
Sizing Ratio: 0.972

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.68	3.93	309
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.4	PSZ	0.159	0.048
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.361	0.230	13.0	0.424
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.230	0.6	32.7	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.14	3.93	305
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.6	PSZ	0.110	0.068
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	13.0	1.758
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.910	0.6	0.0	0.0

Table 8 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	16.00	5.76	4.58	79.43%
kWh	34,231.00	28,077.81	23,267.77	82.87%
Therms	-	28,077.81	-	0.00%

Building Overview Notes

Both the savings for the cooling and the lighting was lower than expected. Also the heating is worse than baseline. I assume this is because they are using heatpumps and the setpoint is all the way up to 72F.

D62567
Climate Zone: 8
Title 24 Bldg

Climate Site: Mission Viejo
Conditioned Area: 137,016
Retail and Wholesale Store **Sizing Ratio: 0.995**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.82	0.99	488
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.6	PSZ	0.119	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.125	0.490	2.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.65	0.99	493
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.8	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	2.7	1.867
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	1.5	0.0	0.0

Table 9 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	282.00	80.64	(49.92)	-61.90%
kWh	514,262.00	390,826.25	(249,404.25)	-63.81%
Therms	(41.00)	390,826.25	138.57	0.04%

Building Overview Notes

- Actual Building Start-up in 2007 not 2005 as entered
- For envelope, using U-values based on T-24 documents unless noted below.
- Roof area for all dropped ceiling areas included in main sales floor roof area

Results:

values are in part due to a large amount of display lighting not accounted for in the initial estimates but were observed on site. The HVAC comprises a much smaller part of the kW savings in our model, but is accurate as entered. I suspect the baselines differ because we used an area definition of the spaces whereas the original estimates considers the entire store as one space type.

D62627
Climate Zone: 7
Title 24 Bldg School

Climate Site: San Diego AP
Conditioned Area: 70,749
Sizing Ratio: 0.996

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.62	1.57	233
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.049	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.533	4.4	1.435
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.093	0.4	69.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.14	1.57	230
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.2	PSZ	0.110	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.687	4.4	1.933
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.275	0.6	0.0	0.0

Table 10 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	33.00	38.00	23.38	61.54%
kWh	211,150.00	205,622.94	141,113.88	68.63%
Therms	1,084.00	205,622.94	3,567.99	1.74%

Building Overview Notes

- Model # for HVAC system onsite do not match those given in file. Refer to pictures.
- Dimensions for windows in all buildings are taken from plans Limited ability to take plug loads. Personnel did not have access to all areas. Estimates are based on a few rooms that were accessible, and from values based on similar buildings.

Actual packaged systems found onsite differ slightly in their cooling efficiencies. In addition, the actual number of units and configurations on each building differ vastly from what was proposed. There is a substantial increase in the tonnage of cooling supplied to each building. Furthermore, the overall cooling efficiency found on site is a marginal improvement (11.3EER versus 11.2EER) to T24.

D62669
Climate Zone: 10
Title 24 Bldg School

Climate Site: Escondido
Conditioned Area: 18,571
Sizing Ratio: 0.905

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.58	1.99	264
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.9	MIXED	0.070	0.035
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.361	0.520	13.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	54.7	5.4

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.18	1.99	261
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.2	MIXED	0.102	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.410	13.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 11 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	45.00	22.87	20.38	89.12%
kWh	52,991.00	58,101.52	52,226.89	89.89%
Therms	1,064.00	58,101.52	(22.49)	-0.04%

D62692

Climate Site: San Diego AP

Climate Zone: 7

Conditioned Area: 69,225

Title 24 Bldg Medical/Clinical

Sizing Ratio: 1.108

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.84	9.16	269
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.3		0.124	0.037
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.466	0.321	37.1	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	31.7	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	141	1.13	9.16
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
17.3		0.430	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.487	37.1	1.885
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	1.3	0.0	0.0

Table 12 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	125.00	(35.12)	(15.21)	43.31%
kWh	596,739.00	(98,733.00)	(50,857.25)	51.51%
Therms	52,159.00	(98,733.00)	694.82	-0.70%

Building Overview Notes

- Completely surveyed first floor and used plug in and lighting loads for second floor. Per facilities manager, composition of first and second floor are the same.
- R-value assumed from T-24 documents (walls=15.5, roof=24), window u-factor based on # of panes and presence of lowE coating, SHGC=.29, otherwise from T-24 documents.

D62736
Climate Zone: 7
Title 24 Bldg

General C&I Work

Climate Site: San Diego AP
Conditioned Area: 128,611
Sizing Ratio: 1.103

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.78	5.11	222
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
21.1		0.101	0.038
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
1.227	0.340	19.7	2.462
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.570	2.1	31.6	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.34	5.11	228
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
17.3		0.689	0.077
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.883	0.450	19.7	1.578
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.710	2.1	0.0	0.0

Table 13 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	174.00	117.00	107.13	91.57%
kWh	386,529.00	303,779.50	271,761.00	89.46%
Therms	1,512.00	303,779.50	1,845.32	0.61%

D62744

Climate Site: Escondido

Climate Zone: 10

Conditioned Area: 11,659

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.967

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.83	2.12	284
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.094	0.064
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.370	0.841	21.3	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	21.9	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.13	2.12	282
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.102	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.392	21.3	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 14 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	5.00	3.14	1.67	53.12%
kWh	21,408.00	13,393.89	7,193.30	53.71%
Therms	(139.00)	13,393.89	(8.32)	-0.06%

Building Overview Notes

Savings is very low due to several factors. The biggest is the fact that over a quarter of the retail space is currently vacant and not contributing to the savings. Also, several tenants have added lighting since initial construction thus increasing the LPD for those areas.

D62762

Climate Site: Escondido

Climate Zone: 10

Conditioned Area: 136,123

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 1.007

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.32	0.57	385
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.072	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.800	2.5	1.547
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.860	3.4	2.5	34.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.69	0.57	384
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.647	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.540	2.5	1.588
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.4	0.0	0.0

Table 15 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	210.00	64.65	38.11	58.94%
kWh	676,295.00	241,027.75	164,178.88	68.12%
Therms	(535.00)	241,027.75	(20.27)	-0.01%

Building Overview Notes

Calibrated

RMSE=26.17, MBE=0.02 CV=.25

- Store occupied and conditioned in December 2006 (no place on form to show this, so it is placed in 2005)
- There is an additional 0.21 W/sq ft of display lighting added to main sales area as part of space LPD
- Skylight SHGC is 1.15X0.65 (1.15 X shading coefficient) per file. R-values for walls/roof from file. U-factor/SHGC from onsite.
- Assumed 40% of lights in retail sales area and receiving are daylight controlled per conversation with manager
- EER taken from manufacture spec sheets

D62774
Climate Zone: 7
Title 24 Bldg Office

Climate Site: San Diego AP
Conditioned Area: 38,385
Sizing Ratio:

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.84	2.40	
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
0.0	HP	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.406	34.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	38.2	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.07	2.40	
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
0.0	HP	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.571	34.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 16 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	21.00	18.84	3.02	16.03%
kWh	63,341.00	48,878.78	10,863.78	22.23%
Therms	30.00	48,878.78	(0.44)	0.00%

Building Overview Notes

Data Entry Notes:

- Occupancy/air conditioning began June 06
- Specifications for heat pumps are from manufacturer. Note that EER, COP, tonnage used by utilities differ substantially.
- Cooling tower fan incented for a 93% efficiency motor but found only a 91% efficiency motor.
- Model entered as surveyed.

D62797

Climate Site: San Diego AP

Climate Zone: 7

Conditioned Area: 65,314

Title 24 Bldg

General C&I Work

Sizing Ratio: 0.600

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.93	15.15	114
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
20.1		0.148	0.075
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.777	0.215	41.2	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	0.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.26	15.15	114
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
17.6		0.689	0.075
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.839	0.411	41.2	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	0.0	0.0

Table 17 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	147.00	69.25	96.36	139.16%
kWh	762,569.00	565,015.00	779,887.13	138.03%
Therms	58,319.00	565,015.00	16,557.50	2.93%

Building Overview Notes

Data entry complete, model runs. Lighting, cooling and ventilation looks OK. The site includes fume hoods. Program file says 3 HWP, but only 1 installed.

D62878
Climate Zone: 7
Title 24 Bldg Office

Climate Site: San Diego AP
Conditioned Area: 66,400
Sizing Ratio:

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.79	2.54	
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
0.0	HP	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	50.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	76.4	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.24	2.54	
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
0.0	HP	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.435	50.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 18 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	37.00	16.60	9.51	57.26%
kWh	114,468.00	58,842.03	33,774.31	57.40%
Therms	(113.00)	58,842.03	(7.19)	-0.01%

D62879
Climate Zone: 7
Title 24 Bldg Office

Climate Site: San Diego AP
Conditioned Area: 37,495
Sizing Ratio:

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.76	2.38	
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
0.0	HP	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	46.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	89.5	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.24	2.38	
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
0.0	HP	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.436	46.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 19 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	13.00	7.08	4.00	56.47%
kWh	39,361.00	24,012.95	13,652.03	56.85%
Therms	(45.00)	24,012.95	(6.02)	-0.03%

D62938

Climate Site: Escondido

Climate Zone: 10

Conditioned Area: 18,132

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.965

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.44	1.57	292
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.8	PSZ	0.108	0.049
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.370	0.691	4.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	3.9	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.64	1.57	298
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.8	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.540	4.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 20 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	12.00	7.72	4.25	55.10%
kWh	16,010.00	16,641.25	9,255.03	55.62%
Therms	-	16,641.25	(1.38)	-0.01%

Building Overview Notes

The site contact only had one set of as-builts and they were less than thorough. Project file was pretty slim as well. The measure savings is right on but the realization rate is extremely high. This is most likely because the proposed LPD was higher than the allowable lpd. According to the lighting as-builts and our thorough lighting inventory the LPD was 1.46 compared to the 1.55 allowed. This most likely caused a significant increase compared to the minimal savings gained from the HVAC savings.

D62974
Climate Zone: 7

Climate Site: San Diego AP
Conditioned Area: 43,207

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.880

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.81	0.42	480
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.6	MIXED	0.148	0.073
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.569
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	3.7	0.0	92.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.59	0.42	480
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.3	MIXED	0.150	0.073
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.569
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	3.7	0.0	0.0

Table 21 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	33.00	67.07	54.45	81.18%
kWh	277,687.00	328,005.25	268,452.75	81.84%
Therms	(1,455.00)	328,005.25	-	0.00%

Building Overview Notes

This was a retrofit of an old warehouse. The entire building is 92,000 sf but Restaurant Depot only occupies just over 60k of the building. They are leasing their location. They have separate meters but I couldn't find the meter and the site contact there had no idea where it was either. They began operation at the facility in September of 2006 not June.

D62980

Climate Zone: 7

Title 24 Bldg Grocery Store

Climate Site: Oceanside

Conditioned Area: 28,977

Sizing Ratio:

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.31	2.07	307
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.8	PVAV	0.148	0.048
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.370	0.880	6.0	1.302
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.490	3.5	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.47	2.07	507
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.5	PVAV	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	6.0	1.933
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.5	0.0	0.0

Table 22 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	37.00	22.97	18.78	81.77%
kWh	284,264.00	196,022.88	179,320.13	91.48%
Therms	(7,269.00)	196,022.88	153.93	0.08%

Building Overview Notes

The lighting measures savings is low for two reasons. The main is that the daylighting controls measure is not being implemented.

I ran the model with 100% of the controls working and the lighting only T24 savings was 10,604. The Lighting measures only savings was 14,790. Without both numbers are -8k or around there. The second reason for the poor lighting savings is that the baseline LPD for a grocery store is less than the 1.60 w/sf that's perscribed in the baseline.

The refrigerant and cooling savings appear to be ok.

D62993
Climate Zone: 7
Title 24 Bldg Other

Climate Site: San Diego AP
Conditioned Area: 7,876
Sizing Ratio: 0.795

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.05	0.00	157
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
32.8		0.146	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.720	32.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	33.6	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.21	0.00	151
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
33.1		0.430	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.390	32.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 23 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	33.00	21.52	21.32	99.08%
kWh	312,571.00	170,495.83	169,893.14	99.65%
Therms	24,654.00	170,495.83	20,608.71	12.09%

Building Overview Notes

Data entry notes:

-building occupied/conditioned on 2007

-For lighting, project file shows an area smaller than what was surveyed. The actual square footage I measured is more in line with

the lighting T24 documents.

-Business is on the 1st floor so no roof area.

-The building was vacant when I visited so no plug loads were observed. The plug loads inputted would be typical equipment for a

similar space but shouldn't matter since the only measures are for lighting and fume hood.

-Leaving out fan motor data, allowing program to self size

-Fume hoods found with Phoenix controls:

Model#5SA-96, 18X84" sash area, 8 found

Model#4SA-96, 32.5x93" sash area, 1 found

-Onsite personnel said that the sash area is usually left open instead of closed when not in use and estimates that it is opened

75% when used. Estimated hourly presence is 3 hours a day. Therefore, estimated fan CFM will be $=\text{min} + .75(\text{max} - \text{min}) = 3300 + .75(16200 - 3300) = 12,975$ CFM which is 80% of the max for 3 hours. Based on the schedule of 14 hours of operations

in a day, the rest of those hours are at the minimum CFM at 3300. Therefore the average CFM from hours 0500 through 1800 is

$= (12975 * 3 + 3300 * 11) / 14 = 5375$ CFM or 33% of the max flow. (see include file for as-built).

D62995
Climate Zone: 7
Title 24 Bldg

Climate Site: San Diego AP
Conditioned Area: 11,746
Retail and Wholesale Store **Sizing Ratio: 0.855**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.71	1.64	276
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.0	PSZ	0.689	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.440	19.1	2.428
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.000	1.4	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.77	1.64	270
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.3	PSZ	0.689	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.883	0.473	19.1	1.554
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	1.4	0.0	0.0

Table 24 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	18.00	14.37	8.53	59.32%
kWh	60,443.00	49,796.98	30,163.20	60.57%
Therms	(178.00)	49,796.98	(0.68)	0.00%

D63017
Climate Zone: 7
Title 24 Bldg Hotels/Motels

Climate Site: San Diego AP
Conditioned Area: 84,179
Sizing Ratio: 1.205

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.56	2.74	3238
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.141	0.030
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.474	0.299	15.0	0.734
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
9631.551	0.1	0.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.30	2.74	3237
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.8	PSZ	0.430	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.524	15.0	1.996
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
15798.952	0.1	0.0	0.0

Table 25 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex-Post Net/Ex-Post Gross)
Peak kW	14.00	24.92	21.67	86.99%
kWh	133,060.00	177,672.25	154,091.56	86.73%
Therms	667.00	177,672.25	13,547.23	7.62%

Building Overview Notes

Data Entry Notes:

- Occupied/conditioned in Aug 2007, not 2005 as entered
- Lighting is always on, and operated by students; this is a dormitory. Light schedule is best estimate.
- No access to fan coils but took specs off mechanical schedule, matches that with proposed design.
- Only found 8 total condenser units which match the paired heat pumps on schedule. Could not locate indoor units.

Assuming they

indeed exist since CU matches.

- No cooling for dormitory units, only heating
- No access to private dormitory rooms for plug in loads but assuming 2 computers, 1 TV, 1 microwave per suite.
- Area calculation using Autocad files (very accurate)
- CFM for exhaust fans adjusted to match OA as per designed.

D63028
Climate Zone: 7
Title 24 Bldg Office

Climate Site: San Diego AP
Conditioned Area: 41,383
Sizing Ratio: 3.694

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.86	2.98	63
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
26.4	PSZ	0.108	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	4.0	2.440
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.000	9.8	89.7	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.06	2.98	63
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
18.6	PSZ	0.108	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	4.0	1.922
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	9.8	0.0	0.0

Table 26 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	(5.00)	1.65	0.54	32.52%
kWh	136,404.00	122,835.91	106,219.75	86.47%
Therms	(34.00)	122,835.91	(12.39)	-0.01%

D63031
Climate Zone: 7
Title 24 Bldg Other

Climate Site: San Diego AP
Conditioned Area: 12,566
Sizing Ratio: 1.171

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.93	7.22	228
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.4	PSZ	0.069	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.300	32.1	1.578
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.230	0.6	22.3	22.6

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.21	7.22	217
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.3	PSZ	0.110	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.390	32.1	1.958
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.6	0.0	0.0

Table 27 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	20.00	0.13	0.13	100.76%
kWh	44,479.00	33,388.66	25,622.19	76.74%
Therms	21.00	33,388.66	1,040.24	3.12%

Building Overview Notes

- There are two MAU units not yet entered 1) 3800CFM, 2hp fan, 200kbtuh, greenheck m/n: TGX-112-H22-H7 and PVF200H 2) 2800 CFM, 2hp, TGX-109-H12-DB, 150kbtuh, furnace m/n: PVF150H. Not sure how to model. This is not part of the incented items.
- Kitchen equipment schedule obtained and entered under kitchen equipment. Numbers entered reflects the equivalent kW usage for model.

D63038

Climate Site: Poway Valley

Climate Zone: 10

Conditioned Area: 14,329

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.955

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.22	0.76	337
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.9	PSZ	0.410	0.034
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.304	0.440	30.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	55.9	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.39	0.76	337
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.9	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.360	30.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 28 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	27.00	2.24	2.14	95.41%
kWh	67,684.00	13,082.86	12,891.69	98.54%
Therms	(263.00)	13,082.86	-	0.00%

Building Overview Notes

Cooling is way under performing compared to the energy pro run. The as surveyed units are standard efficiency.

All Packaged HVAC units found on roof were different than in the as built plans. Plans indicate use of Carrier units, Rheem units found on roof. > 80% of savings anticipated from space cooling. Model-IT results indicate a greater cooling kwh consumption than the title 24 baseline....

-All systems in Zone 3 given enthalpy economizers even though 2 of units were fixed OA control (AC1, HP-4)

-Service center exhaust fans rolled into exterior equipment (Service center is unconditioned space, which causes the exhaust

fans to be placed in another zone where exhaust air exceeds OA air)

-All plug loads in unconditioned space rolled into "Exterior Equipment"

D63043
Climate Zone: 7
Title 24 Bldg Office

Climate Site: San Diego AP
Conditioned Area: 146,551
Sizing Ratio: 2.724

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.73	4.71	192
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.5		0.689	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.380	30.2	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	44.2	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.22	4.71	200
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.6		0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.454	30.2	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 29 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	231.00	153.62	95.58	62.22%
kWh	201,477.00	362,847.06	361,317.19	99.58%
Therms	138.00	362,847.06	9,125.88	2.52%

D63073
Climate Zone: 7
Title 24 Bldg Office

Climate Site: San Diego AP
Conditioned Area: 8,083
Sizing Ratio: 1.143

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.77	4.75	323
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.6	MIXED	0.689	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.720	39.4	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	31.3	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.20	4.75	323
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.6	MIXED	0.689	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.720	39.4	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 30 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	4.00	3.30	1.26	38.08%
kWh	10,563.00	10,255.30	6,296.67	61.40%
Therms	-	10,255.30	(0.14)	0.00%

Building Overview Notes

-2 (4'x2) T8 fixtures changed to 4 (4'x1) T8 fixtures to match exact wattage

D63187
Climate Zone: 7
Title 24 Bldg Office

Climate Site: San Diego AP
Conditioned Area: 17,812
Sizing Ratio: 2.425

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.72	2.77	124
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
17.3		0.689	0.049
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.493	0.310	19.7	1.625
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.889	0.8	27.3	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.06	2.77	124
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
17.6		0.689	0.075
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.839	0.490	19.7	1.983
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.891	0.8	0.0	0.0

Table 31 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	18.00	14.87	13.10	88.10%
kWh	58,155.00	60,601.25	49,653.25	81.93%
Therms	224.00	60,601.25	41.79	0.07%

Building Overview Notes

-The HVAC for this building actually consists of 22 small Fan Coils and Air Handlers operating independently in their own zones.

For modeling purposes, the air handlers and fan coils were grouped into two "Air handlers", one representing the AHUs (w/ economizers), and the other representing the FCs (w/out economizers)

D63233

Climate Site: Oceanside

Climate Zone: 7

Conditioned Area: 18,649

Title 24 Bldg Religious Worship,

Sizing Ratio: 1.012

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.18	0.47	238
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.0	PSZ	0.159	0.035
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.857	0.800	11.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	79.7

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.46	0.47	236
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.110	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	11.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 32 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	19.00	2.40	1.64	68.14%
kWh	45,467.00	53,497.64	51,041.97	95.41%
Therms	-	53,497.64	-	0.00%

D63257 **Climate Site: Oceanside**
Climate Zone: 7 **Conditioned Area: 5,547**
Title 24 Bldg Medical/Clinical **Sizing Ratio: 1.284**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.09	12.77	34
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
13.9		0.140	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	5.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.20	12.77	34
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
7.9		0.224	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	5.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 33 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	50.00	84.00	-	0.00%
kWh	505,112.00	482,197.00	482,197.00	100.00%
Therms	40,326.00	482,197.00	25,374.20	5.26%

Building Overview Notes

The VSD fume hood exhaust fans were modeled as return air fans on the system air handlers. This was deemed appropriate because the system uses 100% outside air. As such, the return fans essentially perform like exhaust fans. Before a calibration, a schedule for the minimum outside air flow (MIN-OA-SCH) was defined to mimic the airflow requirements of the building as dictated by the exhaust fan (i.e., return fan) flow.

In the calibration process, this flow schedule was tweaked to match the modeled power consumption of the AHUs (which included both the air handlers and exhaust fans) to the metered kW profiles of the exhaust fans and air handlers together. Calibrating the chiller load required tweaking the kW/ton efficiency of the chiller in the model. Because the air handlers use 100% outdoor air, the chiller load is primarily dictated by outdoor air conditions, not indoor loads. As such, tweaking plug and process loads in the model did not result in any change in chiller energy usage. With the system calibrated, it was then necessary to model the base case system because Survey-IT is incapable of comparing the modeled equipment to an appropriate title 24 baseline. To develop the base case, the minimum flow schedule was set to 100% of the flow at all times. This mimics the performance of constant volume exhaust fans, which operate at the full speed CFM at all times. Savings were calculated as the difference in total site kWh and total site kW between the base case and calibrated case.

Calibration Results: Ventilation 0.00 MBE, .04 CV;
Cooling -.1 MBE, .22 CV

Cals 5, 6: Changed chiller efficiency from 1.05 to .9 then .72; This was done because altering loads did not affect the chiller energy usage. This can be explained by the fact that the system uses 100% outside air, and as such, the load is dictated by the outside conditions, not the interior space demands.

G02471

Climate Site: San Luis Obispo

Climate Zone: 5

Conditioned Area: 16,135

Title 24 Bldg Religious Worship,

Sizing Ratio: 1.198

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.86	1.32	265
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.0	PSZ	0.000	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.723	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.0	94.6	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.52	1.32	265
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
8.9	PSZ	0.000	0.000

Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.493	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.285	0.0	0.0	0.0

Table 34 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex Post Net/Ex-Post Gross)
Peak kW	-	-	-	0.00%
kWh	-	130.23	162.02	124.41%
Therms	1,008.00	248.51	246.21	99.07%

Building Overview Notes

Baseline (using split systems w/ actual found heating elements left into HVAC systems instead of zonal, using ~12 eer)
This site is unique since there are no HVAC systems installed. The dummy HVAC are from YORK HRE models. Only thing changed from the G02471Z model is that T-stat set to very high to prevent cooling from coming on.
-Note that implementers used two separate files to calculate savings

G12008
Climate Zone: 6

Title 24 Bldg Medical/Clinical

Climate Site: Redondo Beach

Conditioned Area: 130,213

Sizing Ratio: 1.210

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.14	0.70	368
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.6		0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.740	23.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.14	0.70	368
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.6		0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.778	23.7	1.881
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.092	1.1	0.0	0.0

Building Overview Notes

-Run is completed, this is a gas savings measure only and is not in database but modeling is used to estimate savings. The low realization rate below is because the implementers used the existing equipment and operating conditions as the baseline. However, we used T24 so a low rate is expected.

Data entry notes

- This site had no plans available for review. Much of the dimensions were estimated using a walking wheel and general layouts from the building's EMS.
- Majority of areas are private, so no entry permitted, had to estimate plug loads, overall difficult site to accurately survey.
- Gym is on different schedule but size small so lumped as one "Area" instead.
- Building square footage claimed to be 168k, but those that are served by the incanted equipment is less ~123K.
- The supply and exhaust fans replaced with higher efficiency motors and VFD controls are the following: SF-1,2,3,5,8,8a,11 RF1, EF3,4,8 per plans.
- SF7 rented out to Silverado retirement facility, does not use heating so this is not included either.
- EF5, 7, 9 not on plans for VFD, instead VFDs are placed on EF3,4,8.

G20217
 Climate Zone: 10
 Title 24 Bldg School

Climate Site: Riverside Exp Sta
 Conditioned Area: 87,104
 Sizing Ratio: 1.187

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.89	2.54	295
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
15.0		0.104	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.304	0.427	8.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	20.5	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.29	2.54	296
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
15.0		0.189	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.572	8.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 35 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	-	-	-	-
kWh	-	4.25	1.25	29.41%
Therms	8,521.00	4.25	(0.17)	-4.02%

Building Overview Notes

-Occupied/conditioned in 2007, but using 2001 building standards since analysis done in 2003.

G20464
Climate Zone: 9
Title 24 Bldg Restaurant

Climate Site: San Fernando
Conditioned Area: 4,481
Sizing Ratio: 0.891

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.18	4.26	140
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.0	PSZ	0.107	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.304	0.530	42.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	17.1	30.6

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.23	4.26	140
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.3	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.451	42.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Building Overview Notes

Began occupying 7/15/07 with half staff. Full operations by 8/1/07.

Window to Wall Ratio (Non-North) is greater than 40 percent = 0.45 (As observed)

G20471
Climate Zone: 5
Title 24 Bldg

Religious Worship,

Climate Site: San Luis Obispo
Conditioned Area: 16,135
Sizing Ratio: 1.198

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.86	1.32	265
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.000	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.707	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.092	0.0	94.6	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.52	1.32	265
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
8.7	PSZ	0.000	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.484	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.577	0.0	0.0	0.0

Table 36 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	-	-	-	-
kWh	-	130.23	162.02	124.41%
Therms	1,008.00	130.23	246.21	189.05%

Building Overview Notes

Baseline (using split systems w/ actual found heating elements left into HVAC systems instead of zonal, using ~12 eer)
This site is unique since there are no HVAC systems installed. The dummy HVAC are from YORK HRE models. Only thing changed

from the G02471Z model is that T-stat set to very high to prevent cooling from coming on.

-Note that implementers used two separate files to calculate savings

Per file savings are 90,067kwh, 30.1kw, 1008 therms

***To determine energy savings from current system, we will use the same methodology approved in the project file.
That is:

we will subtract the as-built model with the base model to determine the natural ventilation effect. Next we will determine the

savings from the as-built compared to its T24 baseline. These two will be added together for total savings. The original calculations

done for the ex-ante erroneously used the baseline of the base model as its primary baseline to compare the as-built to get the

savings which is not what was approved. It seems the verification person missed this.

-Window size shown on plans do not match actual windows measured

-Building occupied/conditioned on Jan 07

-Some rooms are rarely occupied (under "occupancy type C")

-Nothing entered under HVAC systems; each room has its own furnace and is a separate zone in itself. All HVAC equipment/windows are controlled by EMS. The equipment is listed under the ZoneHVAC section

-There are no fans other than the ZoneHVAC systems. Windows/skylights controlled by EMS and opens when cooling is required.

Heating is a combination of the ZoneHVAC plus passive solar heating from windows, trombe walls of either concrete or water

tanks.

-Has 3.5 kW photovoltaic system on roof, net metering

-For pitch roof, angle of inclination is 25 degrees. Roof area estimated by taking square root of total zone floor area to model like a

square base. Use basic trig to calculate area from that model.

-Has IWH that was not accessible during visit, but per director, was installed.

-Using 2001 code per the file.

G120008
Climate Zone: 6

Title 24 Bldg Medical/Clinical

Climate Site: Redondo Beach

Conditioned Area: 130,213

Sizing Ratio: 1.211

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.14	2.64	368
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.6		0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.782	23.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.14	2.64	368
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.6		0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.820	23.7	1.881
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.092	1.1	0.0	0.0

Table 37 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	-	0.00	0.00	100.00%
kWh	-	81,967.00	81,967.00	100.00%
Therms	178,130.00	81,967.00	912.69	1.11%

Building Overview Notes

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Data entry notes

-This site had no plans available for review. Much of the dimensions were estimated using a walking wheel and general layouts

from the building's EMS.

- Gym is on different schedule but size small so lumped as one "Area" instead.

-Building square footage claimed to be 168k, but those that are served by the inceded equipment is less ~123K.

-The supply and exhaust fans replaced with higher efficiency motors and VFD controls are the following: SF-

1,2,3,5,8,8a,11 RF1,

EF3,4,8 per plans.

-SF7 rented out to Silverado retirement facility, does not use heating so this is not included either.

-EF5, 7, 9 not on plans for VFD, instead VFDs are placed on EF3,4,8.

-

P30386
Climate Zone: 13
Title 24 Bldg School

Climate Site: Bakersfield AP
Conditioned Area: 21,880
Sizing Ratio: 0.346

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.17	0.90	293
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.108	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.000	0.667	3.5	1.569
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.230	0.8	40.6	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.23	0.90	293
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
8.9	PSZ	0.532	0.057
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.584	3.5	1.314
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.8	0.0	0.0

Table 38 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex Post Net/Ex-Post Gross)
Peak kW	17.00	21.39	18.88	88.30%
kWh	28,186.00	22,563.42	21,158.53	93.77%
Therms	(25.00)	0.00	(0.00)	-16.33%

Building Overview Notes

Gym is only used for a couple of hours a day during school hours. Gym lights are manually operated; all others (classrooms, restrooms, concession area, etc.) are on occ sensors.

Janitor arrives at 5:00 to clean gym building before classes start. Classroom building is cleaned after class, from 3-9 PM.

P30462
Climate Zone: 13
Title 24 Bldg School

Climate Site: Bakersfield AP
Conditioned Area: 23,651
Sizing Ratio: 0.866

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.95	1.21	263
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.104	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.720	4.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	100.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.50	1.21	263
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
8.8	PSZ	0.182	0.057
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.540	4.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 39 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex Post Net/Ex-Post Gross)
Peak kW	46.00	37.29	34.27	91.91%
kWh	85,204.00	62,783.30	57,622.72	91.78%
Therms	(22.00)	0.00	0.00	150.26%

Building Overview Notes

Buildings occupied 100% from the last week in August, 2006. Start-up took place over a weekend.

P34352
Climate Zone: 12
Title 24 Bldg School

Climate Site: Antioch
Conditioned Area: 82,568
Sizing Ratio: 0.958

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.97	0.88	238
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	MIXED	0.057	0.033
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.870	5.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	50.9	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.45	0.88	239
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.2	MIXED	0.151	0.057
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.579	5.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 40 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	166.00	111.91	75.81	67.74%
kWh	310,724.00	230,366.63	150,604.44	65.38%
Therms	9,763.00	230,366.63	5,924.89	2.57%

Building Overview Notes

Year-round school.

P34570
Climate Zone: 12
Title 24 Bldg School

Climate Site: Sacramento CO
Conditioned Area: 238,095
Sizing Ratio: 0.912

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.81	1.74	227
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.8	PSZ	0.000	0.040
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.374	0.0	0.764
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.460	0.1	80.8	7.5

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.04	1.74	227
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.4	PSZ	0.000	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.394	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.512	0.0	0.0	0.0

Table 41 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	216.00	93.22	69.29	74.33%
kWh	280,639.00	272,157.50	244,550.25	89.86%
Therms	1,673.00	272,157.50	10,234.76	3.76%

P41214
Climate Zone: 13
Title 24 Bldg School

Climate Site: Bakersfield AP
Conditioned Area: 45,006
Sizing Ratio: 0.751

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.74	1.77	225
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.2	PSZ	0.129	0.030
Window U-Value	Window SC	% Window Area	Skylight U-Value
3.769	0.354	14.5	0.956
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.920	0.3	90.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.59	1.77	225
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.2	PSZ	0.182	0.057
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.431	14.5	0.673
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.530	0.3	0.0	0.0

Table 42 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	150.00	77.72	42.97	55.30%
kWh	236,976.00	191,255.25	94,518.22	49.42%
Therms	-	191,255.25	0.01	0.00%

P42874

Climate Site: San Francisco AP

Climate Zone: 3

Conditioned Area: 19,182

Title 24 Bldg Religious Worship,

Sizing Ratio: 0.285

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.03	1.12	19182
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.101	0.030
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	14.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	15.4	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.38	1.12	19859
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
8.2	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.663	14.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 43 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	14.00	2.69	0.28	10.42%
kWh	62,373.00	19,016.13	11,271.01	59.27%
Therms	28,366.00	19,016.13	35.60	0.19%

Building Overview Notes

No A/C. Cooling by ventilation only (San Francisco)

P43314
Climate Zone: 4
Title 24 Bldg

General C&I Work

Climate Site: Gilroy
Conditioned Area: 11,372
Sizing Ratio: 1.210

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.00	26.11	198
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.720	24.6	2.443
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.707	2.4	0.0	18.9

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.14	26.11	197
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.470	24.6	1.924
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.750	2.4	0.0	0.0

Table 44 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	27.00	36.54	-	0.00%
kWh	81,679.00	73,834.32	-	0.00%
Therms	2,659.00	73,834.32	-	0.00%

Building Overview Notes

This site had a vsd on a dust collector. The dust collector vsd and hvac interactive effects were evaluated using a spreadsheet tool. This model is only representative of the lighting savings

-In office, 1 fixture removed and 1 added to match LPD

-In Warehouse, 1 fixture added to match LPD

-In Ancillary Lab, 1 fixture added to match LPD

-Lighting type of main lab (4FTT5)x4 fixtures not in plans; picked assumed match from fixture code list

P43520
Climate Zone: 13
Title 24 Bldg School

Climate Site: Bakersfield AP
Conditioned Area: 190,998
Sizing Ratio: 0.695

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.00	0.40	294
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
18.2	PSZ	0.049	0.026
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.560	10.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	47.3	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.15	0.40	294
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
15.3	PSZ	0.102	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.457	10.8	1.547
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.6	0.0	0.0

Table 45 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	1,227.00	219.88	199.61	90.78%
kWh	872,243.00	491,623.00	449,228.38	91.38%
Therms	8,863.00	491,623.00	34,148.68	6.95%

Building Overview Notes

*Bulk of savings from implementers come from Building 400 and 1700, which composed mainly of evap coolers.

**Also with these multi building sites, the implementers build separate models for all the buildings.

***High therms savings. This comes mainly from the heating. Our modeling is correct insofar as the equipment used are concern.

discrepancy may be due to differences in how data is input and fact that modeling programs are different.

Data entry notes:

-Occupied/conditioned beginning Sept 07, still not at full capacity

-

-EER for evap coolers calculated by taking tons of cooled air divided by fan horsepower (this is an estimate). Cooled air is estimated as a ten degree drop of dry air from 82 to 72 F.

-lumped zones and air handlers for B6-1400, B15-1600, B1700, and B700

P47557

Climate Site: Placerville

Climate Zone: 12

Conditioned Area: 111,316

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.935

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.26	0.78	374
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.072	0.050
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.749	0.565	2.0	1.573
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	3.6	1.6	49.7

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.69	0.78	385
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.565	2.0	1.573
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.6	0.0	0.0

Table 46 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	228.00	67.24	36.01	53.56%
kWh	367,067.00	255,214.38	199,099.00	78.01%
Therms	-	255,214.38	1,080.96	0.42%

Building Overview Notes

Data Entry Notes:

- Display lighting of 0.259W/sqft combined in space LPD for retail space. (Int Lights Plugs)
- Total area from plans are 111,316 square feet, initial analysis uses 134,000 square feet.
- Assume fan runs continually when building is occupied
- From file assuming Climate zone 12 envelope criteria: Roof R=19, wall R=13, windowU=0.7, SHGC=.47-.61, etc.

Actual square footage and lighting as observed onsite differs significantly from utility's assumptions.

P47814
Climate Zone12
Title 24 Bldg C&I Storage

Climate Site: Tracy Pumps
Conditioned Area: 1,200
Sizing Ratio: 0.892

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.32	0.00	400
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	2.0	2.497
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.000	1.2	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.60	0.00	399
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.8	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.552	2.0	1.631
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	1.2	0.0	0.0

Table 47 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	85.00	99.40	10.47	10.53%
kWh	625,471.00	848,618.13	526,680.56	62.06%
Therms	-	848,618.13	(63.42)	-0.01%

Building Overview Notes

Lower LPD than Ex-Ante projection, hence higher realization rate

P48014
Climate Zone: 4
Title 24 Bldg

Climate Site: Paso Robles AP
Conditioned Area: 6,720
Retail and Wholesale Store **Sizing Ratio: 0.953**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.48	4.59	354
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.049	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.433	0.920	16.7	0.823
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.540	1.1	13.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.27	4.59	354
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.0	PSZ	0.092	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.883	0.643	16.7	1.595
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.910	1.1	0.0	0.0

Table 48 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	25.00	13.29	13.28	99.95%
kWh	83,691.00	39,592.74	39,544.17	99.88%
Therms	-	39,592.74	(5.50)	-0.01%

Building Overview Notes

This site was partially 2001 baseline and 2005 baseline . The site was broken up into 2 models. 1 using the 2001 baseline and 1 using 2005 baseline. The savings for both models are then combined to calculate savings

- Unit C/D was not occupied during site visit. Scheduled for Occupancy on January 2009. Not completely built out yet.
- Observed in field that most of AC units installed have lower SEER efficiency than what was used in original calculations.
- Did not see DHW heater on premise; may be in inaccessible room. Inputted model shown in T-24 docs instead.
- Mitsubishi AC installed later by tenant.

Results:

**Baseline is 2001 title 24 code, per file for units A and B. Low realized savings due to incomplete buildout of units C/D which accounts for about 40% of the HVAC needs. However, a second simulation run with a "mock tenant" in place yielded savings of kWh=46% and kW=76% based on 2001 title 24 code. However, I believe the utilities overestimated the savings based on the equipment and conditions found onsite. Particularly, the HVAC units are not mch more efficient than 2005 title 24 code which is what units C/D are using as their baselines (per file).

P48118
Climate Zone: 3
Title 24 Bldg

General C&I Work

Climate Site: Hayward
Conditioned Area: 18,107
Sizing Ratio: 1.106

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.66	0.71	905
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.0	PSZ	0.147	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.06	0.71	906
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.6	PSZ	0.224	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 49 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	8.00	6.78	3.06	45.15%
kWh	23,893.00	24,653.97	11,325.13	45.94%
Therms	698.00	24,653.97	(131.48)	-0.53%

Building Overview Notes

s. Original estimates uses eQuest to estimate savings from improved insulation and combines that with a general equation for the furnaces. Details are not given, but the low therms realization is probably a reflection of how our modeling engine treats the insulation measure in combination with the furnace measure. (note that the insulation improvement is very minor from R-11 to R-12 in most walls and R-19 in one wall, consistent with our model, so I suspect there is some over estimation of savings in the original estimates. I built a similar eQuest model and it only shows a therms savings of 26-147 therms based o R-12 through R-19 walls for the insulation measure whereas the original estimates 439 therms). The original approach mixes evaluation methods and may not be accurate. Likely used no insulation as the baseline.

P48215
Climate Zone: 13
Title 24 Bldg School

Climate Site: Bakersfield AP
Conditioned Area: 72,375
Sizing Ratio: 0.687

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.06	2.02	219
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.6	PSZ	0.202	0.043
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.857	0.674	4.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	81.3	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.45	2.02	218
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.0	PSZ	0.291	0.057
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.527	4.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 50 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	127.00	79.83	59.68	74.76%
kWh	212,355.00	197,650.00	123,770.13	62.62%
Therms	(334.00)	197,650.00	0.01	0.00%

P48571

Climate Site: South San Francisco

Climate Zone: 3

Conditioned Area: 6,288

Title 24 Bldg Community Center

Sizing Ratio: 1.125

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.98	1.57	159
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.8	PSZ	0.108	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.262	0.445	25.9	0.480
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.390	1.5	64.7	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.34	1.57	159
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.2	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.475	25.9	0.967
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.910	1.5	0.0	0.0

Table 51 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	10.00	1.55	0.67	43.12%
kWh	14,150.00	3,883.75	1,450.87	37.36%
Therms	433.00	3,883.75	379.53	9.77%

Building Overview Notes

Site is a community center with a large meeting room, a small kitchen, a couple of offices, a large storage area, and restrooms. The offices are staffed during the workday but the meeting room is typically in use only an hour or two a day.

P50646

Climate Site: Clovis

Climate Zone: 13

Conditioned Area: 23,700

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.760

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.30	2.59	499
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.940	0.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.38	2.59	499
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.3	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.700	0.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 52 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	4.00	2.95	0.34	11.50%
kWh	5,261.00	4,424.00	497.13	11.24%
Therms	-	4,424.00	0.47	0.01%

Building Overview Notes

all RTU's 11.0 and 11.3 EER

P50706

Climate Zone: 3

Title 24 Bldg C&I Storage

Climate Site: Vallejo

Conditioned Area: 3,442

Sizing Ratio: 1.149

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.21	0.09	430
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
2.0	PSZ	0.147	0.079
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	0.6	2.462
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.260	1.1	81.3	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.61	0.09	430
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.5	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	0.6	1.941
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.910	1.1	0.0	0.0

Table 53 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	58.00	80.71	64.64	80.09%
kWh	698,708.00	295,405.47	202,717.77	68.62%
Therms	-	295,405.47	(3.66)	0.00%

Building Overview Notes

Program savings are based on 24/7, but warehouse actually runs on a 60-hour workweek. Office A/C units are 10 SEER and occupants run fans 24/7 which accounts for some of the negative HVAC savings.

P52066
Climate Zone: 13
Title 24 Bldg School

Climate Site: Bakersfield AP
Conditioned Area: 49,535
Sizing Ratio: 1.004

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.85	1.67	178
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.2		0.104	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.333	0.330	31.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	76.3	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.01	1.67	177
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.2		0.217	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.464	31.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 54 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	182.00	27.85	23.76	85.31%
kWh	131,955.00	77,648.31	147,747.25	190.28%
Therms	(1,961.00)	77,648.31	2,598.72	3.35%

Building Overview Notes

- plug loads are estimated based on typical occupancy and partial survey
- space areas are derived from measurements on site using plans and with LTG-4-c document

P52291

Climate Zone: 3

Title 24 Bldg Grocery Store

Climate Site: Monterey AP

Conditioned Area: 135,260

Sizing Ratio: 1.181

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.92	1.10	604
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.3	PSZ	0.151	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.547
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.490	3.6	0.0	29.5

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.64	1.10	605
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.922
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.750	3.6	0.0	0.0

Table 55 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	127.00	75.68	25.70	33.96%
kWh	555,477.00	713,793.00	497,011.50	69.63%
Therms	(4,082.00)	713,793.00	2.71	0.00%

P52886X
Climate Zone: 12
Title 24 Bldg Office

Climate Site: Stockton AP
Conditioned Area: 65,400
Sizing Ratio: 1.125

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.72	0.00	282
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
12.5	PSZ	0.220	0.051
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.659	0.874	16.5	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	50.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.11	0.00	285
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
9.9	PSZ	0.649	0.051
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.493	0.449	16.5	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	0.0	0.0

Table 56 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	124.00	54.02	54.02	100.00%
kWh	141,371.00	133,147.19	133,147.19	100.00%
Therms	1,355.00	133,147.19	72.56	0.05%

P53586

Climate Zone: 12

Title 24 Bldg C&I Storage

Climate Site: Fairfield FS

Conditioned Area: 10,049

Sizing Ratio: 1.119

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.15	0.02	773
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.4	PSZ	0.148	0.079
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.502	0.440	0.2	2.460
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.260	1.3	70.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.61	0.02	773
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.8	PSZ	0.649	0.057
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.700	0.2	1.309
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	1.3	0.0	0.0

Table 57 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	376.00	412.04	392.24	95.19%
kWh	3,108,518.00	2,241,045.50	2,133,383.13	95.20%
Therms	-	2,241,045.50	-	0.00%

P54486
Climate Zone: 3
Title 24 Bldg School

Climate Site: San Francisco CO
Conditioned Area: 19,232
Sizing Ratio: 0.133

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.97	1.03	2404
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PVAV	0.093	0.045
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.216	0.710	10.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	1.8	46.9

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.18	1.03	2461
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.8	PVAV	0.093	0.045
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	10.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 58 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	45.00	2.08	(8.35)	-401.15%
kWh	49,961.00	30,331.52	549.68	1.81%
Therms	6,680.00	30,331.52	1,643.46	5.42%

Building Overview Notes

Small high school. Designed for ~200 students, currently has ~160 enrolled.

Building occupied in September 2007 at 25% capacity (freshman class only), increased to 50% in September 2008 (freshman, sophomore classes) and hit 75% in September 2009 (freshman, sophomore, and junior classes).

No A/C. Ventilation system remains from old building. Boiler and pump are new, VSD motors on fans are new.

P55808
Climate Zone: 13
Title 24 Bldg School

Climate Site: Bakersfield AP
Conditioned Area: 136,980
Sizing Ratio: 1.190

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.12	0.67	151
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
25.3		0.066	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.505	12.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	61.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.20	0.67	152
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.6		0.195	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.448	12.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 59 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	634.00	98.59	81.55	82.72%
kWh	209,766.00	255,583.00	213,507.63	83.54%
Therms	6,219.00	255,583.00	6,474.44	2.53%

Building Overview Notes

*kW is below parameter chiefly due to a difference in LPD in the majority of the buildings. I do not believe their LPD results as they seem artificially low. LPD in our model are derived from square footage found in the plans on an area classification basis and matched with the lighting plans.

Data Entry Notes:

-Surveyed buildings 100,200,300,600,700,800,900,1000,1100 since these are the ones that qualified for incentives

-Year first occupied/conditioned is 2007

-class300 space (music/choir classrooms) and auditorium do indeed have high LPD

-plug loads are estimated

P57266
Climate Zone: 12
Title 24 Bldg Grocery Store

Climate Site: Modesto
Conditioned Area: 52,869
Sizing Ratio: 1.318

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.42	0.47	307
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.6	MIXED	0.105	0.041
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.857	0.680	6.2	2.180
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.780	3.1	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.52	0.47	311
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.1	MIXED	0.328	0.057
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.540	6.2	1.309
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.1	0.0	0.0

Table 60 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	71.00	68.68	66.67	97.07%
kWh	463,004.00	548,317.25	513,271.75	93.61%
Therms	(12,410.00)	548,317.25	-	0.00%

P57286

Climate Zone: 12

Title 24 Bldg Grocery Store

Climate Site: Modesto

Conditioned Area: 53,114

Sizing Ratio: 1.309

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.38	0.54	309
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.6	MIXED	0.105	0.041
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.857	0.680	5.9	2.180
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.780	3.2	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.52	0.54	311
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.1	MIXED	0.347	0.057
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.540	5.9	1.309
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.2	0.0	0.0

Table 61 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	75.00	65.96	64.87	98.34%
kWh	465,922.00	503,822.63	476,233.00	94.52%
Therms	(13,648.00)	503,822.63	0.00	0.00%

P57451
Climate Zone: 11

Climate Site: Chico Exp Sta
Conditioned Area: 158,764

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.837

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.08	0.19	452
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.6	PSZ	0.144	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	3.0	2.409
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	3.4	0.2	90.9

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.69	0.19	452
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.540	3.0	1.564
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.4	0.0	0.0

Table 62 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	178.00	171.99	(67.23)	-39.09%
kWh	762,115.00	850,580.75	(104,216.00)	-12.25%
Therms	(7,707.00)	850,580.75	216.03	0.03%

P57906

Climate Site: San Jose

Climate Zone: 4

Conditioned Area: 142,501

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.877

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.48	3.64	480
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.5	PSZ	0.181	0.052
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	0.453
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.530	99.6	2.2	40.1

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.66	3.64	481
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.347	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.910
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.750	99.6	0.0	0.0

Table 63 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	152.00	144.57	28.72	19.87%
kWh	543,656.00	540,875.50	43,881.00	8.11%
Therms	(2,136.00)	540,875.50	0.04	0.00%

Building Overview Notes

Pre-fabricated buildings were surveyed on site. Perimeter info was obtained from the as built but lighting and appliance info was collected during the site visit.

P57986

Climate Zone: 4

Title 24 Bldg Medical/Clinical

Climate Site: Hollister

Conditioned Area: 25,806

Sizing Ratio: 0.806

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.77	2.55	126
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.7	MIXED	0.136	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.284	0.510	3.6	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	13.3	0.0

Measures Only Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.77	2.55	126
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.7	MIXED	0.136	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.284	0.510	3.6	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	13.3	0.0

Building Overview Notes

Savings were compared between the baseline model, P57986BL and the as built model (this one). For the base case, the VSDs were removed from the air handlers, the exhaust fans were made less efficient (see the third include file) and the heat pipes were removed (see the 1st and 2nd include files). Unlike the implementers, packaged HVAC was not used as the base case for cooling. That baseline was rejected on the premise that using chilled water for vivariums is standard practice. The following email came from an engineer at Charles River Laboratories:

"We would very rarely design a vivarium without chilled water in our air handling units and VFDs on the AHU fans. The reason being that chilled water systems are more reliable and more efficient than DX type units. The VFDs allow us to vary out air changes for cases when we have animals that don't generate high ammonia rates.

"The exception to the use of chilled water and VFDs might be if we designed a very small vivarium say for a small university (<10 tons), in which case we might just pay the energy penalty and deal with the DX hvac units."

Clearly, the appropriate base case does not include the use of DX systems or CV fans. Therefore, savings come primarily from the efficient exhaust fans. The model indicates that the heat pipe does not produce therm savings as anticipated.

P58326

Climate Site:

Antioch

Climate Zone: 12

Conditioned Area: 100,543

Title 24 Bldg

Retail and Wholesale Store

Sizing Ratio: 0.737

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.07	1.34	513
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	3.4	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.59	1.34	513
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.547
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.7	0.0	0.0

Table 64 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	22.00	55.68	22.46	40.34%
kWh	118,124.00	215,376.44	89,613.25	41.61%
Therms	(659.00)	215,376.44	(455.84)	-0.21%

P61766
Climate Zone: 12
Title 24 Bldg Gymnasium

Climate Site: Woodland
Conditioned Area: 7,138
Sizing Ratio: 1.069

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.36	0.00	238
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.5	PSZ	0.145	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.631	0.570	1.1	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.60	0.00	254
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.7	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.580	1.1	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 65 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	19.00	7.81	6.38	81.72%
kWh	22,115.00	10,863.79	8,828.16	81.26%
Therms	27.00	10,863.79	1,557.72	14.34%

P62326
Climate Zone: 4
Title 24 Bldg School

Climate Site: San Jose
Conditioned Area: 42,732
Sizing Ratio: 0.812

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.75	0.58	337
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
22.0	PVAV	0.092	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.649	0.230	13.5	0.901
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	15.0	37.7	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.33	0.58	344
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PVAV	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	13.5	0.909
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.460	15.0	0.0	0.0

Table 66 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	66.00	53.66	37.26	69.44%
kWh	176,830.00	116,836.44	50,610.88	43.32%
Therms	1,966.00	116,836.44	2,865.48	2.45%

P64746
Climate Zone: 12
Title 24 Bldg School

Climate Site: Manteca
Conditioned Area: 129,064
Sizing Ratio: 1.181

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.71	0.57	286
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.2	PSZ	0.049	0.040
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	6.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	99.5	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.19	0.57	286
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.9	PSZ	0.102	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.578	6.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 67 -Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	188.00	68.97	60.02	87.02%
kWh	405,697.00	322,348.94	292,460.69	90.73%
Therms	626.00	322,348.94	(818.44)	-0.25%

Building Overview Notes

Data Entry Notes

- Occupied condition at 30% in August 08, moved up to 60% in Sep 09
- Plug loads estimated and are typical of schools

P65966
Climate Zone: 12
Title 24 Bldg Office

Climate Site: Vacaville
Conditioned Area: 260,115
Sizing Ratio: 2.698

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.79	6.23	169
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
19.5	PVAV	0.144	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.304	0.360	34.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.18	6.23	170
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
17.0	PVAV	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.407	34.5	1.618
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.0	0.0	0.0

Table 68 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	769.00	269.20	172.78	64.18%
kWh	919,908.00	298,996.00	(50,871.00)	-17.01%
Therms	14,424.00	298,996.00	700.15	0.23%

P69566

Climate Site: Novato

Climate Zone: 2

Conditioned Area: 49,312

Title 24 Bldg Grocery Store

Sizing Ratio: 0.039

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.44	0.96	834
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
13.2	MIXED	0.453	0.049
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.361	0.460	0.4	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.60	0.96	836
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.3	MIXED	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.700	0.4	1.591
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.7	0.0	0.0

Table 69 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	74.00	58.14	55.43	95.34%
kWh	348,189.00	316,973.13	315,866.38	99.65%
Therms	(6,533.00)	316,973.13	(16.76)	-0.01%

P70226

Climate Zone: 12

Title 24 Bldg Grocery Store

Climate Site: Antioch

Conditioned Area: 148,947

Sizing Ratio: 0.899

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.50	1.55	403
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.5	PSZ	0.180	0.046
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	0.705
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.540	4.3	3.3	51.7

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.67	1.55	403
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.365	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.588
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	4.3	0.0	0.0

Table 70 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	198.00	216.87	55.94	25.80%
kWh	726,074.00	807,534.00	226,990.50	28.11%
Therms	1,529.00	807,534.00	2,142.77	0.27%

P70686

Climate Zone: 12

Title 24 Bldg C&I Storage

Climate Site: Stockton AP

Conditioned Area: 14,300

Sizing Ratio: 0.598

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.27	0.03	722
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
12.0	PSZ	0.093	0.051
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.000	0.000	0.0	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	4.0	85.6

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.61	0.03	708
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
10.9	PSZ	0.649	0.051
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.000	0.000	0.0	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	0.0	0.0

Table 71 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	447.00	244.25	244.11	99.94%
kWh	1,232,601.00	987,011.44	986,896.00	99.99%
Therms	(7,608.00)	987,011.44	(16.78)	0.00%

P72707

Climate Zone: 12

Title 24 Bldg Grocery Store

Climate Site: Antioch

Conditioned Area: 148,947

Sizing Ratio: 0.977

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.36	1.51	403
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.5	PSZ	0.180	0.046
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	0.705
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.540	4.3	3.3	77.5

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.67	1.51	400
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.365	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.588
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	4.3	0.0	0.0

Table 72 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	224.00	326.18	57.64	17.67%
kWh	728,362.00	1,080,753.00	121,984.00	11.29%
Therms	1,547.00	1,080,753.00	2,273.13	0.21%

Building Overview Notes

Calibrated

Refrigeration RMSE 32.21, MBE -0.01, CV 0.20 (can't calibrate further)

HVAC RMSE 33.43, MBE -.15, CV =.60 (can't calibrate further)

P81166
Climate Zone: 13

Title 24 Bldg Religious Worship,

Climate Site: Bakersfield AP

Conditioned Area: 14,415

Sizing Ratio: 0.866

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.78	0.72	186
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.9	PSZ	0.104	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.741	0.450	7.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	27.9	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.47	0.72	183
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.4	PSZ	0.217	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.553	7.8	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 73 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	25.00	8.80	2.39	27.12%
kWh	47,554.00	70,010.58	44,056.45	62.93%
Therms	-	70,010.58	(13.34)	-0.02%

Building Overview Notes

*Low realization rate due to building schedules (lighting, occupancy). Implementers probably used a standard occupancy and HVAC operational schedule whereas we tailored this to be site specific. If given a more "standard" schedule, the realization rates are within QC parameters except for kW which remains at 44%. However, site is built as surveyed and is accurate.

Data entry notes:

-The occupancy schedule is per the pastor, but the HVAC schedule given during the audit shows a much abbreviated HVAC usage. Pastor says that they are turned on and off as needed so it is difficult to take an "average" schedule. Relying on what is claimed by pastor since AC can be switched to turn on as needed.

S18005
Climate Zone: 8
Title 24 Bldg

General C&I Work

Climate Site: Mission Viejo
Conditioned Area: 67,158
Sizing Ratio: 1.101

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.81	0.20	672
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.0	PSZ	0.108	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	0.7	1.565
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.490	0.5	18.6	18.6

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.20	0.20	697
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.0	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	0.7	1.786
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.649	1.7	0.0	0.0

Table 74 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex Post Net/Ex-Post Gross)
Peak kW	20.00	29.27	25.16	85.97%
kWh	168,504.00	148,121.19	127,599.00	86.15%
Therms	(14.00)	1.61	3.28	203.63%

Building Overview Notes

Interior lighting measure only. Mainframe/Mini assy/shipping/test/QC room only, not the entire campus. No heating; cooling only.

S18010
Climate Zone: 9
Title 24 Bldg

Climate Site: West Covina
Conditioned Area: 139,208
Retail and Wholesale Store **Sizing Ratio: 0.832**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.99	0.66	473
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.2	PSZ	0.072	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.181	0.713	1.9	2.176
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.750	2.1	0.0	50.2

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.68	0.66	473
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.8	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	1.9	1.924
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.1	0.0	0.0

Table 75 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net savings	Net-to-Gross Realization rate (Ex Post Net/Ex-Post Gross)
Peak kW	205.00	105.40	66.14	62.75%
kWh	637,709.00	668,165.50	536,195.75	80.25%
Therms	-	134.56	134.64	100.05%

Building Overview Notes

- Most systems included an enthalpy economizer. All systems defined as including enthalpy economizer 2 units of 22 w/out economizers: (LGA036H2BS2G, LCA036H2B1Y)
- 2x Energy Recovery Ventilator installed in sales area: 950 CFM Intake/950 CFM Exhaust; 1/2 HP; Spinnaker RERV-1019L1-208/1
- Polyisocyanurate roof insulation supposedly installed. Project file does not indicate R value or thickness.

S18011

Climate Site: Ridgecrest

Climate Zone: 14

Conditioned Area: 18,200

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.524

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.12	0.76	289
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.140	0.070
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.720	8.6	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.66	0.76	289
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.217	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.410	8.6	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 76 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	9.00	9.11	7.88	86.51%
kWh	34,552.00	32,361.53	27,996.61	86.51%
Therms	-	32,361.53	(418.76)	-1.29%

S18012 **Climate Site: Tulare**
Climate Zone: 13 **Conditioned Area: 118,651**
Title 24 Bldg **Retail and Wholesale Store** **Sizing Ratio: 0.852**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.05	1.17	398
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.085	0.055
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.800	1.3	0.908
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.590	3.5	2.1	58.7

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.68	1.17	404
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.577	1.3	1.588
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.5	0.0	0.0

Table 77 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	264.00	140.43	102.76	73.18%
kWh	745,741.00	566,214.63	465,119.75	82.15%
Therms	(1,059.00)	566,214.63	16.05	0.00%

Building Overview Notes

Lower savings due to higher LPD for display lighting as surveyed (1.6) than was initially calculated by the utilities (1.38).
The actual square footage from plans (113,260 sqft) is significantly lower than what was assumed (134,000 sqft).

S18016
 Climate Zone: 10
 Title 24 Bldg

Climate Site: Ontario AP
 Conditioned Area: 129,690
 Retail and Wholesale Store Sizing Ratio: 0.914

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.15	0.22	367
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
11.1	PSZ	0.108	0.039
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.000	0.000	0.0	0.934
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.230	2.8	5.6	55.4

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.98	0.22	366
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
9.6	PSZ	0.689	0.077
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.000	0.000	0.0	1.294
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.710	2.8	0.0	0.0

Table 78 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	210.00	289.32	270.28	93.42%
kWh	676,296.00	983,819.50	929,321.13	94.46%
Therms	(535.00)	983,819.50	(0.09)	0.00%

S18018

Climate Zone: 9

Title 24 Bldg C&I Storage

Climate Site: Santa Fe Springs

Conditioned Area: 8,476

Sizing Ratio: 0.985

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.39	0.00	361
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.0	PSZ	0.217	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.351	0.613	0.8	2.460
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.000	2.5	0.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.10	0.00	365
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.6	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	0.8	1.941
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.5	0.0	0.0

Table 79 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	56.00	280.92	204.36	72.75%
kWh	562,273.00	1,280,662.63	928,361.13	72.49%
Therms	-	1,280,662.63	(0.02)	0.00%

Building Overview Notes

window U =1.19

Roof Wood U= 0.051

Wall U=0.266

Tracking savings is 562,273 kWhyr with a demand saving of 56.3 kW, which makes a 10,000 hrs a year-is incorrect

Actual = 267.00 - 172.7 = 94.3 kW and annual hours as 5,962 hrs

S18021
Climate Zone: 9
Title 24 Bldg

Climate Site: El Monte
Conditioned Area: 14,829
Retail and Wholesale Store **Sizing Ratio: 0.934**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.22	0.94	330
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.108	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	6.6	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	1.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.55	0.94	330
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.2	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	6.6	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 80 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	5.00	6.32	1.23	19.45%
kWh	17,831.00	32,582.47	5,787.56	17.76%
Therms	-	32,582.47	(7.12)	-0.02%

Building Overview Notes

Lighting measures only. The program savings were almost certainly calculated with the pre-24/7 schedule as the store had just recently switched to 24/7.

Store manager was "running errands" during site visit and authorized staff to allow me full access. Staff answered questions as well as they could in his absence.

S18044
Climate Zone: 6
Title 24 Bldg Restaurant

Climate Site: Carson
Conditioned Area: 6,102
Sizing Ratio: 0.935

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.24	3.36	102
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.5	PSZ	0.062	0.046
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.379	0.880	14.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.09	3.36	102
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.7	PSZ	0.110	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	14.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 81 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	5.00	4.79	0.54	11.28%
kWh	18,158.00	14,792.31	1,670.59	11.29%
Therms	-	14,792.31	(0.03)	0.00%

Building Overview Notes

-U values taken from T24 documents

S18114
 Climate Zone: 10

Climate Site: Riverside Exp Sta
 Conditioned Area: 101,211

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.808

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.03	0.33	613
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
11.3	PSZ	0.337	0.054
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.777	0.840	1.5	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	4.8	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.54	0.33	594
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
9.5	PSZ	0.649	0.051
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.493	0.700	1.5	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	0.0	0.0

Table 82 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	89.00	82.47	45.25	54.86%
kWh	293,269.00	368,469.75	223,046.88	60.53%
Therms	204.00	368,469.75	(32.33)	-0.01%

Building Overview Notes

Roof R value 19 , Wall U- value 0.337. Cooling EER 11.3.

PV cells were installed last year July 2008

Hvac Savings looks OK. Lighting savings seems lot more than expected.

S18117
 Climate Zone: 9
 Title 24 Bldg

Climate Site: Covina
 Conditioned Area: 14,678
 Retail and Wholesale Store Sizing Ratio: 0.842

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.51	1.47	408
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
10.8	PSZ	0.141	0.052
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.697	0.790	8.2	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	7.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.55	1.47	423
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
10.6	PSZ	0.478	0.075
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.839	0.700	8.2	0.000
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.000	0.0	0.0	0.0

Table 83 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	1.00	0.14	(0.21)	-155.56%
kWh	1,207.00	574.25	(554.75)	-96.60%
Therms	-	574.25	-	0.00%

Building Overview Notes

--The efficiency measures implemented for this store is for the HVAC units only. This includes RTU4,5,6. No other measures implemented.

-U-value per T24 for walls not realistic (.126) will assume overall wall R-value of 13

The only measures here are 3 rooftop heat pumps. A comparison of these units on a measures basis shows that it has an EER

less than the baseline, resulting in these negative numbers. The building overall does not meet T24 standards due to the low efficiency heat pumps installed.

S18118
Climate Zone: 6
Title 24 Bldg

Climate Site: El Segundo
Conditioned Area: 17,183
Retail and Wholesale Store **Sizing Ratio: 1.043**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.49	0.76	277
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.8	PSZ	0.454	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.277	0.920	8.2	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.7	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.59	0.76	281
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.8	PSZ	0.430	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	8.2	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 84 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	6.00	5.72	3.40	59.42%
kWh	10,938.00	13,838.13	8,257.41	59.67%
Therms	-	13,838.13	(0.62)	0.00%

Building Overview Notes

-Only incented measures are packaged rooftop units 1-4 (RTU1-4)

S18119
Climate Zone: 10
Title 24 Bldg C&I Storage

Climate Site: Redlands
Conditioned Area: 2,411
Sizing Ratio: 1.061

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.33	0.00	241
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.351	0.780	0.6	1.562
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.490	1.5	0.0	87.9

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.61	0.00	239
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.5	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.540	0.6	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	1.5	0.0	0.0

Table 85 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	129.00	131.83	117.11	88.83%
kWh	599,762.00	400,678.26	348,782.33	87.05%
Therms	-	400,678.26	-	0.00%

Building Overview Notes

- Initially occupied in August 2007
- Vacant building at time of audit
- 10 exhaust fans on the roof of the building (Greenheck RBUMO-3l48-50-F) [Fire service only]
- No plug loads added due to vacant condition
- Defined arbitrary lighting/occupancy schedule based on similar shipping/receiving centers surveyed

S18120

Climate Zone: 10

Title 24 Bldg C&I Storage

Climate Site: San Bernardino

Conditioned Area: 4,571

Sizing Ratio: 0.983

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.39	0.00	352
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.2	PSZ	0.148	0.048
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.749	0.570	0.7	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.2	100.0	98.5

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.61	0.00	339
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.0	PSZ	0.689	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.580	0.7	1.309
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.2	0.0	0.0

Table 86 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	187.00	96.22	92.74	96.38%
kWh	789,995.00	545,851.38	521,784.13	95.59%
Therms	-	545,851.38	-	0.00%

Building Overview Notes

- Actual operation of lights are off during daytime. Utilities uses a 24/7, 365 day schedule.
- Building envelope values are estimates based on similar building type and inputted to run model. However, this should not affect realization rates since envelope and HVAC systems are not included.

S18125
Climate Zone: 10
Title 24 Bldg C&I Storage

Climate Site: Fontana
Conditioned Area: 18,650
Sizing Ratio: 0.966

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.39	0.24	278
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.108	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.604	0.700	1.6	2.460
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.3	0.0	78.6

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.63	0.24	281
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.601	1.6	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.3	0.0	0.0

Table 87 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	127.00	152.42	13.75	9.02%
kWh	567,434.00	406,962.88	42,466.75	10.44%
Therms	-	406,962.88	-	0.00%

Building Overview Notes

Interior Lighting, Daylighting measures only.

Sole Technology has scaled back their operations; office space is only ~30% occupied, but warehouse is 100% staffed.

Other tenant is working at 100% occupancy.

Space names: spaces starting with "ST" are Sole Technology spaces; spaces starting with "OT" are Other Tenant spaces.

Battery chargers for forklifts operate overnight. Plug loads reflect this.

SCE used 2 shifts, 16 hours/day, 7 days/week to calculate program savings. In fact they operate 8 hours/day, 5 days/week

S18129
Climate Zone: 9
Title 24 Bldg

Climate Site: Monterey Park
Conditioned Area: 16,197
Retail and Wholesale Store **Sizing Ratio: 0.948**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.92	5.67	415
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.454	0.035
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.277	0.920	2.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	5.9	7.7

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.64	5.67	416
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.451	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.277	0.920	2.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

88 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	12.00	(2.89)	(3.68)	127.52%
kWh	37,727.00	(25,212.47)	(26,906.28)	106.72%
Therms	(163.00)	(25,212.47)	2.24	-0.01%

Building Overview Notes

Project documentation claims 50% of the installed wattage was controlled by daylighting systems. Based on the fact that there were no skylights and the window area was limited to the front elevation. Our engineer could not verify the controls existed. All of the lighting fixtures were on even the ones adjacent to the windows. For this reason we have assumed the fixtures nearest the windows are not controlled. Thus the lack of savings realization is occurring.

Occupancy/AC began on July 2006 not 2005 as entered.

-Daylighting controls not observed, all lights on near windows.

-U-value for windows= 1.13, SHGC=0.8 wall U=0.77 from T24 docs, roof is r19

-Numbers for LPD are indeed accurate based on plans available and measurements and observations taken from the field.

S18152

Climate Site: Elsinore

Climate Zone: 10

Conditioned Area: 19,136

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.720

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.81	1.80	638
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.689	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	3.1	2.587
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.804	1.1	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.81	1.80	639
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.7	PSZ	0.689	0.077
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.512	0.590	3.1	1.216
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.602	1.1	0.0	0.0

Table 89 -Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	4.00	1.59	1.37	86.08%
kWh	4,833.00	3,579.97	3,044.34	85.04%
Therms	-	3,579.97	(0.04)	0.00%

Building Overview Notes

7 Rtu's installed. 01Title 24 baseline
They installed PV cells on August 2008
Roof U value not available

S18162
Climate Zone: 8
Title 24 Bldg Grocery Store

Climate Site: Tustin Irvine Rch
Conditioned Area: 157,540
Sizing Ratio: 1.018

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.94	0.95	403
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.5	PSZ	0.138	0.046
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.547
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.490	4.6	0.0	15.6

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.63	0.95	405
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.922
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	4.6	0.0	0.0

Table 90 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	131.00	126.66	79.99	63.16%
kWh	610,961.00	700,600.75	547,633.50	78.17%
Therms	(2,477.00)	700,600.75	48.54	0.01%

Building Overview Notes

- Building occupied/conditioned in June 07, but since there is no place to put in data entry, it is left in June 06.
- Tires Sales included in Offices and Support Zone.
- This Costco does not pay electric bill for parking lot lights
- Assumed 20% outside air for all packaged units.
- Assuming R-11 walls, R-value for roof found in plans

S19003
Climate Zone: 10
Title 24 Bldg Office

Climate Site: San Bernardino
Conditioned Area: 293,814
Sizing Ratio:

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.97	5.16	397
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
14.2	PVAV	0.000	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.158	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.20	5.16	510
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PVAV	0.000	0.000
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.329	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 91 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	167.00	87.90	89.37	101.67%
kWh	347,959.00	251,582.50	269,243.00	107.02%
Therms	1,302.00	251,582.50	185.62	0.07%

Building Overview Notes

- Incented for HVAC measures which includes low SHGC glass, VFDs, and packaged systems.
- Floor areas are best estimates based on floor plan and sketches. Total conditioned floor area is within ~3.8% error to what is claimed.
- Glazing will exceed 40% of wall area and as observed.
- Exhaust fans are not exact but modeled as separate fans per zone. Actual CFM adjusted to match OSA and may not reflect values taken from mechanical schedule.
- Separate supply fan for OSA, modeled as part of main package system per floor. Actual OSA for package system is zero, but adjusted to both reflect the minimum OSA requirements and actual (separate) minimum supply fan capacity.

S19010
Climate Zone: 13
Title 24 Bldg Restaurant

Climate Site: Tulare
Conditioned Area: 6,295
Sizing Ratio: 0.773

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.96	11.22	138
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.8	PSZ	0.100	0.049
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.749	0.380	9.4	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	50.4

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.16	11.22	140
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.7	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.410	9.4	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 92 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	10.00	5.75	4.67	81.09%
kWh	31,863.00	10,527.41	5,209.28	49.48%
Therms	(123.00)	10,527.41	37.89	0.36%

Building Overview Notes

- U/SHGC values for roof/walls/ windows taken from T24 sheets. U-value=0.7 for double pane metal windows assumed.
- Information for compressor/condenser units not available. Condenser capacity and design values are estimates.
- Lighting verified and as per plans.
- Kitchen equipment energy values are estimates.
- Plans shows a control credit of 1285W for "dimming" feature as modeled.
- Systems incentives for LPD and rooftop HVAC units.

S19015
Climate Zone: 15

Climate Site: Palm Desert
Conditioned Area: 96,127

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.566

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.11	0.17	556
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.2	PSZ	0.410	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	8.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.52	0.17	550
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.5	PSZ	0.410	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.433	8.9	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 93 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	53.00	63.94	24.64	38.53%
kWh	290,296.00	303,963.88	79,238.88	26.07%
Therms	(129.00)	303,963.88	(32.80)	-0.01%

S19018
Climate Zone: 8
Title 24 Bldg Office

Climate Site: Irvine

Conditioned Area: 699,922
Sizing Ratio: 0.975

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.64	5.47	339
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.3	PVAV	0.112	0.071
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.767	0.558	47.7	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	52.1	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.05	5.47	340
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.3	PVAV	0.112	0.071
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.767	0.556	47.7	1.914
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	0.4	0.0	0.0

Table 94 -Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	160.00	308.05	123.76	40.18%
kWh	571,926.00	1,467,459.00	597,295.00	40.70%
Therms	-	1,467,459.00	172.56	0.01%

S19019
Climate Zone: 8
Title 24 Bldg Restaurant

Climate Site: Buena Park
Conditioned Area: 19,678
Sizing Ratio: 1.000

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.87	0.27	264
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
8.4	PSZ	0.108	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.369	0.762	1.2	2.467
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	1.7	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.52	0.27	264
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
8.4	PSZ	0.108	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.369	0.762	1.2	2.467
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	1.7	0.0	0.0

Table 95 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	7.00	11.59	10.17	87.73%
kWh	37,130.00	66,463.38	58,309.47	87.73%
Therms	2,634.00	66,463.38	-	0.00%

Building Overview Notes

Complete remodel of existing warehouse. "Office" space includes two restrooms and two changing/locker rooms.

Bakery lighting, bakery high-efficiency gas oven and office high-efficiency HVAC measures only.

Actual schedule is 14 hours a day, 365 days a year (with 16-hour operations four days a year)

S19023
Climate Zone: 6

Climate Site: Carson
Conditioned Area: 181,167

Title 24 Bldg

Office

Sizing Ratio: 0.568

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.82	2.81	1156
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7		0.242	0.050
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.687	0.404	23.4	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	7.0	8.8

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.18	2.81	1155
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.0		0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.400	23.4	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 96 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	91.00	95.99	80.20	83.55%
kWh	401,744.00	448,997.50	241,039.25	53.68%
Therms	7,914.00	448,997.50	1,453.93	0.32%

Building Overview Notes

-Wattage on exterior lights is an estimate.

-Number inputted for % OA is the % economizer is opened not necessarily the OA%.

S19029X
Climate Zone: 10
Title 24 Bldg Grocery Store

Climate Site: Chino
Conditioned Area: 46,920
Sizing Ratio: 0.970

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.42	6.30	485
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
14.6	MIXED	0.270	0.046
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.940	2.1	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.59	6.30	500
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.9	MIXED	0.270	0.046
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.940	2.1	1.545
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	1.3	0.0	0.0

Table 97 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	37.00	10.59	8.19	77.28%
kWh	411,422.00	122,942.00	103,138.00	83.89%
Therms	-	122,942.00	52.79	0.04%

Building Overview Notes

- Not occupied until June 29, 2006 (100% load from there on out)
- # of front 8' T8 fixtures reduced by 1 to match exterior surveyed LPD
- (-17) F42LL/2 lights subtracted from sales floor to match surveyed LPD
- 1 F42LL light added to match surveyed break room LPD
- (-5) lights subtracted from stock room to match surveyed LPD

S19045

Climate Zone: 8

Title 24 Bldg Grocery Store

Climate Site: El Toro MCAS

Conditioned Area: 48,420

Sizing Ratio: 0.575

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.28	1.91	494
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.7	MIXED	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.235	0.720	2.3	2.426
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	4.7	5.4	39.9

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.49	1.91	491
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	MIXED	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	2.3	1.912
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	4.7	0.0	0.0

Table 98 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	79.00	57.75	53.40	92.48%
kWh	450,661.00	529,055.50	492,121.00	93.02%
Therms	(6,435.00)	529,055.50	(3.04)	0.00%

Building Overview Notes

Modeling notes:

Actual lighting fixture types were not used in creating the LPD because the correct fixture wattages could not be found in the database for the actual fixture types.

S19065
Climate Zone: 8
Title 24 Bldg Office

Climate Site: Irvine
Conditioned Area: 16,616
Sizing Ratio: 0.717

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.94	1.56	328
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.0	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.912	0.754	10.5	2.465
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.790	4.8	86.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.10	1.56	329
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.8	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	10.5	1.943
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	4.8	0.0	0.0

Table 99 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	12.00	4.24	1.25	29.41%
kWh	26,529.00	977.73	(5,061.25)	-517.65%
Therms	-	977.73	(28.71)	-2.94%

Building Overview Notes

LPD savings not being realized because as surveyed Hours are less than the program estimate. KW is not being realized because not all fixtures are on Occ sensors and program assumed.

Exterior lighting lights changed to match surveyed LPD (actual lights include 5 664 W fixtures, 17 332 W fixtures, and 3 135 W fixtures, all MH)

S19066

Climate Site: Hanford

Climate Zone: 13

Conditioned Area: 12,517

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.981

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.95	0.30	238
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.107	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.631	0.880	24.5	2.433
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.000	1.0	30.3	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.32	0.30	238
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.107	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.631	0.880	24.5	2.433
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
1.000	1.0	0.0	0.0

Table 100 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	3.00	(2.01)	(3.85)	191.29%
kWh	3,713.00	(7,815.08)	(12,434.87)	159.11%
Therms	-	(7,815.08)	(0.54)	0.01%

Building Overview Notes

HVAC Measures only. 12.5-ton system not eligible, not included in measure calcs.

S19083
Climate Zone: 10
Title 24 Bldg C&I Storage

Climate Site: Ontario AP
Conditioned Area: 5,013
Sizing Ratio: 1.156

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.46	0.14	264
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.639	0.050
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.474	0.770	1.0	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	3.0	39.1	60.9

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.61	0.14	264
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.640	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.540	1.0	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	3.0	0.0	0.0

Table 101 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	64.00	45.57	3.66	8.04%
kWh	300,590.00	173,136.44	17,729.06	10.24%
Therms	-	173,136.44	-	0.00%

Building Overview Notes

Data entry notes:

-Year of occupancy/condition is 2007

-warehouse lights averaged out to get similar W/fixture.

Higher kWh savings is likely due to difference in operating hours from our interview versus the assumed operating hours used by implementer in calculations.

S19088
Climate Zone: 6
Title 24 Bldg

Climate Site: Long Beach AP
Conditioned Area: 132,557
Retail and Wholesale Store **Sizing Ratio: 0.699**

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.95	0.17	1418
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.8	PSZ	0.051	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	1.1	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	12.3	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.67	0.17	1353
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.9	PSZ	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	1.1	1.867
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	1.4	0.0	0.0

Table 102 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	136.00	28.84	(46.57)	-161.48%
kWh	523,507.00	580,553.25	115,399.75	19.88%
Therms	-	580,553.25	(1.64)	0.00%

Building Overview Notes

Began to reoccupy in mid-June, 2006. Reopened June 29, 2006.

S19105
Climate Zone: 14
Title 24 Bldg Restaurant

Climate Site: Lancaster
Conditioned Area: 6,726
Sizing Ratio: 0.635

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.00	10.20	143
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.8	PVAV	0.101	0.038
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.749	0.380	9.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.39	10.20	143
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.7	PVAV	0.410	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.548	9.5	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 103 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	9.00	9.24	1.19	12.89%
kWh	26,260.00	16,336.91	3,446.00	21.09%
Therms	-	16,336.91	-	0.00%

S19109
Climate Zone: 10
Title 24 Bldg C&I Storage

Climate Site: Redlands
Conditioned Area: 3,980
Sizing Ratio: 1.035

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.44	0.59	265
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.1	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.720	2.2	1.204
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	2.6	0.3	85.2

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.62	0.59	263
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.1	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.540	2.2	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.6	0.0	0.0

Table 104 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	55.00	73.81	73.78	99.96%
kWh	227,698.00	204,440.88	204,214.23	99.89%
Therms	-	204,440.88	-	0.00%

Building Overview Notes

-3 extra 4x6 T8 fixtures added; 1 extra 4x3 T8 fixture added to match surveyed LPD
-Plans indicate 4x3 T8 fixtures in offices; Surveyed lights were T5; chose T5 fixture code most closely matching planned T8
wattage of 93 (97 W fixture selected)

S19111
Climate Zone: 10
Title 24 Bldg C&I Storage

Climate Site: Redlands
Conditioned Area: 8,033
Sizing Ratio: 1.067

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.41	0.19	263
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.644	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.474	0.570	0.8	2.460
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	2.4	0.0	58.6

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.61	0.19	255
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.605	0.8	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.4	0.0	0.0

Table 105 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	175.00	273.82	244.39	89.25%
kWh	1,006,965.00	1,356,009.25	1,144,496.25	84.40%
Therms	-	1,356,009.25	-	0.00%

Building Overview Notes

- Realization Rate significantly reduced surveyed LPD
- Lighting count done completely manually; plans were not made available until after the site visit at the building owner's (Prologis) headquarters

S19112
Climate Zone: 8
Title 24 Bldg Grocery Store

Climate Site: Norwalk
Conditioned Area: 57,766
Sizing Ratio: 1.684

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.99	1.26	555
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
14.5	MIXED	0.108	0.037
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	1.1	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.57	1.26	558
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.7	MIXED	0.108	0.037
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.880	1.1	1.875
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	1.6	0.0	0.0

Table 106 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	32.00	16.96	(7.32)	-43.15%
kWh	291,110.00	157,799.81	(5,747.13)	-3.64%
Therms	(7,107.00)	157,799.81	(0.09)	0.00%

Building Overview Notes

Moved in during last two weeks of September, 2006.

S19114

Climate Site: Porterville

Climate Zone: 13

Conditioned Area: 138,613

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.875

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.06	0.49	393
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
11.1	PSZ	0.649	0.054
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
1.206	0.676	2.0	1.536
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.490	1.7	2.6	66.3

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.68	0.49	397
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
9.6	PSZ	0.649	0.051
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.493	0.540	2.0	1.575
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.710	1.8	0.0	0.0

Table 107 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	264.00	110.08	97.85	88.89%
kWh	745,471.00	480,536.50	450,855.25	93.82%
Therms	-	480,536.50	901.48	0.19%

Building Overview Notes

Added .1108 W/sqft for display lighting (removed for savings change test)

Lighting schedule unavailable (no plans)

Lighting fixture wattages pulled from other surveyed Lowe's in same region (Lowe's of Tulare)

S19121
Climate Zone: 14
Title 24 Bldg

Climate Site: Apple Valley
Conditioned Area: 135,854
Retail and Wholesale Store **Sizing Ratio: 0.893**

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.10	0.54	384
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.1	PSZ	0.150	0.072
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	2.4	1.922
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.890	2.5	2.7	63.3

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.68	0.54	394
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.408	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.530	2.4	1.588
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.670	2.5	0.0	0.0

Table 108 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	223.00	130.65	113.03	86.51%
kWh	686,835.00	625,003.50	558,502.25	89.36%
Therms	(2,969.00)	625,003.50	91.84	0.01%

S19125
Climate Zone: 9
Title 24 Bldg Restaurant

Climate Site: West Covina
Conditioned Area: 12,164
Sizing Ratio: 0.991

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.18	3.10	184
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PSZ	0.110	0.121
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	15.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.85	3.10	185
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.4	PSZ	0.110	0.121
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	15.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 109 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	216.00	215.50	160.83	74.63%
kWh	321,721.00	358,696.56	265,814.35	74.11%
Therms	-	358,696.56	(0.00)	0.00%

Building Overview Notes

*To calculate ballpark lights, we determined the average time at dusk per month and calculated the numbers of hours based on an 11PM shut off time. Based on conversation with staff, the lights are turned on 15 minutes before dusk. Hours per month from January to December are: 193.75,161,139.5,120,108.5,97.5,100.75,116.25,127.5,155,195,201.5
Hours were taken off for New Year's day, Thanksgiving, and 7 days in December to arrive at the final # of hours = 1658 hours/year
Savings = Baseline of (kWxhours) - As-built (kWxhours)
-1602 Watts per lamp, at 192 lamps
-Baseline are from life cycle cost sheet form Musco Lighting showing prior technology consumes 84.2 kW but now is 50 kW.

S19134
Climate Zone: 10
Title 24 Bldg Grocery Store

Climate Site: Upland
Conditioned Area: 48,530
Sizing Ratio: 1.053

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.06	1.74	354
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.060	0.049
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.767	0.940	8.5	1.159
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.490	2.3	0.5	9.4

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.48	1.74	355
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.8	PSZ	0.430	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.540	8.5	1.590
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.3	0.0	0.0

Table 110 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	33.00	54.47	46.69	85.73%
kWh	199,256.00	466,646.50	426,042.50	91.30%
Therms	(3,957.00)	466,646.50	2,135.20	0.46%

Building Overview Notes

Excessive refrigeration savings is because of the increased evaporative condenser efficiency over the base case air cooled condenser. Project did not capture this added efficiency in its EEM implementation.

-Relative humidity setpoints are estimates.

-Supply fan motor efficiency assumed at 86.5%.

-Hood CFM reduced to 390 due to OA limit. Actual is 1800 CFM. Exhaust fan CFM reduced accordingly in other zones to make up for OA limits.

S19152
Climate Zone: 13
Title 24 Bldg Grocery Store

Climate Site: Visalia
Conditioned Area: 148,947
Sizing Ratio: 0.855

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.50	1.55	403
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.5	PSZ	0.180	0.046
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	0.705
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.540	4.3	3.3	51.7

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.67	1.55	403
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	PSZ	0.365	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.000	0.000	0.0	1.588
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	4.3	0.0	0.0

Table 111 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	202.00	218.22	37.47	17.17%
kWh	780,261.00	851,847.00	227,831.00	26.75%
Therms	(7,899.00)	851,847.00	(19.27)	0.00%

Building Overview Notes

Data Entry Notes:

- Roof R=23, Wall R=11 per file.
- Assume OSA at 20% of total CFM, unless required for minimum ventilation.
- Assumed differential enthalpy economizers for all packaged units.

S19176

Climate Zone: 9

Title 24 Bldg Grocery Store

Climate Site: La Mirada

Conditioned Area: 14,380

Sizing Ratio: 1.063

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.01	1.61	495
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
12.0	MIXED	0.689	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.006	0.464	6.6	2.416
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.790	2.6	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.44	1.61	498
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
9.6	MIXED	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.700	6.6	1.902
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.6	0.0	0.0

Table 112 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	27.00	17.25	17.75	102.89%
kWh	172,936.00	124,127.31	129,981.94	104.72%
Therms	108.00	124,127.31	-	0.00%

Building Overview Notes

Office and warehouse lights actually 4' T5 2-bulb fixtures (modelled differently to match wattage)
-HVAC modeled as packaged units (actually tied in with the refrigeration system)

S19186
Climate Zone: 10
Title 24 Bldg C&I Storage

Climate Site: Hemet
Conditioned Area: 13,239
Sizing Ratio: 0.564

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.39	0.09	224
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.7	PSZ	0.148	0.048
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.133	0.450	0.5	0.792
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.620	2.4	34.3	65.7

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	0.60	0.09	208
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
10.5	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.605	0.5	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.4	0.0	0.0

Table 113 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	383.00	192.96	315.95	163.74%
kWh	2,784,748.00	1,262,176.00	1,963,988.50	155.60%
Therms	-	1,262,176.00	-	0.00%

Building Overview Notes

Data Entry Notes:

-Specifications for the heat pumps as provided by the utility appears to be based on a different spec sheet that does not match the packaged heat pump model numbers. Information entered per manufacturer's spec sheet. Actual systems found on site have

lower efficiencies than what was claimed.

-The exterior lights, # of battery chargers are an estimate.

-Guardhouse not included in LPD or as part of zones (8'X22'), not surveyed.

-Utilities simplified the hours of operation. More precise hours of operations of the entire facility as entered in the schedule tab.

Also assumed 50% of greater warehouse are daylight controlled.

S19187
Climate Zone: 10
Title 24 Bldg C&I Storage

Climate Site: Riverside Exp Sta
Conditioned Area: 15,473
Sizing Ratio: 1.054

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.45	0.49	348
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.5	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.720	2.3	1.204
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.570	2.4	2.3	33.4

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.61	0.49	341
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.4	PSZ	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.540	2.3	1.603
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.710	2.4	0.0	0.0

Table 114 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	198.00	163.68	113.87	69.57%
kWh	499,068.00	475,453.38	311,811.00	65.58%
Therms	-	475,453.38	-	0.00%

Building Overview Notes

-All lighting counts done manually

-6 extra warehouse metal halide lights added to match surveyed LPD

-Aside from main warehouse Metal Halide lighting, all lighting fixture types are estimates based on visual inspection on site. No

plans were available for fixture verification. (Only warehouse lighting incented)

S19189
Climate Zone: 10
Title 24 Bldg C&I Storage

Climate Site: Redlands
Conditioned Area: 4,400
Sizing Ratio: 1.143

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	0.39	0.00	880
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.649	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.940	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	0.60	0.00	880
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.3	PSZ	0.649	0.054
Window U-Value	Window SC	% Window Area	Skylight U-Value
1.409	0.940	0.0	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 115 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	87.00	112.19	112.19	100.00%
kWh	683,476.00	612,694.75	612,694.75	100.00%
Therms	-	612,694.75	-	0.00%

Building Overview Notes

The lower than expected kWh realization rate is due to the operation of the lights. Per conversation with multiple personnel and as observed on site, the facility manually shuts off lights from around 8:30AM to 6 PM to take advantage of the existing sky lighting.

Since there are no sensors installed in conjunction with this, no credit was given and only savings from the improved LPD are shown here.

S19192

Climate Site: Redlands

Climate Zone: 10

Conditioned Area: 61,600

Title 24 Bldg Retail and Wholesale Store

Sizing Ratio: 0.856

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.51	0.02	362
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
11.0	PSZ	0.148	0.072
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.418	0.575	2.3	0.680
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.890	2.6	0.0	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.66	0.02	367
<i>Cooling EER</i>	<i>Cooling Type</i>	<i>Wall U-Value</i>	<i>Roof U-Value</i>
9.8	PSZ	0.649	0.051
<i>Window U-Value</i>	<i>Window SC</i>	<i>% Window Area</i>	<i>Skylight U-Value</i>
0.493	0.575	2.3	1.577
<i>Skylight SC</i>	<i>% Skylight Area</i>	<i>% Ltg Occup Ctrl</i>	<i>% Ltg Daylight Ctrl</i>
0.710	2.6	0.0	0.0

Table 116 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	26.00	9.42	(0.50)	-5.30%
kWh	47,605.00	17,637.38	(1,379.63)	-7.82%
Therms	-	17,637.38	-	0.00%

S20021
Climate Zone: 10
Title 24 Bldg Grocery Store

Climate Site: Upland
Conditioned Area: 9,502
Sizing Ratio: 1.545

Building Parameters

Existing

	LPD	EPD	Cooling Cap sf/ton
	1.70	3.50	339
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
16.0	PVAV	0.649	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	25.2	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	15.9	0.0

Title 24 Baseline

	LPD	EPD	Cooling Cap sf/ton
	1.59	3.50	339
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PVAV	0.649	0.051
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.493	0.360	25.2	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 117 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	27.00	28.41	27.48	96.70%
kWh	172,457.00	224,469.06	214,306.44	95.47%
Therms	(713.00)	224,469.06	0.00	0.00%

S20046

Climate Zone: 9

Title 24 Bldg Grocery Store

Climate Site: Simi Valley

Conditioned Area: 9,502

Sizing Ratio: 1.581

Building Parameters

Existing

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.96	3.50	339
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
16.0	PVAV	0.689	0.032
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.777	0.570	25.2	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	13.9	0.0

Title 24 Baseline

	<i>LPD</i>	<i>EPD</i>	<i>Cooling Cap sf/ton</i>
	1.59	3.50	339
Cooling EER	Cooling Type	Wall U-Value	Roof U-Value
11.0	PVAV	0.689	0.075
Window U-Value	Window SC	% Window Area	Skylight U-Value
0.839	0.390	25.2	0.000
Skylight SC	% Skylight Area	% Ltg Occup Ctrl	% Ltg Daylight Ctrl
0.000	0.0	0.0	0.0

Table 118 - Gross and Net Evaluated Savings

	Ex-Ante Gross Savings	Ex-Post Gross Savings	Ex-Post Net Savings	Net-to-Gross Realization Rate (Ex-Post Net/Ex-Post Gross)
Peak kW	24.00	27.50	26.54	96.51%
kWh	158,580.00	253,601.75	246,588.19	97.23%
Therms	65.00	253,601.75	(26.81)	-0.01%

Building Overview Notes

Within QC parameters. Note that HVAC and lighting do not meet T24 due to the lower efficiency units and higher LPD as found onsite.

Data Entry Notes:

-Site occupied/conditioned in Sept 2007

-Uses the refrigeration system to cool the store by adding an air handler. This will be modeled similar to a separate packaged system.

-Lights incanted are "LED" for refrigerated cases, but we only have a "T-8" option, chose "T-8" option instead

Appendix N. Public Comments and Responses to Draft Evaluation Report

The following document is a compilation of the comments and questions raised by the four investor-owned utilities in response to the draft report posted December 2, 2009. At the close of the public comment period, KEMA addressed each of the comments; the responses are provided here.

Reference	Source	Subject:	Section/ Page	Type (Question or Comment)	Comment or Question and Response
1	PGE	Annual Gross Savings	3.4.1 / p.48	Question 1	Tables show dramatically larger error bounds for PG&E results than for those of other utilities. Please explain the basis for this. It is related to the small sample sizes and late schedule for review of PG&E programs?
				Response 1	The error bounds are a measure of the variability between the evaluated savings of each site from the realization rate for the utility. The high error bound means that there was a large amount of variability by site from the realization rate. For net savings this would be caused by responses to the free-ridership survey. The more variable the responses, the larger the error bound. For example, if every site had an 80% free-ridership the error bound would be lower than if the average free-ridership was 80% but sites varied from 0% to 100%.

2	PGE	Evaluating virtual programs	1.4 /p. 15	Question 2	<p>Recommendations state that virtual programs cannot be evaluated consistently with 'real programs' and that virtual programs should not be continued. Is this based on an assessment of how successful the market sector approach is compared with the specific program approach, or is this simply a reflection of what would be easier for evaluators?</p>
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				Response 2	We evaluated the state-wide SBD program; we did not evaluate PG&E's market sector approach and cannot comment on that approach as compared to the SBD program as implemented by the other Utilities. The statement refers to the anyone's ability to actually evaluate the program and to the tracking of "program" data, not simply the ease of evaluation, of the program.
3	PGE	Evaluation objectives	2.1 / p.17	Question 3	In the third bullet, concerning development of impact estimates for each utility, are you referring to gross, net, or both?
				Response 3	The report has been updated to specify that we are referring to both gross and net savings.
4	PGE	Gas sample design	3.4.3, p 53	Question 4	In order to get reasonable sampling for estimating gas savings, one would need a separate stratification and sample for sites having large gas savings. Current sampling is driven by electricity savings. Do you agree that a separate gas sample should be done? Should this be a recommendation for future studies?
				Response 4	We updated the report to say: The gas IOUs' tracking savings estimates have little correlation to the evaluated gas savings, especially in the case of the building simulation models. This result is similar to the gas savings finding in the previous SBD evaluation. As a result of this lack of correlation, a weighted

				<p>mean per unit estimate calculates a weighted average of the sampled gas savings and then multiplies this average by the number of sites in the population. The MPU approach was the approach used for many program evaluations prior to the switch to the ratio estimation approach, and is still being used by multiple evaluations for the 2006-08 program cycle. The advantage of using a ratio estimation approach is that it leverages information that is known about the population to both inform the sample design to more efficiently select a sample and to leverage that information to achieve more precise overall estimates. Although the MPU approach is not as efficient, it still provides a reliable estimate of savings provided that an adequate amount of the population savings is sampled. In the case of gas savings for SBD over 74% of the population savings was sampled, which is well beyond what would be necessary to have a reliable estimate of gas savings. The relative precision and error bounds for the MPU approach look at the variation of each site's weighted evaluated savings from the weighted mean of the sample. Therefore if you have a sample that has a wide range of evaluated savings, as is the case for SBD gas savings which range from ~800,000 to 3,000,000 therms, the error bounds will be large and the relative precision will be high. This does not mean that the evaluated savings are</p>
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					inaccurate; it simply means that there is a great deal of variation in absolute therm savings from site to site, which often depends on the size of the site and measure.
5	PGE	Gas savings findings	3.4.3, p 53	Question 5	The report says "The gas savings estimates have little relationship to the actual gas savings found in the evaluation." (1) Is this meant to refer to the site level, or the ex ante program level? "Without reasonable relationships between estimates and evaluation results it is difficult to say what the findings mean." (2) Can you explain more about what this means and what the program managers should do about it in future? Error bounds and relative precision are not reported, why? Other studies and parameters show wide variation from ex ante to ex post, but results are presented.
				Response 5	We updated the report, in section 3.4.3. (1) This means that the ex ante site level estimates are not closely related to the ex post evaluation results of the as installed and as operated measures. (2) This expression was intended to mean that the error ratio, which is a useful tool for interpreting the results and planning sampling plans, provided little guidance. (3) Error bounds and relative precision for gas savings are provided in the revised report.

6	PGE	Gas savings for electric utility	1.2 / Table 1□6 / p.5	Question 6	Table lists gas savings for an all□electric utility. Elsewhere, it is mentioned that some electric measures actually produced gas savings that overrode the negative gas savings (interactive effects with electric measures). Can this be more thoroughly explained?
				Response 6	Additional detail has been added to the final report in section 1.2 to enhance the explanation of the interactive effects.
7	PGE	Gross Savings by Measure Type	p. 46	Question 7	States, " The systems approach and Industrial approaches are additive in the results". Please explain further the meaning and effect of this statement.
				Response 7	The report now reads: The combined commercial total represents the sum of the system approach sites and the whole building approach sites. The total program savings is the sum of the combined commercial total and the industrial savings.
8	PGE	HIMs for whole buildings	Ch.4 / p.62	Question 8	Results are presented, but the intended use of the HIM values is not explained. Please confirm that the HIM values were not used in this study to determine results. If they were used, please explain how that was done.
				Response 8	The HIM for whole building is only evaluated within this evaluation, based on the buildings in these programs. The HIM results will be included in the ERT calculations.

9	PGE	Industrial analysis	2.1 / p.19	Question 9	There is a brief discussion here of how the baseline is determined for industrial projects, which is somewhat expanded upon further down in the report. Can you give some examples of where the program baseline was illegal or infeasible, to demonstrate how these important judgments are made and justified?
				Response 9	Simple examples include: There are food production and dairy applications where inlet and discharge are not allowed (not legal) for sanitary reasons. It is not feasible to use throttle control on a positive displacement pump. There are water and wastewater pumping applications that are traditionally served by level control, and it is highly unlikely that this would be used.
10	PGE	Net savings by measure type	Table 328 / p.57	Question 10	Why are the error bounds so huge for the PG&E industrial measures? Is this related to small sample sizes?
				Response 10	Error bounds are a measure of variability between a site estimate of savings and the realization rate across the utility. In PG&E's case, the savings estimates were more variable than the other utilities. Also, samples were drawn based on projects at the utility level and not at the measure specific level, so measure precision was not a goal.
11	PGE	NTG	NRNC, NTG	Question 11	NTG estimates are not explicitly stated in the report. These are important numbers for many purposes going forward. Please explicitly state the NTG estimates used.

				Response 11	The calculated NTG values have been added to the report.
12	PGE	Refrigeration savings	general	Question 12	Savings from refrigeration and refrigerated warehouses are mentioned only in passing. Were these included in the 'industrial' savings estimates? Please make explicit what the refrigeration results are.
				Response 12	Section 3.4 of the report now says: The refrigeration measure listed under the systems approach represent any refrigeration savings that were calculated from the building simulation tool. All refrigerated warehouses were considered industrial measures and used engineering calculations, not the building simulation tool, to calculate savings. The savings from these measures were included in the industrial measure savings.
13	PGE	Reported MWh discrepancy	1.2 / p.8 2.1 / p 18	Question 13	Thanks for confirming at the webinar that "Tracking MWh" reported in Table 2-1, p18, and ex ante gross MWh reported in Table 1-3 on p 8, are meant to be the same. However, they are different (68,376 MWh vs. 68,156 MWh). What accounts for the discrepancy?

				Response 13	Tables are now corrected and consistent in the report.
14	PGE	Response bias	3.3 / p 43	Question 14	This section discusses various sources of sample bias. Could an additional type of response bias be present? In particular, could some respondents claim "energy efficient" decision making because that is the correct socially acceptable response? This is a well-known problem in energy efficiency program evaluations. What was done to control for this in this study?
				Response 14	In general, we have found that new construction design decisions are quite costly and usually born of careful consideration and discussion. We find the type of "socially-acceptably green" bias to be a lesser problem in NRNC cases than retrofit or residential decision-makers, due to structure of the new construction design teams. When we bring them back in time to the point of the decision making, we bring them to a discussion or argument, typically not a decision one person made in privacy of their own mind. Our fundamental approach for reducing bias in general is to try our best to have the respondent be interested in the survey and telling the truth. We only use veteran surveyors and we establish the scope Program interaction before asking the scoring questions. When a respondent indicates there is no Program influence on the implementation of any measure, they have to say

					<p>it twice. When they are asked what would have occurred in the absence of Program interaction, they first must give a consistent answer and they have to explain their answer. A simple “we would have done it anyway” does not suffice. We probe until we are satisfied with their answer as to why they would have done it anyway. If we have established that the project received timely design assistance and/or design analysis, we ask them to confirm that these efforts had no bearing on the implementation. This is especially true if they rated Program components as valuable.</p>
15	PGE	Sample design	2.1 / p.17	Question 15	<p>States that the sample was drawn before you could determine which sites were industrial or whole building. Then, as sampling discussion continues, this problem ripples through the entire evaluation process. How do you know that this sampling approach does not disadvantage either industrial or whole building sites? Later on (p. 19), you explain that the industrial and whole building results were expanded up to the population. How could you develop sample weights, if you can't identify which are which in the population?</p>
				Response 15	<p>Updated report (section 2.1) to explain that samples were drawn and weights were calculated by utility and project and not by measure or type of project. The "by measure" and the commercial versus industrial results tables are just to provide some additional information but the sample design was</p>

					conducted to calculate savings at the utility level based on ex ante project savings estimates regardless of measure or facility use.
16	PGE	Sample design	3.1.2	Question 16	Section 3.1.2 describes two phases of sample designs, but never makes it clear how the designs were actually executed. It is conventional to report on the plan, the number of attempts to recruit, the number of refusals, the numbers of final surveys, and the numbers used in the final analysis, with explanations for how and why reality deviated from the ideal. This is typically related to the population, with the sample weights indicated. In this case, it would also be useful to show how these varied by utility, and by whole building/systems analysis/industrial participants. Can this information be included and clearly explained in the report?
				Response 16	We have added to the sample design section, section 3.2.2 of the report, a summary that outlines the final sample design, number of calls places, number of sites dropped due to inability to recruit, reasons for dropping sites, along with the stratum weights by utility for electric and gas savings. Samples were designed at the utility level and not by approach, measure, or building type.

17	PGE	Sample design	p.32	Question 17	States that projects in the sample were enrolled in 2008. Did you mean to say that the sample projects were COMPLETED in 2008, regardless when they were enrolled?
				Response 17	Yes, this was meant to say completed in 2008, the report has been updated.
18	PGE	Savings estimates	NRNC, General	Question 18	How were annual savings estimated for specific sites/projects when savings are influenced by recession factors, such as reduced plant output, reduced operating hours, etc? Are savings estimates in the report intended to represent current year annual savings, or average measure lifetime annual savings?
				Response 18	Each program evaluation looks at the buildings as they are in operation at the time of the evaluation. Sites that are not fully occupied or not operating at full capacity due to economic or other factors are modeled as found. When during a boom time, a plant is running more hours than normal, savings are based on the additional hours of operation; during downtimes plants are running less hours or not at all; the first year savings are based on the as-built and as-operating information.

19	PGE	Self-selection bias	3.3 / p.42	Question 19	Self selection bias is defined, but can you also explain what was done to correct for it in this study?
				Response 19	Self-selection into the analyzed sample was avoided as much as possible rather than corrected for. A minimum of seven calls at different times of the day and different days of the week before a site was dropped. Only the most convincing and tenacious recruiters were utilized for this effort. When a site contact attempted to flatly refuse to accommodate the evaluation efforts, they were reminded that they were contractually obligated to allow reasonable evaluation efforts. Of the 199 calls made, there were only eight outright refusals.
20	PGE	Survey IT database	3.1 / p.29	Question 20	Will the Survey IT database be made available for other researchers, as were the previous NRNC databases from evaluation studies managed by the utilities? This database is an important research tool for codes and standards, program planning, and other building science purposes.
				Response 20	Yes, the Survey IT database will be made available and added to the Appendices as Appendix M.
21	PGE	Systems approach	2.1 / p. 19	Question 21	Gross Whole Building Analysis is described, but no mention is made of the important program Systems Analysis approach. Please confirm that participants using that approach were essentially treated as whole building projects, and that savings

					could end up larger or smaller at the building level than just the Systems measures installed.
				Response 21	Yes, that is correct for commercial systems projects. Complete simulation models were created for “system projects.” The difference between the “measures only savings” and the “whole building savings” are that these “system projects” had better□than□code attributes as part of the building but were not incented measures.
22	SCE (Kathy Gumbleton)	Appendix K	p xi	Question 22	What is appendix K? Are these projects of a specific type? Are the savings in the Appendix K table ex ante or ex post, net or gross?
				Response 22	The old Appendix K has been revised in the report to include a list of site level results for Whole Building approach sites including ex□ante, ex□post gross, and ex□post net savings. It is now Appendix L.
23	SCE (Kathy Gumbleton)	HIMs		Question 23	At the webinar, you confirmed that the HIM results were applied to estimate program savings? Please confirm this in the report.
				Response 23	The report has been updated in section 4.1 to explain what HIMs are and how they are used.
24	SCE (Kathy Gumbleton)	Industrial analysis spreadsheets	3.1/ p.29	Question 24	Will the analysis spreadsheets be made available for reviewers?

				Response 24	Analysis spreadsheets can be made available for review through site-specific requests to ED.
25	SCE (Kathy Gumbleton)	PGE SBD virtual program	NRNC p 4	Question 25	P 4., the report implies that the projects from PG&E's SBD program are distributed across three contract group studies, NRNC, Ag/Food, and Industrial. Is this correct? Can the evaluators clarify which projects are covered by which evaluation? (Note that the Ag/Food evaluation specifically states that new construction projects are NOT covered in that evaluation, although they appear to be.)
				Response 25	We have provided a list of all sites included in the analysis for PG&E for the NRNC program. ED responded to this data request from PG&E giving them all PG&E NRNC population as used across all the evaluation contracts.
26	SCE (Kathy Gumbleton)	Phase II Sample Design	p.37	Question 26	Describes problems of separating out 'virtual program' participants into their respective 'real program' buckets... is the CPUC confident that it captured all of the virtual program savings among these evaluations, or is it possible that some savings fell 'between the stools'?
				Response 26	For the ERT process each evaluator is responsible for identifying each site that falls under their program. These lists are all then compiled into a master database and then checked against the

					utility databases to make sure that each measure in the utility database is accounted for by an evaluation group and that no measures are being evaluated by multiple evaluations. In this way we are ensuring that no savings fell between the cracks and no projects were double-counted.
27	SCE (Kathy Gumbleton)	TBDs	60-61	Question 27	Why are some values TBD? (See table 3-36)
				Response 27	There were sometimes values that were still missing or uncertain when the draft report was produced. Some of the reasons that the values were not ready at the time of the report include: field work was being completed too close to the report due date, lack of cooperation from sites to provide data, and the desire to hold off producing final results until we had sufficient answers to questions. We have updated all TBD values in the final report.
28	SDGE/SCG	Error bounds	Section 3 tables	Comment 28	On a measure-specific level, the error bounds for some of the measure savings calculated exceed the point estimate for ex post savings. This is evident in Tables 3-12, 3-14, 3-17 and 3-20, primarily for SCE and PG&E-specific measures. Again, this raises the question regarding the validity of the sample design and ultimately the reliability of study findings for gross electric and natural gas savings.
				Response 28	Savings for the NRNC program were calculated at the utility level, not based on the measure-specific universe. The addition of

					<p>measure-level data was a post-analysis display of information. It was never a goal of the evaluation to obtain precision at the measure level in NCCS except for whole-building, which is an HIM. For MWh the relative precisions for PG&E, SDG&E and SCE were within $\pm 10\%$ at the 90% level of confidence (for SCG the majority of projects were evaluated due to the low number of projects in the program). For gas savings Mean Per Unit (MPU) estimation was used and the error bounds and relative precision do not represent the variation from the realization rate of tracking to evaluated savings, but rather the amount of variation between the estimates and the weighted mean. For gas savings over 70% of the total program tracking savings were evaluated, so we feel confident that our estimate for the IOU level savings is very good.</p>
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29	SDGE/SCG	Gas sampling		Comment 29	<p>The Joint Utilities find with respect to the natural gas estimation the same sampling issues brought up in Comment 1 related to the electric savings are the same if not more egregious. Furthermore, the evaluation study (at page 10) notes that the “basic gas savings estimation techniques used by the utilities needs to be fundamentally re-examined. The lack of relationship is so poor that error bounds and relative precision have essentially no meaning.” As a result, in table 1-5, no relative precision is shown. The Joint Utilities believe this is because the study was designed based on electric savings and no separate sample designed for natural gas savings. There is no analysis to show that the electric sample suffices as a substitute for a natural gas sample. The Joint Utilities conclude from this that it is impossible to draw any inference about how close the utilities came to achieving their target natural gas goals. It indicates the modeling is so flawed that it produces no usable information. If this is indeed correct, then the Joint Utilities recommend that the gas model, and this portion of the results, not be accepted as reliable or used for updating DEER or used to measure utility performance in the ERT and VRT process.</p>
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				Response 29	<p>With over 70% of the total program tracking gas savings sampled we feel confident that our sample is more than adequate to represent the gas savings for the NRNC program. Weights were calculated separately for electric and gas savings so that each site would accurately represent its contribution to the population. The lack of correlation between tracking and evaluated savings for simulation building models meant that we could not use the same ratio model that was used to analyze the electric savings. The precision and error bounds for the Mean Per Unit (MPU) analysis that was used on gas savings measures the variability of site savings from the weighted mean, which means that if there is a large amount of variation in savings across the sample then the precision will be high and the error bound will be big. This does not mean that the estimates are inaccurate, but simply that there is a great deal of variation (from □800,000 therms to 3,000,000 therms in the case of gas savings). The ratio model is able to deal with the larger variation by calculating at realization rate between tracking and evaluated savings, in that way even with a range of 0 to 5,000,000 MWh, the precision measures the variability of each site to the realization rate and not the weighted mean of the sample.</p>
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30	SDGE /SCG	NTG		Comment 30	<p>It is interesting that a program that is extremely complicated and requires several decision making points over potentially several years (and as noted in the study over several program cycles) with T24 code changes potentially impacting the building project, that the study would resort to depending on a mere 3-question self report procedure. In addition, the methodology documentation (in Appendix D) does not adequately explain the statistical basis for aggregating the responses from the 3 questions and coming up with a reliable statistic to be used in measuring free-ridership (at page4). Furthermore, the scoring methodology for the questionnaire is on a relative not absolute scale, discrete versus continuous scale and therefore the results could vary depending on how the scale is determined. Again, there is no explanation why the choice of the scale is adequate. For example, participant D63257 has a NTGr of 87% based on the 0-6 scale, would the NTGr be different if scale had been 0-10 or 0-100? A sensitivity analysis would have been useful to make this determination and provide the program with a reliable estimate of free-ridership. The following provides an example of why the NTGr self-report and the interpretation accorded the response is questionable and may indicate an inherent bias in the evaluation. The discussion for Participant G70010 goes as follows:</p>
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				<p>“Discussions with the facility owner indicated that while SBD was influential in the implementation of the measure. The site contact said the Program is particularly useful because it verifies the validity of energy efficiency ideas generated within the company. The site contact stated that SBD representatives are helpful because they either “confirm what we think [about an energy efficiency project], refute it, or cause us to rethink it”. The site contact also indicated that in the absence of the program, there is a “50/50” chance they would have gone with different equipment because the installed ovens were very expensive. The site contact’s combination of answers yielded a free ridership score of 3.0 out of 6, or 50.0% free ridership. Site net savings were therefore 50.0% of gross savings.” It appears that the participant attributed many benefits to participating in the program and working with program staff. However, the one question that the interviewee responded, that it was “50/50” chance they would have gone with different equipment because the installed ovens were very expensive” resulted in this project having a NTGr of 50%. How does the methodology account for the extremely positive responses and the one indecisive response of 50/50 resulting in 50% NTGR? It is problematic that when the interviewee does not know or does not remember or is uncertain in Question 23, the participant gets a score of 0. This is common for projects with extended timelines. A score of “0” is a significant in that the most you can score if they responded 10 to both Question 22 and Question 24 is 66%. The study does not explain why this adequate treatment for a response that is more akin to a non-response. If the respondent selects a Q23 response that gives them a score of 1, the total score becomes 83%. This is a huge step function and the program would never get a NTGr between 66% and 83%. What exacerbates the problem is that this is done on a measure basis, if the respondent installed several measures, how does the methodology do internal consistency validation? Below is the Question 23: Q23. How did Savings By Design influence the implementation of (maximum of 2 points) Open ended Question that is coded: 1 = SBD had no influence on this measure 0 points 2 = SBD representative first suggested/introduced measure 2 points 3 = SBD performed simulations and/or design analysis 2 points 4 = SBD incentive made this measure an “easier sell” 1 points 5 = SBD incentive helped the measure meet investment criteria 2 points</p>
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				<p>6 = Prior SBD projects have had success with this measure 1 points 7 = DK, Not Certain, Can't Remember 0 points 50= other individually assessed The Joint Utilities, therefore, conclude that the NTGr estimate or the net savings impacts may not be as reliable as the results show and the Joint Utilities do not recommend the use of these results. Overall, the Joint Utilities find that the sample design and NTG methodology raise significant questions regarding the validity of the ex post results. The Joint Utilities recommend that these issues be addressed and the results re-evaluated prior to using any of the study results for DEER updates or for the Verification Report.</p>
			Response 30	<p>Although it is correct that the SBD decision-maker survey uses the responses from three questions for each measure in order to assign a NTG ratio, the approach goes beyond these questions. The survey uses a fairly lengthy set of warm-up questions to bring the respondent back to the time and place when the decisions were made. The respondents are asked when the first interaction with the Program regarding this project was and to rate the value of the individual Program components, specifically, the incentive, design assistance, and design analysis. The responses to the three NTG questions need to be consistent with these responses. If not, we ask the respondent to clarify these inconsistencies. Frequently, this results in going back and changing the score to reconcile the responses. Finally, the surveyor always asks "why" when the decision-maker responds with a low number for Q23, in order to be more informative as to the cause of the free-rider and be certain that respondent understands the question being asked. In essence, the two basic aspects of Program are being probed here. One is Program influence on the implementation of the measure, and the second is what would have happened in the absence of the Program. In the scoring, these are given equal weight. The program influence is assessed by asking the decision-maker how influential the Program was on the implementation the measure and how the Program came to influence the measure. The perceived influence is part of the score, but the "how" is given the twice the weight than the perceived influence. The six-point scoring was the way we balance the relative importance of the three questions. The linch pin of this approach is asking how the Program influenced the measure without prompting. This forces the decision-maker to remember back and articulate the mechanism</p>

					<p>of influence instead picking one of the prompts. This brings them back to the moment of decision, and doesn't allow for uninterested respondent to continue without some serious thought to what happened at the time. The initial decision to not give credit for a respondent's inability to remember or articulate the mechanism of influence was based on surveyor's impression that most decision-makers could remember the decision process when they tried, and not being able to come with a mechanism was an indication there wasn't any influence. In practice, this type of response so rarely comes into play that it has had no affect on results and the scoring has never been revisited. Note that the surveyor's initial reply to someone who doesn't know or can't remember how the measure implementation was influenced by the Program was to ask for contact information for someone that would be better informed. For some projects, as many as four different decision-makers were contacted in order to get answers for this wide variety of questions. The write-up G70010 is in error, the tables are corrected; the measure net-to-gross ratio is 0.67, not the 0.50 as previously written in the text. .</p>
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31	SDGE/SCG	Outliers	Study Appendix G120006	Question 31	<p>In the Study Appendix, there is documentation provided for each of the study participants. In the case of participant G120006, it states that the customer did not provide requested data to adequately evaluate the site. In spite of this, the evaluators proceeded with their estimation using a different measure to determine its realization rate, resulting in an extremely low realization rate of 12%. The study does not explain either, why this is not an outlier and therefore removed from the study or why the substitute measure provides adequate representation and therefore the results are useable. The study should explain their treatment of outliers or non-responsiveness if they continue to use these sample points.</p>
				Response 31	<p>We were promised by the site contact that they would provide the essential data to evaluate the second measure and held out hope that we would be receiving it in time until the very last day. The choice to apply the gross realization rate for the first measure to the second measure was an 11th hour decision and in retrospect was probably not the best way to establish savings for this site. The results have been revised and are based solely upon the results for just the single measure with sufficient data.</p>

32	SDGE/ SCG	Realization rates	overall	Question 32	Overall, the evaluation suggests that the non-residential new construction program is a success. However, the SDG&E and SCG results do not have the same realization rates as PG&E and SCE. There is no explanation of why SDG&E and SCG programs do not achieve at the level of SCE and PG&E's programs. Is it perhaps a result of the sample design issue raised in the first comment or are there legitimate program design or program participant differences (e.g., mix of building types, greater free-ridership, modeling issues) or some other factors that account for these differences? The evaluation report should provide explanations for their findings.
				Response 32	We consider the program to be a success because there are substantial gross savings with a substantial portion of those savings being program-induced. Each Utility operates the SBD program in its own manner. This kind of variation between utilities operating similar programs is normal and cannot be explained without an extensive process evaluation that would get into the way participants are recruited by account executives, the quality of the engineering analysis and oversight, as well as the mix of known and innovative measures.
33	SDGE/ SCG	Sample design		Comment 33	The study does not explain how the sample was stratified across the service territories. It is not clear why the sample percentage relative to the IOU program population and gross KWH savings for

					<p>SDG&E would have a relatively higher number of sample points compared to SCE and PG&E. It is interesting that the final sample selection results in relative precision rates for PG&E and SCE that are at least twice that of SDG&E. This would imply that if the results were applied on a utility basis, that each utility's results do not have the same level of reliability. This discrepancy should be adequately explained in the study and a thorough discussion how this disparity does not ultimately affect the reliability of individual IOU results. On the other hand, because the study does not explain how the results are to be used for the final verification report, the evaluation study should clearly discuss the applicability of the results when used either on a statewide basis or on an IOU basis.</p>
				<p>Response 33</p>	<p>The sample was designed and stratified for each utility separately to target +/- 10% precision for electric energy savings. The sampling was conducted in two phases, the first phase sampling sites that were completed in 2006-07 and the second phase for sites completed in 2008. When we were designing the sample we forecasted the number of projects completed in 2008 based on the assumption that the Program population for each utility would be approximately half of the 2006-07 population. Using these predictions we allocated samples to utilities to achieve the targeted precision.</p>

					<p>SDGE had a very low number of sites completed in 2008, so some of the sample points that were allocated for SDGE were allocated to PG&E and SCE in the phase 2 sample designs. Even with this reallocation, SDGE was still sampled at a higher percentage due to this downturn in 2008 completions. However, please keep in mind that when using ratio estimation, as we did for the electric evaluation, the relative precision is not strictly a function of sample size relative to the population. Even if each utility had the same number of sample points or % of sampled savings, the precisions would vary by utility based on the relationship between the tracking and the evaluated savings. The more consistent the relationship is, the smaller the relative precision will be. SDGE had more sample points than was necessary to achieve the targeted precision for kWh given the relationship between their tracking and evaluated savings, which is why the precision ended up being half that of the PGE and SCE. Likewise for the gas savings evaluation, that used a mean per unit approach, the variations from the weighted mean drive the relative precision to a larger degree than sample size and percentage of population. The variability of the precision between utilities is normal and the results of the analysis are valid at both the IOU and statewide level. Variability in precision does not make the estimate of savings invalid or unreliable; it is a measure of the variability between the utility tracking estimate and the evaluated savings estimate.</p>
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