

APPENDIX F
EFFECTIVE USEFUL LIFE VALUES FOR
MAJOR ENERGY EFFICIENCY MEASURES

DSM Measure Life Project

Master Table of Measure Life Estimates

Table 1: Non-Residential Measures

Measure ID	Measure Description	Application	PG&E		SDG&E		SCE		ISCC
			New	Retro	New	Retro	New	Retro	
1	Broiler - Instantaneous Gas	All Applications				8.0			
2	Broiler to Griddle Replacement (Gas)	All Applications			8.0				
3	Coffee Maker - Insulated	All Applications			EA1				
4	Controls - Solid State	All Applications			8.0				
5	Cooking Equipment - Efficient	All Applications			EA1				
6	Dual Mode Steamer - Gas	All Applications				9.0			
7	Fryer - Insulated	All Applications			EA1				
8	Hot Top Range Replacement	All Applications			8.0				
9	Process Cooking	Commercial			EA1				12.0
10	Process Cooking	Industrial							EA1
11	Process Cooking - Heat Recovery	Industrial							20.0
12	Range/Stove - High Efficiency Gas	All Applications							EA1
13	Engine - High Efficiency Gas	All Applications							15.0
14	Ballast - Dimmable	All Applications			8.0				A
15	Ballast - Electronic	All Applications			EA1				
			16.0	16.0	16.0	16.0	10.0	10.0 *	
			EA1	EA1	EA1	EA1	EA	EA	

Note: Measure life estimates are stated in years. Letters in the shaded rows identify the source of the measure life estimates, as detailed on Page 23.

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#	End Use	Measure	Application	RGE		SDG&E		SCE		SCG	
				New	Retro	New	Retro	New	Retro	New	Retro
16	Lighting	Ballast - High Efficiency Hybrid	All Applications			16.0	16.0				
17	Lighting	Bypass/Delay Timer - Lighting	All Applications		8.0	CA1	CA1				
18	Lighting	CF Screw-in - Disposable (Integral)	College		2.9	CA1	2.0	2.2 *	2.2 *	10.0 *	
19	Lighting	CF Screw-in - Disposable (Integral)	Grocery		1.4	CA1	1.0	2.2 *	2.2 *	BA	
20	Lighting	CF Screw-in - Disposable (Integral)	Hospital		2.5	CA1	1.0	2.2 *	2.2 *	CA1	
21	Lighting	CF Screw-in - Disposable (Integral)	Large Lodging		2.5 *	CA1	1.0	2.2 *	2.2 *	CA1	
22	Lighting	CF Screw-in - Disposable (Integral)	Large/Medium Office		2.9 *	CA1	2.0	2.2 *	2.2 *	CA1	
23	Lighting	CF Screw-in - Disposable (Integral)	Nursing Home		2.5 *	CA1	1.0	2.2 *	2.2 *	CA1	
24	Lighting	CF Screw-in - Disposable (Integral)	Other Applications		2.5	CA1	2.0	2.2 *	2.2 *	CA1	
25	Lighting	CF Screw-in - Disposable (Integral)	Restaurant		2.1	CA1	1.0	2.2 *	2.2 *	CA1	
26	Lighting	CF Screw-in - Disposable (Integral)	Retail		2.1	CA1	1.0	2.2 *	2.2 *	CA1	
27	Lighting	CF Screw-in - Disposable (Integral)	Schools		4.8	CA1	3.0	2.2 *	2.2 *	CA1	
28	Lighting	CF Screw-in - Disposable (Integral)	Small Lodging		2.5 *	CA1	1.0	2.2 *	2.2 *	CA1	
29	Lighting	CF Screw-in - Disposable (Integral)	Small Office		2.9 *	CA1	2.0	2.2 *	2.2 *	CA1	
30	Lighting	CF Screw-in - Replaceable Lamp (Modular)	College		5.7	CA1	CA1	12.2 *	12.2 *	CA1	

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Table 1: Non-Residential Measures

Measure ID	Measure Description	Application	EPCSE		SIC&E		SOF		SCG
			Ref	New	Ref	New	Ref	New	
31	CF Screw-in - Replaceable Lamp (Modular)	Grocery	2.9				12.2 *	12.2 *	
			CA2				CA1	CA1	
32	CF Screw-in - Replaceable Lamp (Modular)	Large Lodging	5.0 *				12.2 *	12.2 *	
			CA2				CA1	CA1	
33	CF Screw-in - Replaceable Lamp (Modular)	Large/Medium Office	5.9 *				12.2 *	12.2 *	
			CA2				CA1	CA1	
34	CF Screw-in - Replaceable Lamp (Modular)	Other Applications	5.0				12.2 *	12.2 *	
			CA2				CA1	CA1	
35	CF Screw-in - Replaceable Lamp (Modular)	Restaurant	4.2				12.2 *	12.2 *	
			CA2				CA1	CA1	
36	CF Screw-in - Replaceable Lamp (Modular)	Retail	4.3				12.2 *	12.2 *	
			CA2				CA1	CA1	
37	CF Screw-in - Replaceable Lamp (Modular)	School	9.5				12.2 *	12.2 *	
			CA2				CA1	CA1	
38	CF Screw-in - Replaceable Lamp (Modular)	Small Lodging	5.0 *				12.2 *	12.2 *	
			CA2				CA1	CA1	
39	CF Screw-in - Replaceable Lamp (Modular)	Small Office	5.9 *				12.2 *	12.2 *	
			CA2				CA1	CA1	
40	Compact Fluorescent Hardwire Fixture	All Applications	16.0	12.0				12.2 *	
			BA1	BA1				CA1	
41	Delamping/Fixture Modification/Remove Lamps	All Applications	16.0		16.0				
			BA1		BA1				
42	Exit Sign - CF Hardwire Kit/LED/Electroluminescent	All Applications	16.0	12.0	12.0			15.0 *	
			BA1	BA1	BA1			EA	
43	Fixture Modification/Replace Lamps and Ballast	All Applications	16.0					10.0	
			BA1					EA	
44	Fluorescent Fixture	Incandescent Replacement	16.0					15.0 *	
			BA1					EA	
45	Fluorescent Fixture - T8	All Applications	16.0					15.0 *	
			BA1					EA	

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Table 1: Non-Residential Measures

ID	End use	Measure	Application	PG&E		SDG&E		SCE		SCG	
				New	Retro	New	Retro	New	Retro	New	Retro
46	Lighting	Halogen Lamp	Grocery		0.3						
47	Lighting	Halogen Lamp	Office/College		CA2						
48	Lighting	Halogen Lamp	Other Applications		CA2						
49	Lighting	Halogen Lamp	Retail/Restaurant		0.5						
50	Lighting	Halogen Lamp	Schools		CA2						
51	Lighting	High Intensity Discharge (HID) Fixture	All Applications	16.0	16.0				15.0 *		
52	Lighting	Luminaire Maintenance	All Applications	EA1	EA1				EA		
53	Lighting	Metal Halide Fixture	College/Hospital/ Nursing Home	16.0 *	16.0	16.0	16.0	16.0	15.0 *		
54	Lighting	Metal Halide Fixture	Grocery	EA1	EA1	EA1	EA1	EA1	EA		
55	Lighting	Metal Halide Fixture	Lodging - Large	16.0 *	16.0	16.0	16.0	16.0	15.0 *		
56	Lighting	Metal Halide Fixture	Lodging - Small	EA1	EA1	EA1	EA1	EA1	EA		
57	Lighting	Metal Halide Fixture	Restaurant	16.0 *	16.0	16.0	16.0	16.0	15.0 *		
58	Lighting	Metal Halide Fixture	Retail	EA1	EA1	EA1	EA1	EA1	EA		
59	Lighting	Metal Halide Fixture	School	16.0 *	16.0	16.0	16.0	16.0	15.0 *		
60	Lighting	Occupancy Sensor	All Applications	8.0	8.0	8.0	8.0	8.0	10.0	10.0	

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Table 1: Non-Residential Measures

#	End Use	Measure	Application	RC&B		SDG&B		SCE		SCG	
				New	Refr	New	Refr	New	Refr	New	Refr
61	Lighting	Optical Reflector	All Applications			12.0	12.0				
						EA1	EA1				
62	Lighting	Photocell/Daylighting Controls	All Applications	8.0	8.0 *	10.0	10.0	10.0	10.0 *		
				EA1	EA1	EA	EA	EA	EA		
63	Lighting	T12 Lamps - 34-watt, 4ft	All Applications			2.0	2.0				
						CA1	CA1				
64	Lighting	T12 Lamps - 34-watt, U-lamp	All Applications			2.0	2.0				
						CA1	CA1				
65	Lighting	T5 Lamps - 40-watt, CF	All Applications			2.0	2.0				
						CA1	CA1				
66	Lighting	T8 Lamps - 17-watt, 2ft	All Applications			2.0	2.0			5.0 *	
						CA1	CA1			CA1	
67	Lighting	T8 Lamps - 31-watt, U-lamp	All Applications			2.0	2.0			5.0 *	
						CA1	CA1			CA1	
68	Lighting	T8 Lamps - 32-watt, 4ft	College		5.7	3.0	3.0			5.0 *	
					CA2	CA1	CA1			CA1	
69	Lighting	T8 Lamps - 32-watt, 4ft	Grocery		2.9	1.0	1.0			5.0 *	
					CA2	CA1	CA1			CA1	
70	Lighting	T8 Lamps - 32-watt, 4ft	Office		5.9	1.0	1.0			5.0 *	
					CA2	CA1	CA1			CA1	
71	Lighting	T8 Lamps - 32-watt, 4ft	Other Applications		5.0	2.0	2.0			5.0 *	
					CA2	CA1	CA1			CA1	
72	Lighting	T8 Lamps - 32-watt, 4ft	Restaurant		4.2	1.0	1.0			5.0 *	
					CA2	CA1	CA1			CA1	
73	Lighting	T8 Lamps - 32-watt, 4ft	Retail		4.3	1.0	1.0			5.0 *	
					CA2	CA1	CA1			CA1	
74	Lighting	T8 Lamps - 32-watt, 4ft	School		9.5	2.0	2.0			5.0 *	
					CA2	CA1	CA1			CA1	
75	Lighting	Timeclock - Lighting	All Applications		8.0					10.0 *	
					EA1					EA	

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Table 1: Non-Residential Measures

ID	EUI/Use	Measure	Application	PGE		SDG&E		SCE		SCG	
				New	Retro	New	Retro	New	Retro	New	Retro
76	Miscellaneous	Desuperheaters/Condensers	Agricultural		10.0						
77	Miscellaneous	Kiln/Oven/Furnace	All Applications		EA14						25.0
78	Miscellaneous	Kiln/Oven/Furnace - Heat Recovery	All Applications								A 25.0
79	Miscellaneous	Low Pressure Sprinkler Nozzle	Agricultural		8.0						B
80	Miscellaneous	Thermal Night Curtain	Agricultural		EA5						
81	Motors	Electronic Adjustable Speed Drive - HVAC	All Applications		16.0	15.0			10.0		
82	Motors	Electronic Adjustable Speed Drive - Refrigeration	All Applications		EA1	E			EA		
83	Motors	Motors - High Efficiency	All Applications		20.0	15.0	15.0	15.0	15.0	15.0	
84	Process	Dryer - Commercial	All Applications		EA15	EA2	EA	EA	EA	EA	15.0
85	Process	Dryer - Industrial	All Applications								E 25.0
86	Process	Dryer - Industrial Heat Recovery	All Applications								E 25.0
87	Pumping	Pump Adjustment	Agricultural		3.0						E
88	Pumping	Pump Retrofit	Agricultural		EA13						
89	Pumping	Pump System Audit	Agricultural		9.0						
90	Pumping	Surge Valves	Agricultural		EA6						

Note: Measure life estimates are stated in years. Letters in the shaded rows identify the source of the measure life estimates, as detailed on Page 23. Page 13

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Table 1: Non-Residential Measures

#	End Use	Measure	Application	PG&E		SDG&E		SCE		SCG	
				New	Retiro	New	Retiro	New	Retiro	New	Retiro
91	Pumping	Timeclock with Battery Back-Up	Agricultural		5.0						
92	Pumping	Well Water Measurement Device	Agricultural		EA10						
93	Refrigeration	Auto Closer for Cooler/Freezer	All Applications		9.0						
94	Refrigeration	Compressor System - Multiplexed	All Applications		8.0						
95	Refrigeration	Condenser - Evaporative/Oversized Air Cooled	All Applications		EA1						
96	Refrigeration	Condenser - High Capacity/Oversized	All Applications		12.0						
97	Refrigeration	Door Gaskets	Coolers/Freezers		EA1						
98	Refrigeration	Double-Wall Polyethylene	Agricultural		16.0						
99	Refrigeration	Electronic Adjustable Speed Compressor	All Applications		EA1						
100	Refrigeration	Floating Head Pressure	All Applications		14.4						
101	Refrigeration	Heatless Door	All Applications		EA1						
102	Refrigeration	Humidistat Control for Anti-Sweat Heater	All Applications		15.0						
103	Refrigeration	Insulation	Refrigeration Suction Line		15.0						
104	Refrigeration	Milk Pre-Cooler	Agricultural		EA1						
105	Refrigeration	Night Covers for Display Cases	All Applications		16.0						
					EA1						
					12.0						
					EA1						
					16.0						
					EA1						
					4.0						
					EA1						
					2.4						
					EA1						
					14.4						
					EA1						
					15.0						
					EA1						
					16.0						
					EA1						
					12.0						
					EA1						
					11.2						
					EA1						
					12.0						
					EA1						
					4.8						
					EA1						

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Master Table of Measure Life Estimates

Table 1: Non-Residential Measures

#	End Use	Measure	Application	RG&E		SDG&E		SCE		SCG	
				New	Retro	New	Retro	New	Retro	New	Retro
106	Refrigeration	PSC Evaporator Motor - Walk In/Display	All Applications	12.0	12.0						
107	Refrigeration	Refrigeration Case Doors - Glass/Acrylic, Low/Medium Temp	All Applications	EA1	EA1						
108	Refrigeration	Refrigerator Case with Doors - Low/Medium Temp	All Applications	12.0	12.0		15.0		10.0 *		
109	Refrigeration	Refrigerator Condensate Evaporator - Electric/Non-Electric	All Applications	16.0	16.0		EA		EA		
110	Refrigeration	Rigid Double Wall Plastic	Agricultural	EA1	EA1						
111	Refrigeration	Strip Curtains for Walk-ins	All Applications		8.0						
112	Refrigeration	Subcoolers - Ambient (High Stage)	All Applications		EA1						
113	Refrigeration	Subcoolers - Mechanical (Low Stage)	All Applications		16.0						
114	Space Conditioning	Air Distribution Systems	All Applications		EA1						
115	Space Conditioning	Air-Conditioners - Gas	All Applications	20.0							
116	Space Conditioning	Air-Conditioners - High Efficiency	All Applications	EA2	EA2	18.0					
117	Space Conditioning	Boiler - Heat Recovery	All Applications	15.0	15.0	15.0	15.0	15.0	15.0	EA	EA
118	Space Conditioning	Boiler - High Efficiency	Commercial								25.0
119	Space Conditioning	Boiler - High Efficiency	Industrial								B
120	Space Conditioning	Boiler Water Restrictor	All Applications								15.0

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Master Table of Measure Life Estimates

Table 1: Non-Residential Measures

Measure ID	Measure	Application	PCEE		SDG&E		SCE		SCG				
			New	Retro	New	Retro	New	Retro	New	Retro			
121	Space Conditioning	Bypass/Delay Timer - HVAC		15.0									
122	Space Conditioning	Chiller - High Efficiency	20.0	20.0		15.0		20.0	20.0				
123	Space Conditioning	Chiller - High Efficiency Gas	EA2	EA2		EA1		EA	EA				15.0
124	Space Conditioning	Chiller - Variable Speed Drive Centrifugal	20.0 *	20.0 *		15.0		20.0 *	20.0 *				A
125	Space Conditioning	Controls - Indoor Air Quality	EA2	EA2		EA		EA	EA				
126	Space Conditioning	Cooling Towers/Evap Condenser	EA2	EA2									
127	Space Conditioning	Economizer	20.0	20.0									
128	Space Conditioning	Economizer	EA2	EA2									
129	Space Conditioning	Economizer Repair											
130	Space Conditioning	Economizer Repair											
131	Space Conditioning	Evaporative Cooler - Direct Systems	20.0	20.0									
132	Space Conditioning	Evaporative Cooler - Direct/Indirect Systems	EA2	EA2									
133	Space Conditioning	Evaporative Cooler - Direct/Indirect Systems											
134	Space Conditioning	Evaporative Cooler - Indirect Systems											
135	Space Conditioning	Furnace - High Efficiency											

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Master Table of Measure Life Estimates

Table 1: Non-Residential Measures

#	End Use	Mission	PERB		SDO&E		SCE		SCG	
			New	Retro	New	Retro	New	Retro	New	Retro
136	Space Conditioning	Glazing - High VLT and High Shade Coefficient	20.0				20.0			
137	Space Conditioning	Glazing - Tinted	EA2				EA			
138	Space Conditioning	Heat Pump - Packaged			50.0		20.0			
139	Space Conditioning	HVAC/Space Heating/Efficient Design			E		EA			
140	Space Conditioning	Insulation	19.0 *		15.0	15.0	15.0	15.0		15.0
141	Space Conditioning	Insulation	EA1		EA1	EA1	EA			EA
142	Space Conditioning	Insulation					EA			A
143	Space Conditioning	Insulation								15.0
144	Space Conditioning	Insulation								A
145	Space Conditioning	Insulation								15.0
146	Space Conditioning	Pilotless Ignition Device								EA
147	Space Conditioning	Reflective Window Film/Window Treatment								20.0
148	Space Conditioning	Set-Back Thermostat								EA
149	Space Conditioning	Space Heating - Heat Recovery								EA
150	Space Conditioning	Timeclock - HVAC								EA

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Master Table of Measure Life Estimates

Table 1: Non-Residential Measures

Measure ID	Measure	Application	FG&E		SDG&E		SCE		SCG	
			New	Retro	New	Retro	New	Retro	New	Retro
151	Water Heating	Insulation								15.0
152	Water Heating	Insulation		20.0			15.0 *			A
153	Water Heating	Water Heater - Efficient Gas		EA7			EA		15.0	A
		Boiler/Storage Tank								
		Pipe								
		All Applications							15.0	A

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Master Table of Measure Life Estimates

Table 2: Residential Measures

#	End Use	Measure	Application	RSE		SDG&E		SCE		SCG	
				New	Retro	New	Retro	New	Retro	New	Retro
154	Cooking	Range - Gas	All Applications		20.0 *						20.0
155	Dryer	Clothes Dryer - High Efficiency	All Applications	18.0	18.0 *	18.0	18.0				E
156	Freezer	Freezers - High Efficiency	All Applications	18.0	20.0	D	E				
157	Lighting	CF Screw-in - Disposable (Integral)	Direct Assistance		8.0 *		6.0			3.5	
158	Lighting	CF Screw-in - Disposable (Integral)	Other Applications		EA		CA2			CA1	
159	Lighting	CF Screw-in - Replaceable Lamp (Modular)	All Applications		8.0 *		6.0			5.8	
160	Lighting	Compact Fluorescent Hardwire Fixture (Modular)	Downlight		EA		CA2			CA1	
161	Refrigeration	Refrigerator - High Efficiency	All Applications				7.0				
162	Space Conditioning	Air Conditioners - Central High Efficiency	All Applications	18.0	18.0		EA1				
163	Space Conditioning	Evaporative Cooler	All Applications	18.0	18.0	18.0	18.0			18.0	
164	Space Conditioning	Evaporative Cooler Cover	All Applications	18.0	18.0	18.0	18.0			EA	
165	Space Conditioning	Furnace - Efficient Gas, Condensing	All Applications		15.0					15.0	
166	Space Conditioning	Furnace - Efficient Gas, Non-Condensing	All Applications								3.0
167	Space Conditioning	Furnace Filter	All Applications	18.0							B
168	Space Conditioning	Furnace Repair	Direct Assistance	18.0							18.0
				18.0							A
											22.0
											E

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Master Table of Measure Life Estimates

Table 2: Residential Measures

Measure ID	Measure	Application	PC&B		SDC&E		SCE		SCG	
			Retiro	New	Retiro	New	Retiro	New	Retiro	New
169	Space Conditioning	Glazing - Low E Double/Low Shade Coefficient	25.0 *	25.0 *	25.0 *	25.0 *	25.0 *	25.0 *	25.0 *	25.0 *
170	Space Conditioning	Heat Pump - Electric	B	E		EA	18.0		E	
171	Space Conditioning	Heat Pump - Gas Driven		18.0				18.0		
172	Space Conditioning	Hydronic System - Combined High Efficiency		A				A		
173	Space Conditioning	Insulation		18.0						
174	Space Conditioning	Insulation		A						
175	Space Conditioning	Insulation	25.0 *	25.0 *	25.0			25.0 *	20.0	25.0
176	Space Conditioning	Outlet Gaskets	25.0	A				A		A
177	Space Conditioning	Thermal Windows	EA	15.0						15.0
178	Space Conditioning	Trees (not mature for 7 years)	EA	A						A
179	Space Conditioning	Weatherstripping/Caulking	25.0 *	25.0					25.0	10.0
180	Washer	Clothes Washer - Efficient Gas								
181	Washer	Clothes Washer - Horizontal Axis		15.0						
182	Water Heating	Faucet Aerator - Energy Efficient		H						
183	Water Heating	Insulation								

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Master Table of Measure Life Estimates

Table 2: Residential Measures

Measure ID	Measure Description	Application	SCFSE		SCF		SCG	
			New	Retro	New	Retro	New	Retro
184	Water Heating - Energy Efficient	All Applications	8.9	6.0				
185	Water Heater - Central Storage & Non-Storage	All Applications	EA	EA1			15.0	15.0
186	Water Heater - Efficient Electric	All Applications	15.0				A	A
187	Water Heater - Efficient Gas	Other Applications	B		13.0		13.0	13.0
188	Water Heater - Heat Pump	All Applications			B		A	A
189	Water Heater Blanket	All Applications	10.0			EA		10.0
			A					A

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Master Table of Measure Life Estimates

Table 3: Program-Level Measures

Measure ID	Measure Description	Application	RCE		SVE&E		SCE		SEC	
			New	Res	New	Res	New	Res	New	Res
190	Lighting (Non-Res)	Lighting Power Density Reduction					10.0			
191	Selected (Non-Res)	Building Design					EA			
192	Selected (Non-Res)	Building Design - Title 24 + 10%			20.0		10.0			
193	Selected (Non-Res)	Custom/Tailored Rebates					EA			
194	Selected (Non-Res)	Control Technologies							5.0	
194	Selected (Non-Res)	Modify Existing Equipment							EA	
195	Selected (Non-Res)	Custom/Tailored Rebates							10.0	
195	Selected (Non-Res)	Custom/Tailored Rebates							EA	
196	Selected (Res)	Building Design - Title 24 + 5%			20.0				15.0	
		All Applications							EA	
		All Applications								
		All Applications								
		All Applications								
		All Applications								
		All Applications								

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Key to References on Measure Life Tables 1, 2, and 3

Reference	Description
A	Based on measure life estimates from the Collaborative Process.
B	Inferred from measure life estimates from the Collaborative Process.
CA1	A calculated and adjusted measure life estimate based on information provided in Charts 1 and 2 below. Based on dividing engineering life data obtained from manufacturers (in Chart 1), by annual hours of operation for specific building types (in Chart 2). The result is then multiplied by 80% for applicable non-residential measures and 70% for applicable residential measures to account for retention and performance factors.
CA2	A calculated and adjusted measure life estimate based on information provided in Charts 1 and 2 below. Based on dividing engineering life data obtained from manufacturers (in Chart 1), by annual hours of operation for specific building types (in Chart 2). Retention and performance factors are accounted for in the annual hours of operation selected for each building type. Additional reference for all CA2 measures: <u>8th Edition Lighting Handbook: Reference and Application</u> , Illuminating Engineering Society of North America, New York, pages 205-207.

**Chart 1:
Engineering Life Assumptions Used in Measure Life Calculations**

Engineering Life (Base)	PC&E Hrs	SDC&E Hrs	SCE Hrs
Ballast - Electronic & High Efficiency Hybrid		80,000	
Compact Fluorescent Screw-in Edison Base (Integral)	10,000	10,000	9,000
Compact Fluorescent Screw-in Edison Base (Modular)	20,000 (2 lamps)	50,000 (ballast life)	50,000 (ballast life)
Compact Fluorescent Hardwired (Modular)	60,000 (ballast life)	60,000 (Elec) 45,000 (Mag) (ballast life)	50,000 (ballast life)
Halogen Lamps	2,000		
Metal Halide Lamps		15,000	
Metal Halide Ballasts		45,000	
Motors - High Efficiency		60,000	
T12 Lamp, 34-Watt, 4 ft.		12,000	
T12 Lamp, 34-Watt, U-lamp		12,000	
T5 Lamp, 40-Watt, CF		12,000	
T8 Lamp, 32-Watt, 4 ft.	20,000	12,000	20,000
T8 Lamp - 31 Watt, U-lamp		12,000	
T8 Lamps - 17 Watt, 2 ft.		12,000	

**Chart 2:
Annual Hours of Operation by Building Type for Lighting Measure Life Calcs**

Market Sector/Building Type	PC&E Hrs	SDG&E Hrs	SCE Hrs
Grocery/Supermarket	7,000	7,540	3,272*
Hospital	4,000	6,802	3,272*
Hotel/Motel - No Conv. Facilities	4,000*	6,044	3,272*
Hotel/Motel - With Convention Facilities	4,000*	8,760	3,272*
Manufacturing - Assembly	4,000	4,314	3,272*
Meeting Hall	4,000*	2,607	3,272*
Nursing Home	4,000*	6,570	3,272*
Office - High Rise	3,400*	3,303	3,272*
Office - Small/Medium	3,400*	3,345	3,272*
Other	4,000	4,015	3,272*
Process Industrial	4,000	4,015*	3,272*
Residence - Direct Assistance	1,095*	1,095	1,825
Residence - Other Types	1,095	1,095	1,095
Restaurant - Fast Food	4,800	6,032	3,272*
Restaurant - Full Service	4,800	5,657	3,272*
Retail - Convenience Store	7,000*	8,213	3,272*
Retail - Small/Large	4,700*	3,349	3,272*
School - Primary/Secondary	2,100	2,439	3,272*
University Classrooms	3,500	3,205	3,272*
Warehouse - Non-Refrigerated	4,000*	3,494	3,272*
Warehouse - Refrigerated	4,000*	2,607	3,272*

Reference	Description
D	Based on manufacturers' rated life.
E	An engineering judgement based on experience with this technology.
E1	<u>Design and Operation of Farm Irrigation Systems</u> , table 3.1, page 58, American Society of Agricultural Engineers, M.E. Jensen, 1980.
E2	NAA Estimate
E3	Article on remodeling in <u>Housing Economics</u> , July 1991.
EA	An engineering judgement based on experience with this technology, adjusted for retention and performance factors.
EAI	An engineering judgement based on experience with this technology, and multiplied by 80% for applicable non-residential measures and 70% for applicable residential measures (except showerheads, which are multiplied by 55%) to account for retention and performance factors. PG&E provided additional references for the following EAI measures:

Reference	Description
<p>EAI</p> <p>(Continued)</p> <p>(Additional references provided by PG&E for specific EAI measures.)</p>	<p><u>Measures 94, 99, 100, 102, 106, 107, 108, 111, and 113:</u></p> <p>"Commercial Refrigeration Resource Assessment", ADM Associates (prepared for the Bonneville Power Administration), Sacramento, November 1988, pages 2-12; "Commercial Sector Conservation Technologies", Usibelli, A., et al., Lawrence Berkeley Laboratory, LBL 18543, Berkeley, CA, February 1985; and "The State of the Art: Appliances", Shephard, Michael, Amory Lovins, et al, Competitek, Rocky Mountain Institute, Snowmass, Co, August 1990.</p> <p><u>Measures 95 and 96:</u></p> <p>ASHRAE, 1991 HVAC Applications, page 33.3</p> <p><u>Measure 103:</u></p> <p>ASHRAE '87 HVAC Handbook for molded insulation. Communication with John Hassman, Hussman Corp., San Jose, and Wayne Kimmel, Tyler Refrigeration, Livermore, and David Nurse, Hill Refrigeration, Dublin. Also best judgement applied.</p> <p><u>Measure 104:</u></p> <p>Milk Pre-coolers, Peter Canessa, P.E., San Luis Obispo, August 1992.</p> <p><u>Measures 98 and 110:</u></p> <p>ASHRAE HVAC Application Handbook, 1991.</p>
<p>EA2</p>	<p>"Service Life of Energy Conservation Measures", ASHRAE Journal, December 1988.</p>
<p>EA3</p>	<p>ASHRAE 1987 HVAC Handbook, Table 5 - Equipment Service Life, page 49.7.</p>

Reference	Description
EA4	<p>"Commercial Refrigeration Resource Assessment", ADM Associates (prepared for the Bonneville Power Administration), Sacramento, November 1988, pages 2-12; "Commercial Sector Conservation Technologies", Usibelli, A., et al., Lawrence Berkeley Laboratory, LBL 18543, Berkeley, CA, February 1985; and "The State of the Art: Appliances", Shephard, Michael, Amory Lovins, et al, Competitek, Rocky Mountain Institute, Snowmass, Co, August 1990.</p>
EA5	<p>Charles McMillen, Rain Bird Service Center, Glendora, CA., 1991 (accounts for retention and performance factors).</p>
EA6	<p>Memo from Greenleaf Consulting to Mark Backus dated October 25, 1991 (accounts for retention and performance factors).</p>
EA7	<p>ASHRAE HVAC Application Handbook, 1991, page 33.3, Table 3.</p>
EA8	<p>ASHRAE 90.1-1989, Energy Efficient Design of New Low-Rise Buildings.</p>
EA9	<p>ASHRAE HVAC Application Handbook, 1991.</p>
EA10	<p>Report 7644-R1, Synergic Resources Corporation, San Francisco, CA, August 1991 (accounts for retention and performance factors).</p>

Reference	Description
EA11	Based on installation in new housing stock with specific installation requirements (accounts for retention and performance factors).
EA12	Based on filter change at the end of each heating season (accounts for retention and performance factors).
EA13	Johns and Winter: Analysis of Energy Savings from PG&E's Agricultural Energy Management Programs; Vol. 1, Chapter 6. Hanson, Blaine. University of California Irrigation Program. Irrigation Pumping Plants. May 1992, Page 41. Peerless Pump Co., Fresno, CA (209) 233-1241. (Accounts for retention and performance factors).
EA14	Peters, R.A., Koelsch, R.K., "Dairy Farm Heat Exchangers for Heating Water", Cornell University, 1979 (accounts for retention and performance factors).
EA15	EPRI, Technical Brief, <u>Efficient Motors and Drives</u> , 1987, page C-42 (accounts for retention and performance factors).