Efficiency Market Share Needs Assessment and Feasibility Scoping Study

Volume 2

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Appendix B

Efficiency Measure Rating Sheets

Residential DSM Rating Sheets

Table 1: Residential DSM Measures

Measure [Decision Type] **[NC] New Construction** **[Retro] Retrofit** **[R.O.B] Replace on Burnout**	**(I.) In the absence of any market barriers, what do you feel is the future cost-effective savings potential with this technology?** **LOW**		**MED**		**HIGH**	**(II.) What do you feel will be the level of marketing effort to promote this technology in the next few years?** **LOW**		**MED**		**HIGH**	**(III.) How severely do you feel market barriers impede market penetration of this DSM technology?** **NONE**		**SOME**		**A LOT**	**(IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?** **NONE**		**SOME**		**A LOT**
SHELL MEASURES																				
Increased Wall Insulation [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Increased Wall Insulation [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Increased Ceiling Insulation [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Increased Ceiling Insulation [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Windows [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Windows [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Weatherstripping [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Weatherstripping [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Duct Insulation [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Duct Insulation [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Duct Sealing [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Duct Sealing [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Light Colored Roofing [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Light Colored Roofing [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
SPACE COOLING MEASURES																				
High Efficiency Central AC [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Efficiency Central AC [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Efficiency Room AC [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Efficiency Room AC [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Evaporative Pre-Cooler [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Evaporative Pre-Cooler [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Direct Evaporative Cooling [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Direct Evaporative Cooling [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Indirect Evaporative Cooling [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Indirect Evaporative Cooling [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Table 1: Residential DSM Measures (continued)

Measure [Decision Type] [NC] New Construction [Retro] Retrofit [R.O.B] Replace on Burnout	(I.) In the absence of any market barriers, what do you feel is the future cost-effective savings potential with this technology?					(II.) What do you feel will be the level of marketing effort to promote this technology in the next few years?					(III.) How severely do you feel market barriers impede market penetration of this DSM technology?					(IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?				
	LOW		MED		HIGH	LOW		MED		HIGH	NONE		SOME		A LOT	NONE		SOME		A LOT
SPACE COOLING MEASURES continued																				
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
SPACE HEATING AND WATER HEATING MEASURES																				
High-Efficiency Gas Furnaces [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Gas Furnaces [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Elec. Furnaces [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Elec. Furnaces [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Ceiling Fans [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Ceiling Fans [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Eff. Air Source Heat Pumps [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Eff. Air Source Heat Pumps [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gas Heat Pumps [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gas Heat Pumps [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Eff. Ground & Dual Source Heat Pumps [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Eff. Ground & Dual Source Heat Pumps [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Furnace Blowers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Furnace Blowers [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Integrated Gas Space/Water Heat Sys. [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Integrated Gas Space/Water Heat Sys. [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Gas H_20 Heaters [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Gas H_20 Heaters [R.O.B.]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Electric H_20 Heaters [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Electric H_20 Heaters [R.O.B.]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
H_20 Heater Heat Traps [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
H_20 Heater Heat Traps [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Heat Recovery [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Heat Recovery [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Table 1: Residential DSM Measures (continued)

Measure [Decision Type] [NC] New Construction [Retro] Retrofit [R.O.B] Replace on Burnout	(I.) In the absence of any market barriers, what do you feel is the future cost-effective savings potential with this technology?					(II.) What do you feel will be the level of marketing effort to promote this technology in the next few years?					(III.) How severely do you feel market barriers impede market penetration of this DSM technology?					(IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?				
	LOW		MED		HIGH	LOW		MED		HIGH	NONE		SOME		A LOT	NONE		SOME		A LOT
SPACE HEATING AND WATER HEATING MEASURES continued																				
Heat Pump Water Heaters [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Heat Pump Water Heaters [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Pilotless Gas Instant. Water Heaters [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Pilotless Gas Instant. Water Heaters [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
LIGHTING MEASURES																				
Compact Fluorescent Fixtures [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Compact Fluorescent Fixtures [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Compact Fluorescent Bulbs [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Compact Fluorescent Bulbs [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
A-Line Halogen IR Lamps [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
A-Line Halogen IR Lamps [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER MEASURES																				
Horizontal Axis Washers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Horizontal Axis Washers [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Electric Dryers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Electric Dryers [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Low Energy Dishwashers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Low Energy Dishwashers [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Efficiency Refrigerators [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Efficiency Refrigerators [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Nonresidential DSM Rating Sheets

Table 2: Nonresidential DSM Measures

Measure [Decision Type] [NC] New Construction [Retro] Retrofit [R.O.B] Replace on Burnout	(I.) In the absence of any market barriers, what do you feel is the future cost-effective savings potential with this technology?					(II.) What do you feel will be the level of marketing effort to promote this technology in the next few years?					(III.) How severely do you feel market barriers impede market penetration of this DSM technology?					(IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?				
	LOW		MED		HIGH	LOW		MED		HIGH	NONE		SOME		A LOT	NONE		SOME		A LOT
SHELL MEASURES																				
Increased Wall Insulation [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Increased Wall Insulation [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Increased Ceiling Insulation [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Increased Ceiling Insulation [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Window Treatments (films, screens) [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Window Treatments (films, screens) [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-performance Windows [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-performance Windows [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Light Colored Roofing [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Light Colored Roofing [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
HVAC AND WATER HEATING EQUIPMENT																				
High Efficiency Packaged Equipment [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Efficiency Packaged Equipment [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Adjustable Speed Drive Fans [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Adjustable Speed Drive Fans [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Adjustable Speed Drive Pumps [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Adjustable Speed Drive Pumps [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Adjustable Speed Drive Chillers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Adjustable Speed Drive Chillers [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Economizers (where not req'd by T24) [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Economizers (where not req'd by T24) [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Thermal Storage System [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Thermal Storage System [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Efficiency Chillers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High Efficiency Chillers [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Table 2: Nonresidential DSM Measures (continued)

Measure [Decision Type] [NC] New Construction [Retro] Retrofit [R.O.B] Replace on Burnout	(I.) In the absence of any market barriers, what do you feel is the future cost-effective savings potential with this technology?					(II.) What do you feel will be the level of marketing effort to promote this technology in the next few years?					(III.) How severely do you feel market barriers impede market penetration of this DSM technology?					(IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?				
	LOW		MED		HIGH	LOW		MED		HIGH	NONE		SOME		A LOT	NONE		SOME		A LOT
HVAC AND WATER HEATING EQUIPMENT continued																				
Gas Absorption Chillers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gas Absorption Chillers [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Occupancy sensors [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Occupancy sensors [Retri]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Evaporative coolers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Evaporative coolers [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
CO_2 sensors [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
CO_2 sensors [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
VAV instead of CV system [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
VAV instead of CV system [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Energy Management System [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Energy Management System [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Heat Pump Water Heating [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Heat Pump Water Heating [R.O.B]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
REFRIGERATION																				
Floating Head Pressure Control [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Floating Head Pressure Control [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Hot Gas Defrost [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Hot Gas Defrost [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Case Fans [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Case Fans [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Anti-Condensate Heater Controls [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Anti-Condensate Heater Controls [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Strip Curtains [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Strip Curtains [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Table 2: Nonresidential DSM Measures (continued)

Measure [Decision Type] [NC] New Construction [Retro] Retrofit [R.O.B] Replace on Burnout	(I.) In the absence of any market barriers, what do you feel is the <u>future cost-effective savings potential</u> with this technology?					(II.) What do you feel will be the level of marketing effort to promote this technology in the next few years?					(III.) How severely do you feel market barriers impede market penetration of this DSM technology?					(IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?				
	LOW		MED		HIGH	LOW		MED		HIGH	NONE		SOME		A LOT	NONE		SOME		A LOT
REFRIGERATION continued																				
Computer Optimizer Control [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Computer Optimizer Control [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-efficiency Conversions [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-efficiency Conversions [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
INDOOR LIGHTING																				
HIDs [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
HIDs [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
32 W/T8s [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
32 W/T8s [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Delamping [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Delamping [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Daylighting [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Daylighting [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Occupancy Sensors [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Occupancy Sensors [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Compact Fluorescents [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Compact Fluorescents [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Energy Management System [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Energy Management System [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OUTDOOR LIGHTING																				
Photocell Control [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Photocell Control [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Combined Photocell/Timeclock Control [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Combined Photocell/Timeclock Control [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Table 2: Nonresidential DSM Measures (continued)

Measure [Decision Type] [NC] New Construction [Retro] Retrofit [R.O.B] Replace on Burnout	(I.) In the absence of any market barriers, what do you feel is the <u>future cost-effective savings potential</u> with this technology?					(II.) What do you feel will be the level of marketing effort to promote this technology in the next few years?					(III.) How severely do you feel market barriers impede market penetration of this DSM technology?					(IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?				
	LOW		MED		HIGH	LOW		MED		HIGH	NONE		SOME		A LOT	NONE		SOME		A LOT
OUTDOOR LIGHTING continued																				
Compact Fluorescents [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Compact Fluorescents [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
MOTORS																				
CO Sensors on Garage Exhaust Fans [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
CO Sensors on Garage Exhaust Fans [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ASDs on Non-HVAC Motors [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ASDs on Non-HVAC Motors [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Hi Eff. Motors on Non-HVAC Motors [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Hi Eff. Motors on Non-HVAC Motors [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
DC Motor Conversion [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
DC Motor Conversion [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
PROCESS: HEATING																				
Ultra Violet Curing/Treatments [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Ultra Violet Curing/Treatments [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Low NO_x Burners [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Low NO_x Burners [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
PROCESS: COOLING																				
Thermal Recovery (from refrig.) [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Thermal Recovery (from refrig.) [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Table 2: Nonresidential DSM Measures (continued)

Measure [Decision Type] [NC] New Construction [Retro] Retrofit [R.O.B] Replace on Burnout	(I.) In the absence of any market barriers, what do you feel is the future cost-effective savings potential with this technology?					(II.) What do you feel will be the level of marketing effort to promote this technology in the next few years?					(III.) How severely do you feel market barriers impede market penetration of this DSM technology?					(IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?				
	LOW		MED		HIGH	LOW		MED		HIGH	NONE		SOME		A LOT	NONE		SOME		A LOT
PROCESS: CONVERSIONS																				
Chemical to Ozone [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Chemical to Ozone [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Catalyst [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Catalyst [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
PROCESS: HEAT RECOVERY	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
PROCESS: HIGH-EFFICIENCY SEPARATION TECH.	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
COMPRESSED AIR																				
Leak Maintenance and Mgmt. [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Leak Maintenance and Mgmt. [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Variable Speed Drives [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Variable Speed Drives [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Conversions (screw) [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
High-Efficiency Conversions (screw) [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Controls Optimization [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Controls Optimization [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER MEASURES																				
Commercial Kitchen Ventilation [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Commercial Kitchen Ventilation [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gas Booster Heat for Comm. Dishwashers [NC]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Gas Booster Heat for Comm. Dishwashers [Retro]	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
OTHER – Specify:	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Appendix C

Interview Materials

Introductory Letter

(Date)

<Name>
<Company>
<Street Address>
<City, State Zip>

Dear <name>:

On behalf of the California Board of Energy Efficiency and Pacific Gas & Electric, I would like to thank you for agreeing to participate in our assessment of the potential for tracking the market shares of key DSM technologies. Please complete the attached questionnaire and return all pages to me prior to our telephone interview scheduled for *[interview date & time]*.

The questionnaire includes an extensive list of DSM technologies installed in both the residential and nonresidential sectors. We would like you to answer four questions for each technology with which you are familiar. If you are unfamiliar with the market for a technology, feel free to skip over it.

Each question asks you to rate each DSM technology according to a particular criterion. Before answering each question, it might be helpful for you to review the entire list of technologies.

Specific instructions on how to answer each question are as follows:

Question I.) In the absence of any market barriers, what do you feel is the cost-effective savings potential for this technology?

- On a scale of 1 to 5, with a 1 meaning "low," a 3 meaning "medium," and a 5 meaning "high," rate the level of future cost-effective saving potential for each DSM technology. (Circle only one number for each technology.)
- Future cost-effect savings potential refers to the total statewide potential for energy savings in all cost-effective applications.
- Please ignore market barriers in answering this question on future cost-effective savings. Market barriers will be considered in a later question.

Question II.) What do you feel will be the level of marketing effort expended to promote this technology in the next few years?

- Rate the expected marketing effort on a scale of 1 to 5, with a 1 meaning "low," a 3 meaning "medium," and a 5 meaning "high. "
- The marketing effort to which this question refers is the effort that will be expended by ESCOs, private contractors, and other efficiency service providers to encourage the installation of the measure in question. (Circle only one number for each technology.)

Question III.) How severely do you feel that market barriers impede market penetration of this DSM technology?

- On a scale of 1 to 5, with a 1 meaning "none," a 3 meaning "some," and a 5 meaning "a lot," rate how seriously you feel market barriers are preventing the market penetration of each DSM technology. (Circle only one number for each technology.)

Question IV.) To what extent do you feel market barriers can be mitigated through DSM program intervention?

- On a scale of 1 to 5, with a 1 meaning "none," a 3 meaning "some," and a 5 meaning "a lot," rate the extent to which you feel that any market barriers can be mitigated or reduced by DSM program intervention. (Circle only one number for each technology.)

If you have any questions regarding this questionnaire, please feel free to call me anytime at (619) 481-0081. After you have completed the questionnaire, please fax all pages back to me at (619) 481-7550.

Thanks again for your time. I look forward to speaking with you on *[interview date & time]*.

Sincerely,

(interviewer name)
(interviewer title)

Enclosure

Interview Guide

Needs Assessment
Stakeholder Interview Guide

Round 1 Interview

Introduce the Study and Identify Appropriate Respondent

The following is a general outline of the approach that will be used to recruit and screen individuals within the identified target organizations.

The recruitment and screening process might be accomplished in a single telephone call, but could possibly involve two or more telephone calls to identify the appropriate respondent and to schedule a convenient interview appointment.

Hello, my name is _____ with Regional Economic Research, Inc. We have been retained by the California Board of Energy Efficiency and Pacific Gas & Electric to assess the needs and feasibility of a system to track market shares of energy efficient technologies.

The long-run objective of our research is to develop a plan for tracking the market shares of specific energy efficiency measures in California. The first step is to identify a set of major high efficiency technologies for which tracking systems should be developed. To develop this list of technologies, we are collecting information on

1) The potential importance of various measures (in terms of potential cost-effective energy savings),
2) The measures likely to be emphasized by both private and public entities in the next few years,
3) The major market barriers affecting the success of these measures, and
4) The likelihood that program/market intervention can mitigate or reduce such barriers.

A major undertaking of this research involves contacting a variety of professionals and industry participants in California to gain their insights regarding the future potential of various DSM technologies and the issues I just mentioned. Such individuals include members of the CBEE, CEC staff, CADMAC Market Effects Subcommittee members, consultants, and other energy efficiency and market transformation experts, utility program planning personnel, and other private sector efficiency-service providers.

We are contacting you, in particular, because of your *[role of respondent, if known].*

Are you the appropriate person I should speak with?

- ☐ Yes
- ☐ No → *If not appropriate person, obtain contact information:*

Name:		Name:	
Title:		Title:	
Phone:		Phone:	
Email:		Email:	
Fax:		Fax:	
Mail:		Mail:	

Contact the appropriate respondent(s), then proceed to Step 2.

Preliminary Survey and Schedule Interview

We would greatly appreciate your participation in our research. There are two phases in which we need your input. For phase 1, we will ask you to complete a questionnaire about specific high efficiency technologies. The questionnaire includes a list of DSM technologies that are commonly installed in both the residential and nonresidential sectors. For each technology with which you are familiar, you'll be asked to rate the statewide potential for cost-effective savings and to assess future marketing efforts that you expect to be focused on each technology. You will also be asked to assess the severity of market barriers impeding market penetration and the extent to which these barriers can be reduced through program intervention. It should only take you about 15 to 30 minutes to complete, depending on how many measures you are familiar with.

After I have received the technology rating sheets from everyone, we will derive a preliminary list of technologies for which market share tracking systems should be developed – this will be based upon not only the survey responses but other information sources as well.

The second phase is an in-depth interview during which I will ask you specific questions about the measures on the preliminary list. So, prior to our conversation, I will fax or email you the preliminary list of measures. This in-depth interview has three objectives: 1) to obtain your feedback and comments on the preliminary list of measures, 2) to discuss the market characteristics and issues regarding market barriers and intervention pertaining to the measures in more detail, and 3) to solicit your comments and suggestions regarding the tracking of market shares of specific technologies.

The introductory letter with instructions and the technology rating sheet will be e-mailed or faxed to the respondent.

E-Mail: _____

Fax: _____

Mailing Address: _____

_____

_____

When would be a good day/time for a telephone interview?

Date/Time: _____

Is there anyone else who you feel should be part of the interview?

Name:	_____	Name:	_____
Title:	_____	Title:	_____
Phone:	_____	Phone:	_____
Email:	_____	Email:	_____

Thanks, we greatly appreciate your participation. I will [email/fax] the technology rating sheets and more detailed instructions to you – please fax the completed rating sheets back to me before our interview time for *interview time*. If you have any questions about the rating sheet, please feel free to call me anytime at 1-800-481-7550.

Round 2 Interview

Prior to the second scheduled interview, the respondents will be asked to rank a preliminary (and shorter) list of measures for two sectors (residential and non-residential) and two decision types (retrofit/replace-on-burnout and new construction). The preliminary list of measures was derived from the results of the Round 1 interviews. The interviewer will then focus on the three technologies for which the respondent gave the highest ranking (i.e., likely candidates for a tracking system) by sector and decision type. A list of the measures added to the rating sheets by Round 1 participants will also be provided and the respondents will have the option to include any or all of those measures to the preliminary list.

The Round 2 in-depth interview will focus on the following topics: (1) tracking emerging technologies, (2) tracking methods and potential data sources, and (3) potential industry contacts for subsequent phases of this study (the methods and feasibility assessments). The respondent's need or interest in a tracking system and potential data sources are also discussed. Additional issues pertaining to tracking that emerge during the interview will also be discussed.

Note that the interviewer will have the respondent elaborate on any responses deemed necessary.

First, I'd like to ask you a few questions about your background in the DSM industry….

What is your primary role in the energy efficiency market?

Possible roles include: Private energy efficiency service provider, Program planning/management or implementation staff, Government/Non-government, Research, Consultant

What activities regarding high efficiency technologies have you been involved in recently?

I) Emerging Technologies

The measures that were included in the rating sheets were identified from a variety of sources and are already commercialized. However, we also want to assess the need to develop market share tracking systems for emerging technologies.

Are there any emerging technologies that you feel we should consider as candidates for tracking?

- ☐ Yes → Please specify and describe.
- ☐ No

Do you see any advantages and/or disadvantages to tracking the market shares of emerging technologies?

- ☐ Yes → Please describe.
- ☐ No

II) Marketing Efforts and Potential Stakeholder Contacts

The interviewer will ask the following question for each of the respondent's top 3 rated measures on the preliminary list.

Under the organization being established by the CPUC and the California Board of Energy Efficiency, who do you feel will likely play a major role in marketing this technology?

Possibilities include both utilities and private energy efficiency product and service providers, including manufacturers, distributors, vendors, ESCOs, contractors, retailers, etc…

Obtain contact information if possible.

III) Tracking Needs and Potential Data Sources

Do you have an interest in or see a need to track the market penetration of specific DSM technologies?

- ☐ Yes → **Please Explain.**

  Probe – What benefits do you feel will result from such a system?
  Probe – What is your interest in a tracking system?

- ☐ No → **Please Explain.**

As I mentioned earlier, our primary objective is to develop a plan for tracking the market shares of high priority energy efficiency measures in California. We'd like to solicit your input on the design of tracking systems for the measures to which you have assigned the highest ranks.

The interviewer will ask the following question for each of the respondent's top 3 rated measures on the preliminary list.

Do you have any recommendations for tracking the market shares of *[technology]* **?**

- ☐ Yes → **Please Explain.**
- ☐ No

Are you aware of any data sources (or market actors) that could contribute to a tracking s for this technology?

- ☐ Yes → **Please Explain.**
- ☐ No

Are you familiar with any organizations/utilities that are implementing or have implemented a tracking system for this technology?

- ☐ Yes → **Please Explain.** *Obtain any contact information.*
- ☐ No

Even though our primary focus is tracking the market shares of DSM technologies, do you have an interest in or see a need to track any <u>other</u> key market features associated with this technology?

The interviewer might want to provide examples, such as awareness, stocking patterns, key perceptions, organizational practices….

- ☐ Yes → **Please Explain.**
- ☐ No

Because of time constraints, I've asked you for input on market share tracking for only the technologies that you ranked the highest. Can you provide such information for any of the other technologies on this list that you feel will be relevant to this effort?

- ☐ Yes → **Please Explain.**
- ☐ No

That's all of the questions I have for now. Thanks for your time , your expertise is appreciated and invaluable to our research efforts.

(If they are a candidate to be interviewed in subsequent round, mention that we would like to contact them in a month or so as the project progresses.)

Appendix D

Energy Efficiency Measure Rankings from Round 1 Interview Results

Table D-1: Nonresidential New Construction

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
1	Refrigeration	Computer Optimizer Control	11.7	12.1	12.5	12.5	21986
2	Indoor Lighting	Daylighting	12.8	10.9	11.9	12.3	20402
3	Shell	High-Performance Windows	12.3	12.4	11.3	11.4	19611
4	Compressed Air	Leak Maintenance and Mgmt.	12.2	10.2	10.6	13.3	17535
5	HVAC & H_2O Heat	Adjustable Speed Drive Fans	12.9	12.0	10.4	10.9	17518
6	HVAC & H_2O Heat	Energy Management System	12.2	12.6	9.5	12.0	17388
7	HVAC & H_2O Heat	Adjustable Speed Drive Pumps	12.7	11.1	10.9	11.1	17002
8	HVAC & H_2O Heat	High-Efficiency Packaged AC Equipment	12.0	11.4	10.1	11.7	16183
9	Other	Wastewater Facility Optimization	11.6	9.7	11.9	11.8	15846
10	Refrigeration	High-Efficiency Packaged Refrigeration Equipment	12.5	9.1	11.3	1.9	15254
11	HVAC & H_2O Heat	High-Efficiency Chillers	11.8	12.3	9.0	11.6	15190
12	HVAC & H_2O Heat	Adjustable Speed Drive Chillers	12.3	11.7	9.8	10.6	14975
13	Shell	Light Colored Roofing	10.4	9.1	11.6	13.0	14210
14	Motors	ASDs on Non-HVAC Motors	11.4	11.4	10.3	10.5	13996
15	Indoor Lighting	Compact Fluorescents	11.3	11.9	9.0	10.6	12807
16	Motors	High-Efficiency Motors (Non-HVAC)	11.0	11.2	9.1	11.4	12729
17	Indoor Lighting	Skylights and Controls	11.6	8.8	10.5	11.0	11851
18	Process Heat & Cool	High-Efficiency Low NOx Burners	8.2	11.9	10.3	11.4	11470
19	Indoor Lighting	32 W/T8s	12.7	12.2	7.2	10.1	11197
20	Compressed Air	Controls Optimization	10.7	7.7	11.4	11.8	11185
21	Refrigeration	High-Efficiency Case Fans	10.7	9.8	9.3	11.0	10725
22	HVAC & H_2O Heat	High-Eff. Commercial Gas Boilers & Furnaces	11.7	10.5	8.9	9.7	10675
23	Indoor Lighting	Occupancy Sensors	11.7	10.4	8.7	10.0	10592
24	Compressed Air	High-Efficiency Industrial Air Compressors	9.3	9.8	10.2	11.0	10305
25	Other	Industrial Fan/Blower Systems	10.8	8.4	11.1	10.2	10247
26	HVAC & H_2O Heat	Evaporative Pre-Cooler	9.1	10.0	10.7	10.5	10143

Table D-1 (cont'd.): Nonresidential New Construction

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
27	Process Heat & Cool	Ultra Violet Curing/Treatments	7.0	10.8	12.4	10.8	10087
28	Indoor Lighting	Energy Management System	12.0	12.0	7.8	8.8	9848.7
29	Refrigeration	Dessicant Cooling	7.1	11.0	11.3	11.1	9799.8
30	Other	C&I Power Conversion Equipment	10.3	10.1	8.9	10.4	9577.1
31	Other	Gas Booster Heat for Comm. Dishwashers	10.0	9.8	9.8	10.0	9574.1
32	Indoor Lighting	LED Exit Signs	10.9	11.2	7.5	10.5	9556.6
33	Other	Ozonated Laundry	8.9	10.0	10.6	10.1	9526.4
34	HVAC & H_2O Heat	Gas Chillers (engine driven)	8.0	11.1	11.0	9.7	9448.2
35	Refrigeration	Anti-Condensate Heater Controls	11.9	8.7	8.7	10.2	9208.8
36	HVAC & H_2O Heat	Packaged Gas Cooling	7.3	11.4	11.2	9.7	9080.3
37	HVAC & H_2O Heat	Gas Absorption Chillers	8.7	10.9	9.4	9.7	8759.9
38	HVAC & H_2O Heat	Thermal Storage System	7.5	9.8	11.4	10.2	8570.6
39	Refrigeration	Floating Head Pressure Control	11.4	9.4	8.4	9.3	8372.4
40	Shell	Window Treatments (films, screens)	9.2	9.3	9.5	9.8	7993.1
41	HVAC & H_2O Heat	Evaporative Coolers	10.0	8.3	10.3	9.2	7869.5
42	Refrigeration	Hot Gas Defrost	9.0	10.1	8.6	9.4	7458.6
43	Motors	CO Sensors on Garage Exhaust Fans	9.8	8.5	8.4	10.4	7268.8
44	Other	Laundry Wastewater Heat Recovery	8.6	7.0	11.6	10.2	7113.9
45	Compressed Air	Variable Speed Drives	9.0	8.0	9.8	10.0	7089.7
46	Other	Commercial Kitchen Ventilation	10.4	10.5	8.3	7.7	6954
47	Process Heat & Cool	Process Gas Refrigeration	8.3	10.4	9.3	8.6	6897.8
48	Indoor Lighting	HIDs	9.4	10.6	7.3	9.0	6659.8
49	Compressed Air	High-Efficiency Conversions (screw)	13.0	8.4	7.8	7.9	6653.6
50	Refrigeration	High-Efficiency Conversions	10.2	7.8	8.9	9.2	6469
51	HVAC & H_2O Heat	VAV instead of CV system	11.2	9.4	6.7	8.9	6270.3
52	Outdoor Lighting	Compact Fluorescents	10.0	9.0	8.0	8.7	6225.2
53	HVAC & H_2O Heat	Heat Pump Water Heating	6.0	8.8	11.6	10.1	6122.2

Table D-1 (cont'd.): Nonresidential New Construction

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
54	Process Conversions	High-Efficiency Injection Molding Equipment	8.0	8.5	9.6	9.2	6058.4
55	Process Conversions	High-Efficiency Catalyst	8.6	10.2	9.7	6.7	5799.1
56	Motors	DC Motor Conversion	5.9	6.2	12.4	12.6	5689.5
57	Outdoor Lighting	Photocell Control	10.7	9.5	6.9	8.0	5593.9
58	Outdoor Lighting	Combined Photocell/Timeclock Control	11.3	9.0	6.5	8.4	5540.8
59	HVAC & H_2O Heat	Occupancy Sensors	9.9	8.5	7.2	8.7	5282.5
60	HVAC & H_2O Heat	CO_2 Sensors	6.4	7.9	9.1	9.9	4570.6
61	Motors	High-Efficiency Extrusion Equipment	9.7	8.0	6.9	8.5	4494.4
62	HVAC & H_2O Heat	Economizers (where not req'd by T24)	8.1	7.7	7.7	9.1	4405.6
63	Process Conversions	Chemical to Ozone	4.0	13.0	8.6	9.6	4251.5
64	Refrigeration	Strip Curtains	7.7	7.5	9.4	7.1	3912.9
65	Indoor Lighting	Delamping	9.4	5.9	8.6	7.4	3578.3
66	Shell	Increased Wall Insulation	7.4	7.2	7.6	8.1	3316.7
67	Shell	Increased Ceiling Insulation	7.1	7.8	7.2	8.0	3178
68	Process Heat & Cool	Thermal Recovery (from refrig.)	6.0	6.8	7.8	9.1	2908.8

Table D-2: Nonresidential Retrofit or Replace-On-Burnout

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
1	Compressed Air	Leak Maintenance and Mgmt.	13.1	10.9	12.3	12.9	22535
2	HVAC & H_2O Heat	Adjustable Speed Drive Fans	13.3	11.7	11.8	10.9	20111
3	HVAC & H_2O Heat	Energy Management System	12.0	12.3	11.6	11.7	20050
4	Refrigeration	Computer Optimizer Control	10.9	10.6	13.4	11.8	18367
5	HVAC & H_2O Heat	High-Efficiency Packaged AC Equipment	12.5	11	10.8	10.8	16028
6	HVAC & H_2O Heat	Adjustable Speed Drive Pumps	12.7	10.2	11.6	10.6	15783
7	Refrigeration	High-Efficiency Conversions	12.0	10.2	12.0	10.5	15499
8	HVAC & H_2O Heat	High-Efficiency Chillers	12.1	11.4	10.0	11.0	15319
9	Other	Wastewater Facility Optimization	11.1	10.5	11.9	10.8	15109
10	Indoor Lighting	Compact Fluorescents	11.3	12.4	9.7	11.1	15068
11	HVAC & H_2O Heat	Adjustable Speed Drive Chillers	11.3	10.6	12.3	9.9	14639
12	Compressed Air	High-Efficiency Conversions (screw)	12.4	10.6	10.9	10.2	14576
13	Indoor Lighting	32 W/T8s	13.4	12.6	8.0	10.7	14438
14	Compressed Air	Controls Optimization	10.7	10.9	11.7	10.6	14409
15	Motors	ASDs on Non-HVAC Motors	10.7	11.1	11.5	10.5	14372
16	Motors	High-Efficiency Motors (Non-HVAC)	10.6	11.1	10.9	11.2	14288
17	HVAC & H_2O Heat	High-Eff. Commercial Gas Boilers & Furnaces	12.3	10.7	10.2	10.3	13891
18	Refrigeration	High-Efficiency Case Fans	8.7	12.3	10.8	10.7	12431
19	Refrigeration	Anti-Condensate Heater Controls	11.9	9.4	10.6	10.4	12380
20	Compressed Air	High-Efficiency Industrial Air Compressors	9.2	10.6	11.5	10.5	11692
21	Other	Commercial Kitchen Ventilation	11.0	10.6	11.1	9.0	11671
22	Indoor Lighting	LED Exit Signs	10.9	10.8	8.9	10.7	11356
23	Process Heat & Cool	High-Efficiency Low NOx Burners	8.6	12.4	10.3	10.3	11274
24	Shell	Light Colored Roofing	10.2	7.4	12.1	11.3	10346
25	Process Heat & Cool	Ultra Violet Curing/Treatments	7.0	12.7	12.4	9.4	10247
26	Refrigeration	Hot Gas Defrost	8.4	12.6	10.7	8.9	10104
27	Other	Industrial Fan/Blower Systems	9.8	8.9	12.5	9.2	10084

Table D-2 (cont'd.): Nonresidential Retrofit or Replace-On-Burnout

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
28	Indoor Lighting	Occupancy Sensors	11.1	10.4	9.0	9.6	9949.1
29	Other	C&I Power Conversion Equipment	8.3	10.4	11.7	9.7	9848.5
30	Other	Gas Booster Heat for Comm. Dishwasher	9.7	10.2	11.2	8.6	9500.4
31	HVAC & H_2O Heat	Evaporative Pre-Cooler	9.4	8.5	11.7	10.1	9467.2
32	Refrigeration	Floating Head Pressure Control	12.1	9.7	9.6	8.3	9442.5
33	Motors	CO Sensors on Garage Exhaust Fans	10.1	8.9	9.8	10.7	9349.1
34	Other	Ozonated Laundry	8.8	9.8	11.3	9.5	9262.3
35	Motors	High-Efficiency Extrusion Equipment	10.2	9.4	9.6	9.9	9064.4
36	Indoor Lighting	Energy Management System	11.1	10.8	8.6	8.3	8471.2
37	Compressed Air	Variable Speed Drives	8.9	9.3	11.0	9.1	8255.8
38	Indoor Lighting	Daylighting	8.1	9.4	12.6	8.3	8028.9
39	Outdoor Lighting	Combined Photocell/Timeclock Control	11.1	9.3	8.5	8.8	7659.3
40	Indoor Lighting	Skylights and Controls	7.2	8.5	12.6	10.0	7658.6
41	Shell	Window Treatments (films, screens)	9.3	9.0	9.7	9.3	7549.1
42	HVAC & H_2O Heat	Packaged Gas Cooling	6.6	11.1	11.6	8.9	7450.6
43	Motors	DC Motor Conversion	5.9	8.0	12.4	12.6	7411.9
44	Outdoor Lighting	Photocell Control	9.9	10.0	8.4	8.9	7394.5
45	HVAC & H_2O Heat	Heat Pump Water Heating	6.7	9.3	12.3	9.7	7310.6
46	Outdoor Lighting	Compact Fluorescents	10.4	9.2	8.5	8.7	7068.6
47	HVAC & H_2O Heat	Thermal Storage System	6.7	9.8	11.9	8.9	6955.3
48	HVAC & H_2O Heat	VAV instead of CV system	10.3	8.3	9.1	8.8	6869
49	HVAC & H_2O Heat	Gas Chillers (engine driven)	6.6	10.5	11.6	8.5	6815.6
50	HVAC & H_2O Heat	Occupancy Sensors	10.6	8.9	8.0	8.9	6719.2
51	HVAC & H_2O Heat	Gas Absorption Chillers	7.8	9.9	9.4	9.1	6656
52	Indoor Lighting	HIDs	9.2	10.6	7.6	8.8	6542.4
53	Other	Laundry Wastewater Heat Recovery	6.7	8.0	12.1	9.6	6192.6
54	HVAC & H_2O Heat	Economizers (where not req'd by T24)	9.6	7.4	9.7	9.0	6185.3

Table D-2 (cont'd.): Nonresidential Retrofit or Replace-On-Burnout

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
55	Process Heat & Cool	Process Gas Refrigeration	7.7	10.2	10.0	7.9	6173.9
56	Indoor Lighting	Delamping	10.1	7.8	8.8	8.7	6068.1
57	Process Conversions	Chemical to Ozone	5.8	11.9	9.4	9.2	5988.7
58	Shell	High-performance Windows	7.5	9.3	10.1	8.3	5834.6
59	HVAC & H_2O Heat	Evaporative Coolers	9.2	7.0	10.3	8.7	5736.9
60	HVAC & H_2O Heat	CO_2 Sensors	6.4	8.6	10.5	9.9	5718.9
61	Process Conversions	High-Efficiency Catalyst	7.9	7.8	7.0	10.9	4691.7
62	Refrigeration	Strip Curtains	7.7	7.4	10.0	7.1	4057.4
63	Shell	Increased Ceiling Insulation	6.5	8.2	7.7	7.6	3092.6
64	Shell	Increased Wall Insulation	5.7	7.1	8.2	7.7	2559.7
65	Process Heat & Cool	Thermal Recovery (from refrig.)	5.1	8.3	7.8	7.3	2392.2
66	Process Conversions	High-Efficiency Injection Molding Equipment	6.9	6.6	7.6	6.8	2369.1

Table D-3: Residential New Construction

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
1	Lighting	Compact Fluorescent Fixtures	13.6	13.2	10.8	12.5	24232
2	Other	Horizontal Axis Washers	13.1	13.1	10.3	11.4	20327
3	Shell	Duct Sealing	13.3	10.4	11.5	12.2	19240
4	Lighting	Compact Fluorescent Bulbs	12.2	13.4	10.6	10.8	18830
5	Other	High-Efficiency Refrigerators	11.9	11.9	10.2	11.1	16203
6	Space Cooling	High-Efficiency Central AC	12.1	12.5	9.2	11.1	15455
7	Shell	High-Efficiency Windows for Cooling Climate	11.9	12.0	9.0	11.5	14880
8	Space & H_2O Heat	Integrated Gas Space/Water Heat Sys.	11.7	9.6	11.0	11.8	14596
9	Space & H_2O Heat	High-Efficiency Gas H_2O Heaters	11.9	11.4	9.0	11.5	14033
10	Shell	Duct Insulation	11.7	10.2	9.9	10.9	12869
11	Space Cooling	Indirect/Direct Evaporative Cooling	12.3	9.6	10.6	10.1	12672
12	Space & H_2O Heat	High Eff. Ground & Dual Source Heat Pumps	10.3	9.9	12.4	9.4	11999
13	Other	Low Energy Dishwashers	9.9	10.2	10.4	11.2	11732
14	Space & H_2O Heat	High-Efficiency Gas Furnaces	10.5	10.8	8.9	10.9	11019
15	Space & H_2O Heat	High-Efficiency Air Source Heat Pumps	9.8	12.2	9.4	9.4	10586
16	Shell	High-Efficiency Windows for Heating Climate	10.7	11.2	7.8	10.2	9577.4
17	Other	High-Efficiency Freezers	10.2	9.3	10.4	9.3	9112.6
18	Space Cooling	Evaporative Pre-Cooler	9.8	9.1	10.9	9.1	8927.5
19	Lighting	A-Line Halogen IR Lamps	9.3	10.6	9.0	9.4	8380.9
20	Shell	Light Colored Roofing	10.8	7.5	10.9	9.0	7960.3
21	Other	High-Efficiency Gas Cooking Equipment	9.0	10.7	8.7	9.3	7826.4
22	Shell	Weatherstripping/Infiltration Reduction	10.0	8.5	9.2	9.7	7597.8
23	Shell	Increased Ceiling Insulation	10.6	10.0	6.7	10.5	7513.4
24	Space Cooling	Direct Evaporative Cooling	10.1	7.4	11.8	7.6	6661.9
25	Space & H_2O Heat	Gas Heat Pumps	8.1	9.2	8.7	8.6	5554.7
26	Space & H_2O Heat	Heat Pump Water Heaters	7.5	8.3	10.3	8.6	5541.7
27	Space & H_2O Heat	Pilotless Gas Instant. Water Heaters	9.2	7.3	9.1	9.0	5425.5

Table D-3 (cont'd.): Residential New Construction

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
29	Shell	Increased Wall Insulation	9.6	9.0	7.5	8.1	5214.8
30	Space & H_2O Heat	H_2O Heater Heat Traps	8.4	7.7	8.5	9.3	5178.3
31	Other	High-Efficiency Electric Dryers	8.5	7.6	8.9	9.0	5176.9
32	Space Cooling	High-Efficiency Room AC	6.4	9.1	9.6	9.1	5071.4
33	Space & H_2O Heat	Heat Recovery	7.8	6.2	10.3	7.9	3859.1
34	Space & H_2O Heat	Furnace Blower Motors	7.0	7.2	8.1	9.4	3804.8
35	Space & H_2O Heat	Ceiling Fans	7.2	10.0	6.9	7.6	3800.7
36	Space & H_2O Heat	High-Efficiency Electric H_2O Heaters	6.5	7.5	9.3	7.6	3474.4
37	Space & H_2O Heat	High-Efficiency Elec. Furnaces	5.1	5.8	7.5	6.0	1325.7

Table D-4: Residential Retrofit or Replace-On-Burnout

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
1	Lighting	Compact Fluorescent Bulbs	13.6	14.6	11.2	12.3	27492
2	Lighting	Compact Fluorescent Fixtures	13.3	12.5	11.8	12.5	24843
3	Other	Horizontal Axis Washers	12.4	15.3	10.9	11.8	24361
4	Shell	Duct Sealing	12.3	10.8	13.0	13.1	22585
5	Other	High-Efficiency Refrigerators	11.8	13.9	10.7	11.7	20636
6	Space Cooling	High-Efficiency Central AC	13.1	13.2	10.5	11.0	19817
7	Space & H_2O Heat	High-Efficiency Gas Furnaces	11.8	12.4	10.4	10.9	16571
8	Space & H_2O Heat	High-Efficiency Gas H_2O Heaters	12.7	11.1	10.1	11.2	16005
9	Shell	Increased Ceiling Insulation	11.0	11.2	10.0	11.8	14548
10	Other	Low Energy Dishwashers	9.8	11.4	10.7	11.5	13765
11	Shell	Weatherstripping/Infiltration Reduction	10.8	10.6	10.3	11.6	13658
12	Shell	High-Efficiency Windows for Cooling Climate	8.8	12.3	10.8	10.4	12188
13	Shell	Duct Insulation	9.2	10.2	11.2	11.2	11743
14	Other	High-Efficiency Freezers	10.1	10.1	10.4	10.6	11179
15	Space Cooling	Indirect/Direct Evaporative Cooling	10.1	9.8	11.1	9.6	10482
16	Space & H_2O Heat	Integrated Gas Space/Water Heat Sys.	9.4	9.2	11.0	10.4	9983.7
17	Space & H_2O Heat	High-Efficiency Air Source Heat Pumps	9.3	11.7	9.7	8.7	9236
18	Other	High-Efficiency Gas Cooking Equipment	8.7	10.7	8.9	10.1	8345.1
19	Space Cooling	High-Efficiency Room AC	8.9	9.2	10.4	9.7	8221.5
20	Shell	High-Efficiency Windows for Heating Climate	8.3	11.3	9.5	9.0	8017.9
21	Space Cooling	Evaporative Pre-Cooler	9.4	7.8	11.4	9.4	7926.3
22	Lighting	A-Line Halogen IR Lamps	8.2	10.7	8.5	10.2	7628.1
23	Space & H_2O Heat	Heat Pump Water Heaters	8.4	9.2	10.7	7.8	6421.2
24	Shell	Increased Wall Insulation	7.7	8.2	9.8	9.5	5864.7
25	Space & H_2O Heat	High Eff. Ground & Dual Source Heat Pumps	7.9	8.2	11.8	7.7	5861.8
26	Space Cooling	Direct Evaporative Cooling	8.8	7.0	11.7	7.9	5747.1
27	Shell	Light Colored Roofing	7.8	7.4	11.2	8.4	5452.2

Table D-4 (cont'd.): Residential Retrofit or Replace-On-Burnout

	End Use	Measure	Cost-Effective Saving Potential	Marketing Effort	Seriousness of Marketing Efforts	Effictiveness of Program Measures	Rank
28	Other	High-Efficiency Electric Dryers	8.7	7.6	8.7	9.5	5405.5
29	Space & H_2O Heat	Gas Heat Pumps	7.6	8.6	10.0	8.1	5247.4
30	Space & H_2O Heat	Pilotless Gas Instant. Water Heaters	8.3	6.9	9.1	8.6	4482.2
31	Space & H_2O Heat	H_2O Heater Heat Traps	6.5	7.6	8.4	8.7	3579.3
32	Space & H_2O Heat	Ceiling Fans	7.2	10.2	6.9	6.8	3463.5
33	Space & H_2O Heat	Furnace Blower Motors	7.1	6.0	9.1	8.0	3134.3
34	Space & H_2O Heat	Heat Recovery	6.6	6.4	10.3	6.4	2780.5
35	Space & H_2O Heat	High-Efficiency Elec. Furnaces	5.8	5.8	8.2	6.0	1648.9

Appendix E

Interview Participants

As shown in Table E-1, RER included industry professionals and experts from a variety of organizations in the sample of interview respondents. The target was to complete 38 interviews, the majority of which were to be with individuals from government and nongovernment organizations.

Table E-1: Interview Targets

Organization/Company Type	Target
Government and Nongovernment	20
California Utilities	6
ESCO (residential and nonresidential)	8
Other energy efficiency service providers	4
Total	**38**

Table E-2 includes the government and nongovernment organizations, ESCOs, and other efficiency service providers, and utility companies in California that were contacted to participate in the interview process. Note that in cases where there are multiple contacts for any one company or organization, efforts will be made to conduct a group interview, such as a conference call, or an in-person session when all respondents will be in a single location.

Table E-2: Stakeholder Interview Respondent Sample

Government/Nongovernment Organizations	ESCOs (Residential Focus)
American Council for an Energy Efficient Economy	Co-Energy
Alliance to Save Energy	Honeywell DMC Services
ASHRAE	Planergy
CADMAC Market Effects Subcommittee Members	Sempra Energy Solutions
CA Home Energy Efficiency Rating System	SESCO
CBEE Board Members	Winegard
California Energy Commission	**ESCOs (Nonresidential Focus)**
CLF	CES Way
EPRI	Edison Source
E-Source	Honeywell
Gas Research Institute	Johnson Controls
Lawrence Berkeley National Laboratory	NAESCO
NEEP	Onsite
Natural Resources Defense Council	PG&E Energy Services
Northwest Energy Efficiency Alliance	Proven Alternatives
Northwest Power Planning Council	**Other Energy Efficiency Service Providers**
Office of Energy Assessments	Bentley Company
Research Into Action	Carrier Corporation
Wisconsin Energy Center	Duke Energy Corporation
Wisconsin Public Service Commission	GE Lighting
California Utilities	Parke Industries
LADWP	Southland Industries
PG&E	Sylvania Lighting Services
SCE	**Other**
SDG&E	Robert Mowris & Associates
SMUD	Xenergy
SoCalGas	

Organizations and companies are listed in alphabetical order for each category.

E.1 Round 1 Interview Participants

Table E-3 includes the organizations of individuals who participated in Round 1 of the stakeholder interviews. Twenty-three individuals from 20 different organizations or private energy efficiency service providers completed the energy efficiency technology rating sheets. While the number of participants in Round 1 is lower than expected, it is important to note that several individuals deferred their participation to Round 2 because they were not

qualified to respond to the measure-specific questions in the rating sheets. Although these individuals did not participate in Round 1, they will be contacted to participate in Round 2.

Table E-3: Round 1 Interview Respondents

Government/Nongovernment Organizations	California Utilities
American Council for an Energy Efficient Economy	PG&E
CA Home Energy Efficiency Rating System	SCE
CBEE Board Member	SMUD
California Energy Commission	SoCalGas
Consortium for Energy Efficiency	**Private Energy Efficiency Service Providers**
Natural Resources Defense Council	GE Lighting
Wisconsin Energy Center	Edison Source
Other	Proven Alternatives
Xenergy	Co-Energy
	Planergy
	Sempra Energy Solutions
	SESCO
	UCONS
	PG&E Energy Services

Organizations and companies are listed in alphabetical order for each category.

E.2 Round 2 Interview Participants

Table E-4 included the organizations/companies to which Round 2 interview participants belong. As shown, individuals from 18 organizations or companies were interviewed during Round 2.[1]

[1] In some instances, more than one person from an organization or company participated.

Table E-4: Round 2 Interview Respondents

Government/Nongovernment Organizations	Private Energy Efficiency Service Providers
American Council for an Energy Efficient Economy	Edison Source
Alliance to Save Energy	PG&E Energy Services
CBEE Board Member	Planergy
California Energy Commission	Proven Alternatives
Consortium for Energy Efficiency	Sempra Energy Solutions
Natural Resources Defense Council	SESCO
Wisconsin Energy Center	UCONS
California Utilities	
PG&E	
SCE	
SMUD	
SoCalGas	

Organizations and companies are listed in alphabetical order for each category.

Appendix F

Measure Rankings Derived from Market Potential Studies and Utility Program Results

Residential DSM Rating

Residential DSM Measures

Category and Measure	Ranking in PG&E DSM Potential Study	Ranking in ACEEE National Study	Ranking by Energy Savings in Recent Utility Programs			Overall Score
			PG&E	SCE	SDG&E	
SHELL MEASURES						
Increased Wall Insulation	100	100	30	100	100	93
Increased Ceiling Insulation	100	100	20	17	100	75
High-Efficiency Windows	28	19	100	29	100	**40**
Weatherstripping	6	47	100	27	100	**41**
Duct Insulation	100	100	100	26	100	85
Duct Sealing	9	12	23	16	100	**22**
Light Colored Roofing	21	21	100	100	100	**53**
OTHER – Passive Cooling Design	100	100	100	100	100	100
OTHER – Floor Insulation	100	100	32	100	100	93
SPACE COOLING MEASURES						
High Efficiency Central AC	2	6	9	21	100	**18**
High Efficiency Room AC	100	50	100	100	100	85
Evaporative Pre-Cooler	1	100	100	100	100	70
Direct Evaporative Cooling	100	100	100	100	100	100
Indirect/Direct Evaporative Cooling	47	100	100	100	100	84
OTHER – Evaporative Condensers	100	100	100	100	100	100
SPACE HEATING AND WATER HEATING MEASURES						
High-Efficiency Gas Furnaces [NC]	100	53	100	100	100	86
High-Efficiency Elec. Furnaces [NC]	100	100	100	100	100	100
Ceiling Fans [NC]	16	100	100	100	100	75
Integrated SH/WH Heat Pumps [NC]	14	37	100	22	100	**40**
Gas Heat Pumps [NC]	24	100	100	100	100	77
High Eff. Ground & Dual Source Heat Pumps [NC]	34	44	100	100	100	63
Furnace Blowers [NC]	12	100	100	100	100	74
Integrated Gas Space/Water Heat Sys. [NC]	41	54	100	100	100	69
High-Efficiency Gas H_20 Heaters [NC]	53	8	100	100	100	**58**

Residential DSM Measures (cont.)

Category and Measure	Ranking in PG&E DSM Potential Study	Ranking in ACEEE National Study	Ranking by Energy Savings in Recent Utility Programs			Overall Score
			PG&E	SCE	SDG&E	
SPACE HEATING AND WATER HEATING MEASURES continued						
High-Efficiency Electric H_20 Heaters	100	4	100	100	100	71
H_20 Heater Heat Traps	100	100	100	100	100	100
Wastewater Heat Recovery	5	100	100	100	100	72
Heat Pump Water Heaters	11	39	100	30	100	**41**
Pilotless Gas Instant. Water Heaters	37	55	100	100	100	68
Faucet Aerators	100	100	100	23	100	85
Low Flow Showerheads	100	100	100	20	15	76
OTHER – Solar Water Heaters	100	100	100	100	100	100
OTHER – Pipe Wrap	100	100	100	100	100	100
LIGHTING MEASURES						
Compact Fluorescent Fixtures	56	28	31	100	4	**49**
Compact Fluorescent Bulbs	20	14	100	7	2	**22**
A-Line Halogen IR Lamps	36	49	100	100	100	66
OTHER – T-5 Lamps	100	100	100	100	100	100
OTHER – MF exit signs	100	100	100	100	17	92
OTHER – Torchieres	100	100	100	100	6	91
OTHER MEASURES						
Horizontal Axis Washers	100	2	12	28	18	**39**
High-Efficiency Electric Dryers	100	100	25	100	100	93
Low Energy Dishwashers	49	10	100	100	19	**50**
High Efficiency Refrigerators		36	5	15	13	**46**
Coin-operated clothes washers	46	7	100	100	100	**56**
OTHER – High Efficiency Freezers	100	33	100	100	100	80
OTHER – High Efficiency Gas Cooking	100	48	100	100	100	84
OTHER – Occupancy Sensor Power Strips	100	100	100	100	100	100
OTHER – Electric Range	100	100	21	100	100	92

Nonresidential DSM Rating

Nonresidential DSM Measures

Category and Measure	Ranking in PG&E DSM Potential Study	Ranking in ACEEE National Study	Rankings by Energy Savings in Recent Utility Programs			Overall Rank
			PG&E	SCE	SDG&E	
SHELL MEASURES						
Increased Wall Insulation	100	100	100	100	100	100
Increased Ceiling Insulation	100	100	100	100	100	100
Window Treatments (films, screens)	25	100	100	100	100	78
High-performance Windows	4	52	14	100	100	**48**
Light Colored Roofing	21	23	100	100	100	**53**
OTHER – Passive Heating/Cooling Design	100	100	100	100	100	100
HVAC AND WATER HEATING EQUIPMENT						
High Efficiency Packaged AC Equipment	10	13	100	24	3	**22**
Adjustable Speed Drive Fans	100	100	10	13	16	65
Adjustable Speed Drive Pumps	100	100	100	100	12	91
Adjustable Speed Drive Chillers	100	100	100	100	9	91
Economizers (where not req'd by T24)	100	100	100	100	100	100
Thermal Storage System	62	100	100	100	100	89
Evaporative Pre-Cooler /Evap Condenser/Evap Cooler	100	100	7	100	100	91
High Efficiency Chillers	100	100	3	5	8	62
Gas Absorption Chillers	18	100	100	100	100	75
Occupancy sensors	100	100	100	100	100	100
CO_2 sensors	100	100	100	100	100	100
VAV instead of CV system	100	100	100	100	100	100
Energy Management System	100	100	100	25	100	85
Heat Pump Water Heating	3	42	100	100	100	**54**
Packaged gas cooling	63	100	100	100	100	89
Gas chillers (engine driven)	52	100	100	100	100	86
OTHER – Air Distribution Sealing	100	100	100	100	100	100
OTHER – HE Gas Boilers and Furnaces	100	26	100	100	100	78
OTHER – Programmable Setback	100	100	18	100	100	92
OTHER – VFDs on Air Handlers	100	100	22	100	100	92
OTHER – VFDs on Water Pumps	100	100	11	100	100	91
OTHER – Oversized Cooling Tower	100	100	20	100	100	92

Nonresidential DSM Measures (cont.)

Category and Measure	Ranking in PG&E DSM Potential Study	Ranking in ACEEE National Study	Rankings by Energy Savings in Recent Utility Programs			Overall Score
			PG&E	SCE	SDG&E	
REFRIGERATION						
Floating Head Pressure Control	100	100	100	100	100	100
Hot Gas Defrost	100	100	100	100	100	100
High-Efficiency Case Fans	100	100	100	100	100	100
Anti-Condensate Heater Controls	100	100	24	100	100	92
Strip Curtains [NC]	100	100	17	100	100	92
Computer Optimizer Control	100	100	100	100	100	100
High-efficiency Conversions	100	100	100	100	100	100
High-efficiency packaged refrigeration equipment	7	18	19	100	20	**31**
OTHER – Mechanical Subcooling	100	100	29	100	100	93
OTHER – Dessicant Cooling:	100	46	100	100	100	84
INDOOR LIGHTING						
HIDs	100	100	13	3	7	63
32 W/T8s	61	9	1	2	1	**22**
Delamping	61	100	2	18	100	62
Daylighting	42	51	100	14	100	**51**
Occupancy Sensors	43	29	15	100	100	**53**
Compact Fluorescents	100	100	4	12	5	63
Energy Management System	100	100	100	100	100	100
Skylights and Controls	100	100	100	19	100	84
LED Exit Signs	42	3	16	6	10	**17**
OTHER – T-5 Lamps	100	100	100	100	100	100
OTHER – Halogens	100	100	27	100	100	93
OUTDOOR LIGHTING						
Photocell Control [NC]	100	100	100	100	100	100
Combined Photocell/Timeclock Control	100	100	100	100	100	100
Compact Fluorescents	100	100	100	100	100	100

Nonresidential DSM Measures (cont.)

Category and Measure	Ranking in PG&E DSM Potential Study	Ranking in ACEEE National Study	Rankings by Energy Savings in Recent Utility Programs			Overall Score
			PG&E	SCE	SDG&E	
MOTORS						
CO Sensors on Garage Exhaust Fans	100	100	100	100	100	100
ASDs on Non-HVAC Motors	100	100	100	4	11	72
Hi Eff. Motors on Non-HVAC Motors	38	35	26	9	14	**28**
DC Motor Conversion	100	100	100	100	100	100
Extrusion Equipment	100	100	100	11	100	82
OTHER – Specify:	100	100	100	100	100	100
OTHER – Specify:	100	100	100	100	100	100
OTHER – Specify:	100	100	100	100	100	100
PROCESS: HEATING and COOLING						
Ultra Violet Curing/Treatments	100	100	100	100	100	100
High-Efficiency Low NO_x Burners	100	100	100	100	100	100
Thermal Recovery (from refrig.)	100	100	100	100	100	100
Process gas refrigeration	54	100	100	100	100	86
PROCESS: CONVERSIONS						
Chemical to Ozone	100	100	100	100	100	100
High-Efficiency Catalyst	100	100	100	100	100	100
Injection Molding Equipment	100	100	100	10	100	82
COMPRESSED AIR						
Leak Maintenance and Mgmt.	100	100	100	100	100	100
Variable Speed Drives	100	100	100	100	100	100
High-Efficiency Conversions (screw)	100	100	100	100	100	100
Controls Optimization	100	100	100	100	100	100
High-efficiency Industrial air compressors	29	32	100	100	100	**58**

Nonresidential DSM Measures (cont)

Category and Measure	Ranking in PG&E DSM Potential Study	Ranking in ACEEE National Study	Rankings by Energy Savings in Recent Utility Programs			Overall Score
			PG&E	SCE	SDG&E	
OTHER MEASURES						
Commercial Kitchen Ventilation	59	100	100	100	100	88
Gas Booster Heat for Comm. Dishwashers	7	100	100	100	100	72
Laundry wastewater heat recovery	57	100	100	100	100	87
Ozonated laundry	23	100	100	100	100	77
Industrial fan/blower systems	50	43	100	100	100	68
LED Traffic Lights (incl Pedestrian)	27	11	8	100	100	**42**
Wastewater facility optimization	31	100	100	100	100	79
C&I power conversion equipment	60	100	100	100	100	88
OTHER – Sprinkler to Micro	100	100	6	100	100	91

Appendix G

Preliminary Short Lists of Efficiency Measures

Table G-1: Residential Efficiency Measures

End Use	Measure [Decision Type]	Priority
Lighting	A-Line Halogen IR Lamps	
Lighting	Compact Fluorescent Bulbs [NC]	
Lighting	Compact Fluorescent Bulbs [R]	
Lighting	Compact Fluorescent Fixtures [NC]	
Lighting	Compact Fluorescent Fixtures [R]	
Lighting	Occupancy Sensor Power Strips	
Lighting	T-5 Lamps	
Other	Energy Efficient Showerheads	
Other	Faucet Aerators	
Other	High Eff. Refrigerators [NC]	
Other	High Eff. Refrigerators [R]	
Other	Horizontal Axis Washers [NC]	
Other	Horizontal Axis Washers [R]	
Other	Low Energy Dishwashers [R]	
Shell	Attic Radiant Barrier	
Shell	Duct Sealing [NC]	
Shell	Duct Sealing [R]	
Shell	High Eff. Windows for Cooling Climate [NC]	
Shell	Increased Ceiling Insulation [R]	
Shell	Light Colored Roofing	
Shell	Weatherstripping/Infiltration Reduction [R]	
Space & H_2O Heat	Evaporative Condensers	
Space & H_2O Heat	Heat Pump Water Heaters	
Space & H_2O Heat	High Eff. Gas Furnaces [R]	
Space & H_2O Heat	High Eff. Gas H_2O Heaters [R]	
Space & H_2O Heat	High Eff. Gas H_2O Heaters [NC]	
Space & H_2O Heat	High Eff. Ground & Dual Source Heat Pumps	
Space & H_2O Heat	Integrated Gas Space/H_2O Heat System [NC]	
Space & H_2O Heat	Passive Cooling Design	
Space & H_2O Heat	Pipe Wrap	
Space & H_2O Heat	Solar Water Heating	
Space Cooling	High Eff. Central AC [NC]	
Space Cooling	High Eff. Central AC [R]	

Note: Measures are listed in alphabetical order by enduse and measure name.
[R] Retrofit or Replace-on-burnout
[NC] New Construction

Table G-2: Nonresidential Efficiency Measures

End Use	Measure [Decision Type]	Priority
Compressed Air	High Eff. Industrial Air Compressors	
Compressed Air	Leak Maintenance & Mgmt. [NC]	
Compressed Air	Leak Maintenance & Mgmt. [R]	
HVAC & H_2O Heat	Adjustable Speed Drive Fans [NC]	
HVAC & H_2O Heat	Adjustable Speed Drive Fans [R]	
HVAC & H_2O Heat	Adjustable Speed Drive Pumps [NC]	
HVAC & H_2O Heat	Adjustable Speed Drive Pumps [R]	
HVAC & H_2O Heat	Energy Mgmt. System [NC]	
HVAC & H_2O Heat	Energy Mgmt. System [R]	
HVAC & H_2O Heat	High Eff. Chillers [NC]	
HVAC & H_2O Heat	High Eff. Chillers [R]	
HVAC & H_2O Heat	High Eff. Packaged AC Equip. [NC]	
HVAC & H_2O Heat	High Eff. Packaged AC Equip. [R]	
HVAC & H_2O Heat	Passive Heating/Cooling Design	
Indoor Lighting	32 W/T8s	
Indoor Lighting	Compact Fluorescents	
Indoor Lighting	Daylighting [NC]	
Indoor Lighting	LED Exit Signs	
Lighting	T-5 Lamps	
Motors	High Eff. Non-HVAC Motors	
Other	LED Traffic Lights	
Other	Wastewater Facility Optimization [R]	
Other	Wastewater Facility Optimization [NC]	
Refrigeration	Computer Optimizer Control [NC]	
Refrigeration	Computer Optimizer Control [R]	
Refrigeration	Electronic Evaporative Pressure Regulating Valves	
Refrigeration	High Eff. Conversions [R]	
Refrigeration	High Eff. Packaged Refrigeration Equip. [NC]	
Shell	Air Distribution System Sealing	
Shell	High Performance Windows [NC]	
Shell	Light Colored Roofing	

Note: Measures are listed in alphabetical order by enduse and measure name.
[R] Retrofit or Replace-on-burnout
[NC] New Construction

Appendix H

Market Share Tracking in Wisconsin

H.1 Introduction

RER's review of recent literature and market share tracking attempts revealed that the "ideal data" for efficiency level tracking currently does not exist, and that tracking market shares by efficiency level will be difficult and time consuming and require considerable resources and a long-term commitment. The only successful market share tracking by efficiency level known to date is that currently being implemented by the Energy Center of Wisconsin (ECW) and Opinion Dynamics Corporation (ODC).[1]

Tracking initiatives in Wisconsin are focused on energy-intensive appliances in the residential sector, including central air conditioners, forced air heating systems, refrigerators, water heaters, and room air conditioners. The objective of tracking these appliances initially was for accurately forecasting DSM potential. In the last two years, the focus has changed and market share tracking is viewed as a means of collecting data for assessment of market transformation and evaluation of market transformation initiatives.

This appendix summarizes the market share tracking initiative currently in operation to collect sales of some residential appliance and HVAC equipment in the state of Wisconsin. The majority of information presented here was obtained during interviews with ECW staff and the ODC project manager who developed and maintains the distributor data tracking strategy.[2]

H.2 Overview – Different Methods for Different Measures

Different methods are used to collect sales data for different measures. For refrigerators, water heaters and now lighting (specifically halogen torchieres), surveys are used to collect

[1] The Energy Center of Wisconsin, a nonprofit organization supported by Wisconsin utilities, focuses its research primarily on energy efficiency products and services. The ECW has undertaken several initiatives in the field of market transformation, particularly in the residential sector. Opinion Dynamics Corporation is a market research firm with locations in Cambridge, Massachusetts and Madison, Wisconsin.

[2] Personal communication with John Peloza of the Energy Center of Wisconsin, August 7, 1998, and personal communication with Rick Winch of Opinion Dynamics Corporation, November 17, 1998.

energy-efficient information from residential customers on an annual basis. The survey approach is the least expensive way of gathering information that customers are willing and able to provide. For furnaces and air conditioners, however, information regarding the make and model number is not easily accessible and therefore, it was necessary to gather this information from an upstream market actor – distributors. The ECW retained ODC to collect sales data from distributors in Wisconsin.

ODC found distributors to be a highly reliable source for such data after randomly checking invoices in their stores. Before developing the distributor data collection system, ODC attempted or investigated several methods for collecting sales data by efficiency level and learned that there are problems associated with any system.

- ***Customers.*** As mentioned above, there is an accuracy risk in collecting data from end users because model numbers for some measures are not easily accessible.
- ***Contractors.*** ODC discovered problems with collecting data from HVAC contractors in Wisconsin because they do not generally maintain accurate records. Furthermore, more contractors would need to be recruited as data suppliers in order to have a reliable sample.
- ***Manufacturers.*** The biggest problem with data collected from manufacturers is that manufacturers do not have the mechanism to track where the product is delivered to after the first delivery point (typically a centralized regional distribution center), therefore data by state or smaller geographic region is not available. Shipments data collected by the Gas Appliance Manufacturers' Association (GAMA) and the Air-Conditioning and Refrigeration Institute (ARI), for example, are collected from manufacturers and are often available by state. However, to estimate shipments by a more precise geographic region, these organizations take the statewide shipments from manufacturers and estimate shipments by smaller marketing region according to a per capita spending index. The data ODC collected from distributors has proven that this method is very misrepresentative and inaccurate.

Because of the unique nature of collecting sales data from distributors to track efficiency market shares, the remainder of this appendix focuses on those efforts instead of the survey of residential customers.

H.3 Introduction to Tracking Market Shares by Efficiency Level with Distributor Data

The Wisconsin distributor data tracking system collects sales data from 15 of the 22 or so HVAC distributors in the state on a quarterly basis. Because manufacturers evaluate distributors according to their shares of the market as reported by GAMA and ARI (which is

inaccurate when used to estimate shipments to small geographic regions, as explained above), ODC recognized a mutually beneficial opportunity for collecting sales data from distributors. In particular, in return for providing their HVAC equipment sales data by efficiency level, ODC provides each distributor with their share of the market by manufacturer and equipment type. Thus, each distributor supplies their sales data by efficiency level to ODC and in return, each distributor gets their market share by efficiency level for each of the 23 marketing regions in Wisconsin, as well as their statewide market share. Distributors find this information extremely valuable. Given the inaccuracies with the GAMA and ARI data, the distributors welcomed a better system that helped them identify their true market share.

Because ECW sponsors this data collection effort, ODC provides the ECW with market shares by efficiency level for each of the 23 marketing regions aggregated over all distributors. ODC is the only party that has access to each distributor's company-specific data.

H.4 Developing the Distributor Data Tracking System

Measure Coverage

ODC collects data on furnaces and air conditioning equipment for residential and small commercial customers. ODC does not collect data for all units, only that for specific sizes or SEER levels (not the "super" efficiency equipment yet). Furthermore, ODC does not collect data by decision type. In the Wisconsin market, this data is not obtainable from distributors because of the relatively small residential new construction market in Wisconsin. However, because of the enormity of the new construction industry in California, it might be possible to collect HVAC sales data by both efficiency level and decision type from distributors in the California market.[3]

Know the Market and the Key Market Actors

ODC essentially began to develop this tracking strategy at "ground zero." The first task was to collect efficiency mixes of HVAC equipment sales from each distributor in the state. ODC personnel traveled around the state to visit each distributor in person to collect this data and to become familiar with their businesses and their markets. In particular, ODC learned each distributor's relative size/share of the market, which were the key distributors in the market, those most respected by their competitors, and even how each distributor perceived

[3] HVAC installations in the residential new construction market in California are dominated by a relatively small number of HVAC contractors. Because the majority of their installations are in new construction market, most distributors are able to identify sales for new construction based upon the contractor who purchases the equipment.

their competitors. ODC explained that this process – developing a personal relationship with the distributors – was critical to the success of their data collection efforts.

Recruiting Participants

There are roughly 22 HVAC distributors in Wisconsin. Developing a tracking system that relies on a small number of data suppliers was risky, because if only a few of the key distributors opted to not participate, the data would not represent the majority of the market and the system would not be useful. Primarily, as explained above, learning about the market and developing a relationship with each distributor is critical to successful recruiting. In order for the system to work, "someone" needs to gain the trust of the distributors. ODC explained that the data collection agent needs to be an independent company or organization that is not a state agency, and not a utility or a utility affiliate.[4]

Second, ODC explained that the procedure used to recruit the distributors successfully was to recruit the key or most dominant distributors *first*. Their participation was then used to convince the others to participate. Knowing how the distributors perceived their competitors helped to identify those to be recruited first.

Development Costs and Time

ODC explained that developing the distributor data market share tracking system took roughly six to eight months and cost approximately $100,000. This estimate includes all work completed up to the time of actually receiving data from participating distributors.

H.5 Maintaining the Distributor Data Tracking System

Operating and maintaining the distributor data market share tracking system entail the following:

- Collecting and processing sales data submitted by each participating distributor each quarter,
- Preparing and submitting quarterly market share reports to each participating distributor,
- Aggregating distributor-specific data and preparing and submitting quarterly market share reports to the ECW, and
- Maintaining relationships with each participating distributor and continuing to recruit nonparticipating distributors.

[4] For example, distributors would not give data to the ECW because of its strong affiliation with the utilities in Wisconsin.

In addition to collecting and summarizing the quantitative information, ODC collects qualitative information informally as part of its normal practice of maintaining relationships with distributors. For example, in a recent quarter, it was found that the market share for energy-efficient furnaces in Wisconsin, overall, was 75%. However, the share in the Green Bay (northern Wisconsin) region was about 85% and that in Milwaukee was 63%. Informal discussions with the distributor revealed that the higher levels of multi-family units in Milwaukee and colder temperatures in Northern Wisconsin were some reasons for the differing penetrations of energy-efficient furnaces between regions.

Additional observations regarding maintaining the distributor data market share tracking system are included below.

Keep It Simple and Be Flexible

ODC does not have the distributors complete a survey form when they submit their sales data each quarter; each distributor submits data to ODC in a format that is most convenient. For example, some distributors provide sales data by efficiency level, while others provide a listing of the model numbers sold during the quarter. As such, a step in developing the system was to convert the data provided by all distributors into a consistent, usable format. Even though this required a considerable amount of time and effort for ODC, it was critical not to impose additional work on the distributors and/or have them change their normal way of record keeping in order to supply data in a pre-specified format. ODC explained that *any* impositions or additional work placed on distributors might be a strong disincentive to participation. The key was to keep it as easy as possible for the data suppliers, not the data collectors.

System Flexibility

ODC recognized that the system should be flexible enough to incorporate additional efficiency or other additional HVAC-related measures in the future and to not disrupt the current system should they decide to do so. ODC does not believe that adding new measures/efficiency levels into the current system will do so, primarily because distributors supply data in their format of choice. Now that the system is in place and strong relationships with the distributors have been developed and maintained, ODC will likely present the idea of requesting data for additional measures sometime in the future.

Administration Costs and Time

ODC estimates that the distributor data market share tracking system costs roughly $50,000 per year to maintain. This estimate includes all direct costs associated with data collection, processing, and reporting, as well as maintaining relationships with distributors throughout the state. It is necessary to remain in constant contact with the distributors not only to remind them to submit their data, but to obtain qualitative supporting information as well.

H.6 Status, Future Projects and Lessons Learned

Status of Distributor Data Market Share Tracking

ODC has collected sales data from distributors every quarter for two years. The system is solidly in place and covers approximately 85% of all units sold in Wisconsin from 15 distributors.[5]

Future Tracking Projects

ECW and ODC are considering expanding the tracking into other bordering states and are currently evaluating whether they should begin to track additional measures, such as commercial lighting measures.

Lessons Learned

Lessons learned thus far are as follows:

- ***Alternate methods should be used for different measures.*** While surveys are able to collect somewhat reliable information on technologies such as refrigerators and lighting, furnace and air conditioner data should be obtained from distributors. It appears as though a handful of distributors account for the majority of the market share.
- ***Importance of developing relationships with distributors.*** Because of the sensitive and proprietary nature of sales data, it is crucial to develop strong, trusting relationships with the distributors. The tracking strategy should provide mutually beneficial solutions to both the data collection agent and the data suppliers.

[5] The number of participating distributors has varied since the inception of this tracking system because distributors are not legally bound to supply the data.

Appendix I

Examples of Title 24 Compliance Forms

Compliance forms can be found on the California Energy Commission's web page:

http://www.energy.ca.gov/efficiency/compliance/residential/index.html
http://www.energy.ca.gov/efficiency/compliance/nonresidential/index.html

Appendix J

Details of Tracking Alternatives Reviewed in Methods Assessment

Section 5 provided a general overview of a variety of alternatives for tracking the market shares of key efficiency measures. This appendix provides additional details, including some company- or supplier-specific information for the following methods:

- Consumer Panel Data Services,
- Scanner (Point-of-Sale) Data Services,
- Data collection from upstream or midstream market actors, and
- Market research.

J.1 Consumer Panel Data Services

Simmons Market Research Bureau

Simmons specializes in syndicated and custom media research. Syndicated services include the Study of Media and Markets (SMM), a Survey of the American Population, measuring media habits, product purchasing behaviors and beliefs, opinions, and attitudes.

- ***Mode of Administration.*** The research is based on in-home interviews with 23,000 adults, and measures over 800 product categories and over 4,800 individual brands. Each item can be related to other factors, such as 28 demographic categories, psychographics, media usage, geodemographic (such as CLUSTERPLUS and VISION), and purchase influence data.
- ***Geographic Coverage.*** Information can be purchased for the entire U.S., as well as five marketing regions, namely Northeast East Central, West Central, South and Pacific. The Pacific region can be further segmented into the Greater Los Angeles and Remaining Pacific regions.
- ***Measure Coverage.*** Simmons collects information on lighting, kitchen and bathroom faucets, CAC, hot water heating, weather stripping, insulation, washing machines, gas and electric clothes dryers, portable room heaters, wood burning stoves, room air conditioners, ceiling fans, and all major kitchen appliances. Survey questions ask if respondents own the particular equipment and if they

purchased it within the last 12 months. Efficiency information is collected for screw-in light bulbs only. However, purchasers were not asked to report on the quantity of their purchases.

- ***Sample Representativeness.*** The sample is representative of IRI's five marketing regions and the U.S. overall

Industrial Market Research (IMR)

IMR specializes in providing consumer panel data for consumer durables on a quarterly basis.

- ***Mode of Administration.*** IMR obtains information by sending mail surveys to 50,000 households per quarter. The survey is sent to the Market Facts Mail Panel and requests information on purchases made during the three-month period. A 70% response rate is generally achieved.
- ***Measure Coverage.*** Major appliances include clothes washers and dryers, refrigerators, microwave ovens, freezers, room and central air conditioners, furnaces, and dehumidifiers. Discussions with IMR revealed that additional products could be added to the survey—gas furnaces and dishwashers, in particular. Thus, the following measures covered by IMR have been identified as priorities in this study:
  - Central air conditioning,
  - Horizontal axis clothes washers,
  - Gas furnaces,
  - Refrigerators,
  - Dishwashers, and
  - Gas water heaters.

  If a respondent is a purchaser of relevant equipment over a three-month period, then the following questions are asked:

  - Number purchased,
  - Location of purchase,
  - Other stores shopped,
  - Month of purchase,
  - Brand purchased,
  - Price paid,
  - A first time or replacement purchase,
  - Male or female buyer,
  - EER for room and central air conditioners, and
  - Size in BTUs for furnaces.

- ***Geographic Coverage.*** Data can be presented by each of the nine census regions and by the nation overall. IMR would be willing to oversample California.
- ***Sample Representativeness.*** The sample is balanced to correspond to U.S. Census data for each of the nine census regions. Within each region, the sample is representative with respect to city size, head of household age, number of people in the household, and annual family income.
- ***Costs.*** Subscription costs include a copy of each quarterly report on CD-ROM. Each fresh CD will contain data from previous quarters. The cost schedule varies by the number of products and is given in Table J-1. The costs presented in Table J-1 only apply to products already covered by the existing survey (horizontal axis washers, central air conditioning, furnaces, and refrigerators). The cost for these four products would be $4,000. Adding the other two products (dishwashers and gas furnaces) would cost an additional $12,500, bringing the total cost for the six products to $16,500 per year.

Table J-1: IMR Cost Schedule

Number of Products	Cost per Product
1	$8,000
2 – 3	$2,000
4 – 15	$1,000

- ***Level of Customization/Possibility for Follow-Up Survey on Pre-Screened Sample.*** IMR frequently surveys a customer sample that has been pre-screened from responses to the standard consumer panel survey. As explained above, the survey identifies recent purchasers of the equipment listed above and collects EERs of recently purchased room and central air conditioning, and size in BTUs for recently purchased furnaces. Recent equipment purchasers can then be surveyed again to collect additional or more specific data.

  To conduct a follow-up survey of equipment purchasers, the client must first purchase IMR's original database at the prices discussed above. IMR's cost to implement a follow-up survey is minimal, but depends upon the sample size and length of the survey instrument. A handling cost of $200 would cover the development of the follow-up survey sample. This sample would then be transferred to the panel data company that conducted the original survey. This company would also administer the follow-up survey. The client would then pay the additional cost for the implementation of the follow-up survey. The costs of follow-up survey implementation will be based upon the sample size and the length of the survey instrument.

  To set up a follow-up survey, the following steps must take place:

  - The client must develop the survey instrument,

- The client needs to determine the sample (e.g., everyone surveyed in California, or some subset of the surveyed sites),
- IMR pulls the sites and sends the sample to the panel data company,
- The panel data company administers the survey and sends the resulting data to the client.

Once this system is in place, much less time would be required to administer subsequent follow up surveys.

It is important to note that IMR has attempted to collect data by efficiency level in the past without success, and does not intend to do so again. IMR is also willing to syndicate a few questions aimed at obtaining energy-efficient equipment information for tracking market share at no cost, provided some of their main users think that it is valuable information to collect.

- ***Time.*** The data already being gathered can be obtained almost immediately.
- ***Set Up Procedure.*** To purchase their current database, the client is required to sign a purchasing agreement and the data will be sent immediately.

J.2 Scanner (Point-of-Sale) Data Services

IRI, Inc.'s INFOSCAN®

IRI's INFOSCAN database is populated by collecting weekly retail scanner information for a sample of grocery, drug, and mass merchandiser stores across the U.S.

- ***Mode of Administration.*** Scanner data are purchased from a sample of retail outlets. The sample consists of roughly 3,000 grocery stores, 550 drug stores, and 288 mass merchandiser stores.
- ***Geographic Coverage.*** The data are presented by the eight IRI-defined marketing regions defined as follows:
  - California (All California),
  - South Central (Arkansas, Louisiana, Oklahoma, Texas),
  - Southeast (Alabama, Florida, Georgia, Mississippi, South Carolina),
  - Plains (Iowa, Kansas, Minnesota, North Dakota, Nebraska, South Dakota),
  - West (Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, Wyoming),
  - Great Lakes (Illinois, Indiana, Michigan, Ohio, Wisconsin),
  - Northeast (Connecticut, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont), and

- Mid-South (District of Columbia, Delaware, Kentucky, Maryland, North Carolina, Tennessee, Virginia, West Virginia).

- ***Measures.*** INFOSCAN provides both volumetric and promotional information for any scannable product category in the grocery, drug, and mass merchandiser outlets. The only measures applicable to this study are light bulbs. Data collected includes number of units sold, average retail price, dollar sales, distribution of item, merchandising conditions, market share, and other relevant information by UPC code.

- ***Sample Representativeness.*** The sample represents the eight marketing regions and the nation as a whole. Sample design details are provided in Table J-2.

Table J-2: INFOSCAN Sample Design

Channel	Universe Stores	Sample Size	Total Channel Coverage
Grocery >$2MM – U.S.	29,315	3,050	94%
Mass Merchandisers – U.S.	6,483	300	-
Drug - U.S.	38,443	650	-
Grocery >$2MM – California	3,143	285	97%
Mass Merchandisers – California	3,572	100	-
Drug – California	405	20	-

Nielsen's SCANTRACK®

SCANTRACK provides basic tracking information at multiple levels from product category at the national level and all outlet sales volume to single item performance in one market. It also provides customers with the ability to monitor performance trends by tracking and forecasting non-promoted versus promoted product movement.

- ***Mode of Administration.*** All the data scanned is collected at point of sale.
- ***Geographic Coverage.*** While food stores can be broken out for all the SCANTRACK markets below, drug and mass merchandising outlets can be broken out only for eight markets, namely Atlanta, Chicago, Houston, Los Angeles, Philadelphia, Pittsburgh, San Francisco, and Washington, D.C.
- ***Measures.*** Data are available on every UPC scanned in warehouse clubs, mass merchandising stores, drug stores, and grocery-related businesses. Measures relevant to this study include refrigerators, freezers, air conditioners, and light bulbs. The information in the database can be described in terms of the market (location), product, period (weekly and monthly), and fact (unit and dollar sales,

volume of sales, and percent of stores selling). Light bulbs are investigated further for cost estimates. The data will provide the information needed to track light bulbs, such as wattage, fluorescent or incandescent type, brand name, and model number.

- ***Sample Representativeness.*** SCANTRACK collects data weekly from a sample of over 4,800 stores representing more than 800 retailers in 50 major markets. SCANTRACK includes data from a sample of supermarkets, mass merchandisers, drug stores, food and gas convenience stores, and independent drug and grocery stores that is projected to the universe (see Table J-4 below). Nielsen covers rural areas as well. For California, data can be made available overall for the state, as well as by four major cities, namely Los Angeles, San Diego, San Francisco, and Sacramento.

  It should be noted, however, that data are not being collected from other distribution channels, such as wholesalers, distributors, and other supply houses from which various market actors purchase their new construction electric supplies. In addition, for drug service and mass merchandising stores, it covers only eight markets.

- ***Costs.*** Cost estimates vary widely depending on the type of product being chosen, geographic coverage, and type of information needed. Prices range from $1,000 to $18,000. Cost estimates for light bulb information on an annual basis for the four major markets in California was $5,135

Table J-3: SCANTRACK's® Markets for Food Stores

Southern Region	Central Region	Eastern Region	Pacific Region
Southwest Arkansas, Louisiana, New Mexico, Oklahoma, Texas	**West Central** Colorado Illinois Iowa Minnesota Missouri Montana North Dakota Kansas South Dakota Wisconsin Wyoming	**New England** Connecticut Massachusetts Maine New Hampshire Rhode Island Vermont	Arizona California Nevada Idaho Oregon Washington
Southeast Alabama Georgia Florida North Carolina Mississippi South Carolina Tennessee Virginia	**East Central** Indiana Kentucky Michigan Ohio West Virginia Western PA	**Middle Atlantic** Delaware Eastern PA Maryland New Jersey New York Washington, DC	

Table J-4: SCANTRACK® Sample Design

Channel	Universe Stores	Sample Size	Total Channel Coverage
Supermarkets >$2MM	30,286	3,000	83%
Mass Merchandisers All chains and Independents >$1MM	6,491	320	100%
Drug All chains and Independents >$1MM	24,676	470	84%
Food Convenience	26,992	175	
Gas Convenience	52,609	125	
Independent Drug < $1MM	24,761	106	
Independent Grocery < $2 MM	114,580	500	

Audits and Surveys Worldwide's (ASW) Intelect® – Triad Systems

ASW and Triad have formed a strategic alliance to collect scanner data from a sample of retailers, mass merchants, chain home centers, electronic specialty, and other independent merchandisers.

- ***Mode of Administration.*** ASW-Triad can provide reports on a monthly basis on the home appliance market with information from scanner data obtained from a sample of retailers, mass merchants, chain home centers, electronic specialty, and other independent merchandisers.
- ***Geographic Coverage.*** Data are available on a national level.
- ***Measures.*** ASW-Triad tracks residential appliances including room air conditioners, refrigerators, freezers, washers, dryers, ranges, ovens, dishwashers, and microwave ovens. Information tracked is unit and dollar sales, brand name, inventory levels, model name, and distribution channel used.
- ***Sample Representativeness.*** ASW-Triad is able to project findings from their sample on to a national level. Currently, the company obtains data from 48%, 90% and 50% of the total department stores, mass merchandisers, and electronic appliances respectively.
- ***Costs.*** The cost for data on a monthly basis is $24,000. This includes providing the data and an analytical database.

J.3 Data Collection from Distributors and/or Other Upstream or Midstream Market Actors

This tracking strategy involves the collection of shipments or sales data from upstream market actors, including manufacturers, distributors, retailers, and installation contractors. This strategy would be modeled after the tracking system currently in place in Wisconsin, which involves the collection of sales data of residential heating and cooling equipment from HVAC distributors throughout the state.[1] Because this study covers HVAC and non-HVAC measures in both the residential and nonresidential sectors, RER researched data collection from not only distributors, but other upstream market actors as well.[2]

Measure Coverage

This method is applicable to nearly all priority measures. The market actor from which data will be obtained is the primary issue; the most appropriate market "nodes" for data collection were discussed in Section 2.

Mode of Data Collection

The most logical vehicle for collecting sales or shipments data by efficiency level might appear to be a mail or telephone survey through which the market actor reports sales of equipment by predefined efficiency levels. However, the experience in Wisconsin reveals that a more successful approach is to collect sales data from the market actor in their format of choice. The data collecting/analytical agent would then be responsible for converting all data into a common and usable format. The Wisconsin experience shows that most, if not all distributors, have different methods of record keeping. Administering a survey that defines the format of the data will impose constraints and additional work for distributors and other market actors and would be a disincentive for their participation and detrimental to the system's success. As such, RER recommends that sales data be collected from upstream market actors in a manner similar to the procedure in Wisconsin.

Development of the Tracking System

The development of an upstream/midstream market actor tracking system entails the following, sometimes overlapping steps:

- Become familiar with the market and develop a relationship with market actors,
- Construct sample design and recruit data suppliers,

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1 A summary of tracking initiatives in Wisconsin is included in Appendix C.

2 Recall from the review of markets presented in Section 2 and the experience from tracking initiatives in Wisconsin reveals that, because of the inherent differences in measures and their distribution channels, tracking the sales of different measures requires that the data be collected from different points (e.g., from different market actors) in the distribution system.

- Determine the method for data collection,
- Negotiate agreement with data suppliers.

Become Familiar with the Market and Develop A Relationship with Market Actors

Irrespective of the actual method of data collection (e.g., survey or direct submission of data), development of a tracking system to collect sales data from distributors requires intimate knowledge and understanding of each distributor's business and their role in the market. This first step is critical because of the sensitive and proprietary nature of the data being sought. This necessitates developing a mutually beneficial and trusting relationship, often accomplished through several in-person visits and discussions between the potential data supplier and the data collection agent.

The Wisconsin tracking experience emphasizes the benefits and need for intimate knowledge of the market, individual market actors, and their interaction with each other and other market actors. Understanding their business practices and developing (and maintaining) a mutually beneficial and trusting relationship with each potential data supplier is critical to not only in recruiting data suppliers, but to the overall the success of this tracking method.

Determine the Method for Data Collection

The Wisconsin experience has revealed that a critical element in collecting sales data from distributors is *flexibility* on the part of the data collection agent and that there be no constraints or additional work placed on the data suppliers. Thus, it is recommended that the most appropriate method for data collection is to allow the data suppliers to submit their sales data in the most convenient method and format. The only requirements should be 1) efficiency levels of the relevant measure should be derivable from the data submitted, and 2) data should be submitted on a quarterly basis.

Forge Confidentiality Agreement with Data Suppliers

Because of the proprietary nature of the data, the Wisconsin experience suggests that most market actors will not consider supplying sales data unless assured that any company-specific data and other information remain completely confidential.

Development Time and Associated Costs

The costs of developing a market share tracking strategy that involves the collection of data from upstream market actors varies according to the following:

- The number of market actors required to be recruited as data suppliers, which is directly related to 1) the type of market actor supplying the data (for example, fewer distributors would need to supply data than contractors to cover the same

proportion of the market), and 2) the number of measures for which sales data will be collected,

- The time needed to recruit data suppliers, which is a function of travel time and costs, and the time needed to become familiar with the market and develop a relationship with the market actors, and
- The time and effort required to develop a system that will convert all data into a common and usable format.

The development of the HVAC distributor data tracking system in Wisconsin took approximately six to eight months and cost roughly $100,000.

Implementation Time and Associated Costs

The costs of implementing a market share tracking strategy that involves the collection of data from upstream market actors varies according to the following:

- Data processing time, which is a function of the number of market actors supplying data,
- The time needed to maintain participation of data suppliers, and
- Preparation and dissemination of quarterly reports.

The implementation of the Wisconsin HVAC distributor data tracking system, which involves receiving and processing quarterly sales data from distributors and requires constant monitoring and contact with distributors throughout the state, is estimated to cost roughly $50,000 per year.

Trade Organization Alliance

The development and implementation of the distributor data tracking initiative in Wisconsin emphasizes the importance of 1) understanding the market for the measure, 2) understanding and becoming familiar with each individual business, and 3) developing and maintaining a solid relationship and mutual trust between the data collecting agent and the data supplier. The data collection agent for the Wisconsin distributor data tracking system explained that most of the time and effort spent in system development was devoted to meeting distributors in person and becoming familiar with their businesses and relative roles in the market.

While this process is necessary and would be inevitable should this method be developed in California, there would be tremendous advantages in forming an alliance with one or more trade organizations whose membership is comprised of a variety of upstream market actors. The trade organization would then serve as a liaison between the market actors and the data collection and/or analytical agent(s).

The involvement of one or more trade organizations in a market share tracking strategy can be on one of two levels:

1. At a minimum, the trade organization(s) could provide support and help to recruit data suppliers. This role would include identifying all potential market participants, making the initial contact and arranging meetings between the data collecting agent and the market actors, helping to forge agreements for the submission of data, and other tasks supportive of recruiting data suppliers.
2. In addition to a supportive role in recruiting data suppliers, the trade organization(s) would serve as the data collection agent. This role would include collecting and converting the data into a common and usable format, providing quarterly reports to the analytical agent, and providing the data suppliers with any agreed upon deliverables in return for providing their sales data.

Example: Alliance with the Electric and Gas Industries Association

The Electric and Gas Industries Association (EGIA) is a California-based trade organization with a membership comprised of manufacturers, distributors, and contractors and has strong potential for fulfilling either of the roles enumerated above. First, the EGIA could provide a valuable link between potential data suppliers and the data collection/analytical agents – i.e., a "foot in the door" with potential data suppliers. Second, the EGIA is actively involved in the energy efficiency industry in Northern California and is familiar with related policy making in the state.[3]

The EGIA membership is comprised of more than one type of market actor, making it feasible to cover several of the priority measures identified for tracking. EGIA membership pertains mostly to residential measures, but there might be some crossover to nonresidential measures. Because of the EGIA membership, the data suppliers most likely to participate would provide sales data for residential HVAC equipment and appliances. The EGIA membership and corresponding priority measures for tracking are presented below.

- ***Residential Appliances.*** The residential appliances identified as priorities for tracking include:
  - High efficiency dishwashers,
  - High efficiency refrigerators, and
  - High efficiency (horizontal and vertical axis) clothes washers.[4]

[3] For example, the EGIA has designed and implemented residential energy efficiency programs for PG&E, served as an appliance rebate processing center, and has administered follow-up surveys for program M&E requirements. The EGIA also works with PG&E in promoting Energy Star products.

[4] Whirlpool introduced an Energy Star vertical-axis washer in September, so the coverage of priority residential appliances could be extended to track market shares of vertical-axis washers as well.

EGIA membership includes several national appliance manufacturers, including Frigidaire, Maytag, General Electric, Whirlpool, and Amana. EGIA membership also includes major appliance distributors in Central and Northern California that cover a significant portion of the residential appliance market in these regions.

EGIA membership also includes a large percentage of appliance retailers, such as Sears, Circuit City, and Montgomery Ward, as well as smaller, independent retailers in Central and Northern California.

- ***Residential HVAC Equipment.*** The residential HVAC equipment identified as priorities for tracking includes:
  - Central air conditioning, and
  - High efficiency gas furnaces.

  EGIA membership includes major HVAC equipment manufacturers and many distributors and HVAC contractors in Northern and Central California.[5] HVAC installation contractors could supply data for residential HVAC installations (central air conditioning and gas furnaces), as well as the incidence of duct testing and/or duct sealing practices.
- ***Residential Windows.*** The EGIA membership also includes a few glazing manufacturers and some window installation contractors in Central and Northern California that hold the C17 glazing license.

Advantages

The following are advantages of this tracking strategy:

- Enables the collection of sales data for equipment that is not easily accessible by consumers (e.g., HVAC equipment),
- Possibility of tracking additional measures not identified as priorities, particularly from distributors and retailers,
- Sales by geographic region (state and smaller-than-the-state) could be derived from distributor and contractor data,

Additional benefits could be realized through an alliance with a trade organization, such as the EGIA:

- Forming an alliance with a trade organization could reduce the time needed to recruit data suppliers,
- Market actors would be more willing to release proprietary data to a trade organization rather than a consultant, utility, or government agency,

[5] The HVAC contractors belonging to the EGIA hold the C20 license, the HVAC specialty license offered by the state's license board.

- The EGIA, in particular, is familiar with the energy efficiency industry in California and could provide a valuable link between upstream market actors and data collection and/or analytical agents, and
- The EGIA has data collection and processing capability and experience.

Disadvantages

The following are disadvantages tracking market shares with data from distributors and contractors:

- Recruiting data suppliers might be difficult and time intensive, and
- Depending on the market actors supplying the data (e.g., manufacturers), market shares by region might not be ascertainable.

Disadvantages specific to forming an alliance with a trade organization, such as the EGIA include the following:

- Nonmember market actors would need to be recruited because 1) trade organization membership is not likely to include every market actor, 2) trade organization membership might not be representative of the population, and 3) trade organization membership might not be statewide.[6]
- Data by decision types might not be available or accurate because data would be collected from upstream rather than downstream market actors.
- There may be a possible conflict of interest with the EGIA because they implement or have implemented energy efficiency programs for PG&E.

J.4 In-Store Surveys (Mystery Shoppers)

Guest Perceptions, Inc., Sights on Service, and Sinclair Service Assessments are three companies investigated that employ mystery shoppers.

Guest Perceptions, Inc. (GPI)

- ***Mode of Administration.*** Provides a list of equipment and/or items for a shopper to seek. GPI finds mystery shoppers in the designated areas and gives them assignments. The shoppers return the information and GPI compiles the results in the preferred format.
- ***Geographic Coverage.*** As specific as desired.

[6] Tim Michels, Executive Director of the EGIA, explained that the EGIA is in the position to recruit both EGIA members and nonmembers as data suppliers.

- ***Measures.*** Appliances found in retail stores, such as compact fluorescent lamps and fixtures, horizontal axis washers, refrigerators, dishwashers, and gas water heaters.
- ***Costs.*** The cost is dependent on several issues: amount of time, difficulty, quantity, and frequency. Economies can be found in the number of shops being conducted and long-term contracts. An average price for a mystery shopper would most likely fall into the $50-$85 range per shop.

Sights on Service

- ***Mode of Administration.*** Provides a list of equipment and/or items for a shopper to seek. Sights on Service finds mystery shoppers in the designated areas and gives them assignments. The shoppers return the information and Sights on Service compiles the results in the preferred format.
- ***Geographic Coverage.*** As specific as desired.
- ***Measures.*** Appliances found in retail stores, such as compact fluorescent lamps and fixtures, horizontal axis washers, refrigerators, dishwashers, and gas water heaters.
- ***Costs.*** The cost is dependent on several issues: amount of time, difficulty, quantity, and frequency. Economies can be found in the number of shops being conducted and long-term contracts. An average price for a mystery shopper would most likely fall into the $25-$50 range per shop.

Sinclair Service Assessments

- ***Mode of Administration.*** Provides a list of equipment and/or items for a shopper to seek. Sinclair finds mystery shoppers in the designated areas and gives them assignments. The shoppers return the information and Sinclair compiles the results in the preferred format.
- ***Geographic Coverage.*** As specific as desired.
- ***Measures.*** Appliances found in retail stores, such as compact fluorescent lamps and fixtures, horizontal axis washers, refrigerators, dishwashers, and gas water heaters.
- ***Costs.*** The cost is dependent on several issues: amount of time, difficulty, quantity, and frequency. Economies can be found in the number of shops being conducted and long-term contracts. An average price for a mystery shopper would most likely fall into the $20-$45 range per shop.

J.5 Market Research

Market research is technically not a tracking method, *per se*. Market research firms employ most if not all of the methods reviewed in Section 5 to study and characterize specific product markets and market participants. In the context of this study, market research should

be viewed as an alternative for implementing desired tracking methods. For example, a market research firm can be retained to collect data from manufacturers or to conduct a survey of commercial customers. Market research firms also conduct "multi-client" or syndicated studies, which are publicly available studies of specific markets. This subsection describes both customized and syndicated market research as a possibility for tracking efficiency market shares in California.

Description

Market research is the systematic, ongoing collection and analysis of data regarding a specific market or markets. There are numerous techniques used in market research including mail, telephone and on-site surveys, panel data, focus groups, and in-person interviews. The nature and focus of market research largely depends upon the client's needs, but often involves 1) assessing the preferences and choices of consumers and potential consumers, 2) conducting extensive analyses of interactions between market actors, and 3) fully characterizing the market(s) of interest. In particular, market research involves, but is not limited to, competitor analysis, tracking sales volumes, conducting market potential studies for new products, collecting demographic characteristics of present and potential consumers, and monitoring industry specific economic indicators. Because market research is often an ongoing effort, many market research firms focus on specific industries or markets.

Most market research is conducted for a specific client and therefore kept proprietary. Some market research firms, however, produce syndicated reports that are available for purchase at a sometimes-substantial fee. For purposes of this study, both customized and syndicated market research were investigated as possible market share tracking options.

- ***Customized Market Research.*** Some market research firms specialize in the collection of market data and information pertaining to energy-using equipment in the residential and nonresidential sectors. This method involves contracting with reputable market research firms to provide market information tailored to the needs of market share tracking.
- ***Syndicated Market Research Reports.*** Some market research firms produce syndicated, publicly available reports. This method would use the data provided in these reports to track key market indicators and sales of equipment by efficiency level and geographic region, if available.

Measure Coverage

Customized market research could be designed to track any or all of the priority measures. Syndicated market research is conducted for countless industries, markets, and products. Market research producing data and/or market characterizations relevant to this study has

been identified for windows, adjustable speed drives, lighting (both residential and nonresidential), and HVAC equipment (both residential and nonresidential).

Applicable Decision Type

Again, the design of the tailored research would necessarily include collecting data by any or all decision types. Typically, syndicated studies do not present information by decision type.

Data Availability

Customized research can be tailored to the needs of the tracking effort. The extent of the data collected is limited by whether or not the data are proprietary, the market research firms' industry contacts, and the ability of the market research firm to gather the data.

Syndicated market research reports typically present shipments data, which are usually available in units shipped (price data are rarely available, though some provide average product prices), and some sources provide data by efficiency level. Data availability is both historical and projected.

Possibility of Tracking Other Marketing Effects Indicators

Many market research firms conduct extensive market research on a periodic basis. The extent and content of these market characterizations and their usefulness to the CBEE's MA&E needs will be further investigated in the Feasibility Assessment phase of this study.

Market Actor(s)/Market Node(s)

Sales and technology data are collected directly from manufacturers or from other key market actors in the distribution channel. Additional qualitative information is collected from various market actors through in-depth interviews and surveys.

Geographic Scope

Customized Market Research. The tailored research design will dictate the geographical scope. Customized research can offer considerably more detailed geographical market data than existing syndicated research.

Syndicated Market Research Reports. Most syndicated studies are segmented at the national or regional level; data in syndicated studies are rarely available for California. One firm in particular, however, segments the national market into 11 geographic regions in one of their studies, one of which is the entire state of California.

Data Format

Data reporting formats for customized market research would be part of the research design. The format of the data contained in syndicated market research reports varies, depending on the nature of information and the client's specifications. Results of syndicated studies are typically for sale in hard-copy format only.

Reporting Frequency

The reporting frequency of customized research should be specified in the research design. Most syndicated studies reviewed here are conducted biannually.

Set-Up Procedure

Customized Market Research. Contract with market research firms to develop and implement a measure tracking plan. The planning process should be an interactive process that addresses the requirements for tracking and relies on the market research firm's expertise and relationships with key market actors.

Syndicated Market Research Reports. Contact market research firms and arrange for purchase syndicated study.

Costs

Costs of customized market research will vary depending on the firm and the scope of the customized research. Costs of syndicated market research reports vary depending on the product.

Time

Timing of customized research is a function of the agreed upon workscope. However, it is reasonable to assume that selecting a market research firm and designing and implementing a tracking scheme could be completed in six months. Results of syndicated studies are available for purchase immediately.

Major Market Research Firms

Numerous market research firms produce syndicated studies that are to some extent related to this project. RER investigated three such firms with experience in at least one of the markets related to the priority measures:

- Ducker Research Company (DRC),
- Freedonia, and
- Frost & Sullivan.

More detailed descriptions of these firms and their syndicated products are provided below.

Customization/Joint Venture Possibilities

The firms identified thus far differ in terms of their willingness to contract for additional research. One firm in particular seems to be very interested in conducting additional analyses and research specifically to meet the CBEE's market share tracking needs. Another firm is not amenable to the idea.

Advantages

Customized Market Research. The major advantage of customized market research is that it could be designed to provide the level of detail on measure efficiencies, geographical scope, and, if possible, provide insights on other market indicators.

Syndicated Market Research. At least one of the companies investigated for this study collects data by efficiency level and can provide California-specific results. Information and data are available for a comparison region (e.g., rest of the country or other geographic region). Reports typically include in-depth market characterizations. Because studies are ongoing, results of past studies can provide baseline data compatible to tracking data. At least one firm can be retained to conduct CBEE-specific research. Market research firms (at least those identified here) have expertise in specific markets and have already developed relationships with market actors.

Disadvantages

Customized Market Research. Customized research is relatively expensive.

Syndicated Market Research Reports. The syndicated studies relevant to the priority measures in this study are conducted biannually; the "ideal" data are not published in the syndicated reports available for purchase. In general, the reports are written for a broader audience, data tend to be aggregated on regional or national levels, and the level of detail on equipment characteristics (e.g., size efficiency) varies by report.

Table J-5: Summary Profile of Major Suppliers of Syndicated Market Research Data

	Freedonia Group Inc.	Ducker Research Company (Syndicated Studies only)	Frost & Sullivan
Market Nodes	Manufacturer	Mfr. and other market actors	Mfr. and other market actors
Equipment Type	Lamps and fixtures	Window, HVAC, ASDs	HVAC, EMS, lighting, ASDs, motors, and EMS
Geographic Scope	National	Regional, national	Regional, national
California Possible (as is?)	No	Yes – windows only	No
Other Market Effects	No	Market characterizations	Market characterizations
Possibility of Joint Venture	No	Yes	Maybe
Cost	$2500/full report	Varies by report	Varies by report
Available Data			
Model No. and Brand Name	No	No	No
Decision Type	No		
Efficiency Levels	No	Yes	
Dist. Channel Information	Yes	Yes	
Unit Sales Share	Units shipped	Units shipped for windows and HVAC equipment only	
Dollar Sales Share	Yes	ASDs only	
Reporting Frequency	Biannual	Biannual	

Details of two market research firms specializing in markets relevant to this study are provided below.

Ducker Research Company

The Ducker Research Company (DRC) combines primary research and secondary data sources to produce syndicated reports that profile various industries and markets (as well as proprietary studies for clients), including:

- Construction materials (roofing, windows, metals, industrial panels, glass),
- Electronic and industrial components (ASDs and robotics),
- HVAC (also includes the water heating market), and
- Forest products.

DRC's syndicated research relevant to this study is summarized below. Note, however, that the majority of DRC's business is through private contracts with clients and therefore not publicly available. DRC personnel explained that they could be retained to conduct additional research – on an ongoing basis, if needed.

Study of the U.S. Market for Windows and Doors

DRC's *Study of the U.S. Market for Windows and Doors* provides an in-depth characterization of the U.S. window and door market, in addition to providing residential and nonresidential window and door market volumes. In particular, DRC collects shipments data of window and window assembly products from approximately 250 manufacturers. The shipments data are augmented with roughly 600 interviews with market actors, including builders, architects, contractors, and national historic data available from F.W. Dodge and the U.S. Bureau of Census to cross-reference and confirm survey results.

An appendix of the report presents data by the 11 regions:

DRC has conducted this study biannually for the past 16 years. The study is co-funded by the American Architectural Manufacturers Association (AAMA) and the National Wood Window and Door Association (NWWDA), and is available for purchase through the AAMA.

Study of the Current and Expected United States Heating and Air Conditioning Market

DRC's *Study of Current and Expected United States Heating and Air Conditioning Mark*et is comprised of seven reports, each corresponding to a key HVAC market segment. These segments include:

- Residential and Specialty Air Conditioning Products,
- Unitary A/C Market,
- Central Plant Market (applied and airside),
- Hydronic Heating Systems (boilers, burners, and wet heat emitters),

- Water Heating Market,
- Ducted Warm Air Central Heating Systems, and
- Space Heating Systems.

Several products are examined within each segment. In particular, the typical report includes the following for each product: analysis of market size, structure, and segmentation (in 1996 and 1997), major companies (shares by segment and product range), trends and forecasts to the year 2000, overseas trade, distribution and pricing, and end-user sectors (e.g., building type).

Sales volumes are presented by efficiency level, as well as by region, but not by efficiency level and region in the same table.

DRC personnel explained that the data and information utilized for this study included shipments data (units shipped) collected from manufacturers and approximately 600 in-depth, unstructured interviews with market actors, including component suppliers, distributors, and end users. All "large" manufacturers (having market share greater than 10%), about 80% of the "medium" manufacturers (those having at least 5% market share), and about 20% of "small" manufacturers provided their shipments data for this study.

This first-time study was conducted in conjunction with the Building and Services Research and Information Agency (BSRIA). Table J-6 presents the cost for DRC's syndicated reports.

Table J-6: Cost Structure of DRC's Syndicated HVAC Study

Number of Reports	Total Cost
1	$1,800
2	$2,020
3	$2,230
4	$2,430
5	$2,620
6	$2,800
7	$2,970

Study of the North American Market for Adjustable Speed Drives

DRC's biannual studies of the adjustable speed drives (ASD) market have characterized and quantified the U.S. market for ASDs since 1984. The targeted audience for this research includes manufacturers and other industry participants. DRC's methodology includes both primary and secondary data collection and analysis. Primary data sources include shipments data provided by major ASD manufacturers (both domestic manufacturers and foreign

exports) and information obtained from approximately 235 in-depth interviews with upstream and downstream market actors, including ASD manufacturers, distributors, original equipment manufacturers (OEMs), and trade associations and other agencies.

The shipments data (presented in dollar sales) is used to quantify the U.S. ASD market. In particular, the study enumerates the following:

- Market size of DC and AC drives by efficiency level (horse power range),
- Market size of DC and AC drives by position and motion control devises, and
- Historical comparisons and projected sales volumes (1986 – 2002).

Market size is also presented the following five geographic regions: Northeast, Southeast, Midwest, Southwest, and West.

The bulk of this syndicated study, however, provides an in-depth characterization of the market for both AC and DC ASDs. In particular, the study includes market segmentation (geographic, by voltage, by power, by application, and by industry sector), levels of imports and exports, growth forecasts, a description of distribution channels (including identification of key decision makers and purchasing decision factors), application requirements and trends within key industries, technology trends and advancements, and an analysis of the industry's competitive environment.

Freedonia Group, Inc.

Freedonia has conducted studies of the lighting market every two years for four years. Shipments from the manufacturer are tracked and aggregated to the national level, so regional or California-specific data are not available. Furthermore, Freedonia does not specifically track compact fluorescent lighting (lamps or fixtures) or T8s; those lighting measures are included in the general fluorescent lighting and ballasts categories.

Freedonia personnel explained that they would not be interested in privately contracting to extend the study in a way that would specifically meet the CBEE's needs.