California Measurement Advisory Committee

Public Workshops on

PY 2001 Energy Efficiency Programs

Day 1: September 12, 2000
9:00 AM to 5:00 PM
(Ordering Paragraphs 7, 8, 9, 12, 51)
Sempra Energy
101 Ash Street, San Diego, CA

Day 2: September 13, 2000
9:00 AM to 4:00 PM
(Ordering Paragraphs 14, 51, 54, 72, 73)
Sempra Energy
101 Ash Street, San Diego, CA

Day 3: September 19, 2000
9:30 AM to 3:00 PM
(Workshop Report Review)
Embassy Suites Hotel
8425 Firestone Blvd, Downey CA

Day 4: September 20, 2000
9:30 AM to 12:00 PM
(Workshop Report Review)
Southern California Gas Company Energy Resource Center
9240 East Firestone Blvd, Downey CA

Table of Contents

I. Background

The "Administrative Law Judge's Ruling Establishing Schedule and process for PY 2001 Energy Efficiency Program Planning" issued on August 15, 2000, directed the California Measurement Advisory Council (CALMAC) to sponsor workshops that would provide interested stakeholders a public forum to discuss and develop consensus recommendations on the issues identified in Ordering Paragraphs (OP) 7, 8, 9, 12, 14, 51, 54, 72 and 73. Discussions on OP 9 were extended to an additional workshop, pursuant to the September 14, 2000, Administrative Law Judge's Ruling Concerning Cost-Effectiveness Inputs for Program Year 2001 Planning.

II. Workshop Attendees

Representatives from the following organizations participated at the workshops (see Appendix A for a copy of meeting agendas, as publicly posted): San Diego Gas & Electric Company (SDG&E), Pacific Gas & Electric Company (PG&E), Southern California Edison Company (SCE), Southern California Gas Company (SoCalGas) (hereafter referred to as "the utilities"), Sempra Energy (SE), California Public Utilities Commission (CPUC) Energy Division (ED), California Energy Commission (CEC), Office of Ratepayers Advocates (ORA), Natural Resources Defense Council (NRDC), Knight Research, Regional Economic Research (RER), Ridge & Associates, Xenergy, Sisson & Associates, VPI Consulting, Equipoise Consulting, and Quantum Consulting (QC). A list of attendees that signed in at the workshops is presented in Appendices B1, B2, B3, and B4. Every effort was made to have all attendees sign the workshop attendance sheets.

III. Workshop Operation

The workshops were facilitated, tape recorded, and reported by Knight Research. Copies of the tapes are available upon request from Sempra[1].

[1] Copies of the tape recordings are available by contacting Todd Cahill (Tcahill@sempra.com).

The Day 1 workshop (Ordering Paragraphs (OP) 7, 8, 9, 12, 51) started on September 12, 2000, at 9:00 AM, adjourned for lunch from 12:00 PM to 1:00 PM, and completed at 5:00 PM.

The Day 2 workshop (OP 14, 51, 54, 72, 73) started on September 13, 2000, at 9:00 AM, adjourned for lunch from 11:45 AM to 12:30 PM, and completed at 3:00 PM.

Day 3 workshop (Spillover Meeting) started on September 19, 2000, at 9:30 AM, adjourned for lunch from 12:PM AM to 12:30 PM, and completed at 3:30 PM. This was a continuation of the Days 1 and 2 workshops.

Day 4 meeting (Review Workshop Report) started on September 20, 2000, at 9:30 AM, and adjourned at 12:00 PM.

IV. Overview of the Workshop

The workshops concluded with consensus recommendations and majority recommendations on all of the Ordering Paragraphs except OP 9, which was extended to an additional workshop, pursuant to the September 14, 2000, Administrative Law Judge's Ruling Concerning Cost-Effectiveness Inputs for Program Year 2001 Planning. The recommendations presented in this report were arrived at after extensive discussion allowing all parties in attendance to present their views. The bases for the recommendations are provided in the remainder of this report together with specific comments from workshop participants that provide clarity to the recommendations.

ORA's general position on the consensus items is that acceptance of cost-effectiveness inputs developed at the CALMAC-sponsored workshops does not constitute endorsement of continuing to offer the program.

The consensus recommendations and majority recommendations are summarized by Ordering Paragraph (and related discussions) as follows:

<u>OP 7 & OP 51: Net-to-Gross Ratios</u>. The Net-to-Gross Ratios (NTGRs) to be used for program elements and end uses will be:

a) those listed in Appendix C1 (Discussion Paper #1), with the exception of a limited number of NTGRs that are still disputed by ORA and CEC; or

b) the default NTGR, 0.80, for end uses or program elements that are not addressed in Appendix C1 (Discussion Paper #1)

OP 8: Effective Useful Life. The effective useful life for measures promoted in program year (PY) 2001 programs will be:

a. those listed in see Appendix C2 (Discussion Paper # 2); or

b. for measures not addressed in Discussion Paper #2, the effective useful lives (EULs) will be based on best available information. Justification for these EULs will be included in the utilities' PY2001 application.

OP 12: Non-energy Factors and Market Effects Multipliers. The workshop included a discussion on the basis for development of the non-energy factors and market effects multipliers the utilities will use in the PY2001 applications in compliance with Ordering Paragraph 13.

OP 14: Incremental Measure Cost. Costs for individual energy-efficiency measures should be obtained from any one of the following: a) the most recent Measure Cost Study (MCS); or b) data collection and estimation processes equivalent or superior to those used in the most recent Measure Cost Study for similar measures; or c) appropriate analysis of normalized costs obtained from program participation records (usually for retrofit, i.e., full-cost measures only); or if none of the above are available; d) secondary sources, such as other industry research studies, may also be utilized if they have publication dates of 1996 or later. Per unit measure costs will be developed and reported on an *ex ante* basis. Reported per unit measure costs will be the same as forecasted.

OP 51: Nonresidential Saturation. (1) The market saturation data presented in Appendix C3 (Discussion Paper #3) satisfies OP51's requirement to provide saturation data.

(2) The CEC will update nonresidential market saturation and penetration data through two studies that it currently is undertaking with MA&E funding from the four utilities, the Commercial Saturation Survey and the Nonresidential Market Share Tracking Study.

(3) The CALMAC will be responsible for making the market saturation and penetration data available to program managers and to the public in a timely manner, to assure that they can be used in program planning.

OP 54: Saturation Rates and Protocols for Determining Saturation. (1) The market saturation data for T-8 lighting and other measures presented in Appendix C3 (Discussion Paper #3) satisfies OP54's requirement to investigate the saturation rates for T-8 lighting and other measures.

(2) The "Proposed Protocols for Decisions to Terminate Promotion of Energy Efficiency Measures" presented in Appendix C4 (Discussion Paper #4) are adopted for use in the PY 2001 applications to determine which specific measures should continue or be phased out.

OP 72 & OP 73: Third Party Initiatives. (1) The "Standards for Assessing Cost-Effectiveness of Third Party Initiative Programs." presented in Appendix C4 (Discussion Paper #4) are adopted for use in the PY 2001 TPI programs. These standards give utilities two options for including the costs and benefits of TPI programs within the portfolio cost-effectiveness calculation.

Option A—Pilot Program Approach: If a utility uses the TPI Program as a way to solicit and test, on a limited, one-year basis, innovative new approaches to increasing energy efficiency, the utility will assign the program zero benefits, resulting in a low-cost, conservative way to assess overall portfolio cost-effectiveness.

Option B—Substitute Program Approach: If a utility uses the TPI Program as a way to solicit alternative designs for program elements that it might otherwise have developed itself, the utility's would assign the program a Public Purpose Test (PPT) ratio of one, in order to assess the cost-effectiveness of its program portfolio. In its ensuing TPI program solicitation, the utility would require that accepted proposals be demonstrated to be cost-effective. If *ex post* cost-effectiveness analysis is required for the other programs in the utility's portfolio, the TPI Program would be subject to the same requirements as all other programs.

(2) The utilities' annual energy efficiency reports would provide an overall assessment of the effectiveness of its TPI portfolio in meeting its goals and would report any *ex post* costs and benefits information provided by the TPI implementers.

ORA's alternate recommendations for the following ordering paragraphs are summarized below:

OP 12: Non-energy Factors and Market Effects Multipliers. ORA continues to oppose the use of these specific market effects values or similar values for the purposes of authorizing and verifying utility forecasted and reported costs and benefits. The ORA also objects to the continued use of MA&E funds to develop estimates of market effects for future use.

OP 54: Saturation Rates and Protocols for Determining Saturation. The ORA objects to adopting protocols for the termination of incentives

OP 72 & OP 73: Third Party Initiatives. The ORA disagrees with the adoption of these standards. ORA objects to the use of program funding for TPI programs in PY2001.

V. OP 7 and OP 51—Net-to-Gross Ratios

"Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), and Southern California Gas Company (SoCalGas) shall jointly collect data on free-riders, review field studies and gathered information, including the final Xenergy Study on the nonresidential SPC program scheduled to be completed this year, and jointly with interested stakeholders, after conducting a public process, develop net-to-gross ratios (NTG) ratios to be used for Program Year (PY) 2001 programs. If there is credible evaluative measurement of the NTG ratio of individual programs, the utilities shall use that data for PY 2001."

OP 51 (Net-to-Gross): "For nonresidential programs, in the PY 2001 applications, the utilities shall gather and provide data regarding the extent of free-riders and market saturation by product and customer markets and market segments. The utilities shall convene a public process with interested stakeholders to determine how best to obtain and report the information."

A. Consensus Recommendation (OP 7 & OP 51)

The Net-to-Gross Ratios (NTGRs) to be used for program elements and end uses will be:

a) those listed in Appendix C1 (Discussion Paper #1), with the exception of a limited number of NTGRs that are still disputed by ORA and CEC; or

b) the default NTGR, 0.80, for end uses or program elements that are not addressed in Appendix C1 (Discussion Paper #1)

B. Basis for Consensus

PG&E, SDG&E, SoCalGas, SCE: A synopsis of Discussion Paper #1 was presented by the utilities. The utilities comprehensively reviewed all relevant impact evaluations covering program years 1994 through 1999 in order to obtain NTGRs by program and end use. Each program element for program year (PY) 2000 was then correlated and mapped into nine program types, based on the information in the applications. To the extent that program elements were similar to one of the nine program types, the historical NTGRs were used. When there was little or no similarity to any of the program types, a default NTGR was used of 0.80. The default NTGR is the average NTGR, weighted by net kWh impacts, across all utilities (except SoCalGas) and across all years (1994 through 1999).

As a result of the extensive discussions, several changes were made to the initial Discussion Paper #1(see Appendix C1 for final version). The substance of these changes are summarized below:

- NTGRs should be used at the program element and end use levels
- For the program element "Financial Incentives," break out the specific program interventions (such as Express Efficiency or Standard Performance Contracting) and assign NTGRs to each.
- Use the default NTGR of 0.80 for the Small/Medium Nonresidential SPC Program, rather than the NTGR of 0.53 that was estimated for the Large SPC Program.
- The "Tools, Demonstrations, and Design Assistance," "Emerging Technologies," and "Energy Centers" program elements should be assigned the default NTGR of 0.80 rather than the initial proposal of using the NTGRs arising from previous utility energy management services programs.
- Addressing the potential need for evaluating the NTGRs or other cost-effectiveness inputs of other program elements should be a priority for ongoing CALMAC activities.

C. Other Related Discussions

ORA: ORA contends that the following program/end use NTGRs are inappropriate. Additional data and rationale were not provided.

CEC: CEC contends that the following program/end use NTGRs are inappropriate:

A. **Identification of Non Consensus NTG ratios in Tables 4 and 6 by:**

Sector Residential

1. I agree with all the NTGR's assigned to the residential program sector with the possible exception of 1.3 NTGR for the early appliance retirement program. In part, this is because the program design for PG&E's program element for 2001 is not likely to be similar to the program studied in 1996 to estimate a NTG of 1.3. Recommend use of default ratio=0.80 for this element if such a program called early retirement is going to be implemented.

Non Residential

1. Question-Express Efficiency element is only listed in one of six market areas for non residential. Does this mean that PG&E or the statewide program will really be limited to the non-residential renovation market? Isn't this program also targeted at the small non-residential comprehensive retrofit market?

2. NTGR Values in dispute- All of our disputes are limited to values proposed for selected elements the small non residential comprehensive retrofit sectors.

- PG&E- Use of .96 NTGR for the NR small/medium C/I Standard incentives- Recommend use of the default value of .8 instead- Rationale- NTGR reported used discrete choice analysis for customers targeted in pre 1998 programs which are different than the target market for the new program.
- SCE uses .94 NTGR for the same program- Recommend use the end use NTGR reported in this report that range from .8 for lighting to 1.0 for process.
- SDG&E uses a 1.11 NTGR for financial incentives for small medium customers. Recommend use default of .8 until better evidence is available. Study cited found value for all commercial customers, not small customer target.

- SoCalGas use of 1.0 NTGR for Advanced Water heating systems, comprehensive space conditioning, and integrated food services retrofit. Not enough information has been presented about the program designs used here to assume these results are transferable from the studies of commercial rebate program run between 1995 and 1997 to these new program designs. Recommend use of the default of .8 NTGR.

New Construction

1. Recommend use of .75 NTGR for SCE's saving by design program (as opposed to .62) to make it consistent with the .75 NTGR being used for PG&E and SDG&E's savings by design program for the commercial new construction market.

Statewide programs

1. Cannot support use of 1.0 NTGR for statewide express efficiency program, recommend use of default ration of .8 NTGR. Rationale: Not enough time to review the studies used to support this conclusion for a key statewide program. Common sense suggests that at least some of these customers will be freeriders, question is whether spillover effects exactly counteract the free rider fraction.

VI. OP 8—Effective Useful Life

"The utilities shall, jointly with interested stakeholders, after engaging in a public process, devise a table showing the proposed measure life for each energy efficiency measure included in their programs. The table shall be included in the PY 2000 applications and include a description of any remaining areas of disagreement. The utilities shall use the agreed upon values in their PY 2001 applications subject to our approval. As a general rule, the utilities shall use the same measure life in the cost-benefit calculations, particularly for statewide programs. Where there is a reason for varied measurement lives, the table should include agreed-upon variations, and, in the PY 2001 application, the utilities shall explain the basis for the variations.

A. Consensus Recommendation

The effective useful life for measures promoted in PY2001 programs will be:

a) those listed in see Appendix C2 (Discussion Paper # 2); or

b) for measures not addressed in Discussion Paper #2, the effective useful lives (EULs) will be based on best available information. Justification for these EULs will be included in the utilities' PY2001 applications.

B. Basis for Consensus

PG&E, SDG&E, SoCalGas, SCE: The utilities presented a synopsis of Discussion Paper 2 (Effective Useful Life for Measures for PY 2001 Program Elements). The EULs for program elements were developed after a comprehensive review of all PY 2000 programs. Where EULs were the same for PY 2000 programs between the utilities, these EULs were adopted for PY 2001. Where there were differences in EULs among utilities, the most common value was adopted (i.e., two utilities EULs were the same and one EUL was different). In some cases, small changes to the EULs were made to ensure consistency across common measure types (e.g., common types of lighting fixtures). In cases were the EULs were close between utilities, the nearest round number was adopted. The results were a table of EULs for the various energy efficiency program measures. Questions raised at the workshop, led to the development of more complete documentation of the EULs and their sources, in the revised Discussion Paper.

C. Other related Discussions

ORA: ORA contends that EULs in excess of 20 years should not be allowed.

VII. OP 12—Non-energy Factors and Market Effects Multipliers

"For PY 2001, the utilities, jointly with interested stakeholders, shall engage in a public process to discuss and review the basis for the development of any non-energy factors and market effects multiplies they seek to include in the PY 2001 applications. The review shall include a follow-up on the Regional Economic Research, Inc. (RER) study and shall consider the mitigations

proposed in Policy Rule V-4. The utilities shall report on that process, including agreements reached and areas of remaining disagreement, the PY 2001 applications."

A. Recommendation of all Parties except ORA.

The non-energy factors and market effects multipliers used in the cost effectiveness calculations for PY 2000 are reasonable and are to be used in the cost effectiveness calculations for PY 2001 consistent with OP 13[2].

B. Basis for Recommendation:

PG&E, SDG&E, SoCalGas, SCE: The utilities presented a synopsis of Discussion Paper #7, which is a proposed methodology for determining non-energy factors and market effects multipliers. The methodology was considered a good first step, but additional work is needed to apply this methodology if these metrics are to continue to be used in program applications.

C. Other Related Discussions

CEC: The CEC recommends use of MA&E funds in 2001 to conduct a pilot for one program in PY 2001 to implement or test the market adoption model described in Discussion Paper #7 (see Appendix C7). The CEC sees little justification or benefit in continuing to use the same market multipliers used in 1999 for the PY 2001 Planning Process, if there is not utility commitment to estimate either market effects multipliers or more generally energy savings estimates for the vast majority of other programs that have neither first year or multi-year savings estimates. The CEC expects that at least some funds from the PY 2001 MA&E budget will address this need.

PGE: PG&E, as the MA&E project manager, clarified that there was insufficient information in Discussion Paper #7 on the model at the time of the workshop. A formal presentation of the methodology is scheduled for October 6, 2000.

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[2] OP 13: "For PY 2001, the utilities shall submit two sets of cost/benefits calculations, one including and one omitting, non-energy factors and market effects multipliers. The calculations shall also explicitly identify 1) the non-energy factors and market effects multipliers used; 2) the programs or measures affected; 3) the calculation; and 4) the justification for using them."

D. Alternate Recommendation—ORA

ORA continues to oppose the use of these specific market effects values or similar values for the purposes of authorizing and verifying utility forecasted and reported costs and benefits. ORA also objects to the continued use of MA&E funds to develop estimates of market effects for future use.

VIII. OP 14—Incremental Measure Cost

"The utilities shall develop, with interested stakeholders, in a public process, 1) protocols, including mechanism and standards, for the collection and use of incremental Measure Cost (IMC) data, including the use of a statewide database such as Database for Energy Efficiency Resources (DEER); 2) guidelines or standards for estimating IMC costs associated with the various program strategies and elements, including possible default assumptions; 3 other mitigations, or avenues to ensure that the cost-effectiveness calculations are reasonable where credible IMC is not available, such as those set forth in Policy Rule V-4. The utilities shall attempt to have at least a preliminary agreement in place prior to filing PY 2001 applications. The utilities' PY 2001 applications shall report on the development of IMC standards and protocols, use uniform, agreed upon IMC for like measures, and explain the basis for any deviations."

A. Consensus Recommendation

Costs for individual energy-efficiency measures should be obtained from any one of the following: a) the most recent Measure Cost Study (MCS); or b) data collection and estimation processes equivalent or superior to those used in the most recent Measure Cost Study for similar measures; or c) appropriate analysis of normalized costs obtained from program participation records (usually for retrofit, i.e., full-cost measures only); or if none of the above are available; d) secondary sources, such as other industry research studies, may also be utilized if they have publication dates of 1996 or later. Per unit measure costs will be developed and reported on an *ex ante* basis. Reported per unit measure costs will be the same as forecasted.

B. Basis for Consensus

PG&E, SDG&E, SoCalGas, SCE: The utilities sponsored the discussion paper on "Proposed Measure Cost Guidelines for PY2001" in Appendix C5 (Discussion Paper #5). This paper builds primarily upon research previously conducted in Statewide Measure Cost Studies (MCS). These studies include the following:

1992 Measure Cost Study. This first measure cost study was managed by the California Conservation Inventory Group.

1994 Measure Cost Study. The second MCS was managed by the California DSM Measurement Advisory Committee (CADMAC). The data from this study were input into the California Energy Commission's (CEC) Database of Energy-Efficient Resources (DEER).

1996 Measure Cost Study. The third MCS also was managed by CADMAC. The data from this study also were input into the California Energy Commission's (CEC) Database of Energy-Efficient Resources (DEER).

In addition, this document was developed in parallel with an MCS update study being managed by the CEC (the *DEER Update 2001 Study*). This document is consistent with the planned approaches to sampling, data collection, and analysis in the DEER Update 2001 Study. In addition, the first draft of this document was developed with input from utility staff. The current version of this document incorporates feedback obtained during the public workshop at which these draft IMC guidelines was presented and discussed.

IX. OP 51—Market Saturation Data

"For nonresidential programs, in the PY 2001 applications, the utilities shall gather and provide data regarding the extent of free-riders and market saturation by product and customer markets and market segments. The utilities shall convene a public process with interested stakeholders to determine how best to obtain and report the information."

A. Consensus Recommendation (OP 51)

(1) The market saturation data presented in Appendix C3 (Discussion Paper #3) satisfies OP51's requirement to provide saturation data.

(2) The CEC will update nonresidential market saturation and penetration data through two studies that it currently is undertaking with MA&E funding from the four utilities, the Commercial Saturation Survey and the Nonresidential Market Share Tracking Study.

(3) The CALMAC will be responsible for making the market saturation and penetration data available to program managers and to the public in a timely manner, to assure that they can be used in program planning.

B. Basis for Consensus

PG&E, SDG&E, SoCalGas, SCE: Appendix C3 (Discussion Paper #3) is a report on currently available nonresidential market saturation data. This meets the Commission's order as expressed in OP51 to provide saturation data. This report was developed from several utility studies and parties agree that these are the currently available data.

X. OP 54—Saturation Rates and Protocols for Determining Saturation

"The utilities shall immediately, and jointly with interested stakeholders, conduct an investigation of saturation rates for T-8 lighting and other measures, by market and market segment. The utilities, together with interested stakeholders shall also develop protocols for determining when a measure has reach saturation so that the incentives should be phased out or eliminated In the PY 2001 applications, the utilities shall report on the proposed saturation rates of specified measures, the proposed saturation protocols, and how they intend to incorporated such agreements and protocols in the program."

A. Recommendation of all Parties except ORA

(1) The market saturation data for T-8 lighting and other measures presented in Appendix C3 (Discussion Paper #3) satisfy OP54's requirement to investigate the saturation rates for T-8 lighting and other measures.

(2) The "Proposed Protocols for Decisions to Terminate Promotion of Energy Efficiency Measures" presented in Appendix C4 (Discussion Paper #4) are adopted as for use in the PY 2001 applications to determine with specific measures should continue or be phased out.

B. Basis for Recommendation

PG&E, SDG&E, SoCalGas, SCE: Discussion Paper #4 ("Proposed Protocols for Decisions to Terminate Promotion of Energy Efficiency Measures – see Appendix C4)," identifies the issues, including saturation, that should be considered when making decisions to phase out or terminate incentive payments or other methods of promotion of specific high-efficiency measures. It also places the task of considering continuation or termination of promotion as part of the annual program planning and review process.

The descriptions and discussion demonstrate that the incentive termination decision should be a judgment based on a number of market and program factors, not just one or two. The multiplicity of factors makes it infeasible to reduce the decision criteria to a numerical value or formula.

These factors include:

- overall measure saturation and trends in market share;
- the overall goals and duration of the programs and program effectiveness and cost-effectiveness;
- market characteristics and the likelihood of market regression in the absence of utility promotion; and
- changes in equipment or building energy efficiency standards, and improvements in measure technology.

C. Alternate Recommendation—ORA

The ORA objects to adopting protocols for the termination of incentives.

D. Basis for ORA Recommendation: No additional rationale provided.

ORA: No additional rationale provided.

XI. OP 72 and OP 73: Third Party Initiatives

OP 72: "For PY 2001, the utilities shall jointly, with interested stakeholders, develop a standard to use for IMC in the cost-effectiveness calculations, such as a default ratio or a requirement that

all TPI meet a minimum threshold of cost-effectiveness (e.g., SoCalGas' convention of requiring each TPI to show a cost/benefit ratio of 1 or greater and using 1 in the analysis). The utilities shall jointly, with interested stakeholders, develop protocols to govern the cost-effectiveness analyses conducted by TPI bidders. The utilities shall convene a public process and report the results of any agreement reached and any remaining areas of disagreement in the PY 2001 applications. The utilities shall also propose use of the jointly developed IMC standards in the PY 2001 applications."

OP 73: "The utilities, for PY 2001 programs, shall convene a public process for purposes of developing, with interested stakeholders, reporting requirements, procedures and standards for post-program data collection of IMC and other cost data for TPI programs."

A. Recommendation of all Parties except ORA

a) The "Standards for Assessing Cost-Effectiveness of Third Party Initiative Programs." presented in Appendix C4 (Discussion Paper #4) are adopted for use in the PY 2001 TPI programs. These standards give utilities two options for including the costs and benefits of TPI programs within the portfolio cost-effectiveness calculation.

Option A—Pilot Program Approach: If a utility uses the TPI Program as a way to solicit and test, on a limited, one-year basis, innovative new approaches to increasing energy efficiency, the utility will assign the program zero benefits, resulting in a low-cost, conservative way to assess overall portfolio cost-effectiveness.

Option B—Substitute Program Approach: If a utility uses the TPI Program as a way to solicit alternative designs for program elements that it might otherwise have developed itself, the utility's would assign the program a Public Purpose Test (PPT) ratio of one, in order to assess the cost-effectiveness of its program portfolio. In its ensuing TPI program solicitation, the utility would require that accepted proposals be demonstrated to be cost-effective. If *ex post* cost-effectiveness analysis is required for the other programs in the utility's portfolio, the TPI Program would be subject to the same requirements as all other programs.

(2) The utilities' annual energy efficiency reports would provide an overall assessment of the effectiveness of its TPI portfolio in meeting its goals and would report any *ex post* cost and benefit information provided by the TPI implementers.

B. Basis for Recommendation

PG&E, SDG&E, SoCalGas, SCE: The utilities presented a synopsis of Discussion Paper #6, which provides protocols for the development and reporting for Incremental Market Costs (IMC) and other cost data that are applicable to TPI programs.

C. Alternate Recommendation—ORA

The ORA disagrees with the adoption of these standards. ORA objects to the use of program funding for TPI programs in PY2001.

D. Basis for ORA Recommendation

ORA's disagreement is based on the ratepayer risk created by the funding of programs that have costs and benefits that cannot be adequately reviewed in the program forecasting and program performance review processes

XII. OP 9—Avoided Costs

"The utilities shall use the most updated costs available in their cost-benefit analyses for PY 2001, such as the avoided cost forecast report prepared by the California Energy Commission (CEC)."

Progress Report

The CEC gave a presentation on the results of their MULTISYM model for Market Clearing Price (MCP) forecasting (see Appendix H). Workshop participants discussed the information provided and were of the opinion that the MCP forecast for 2001 (a) did not consider the probability that forecasted generation could be delayed and (b) did not include an updated gas price forecast. A subcommittee was appointed to continue to work with the CEC staff to finalize the PY 2001 avoided costs forecast.

On September 14, 2000, the "Administrative Law Judge's Ruling Concerning Cost-effectiveness Inputs for Program Year 2001 Planning" directing parties (1) to further study and consider methods to address the system value of reduced load described above and to develop a process and timeline for developing the necessary values; and (2) to file a supplemental report by October 2, 2000 addressing these issues.

Workshop participants continued discussions on the avoided costs on September 19 with a subcommittee meeting on September 21. A workshop is scheduled for September 26 to discuss progress on the development of avoided costs. Additional workshops/meetings will be scheduled as necessary in order to finalize the avoided costs to be used for PY 2001 program planning.

XIII. Conclusion

Consensus recommendations were adopted for OPs 7, 8, 14, and 51, therefore, all parties who participated at the workshop recommend that these consensus recommendations be adopted.

Recommendations of all parties except ORA were adopted for OPs 12, 54, 72 and 73, therefore these parties recommend that these recommendations be adopted.

Appendix A

(Workshop Agendas)

California Measurement Advisory Committee (CALMAC)

Public Workshop on PY 2001 Energy Efficiency Programs

Sempra Energy

101 Ash Street

San Diego, CA

Day 1:September 12, 2000

9:00 AM – 5:00 PM

Issues for Discussion:
Determining Net-to-Gross ratios for all programs (OP 7 & OP 51)
Updated Avoided Costs (OP 9)
Develop table of Useful Measure Lives (OP 8)
Review of non-energy factors and market-effects multipliers (OP 12)

Day 2: September 13, 2000

9:00 AM – 4:00 PM

Issues for Discussion:
Investigate measure saturation rates by market segment (OP 51 & 54)
Develop protocols to determine saturation (OP 54)
Develop protocols for collection & use of incremental measure cost (IMC) data (OP 14)
Determine standard for TPI cost-effectiveness (OP 72)
Determine TPI program reporting requirements, procedures, and standards for post-program data collection (OP73)

Note: Unfinished discussions on any of these issues can be dealt with at the scheduled carry-over CALMAC workshop on September 19, 2000 in Downey, CA

California Measurement Advisory Committee (CALMAC)

Public Workshop PY 2001 Energy Efficiency Programs

Embassy Suites Hotel
8425 Firestone Blvd.
Downey, CA 90241

Day 3: September 19, 2000
Spillover Meeting
9:30 AM - 3:00 PM

Issues for Discussion:
Avoided costs (OP 9)
Net-to-Gross (OP 7 & OP 51)
Useful Measure Life (OP 8)
Incremental Measure Cost (IMC) (OP 14)
Third Party Initiatives (OP 72 & OP 72)

Teleconference Information: The meeting is accessible through teleconference. To use this option, please call 1-888-422-7109 and enter the access code 144919.

Gas Company Energy Resource Center
9240 East Firestone Blvd.
Downey, CA 90241

Day 4: September 13, 2000
9:30 AM – 12:00 PM

Issues for Discussion:
Workshop report

Teleconference Information: The meeting is accessible through teleconference. To use this option, please call 1-888-422-7109 and enter the access code 144919.

Appendix B1

(Meeting Sign-In Sheet – September 12, 2000)

Bob Boutwell	Knight Research	Rboutwe1@san.rr.com
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Appendix B2

(Meeting Sign-In Sheet – September 13, 2000)

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Appendix B3

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Appendix B4

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Appendix C1

(Discussion Paper #1)

(Proposed Net-to-Gross Ratios for PY 2001 Program Elements)

Proposed Net-to-Gross Ratios for PY2001 Program Elements

Response to Ordering Paragraph #7

Pacific Gas and Electric Company

Southern California Edison Company

San Diego Gas and Electric Company

Southern California Gas Company

September 22, 2000Introduction

On July 6, 2000, Decision 00-07-017 was issued by the California Public Utilities Commission (CPUC). This decision addressed a number of issues and included 96 ordering paragraphs covering energy efficiency programs, their cost-effectiveness, and the need for public workshops. The focus of this report is ordering paragraph #7, which states:

> The Pacific Gas and Electric Company (PG&E), Southern California Edison Company (Edison), San Diego Gas & Electric Company (SDG&E), and the Southern California Gas Company (SoCalGas) shall jointly collect data on free-riders, review field studies and gathered information, including the final XENERGY Study on the nonresidential SPC program scheduled to be completed this year, and jointly with interested stakeholders, after conducting a public process, develop net-to-gross (NTG) ratios to be used for Program Year (PY) 2001 programs. If there is credible evaluative measurement of the NTG ratio for individual programs, the utilities shall use that data for PY2001. If there is only more generalized data, the utilities shall use a default ratio for PY2001. (Decision 00-07-017, Ordering Paragraph #7, pp. 249-250)

Beginning with PY1994 demand-side management (DSM) programs, evaluations of these programs implemented by PG&E, Edison, SDG&E, and SoCalGas were evaluated in accordance with a specific set of measurement and evaluation protocols, the *Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management (DSM) Programs* (M&E Protocols). As required by the M&E Protocols, one of the primary products of any DSM evaluation were net-to-gross ratios (NTGRs). The M&E Protocols define a NTGR as: “A factor representing net program load impacts divided by gross program load impacts that is applied to gross program load impacts to convert them into net program load impacts. This factor is also sometimes used to convert gross measure costs to net measure costs”.

The remainder of this report will discuss the methods used to comply with Ordering Paragraph #7 and the recommendations for NTGRs for all PY2001 program elements.

Methods

The main challenge to using historical NTGRs estimated for information and rebate programs targeted to individual customers is that PY2001 programs are designed as market transformation programs targeted to a variety of market actors (e.g., manufacturers, distributors, retailers, etc.) in a particular market (e.g., commercial HVAC). Some elements of the PY2001 program target the end users and are very similar to historical incentive programs. One could argue that

historical NTGRs could be used for a given PY2001 program if the two programs and associated market conditions were generally similar. Attempting to identify those cases in which there was sufficient similarity was not a straightforward process.

The first step involved the review of all relevant impact evaluations covering program years 1994 through 1999 in order to obtain the study ID, the program year, the NTGRs by end use, the net energy impacts by end use, the author, the study title and date, and the method(s) by which the NTGRs were estimated. Table 1 in Attachment A presents the study ID, the program year, the author, the study title and date, and the method(s) by which the NTGRs were estimated. Table 2 presents the historical NTGRs by utility and end use.

The next step was to determine the extent to which the past programs (PY1994 through PY1999) resembled the proposed PY2001 program elements. First, all utility PY2001 program elements described in the following utility PY2000 and PY2001 applications were reviewed:

- Application of Pacific Gas and Electric Company for Approval of Programs Years 2000 and 2001 Energy Efficiency Programs, Application No. 99-09-050, September 27, 1999.
- Application of Southern California Edison Company (U 338-E) for Approval of Program Years 2000 and 2001 Energy Efficiency Program Plans, Budgets, and Performance Award Mechanism, Application No. 99-09-, September 27, 1999.
- Southern California Gas Company Request for Approval of 2000 and 2001 Energy Efficiency Programs, Application No. 99-09-, September 27, 1999.
- San Diego Gas and Electric Company Request for Approval of 2000 and 2001 Energy Efficiency Programs, Application No. 99-09-, September 27, 1999.

Based on the information in these applications, each PY 2001 program element was analyzed and mapped into one of nine program types[3]. Then each of the nine program types was assessed

[3] The nine program types are 1) up-stream incentives, 2) down-stream incentives, 3) mass information/education, 4) services (services (on-site and mail-in audits), 5) tools/demonstrations/

to determine whether it resembled one of the three historical program types, i.e. an energy management services program, a rebate program, or the SPC program. If a given PY 2001 program type did not resemble one of the three historical program types, it was assigned to a default category. Table 3 in Attachment A presents the results of this classification. Table 8 presents the more detailed mapping of PY 2001 program elements into the nine program types. Table 8 also shows the mapping of each program element (based on its assignment to one of the nine program types) into one of the three historical program types or the default.

If a given program element in a particular PY 2001 program type *could* be mapped into one of the three historical program types, then the historical NTGR from the most recent utility-specific evaluation of an EMS, rebate, or SPC program was used. When a given program element in a particular PY 2001 program type *could not* be mapped into one of the historical program types, a default NTGR was used. For PY2001 downstream rebate programs, historical NTGRs at the end-use level were used to determine the proposed NTGR, weighted by first year net impact. In some cases, where there was sufficient resemblance, SoCalGas had no historical NTGRs or the available SoCalGas NTGRs were not considered to be robust. In such cases, the weighted average of the most recent NTGRs from the other utilities was used.

Although many of the PY2001 programs are very different from the historical programs, California utilities have been designing, implementing, and evaluating DSM programs in accordance with the M&E Protocols for six years and have numerous robust estimates, in the form of NTGRs, of how effective their programs have been. It is argued that these historical NTGRs also represent a reasonable forecast of how effective they are expected to be in designing and implementing the next generation of DSM programs. Thus, the determination of the default NTGR was made through an analysis of all historical NTGRs in Table 2. The average NTGR, weighted by net kWh impacts, across all utilities (except for SoCalGas) and across all years (1994-1999) is 0.80.

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design assistance, energy centers, training, 6) codes/standards/local government initiatives, 7) TPI, 8) SPC, and 9) RCP.

For those programs that are considered to be statewide and for which there was sufficient resemblance to the historical program types, the average of the most recent NTGRs for the most appropriate program types across utilities was used. In those cases where there was insufficient resemblance, the default value of 0.80 was used.

Proposed NTGRs

A series of tables in Attachment A present the proposed NTGRs for the PY2001 Programs. Table 4 presents the proposed NTGRs for each program element within each utility program. Table 5 presents the particular basis for each NTGR by program element and utility. Table 6 presents the proposed NTGRs for those PY2001 programs that are statewide. Table 7 provides more detail on how the NTGRs at the end use level were used to determine utility-specific downstream incentive program elements (e.g. Nonresidential Small/Medium Commercial/Industrial Standard Incentives Program Element (also known as the Express Efficiency Program)). Finally, a NTGR of 0.80 is proposed for all program elements and statewide programs for which a default NTGR is recommended.

Proposed Net-to-Gross Ratios for PY2001 Program Elements

Attachment A

Pacific Gas and Electric Company

Southern California Edison Company

San Diego Gas and Electric Company

Southern California Gas Company

September 22, 2000

Table 1. Study Information

Utility	PY	StudyID	NTG Analysis Type	Comments	Study Title	Study Date	Study Author
PG&E	1994	310	SR		Impact Evaluation of 1994 Commercial Lighting Technologies Study	27-Feb-96	Quantum Consulting Inc
PG&E	1994	311	SR		Impact Evaluation of 1994 Industrial Lighting Technologies Study	27-Feb-96	Quantum Consulting Inc
PG&E	1994	312	LR		1994 Commercial HVAC Impact Evaluation	01-Mar-96	SBW Consulting Inc., KVDR, Inc., Ridge and Associa
PG&E	1994	313	SR		Impact Evaluation of the Industrial HVAC End Use in PG&E's 1994 Retrofit Energy-Efficiency Programs	28-Feb-96	XENERGY Inc.
PG&E	1994	314	SR		Impact Evaluation of 1994 Industrial Process Energy-Efficiency Projects	01-Mar-96	XENERGY Inc.
PG&E	1994	315	SR		Impact Evaluation of PG&E's 1994 Agricultural Programs	27-Feb-96	Quantum Consulting Inc
PG&E	1994	316	SR		Impact Evaluation of PG&E's 1994 Commercial-Industrial Energy Management Services Programs: Commercial EMS	26-Feb-96	Hagler Bailly Consulting, Inc. and ADM Associates
PG&E	1994	317	SR		Impact Evaluation of PG&E's 1994 Commercial-Industrial Energy Management Services Programs: Industrial EMS	26-Feb-96	Hagler Bailly Consulting, Inc. and ADM Associates
PG&E	1994	318	SR		Impact Evaluation of PG&E's 1994 Agricultural Programs	27-Feb-96	Quantum Consulting Inc
PG&E	1994	320	NA	Miscellaneous measures, no analysis required by Protocols. Default value of 0.75 used.	Impact Evaluation of 1994 Industrial Miscellaneous Measures Energy-Efficiency Projects	01-Mar-96	XENERGY Inc.
PG&E	1994	321	SR		Impact Evaluation of PG&E's 1994 Agricultural Programs	27-Feb-96	Quantum Consulting Inc
PG&E	1994	323	LR		Pacific Gas and Electric Company and Southern California Edison 1994 Nonresidential New Construction Programs	01-Mar-97	RLW Analytics, Inc.
PG&E	1994	332	NA	CADMAC Waiver, NTGR 0.97	Impact Evaluation of Pacific Gas and Electric Company's 1994 Residential Appliance Efficiency Incentives and 1994 Residential Weatherization Retrofit Incentives Programs	28-Feb-97	XENERGY, Inc.
PG&E	1994	384A	NA	CADMAC Waiver, NTGR 0.97	Impact Evaluation of Pacific Gas and Electric Company's 1994 Residential Appliance Efficiency Incentives and 1994 Residential Weatherization Retrofit Incentives Programs	28-Feb-97	XENERGY, Inc.
PG&E	1994	384B	NA	CADMAC Waiver, NTGR 0.97	Impact Evaluation of Pacific Gas and Electric Company's 1994 Residential Appliance Efficiency Incentives and 1994 Residential Weatherization Retrofit Incentives Programs	28-Feb-97	XENERGY, Inc.
PG&E	1994	384C	NA	CADMAC Waiver, NTGR 0.97	Impact Evaluation of Pacific Gas and Electric Company's 1994 Residential Appliance Efficiency Incentives and 1994 Residential Weatherization Retrofit Incentives Programs	28-Feb-97	XENERGY, Inc.

Table 1. Study Information

Utility	PY	StudyID	NTG Analysis Type	Comments	Study Title	Study Date	Study Author
PG&E	1995	324	SR, DC		Evaluation of Pacific Gas & Electric Company's 1995 Nonresidential Energy Efficiency Incentives Program for Commercial Sector Lighting Technologies	01-Mar-97	Quantum Consulting Inc
PG&E	1995	325	SR		Impact Evaluation of 1995 Industrial Sector Energy Efficiency Incentives Programs: Lighting	01-Mar-97	SBW Consulting Inc. and Ridge and Associates
PG&E	1995	326	SR		Evaluation of Pacific Gas & Electric Company's 1995 Nonresidential Energy Efficiency Incentives Program for Commercial Sector HVAC Technologies	01-Mar-97	Quantum Consulting Inc
PG&E	1995	327	SR		Impact Evaluation of 1995 Industrial Sector Energy Efficiency Incentives Programs: HVAC	01-Mar-97	SBW Consulting Inc. and Ridge and Associates
PG&E	1995	328	SR		Impact Evaluation of 1995 Industrial Sector Energy Efficiency Incentives Programs: Process	01-Mar-97	SBW Consulting Inc. and Ridge and Associates
PG&E	1995	329	SR		Impact Evaluation of PG&E's 1995 Agricultural EEI Programs	01-Mar-97	Quantum Consulting Inc
PG&E	1995	330	SR		Evaluation of Pacific Gas & Electric Company's 1995 Nonresidential Energy Efficiency Incentives Program for Commercial Sector Refrigeration Technologies	01-Mar-97	Quantum Consulting Inc
PG&E	1995	331	SR		Impact Evaluation of PG&E's 1995 Agricultural EEI Programs	01-Mar-97	Quantum Consulting Inc
PG&E	1995	336	LR		Impact Evaluation of Pacific Gas and Electric Company's 1995 Residential Direct Assistance and 1995 Residential Energy Management Services Programs	01-Mar-97	XENERGY, Inc.
PG&E	1995	337	LR		Impact Evaluation of Pacific Gas and Electric Company's 1995 Residential Direct Assistance and 1995 Residential Energy Management Services Programs	01-Mar-97	XENERGY, Inc.
PG&E	1996	349	DC		Evaluation of PG&E's 1996 Nonresidential EEI Program for Commercial Sector Lighting Technologies	01-Mar-98	Quantum Consulting Inc
PG&E	1996	350	SR		Impact Evaluation of 1996 Industrial Sector Energy Efficiency Incentives Programs: Lighting	01-Mar-98	SBW Consulting Inc. and KVDR, Inc.
PG&E	1996	351	SR, DC		Impact Evaluation of Pacific Gas & Electric Company's 1996 Commercial Energy Efficiency Incentives Program: HVAC Technologies	01-Mar-98	Quantum Consulting Inc
PG&E	1996	352	SR		Impact Evaluation of 1996 Industrial Sector Energy Efficiency Incentives Programs: HVAC	01-Mar-98	SBW Consulting Inc. and KVDR, Inc.
PG&E	1996	353	SR		Impact Evaluation of 1996 Industrial Sector Energy Efficiency Incentives Programs: Process	01-Mar-98	SBW Consulting Inc. and KVDR, Inc.
PG&E	1996	354	DC		Impact Evaluation of PG&E's 1996 Agricultural EEI Program	01-Mar-98	Equipoise Consulting Inc.
PG&E	1996	358	SR		Impact Evaluation of 1996 Commercial Sector Energy Management Services Program	01-Mar-98	Quantum Consulting Inc
PG&E	1996	359	SR		Impact Evaluation of Pacific Gas & Electric Company's 1996 Industrial Sector Energy Management Services Program	01-Mar-98	SBW Consulting Inc. and KVDR, Inc.

Table 1. Study Information

Utility	PY	StudyID	NTG Analysis Type	Comments	Study Title	Study Date	Study Author
PG&E	1996	360	NA	CADMAC Waiver of 0.75	Impact Evaluation of PG&E's 1996 Agricultural EMS Program	01-Mar-98	Equipoise Consulting Inc.
PG&E	1996	372	SR		Impact Evaluation of Pacific Gas and Electric Company's 1996 Residential Appliance Efficiency Incentives Program	01-Mar-98	XENERGY, Inc.
PG&E	1996	373-1	SR		Impact Evaluation of Pacific Gas and Electric Company's 1996 Residential Appliance Efficiency Incentives Program	01-Mar-98	XENERGY, Inc.
PG&E	1996	385	DC		Impact Evaluation of PG&E's 1996 Agricultural EEI Program	01-Mar-98	Equipoise Consulting Inc.
PG&E	1996	389	LR		Pacific Gas and Electric Company's 1996 Nonresidential New Construction Programs	01-Mar-98	RLW Analytics, Inc.
PG&E	1997	333A	DC		Evaluation of Pacific Gas & Electric Company's 1997 Commercial Energy Efficiency Incentives Program: Lighting Technologies	01-Mar-99	Quantum Consulting Inc
PG&E	1997	333B	SR, DC		Evaluation of PG&E's 1997 Commercial EEI Program HVAC Technologies	01-Mar-99	Quantum Consulting Inc
PG&E	1997	334A	SR		1997 Industrial Energy Efficiency Incentive Program Impact Evaluation: Process End Use	01-Mar-99	XENERGY Inc.
PG&E	1997	334B	SR		1997 Industrial Energy Efficiency Incentive Program Impact Evaluation: Indoor Lighting End Use	01-Mar-99	XENERGY Inc.
PG&E	1997	335A	NA	CADMAC Waiver of 0.75	Impact Evaluation of PG&E's 1997 Agricultural EEI Program	01-Mar-99	Equipoise Consulting Inc.
PG&E	1997	335B	NA	CADMAC Waiver of 0.75	Impact Evaluation of PG&E's 1997 Agricultural EEI Program	01-Mar-99	Equipoise Consulting Inc.
PG&E	1997	335C	NA	CADMAC Waiver of 0.75	Impact Evaluation of PG&E's 1997 Agricultural EEI Program	01-Mar-99	Equipoise Consulting Inc.
PG&E	1997	397	SR		Impact Evaluation of Pacific Gas and Electric Company's 1997 Residential Energy Management Services Programs	01-Mar-99	Hagler Bailly Consulting and XENERGY Inc.
PG&E	Pre-1998	403A	SR		Pre-1998 Industrial Energy Efficiency Incentive Program 1998 Carry Over Impact Evaluation	01-Mar-00	XENERGY Inc.
PG&E	Pre-1998	403B	SR		Pre-1998 Industrial Energy Efficiency Incentive Program 1998 Carry Over Impact Evaluation	01-Mar-00	XENERGY Inc.
PG&E	Pre-1998	403C	SR		Pre-1998 Industrial Energy Efficiency Incentive Program 1998 Carry Over Impact Evaluation	01-Mar-00	XENERGY Inc.
PG&E	Pre-1998	404A	DC		Evaluation of PG&E's Pre-1998 Commercial EEI Program Carry-over Lighting Technologies	01-Mar-00	Quantum Consulting Inc
PG&E	Pre-1998	404B	SR		Evaluation of PG&E's Pre-1998 Commercial EEI Program Carry-over HVAC Technologies	01-Mar-00	Quantum Consulting Inc
PG&E	Pre-1998	404C	SR		Pre-1998 Commercial Energy Efficiency Incentive Program 1998 Carry over Impact Evaluation	01-Mar-00	XENERGY Inc.
PG&E	Pre-1998	404D	SR		Evaluation of PG&E's Pre-1998 Commercial EEI Program Carry-over Traffic Signal Technologies	01-Mar-00	Quantum Consulting Inc

Table 1. Study Information

Utility	PY	StudyID	NTG Analysis Type	Comments	Study Title	Study Date	Study Author
PG&E	Pre-1998	405A	NA	CADMAC Waiver of 0.75	Pacific Gas and Electric Company's Carryover for Pre-1998 Energy Efficiency Incentives Program: Agricultural Sector Impact Evaluation Report	01-Mar-00	Equipoise Consulting Inc.
PG&E	Pre-1998	405B	NA	CADMAC Waiver of 0.75	Pacific Gas and Electric Company's Carryover for Pre-1998 Energy Efficiency Incentives Program: Agricultural Sector Impact Evaluation Report	01-Mar-00	Equipoise Consulting Inc.
PG&E	Pre-1998	405C	NA	CADMAC Waiver of 0.75	Pacific Gas and Electric Company's Carryover for Pre-1998 Energy Efficiency Incentives Program: Agricultural Sector Impact Evaluation Report	01-Mar-00	Equipoise Consulting Inc.
PG&E	Pre-19998	400	DD, SR	SR on the Industrial Sites	Pre-1998 Nonresidential New Construction Impact Evaluation Carryover	01-Mar-00	RLW Analytics, Inc.
SCE	1994	512	LS		1994 Residential HVAC Rebate Program Impact Evaluation	01-Feb-96	XENERGY, Inc.
SCE	1994	513	DD		Residential Appliance Efficiency Incentives Program: Fluorescent Lighting (CFL): 1994 First-Year Statewide Load Impact Study	01-Feb-96	XENERGY, Inc.
SCE	1994	514	DD		Residential Appliance Efficiency Incentives Program: High Efficiency Refrigeration: 1994 First-Year Statewide Load Impact Study	01-Feb-96	XENERGY, Inc.
SCE	1994	515	SR		Extended Impact Evaluation of the Spare Refrigerator Recycling Program	01-Feb-97	XENERGY, Inc.
SCE	1994	516	LS		Evaluation of First-Year Load Impacts of Southern California Edison's 1994 Commercial Energy Efficiency Incentives and Audit Programs	01-Mar-96	Synergic Resources Corporation, Kirtida Parikh, Ap
SCE	1994	517	SR		First-Year Impact Studies: 1994 Industrial Services and Retrofit Incentive Programs	01-Feb-96	Alternative Energy Systems Consulting, Inc.
SCE	1994	518A	SR		Evaluation of First-Year Load Impacts of Southern California Edison's 1994 Agricultural Audit and Rebate Programs	01-Feb-96	Athens Research
SCE	1994	518B	SR		Evaluation of First-Year Load Impacts of Southern California Edison's 1994 Agricultural Audit and Rebate Programs	01-Feb-96	Athens Research
SCE	1994	519	LS		Evaluation of First-Year Load Impacts of Southern California Edison's 1994 Commercial Energy Efficiency Incentives and Audit Programs	01-Mar-96	Synergic Resources Corporation, Kirtida Parikh, Ap
SCE	1994	520	SR		First-Year Impact Studies: 1994 Industrial Services and Retrofit Incentive Programs	01-Feb-96	Alternative Energy Systems Consulting, Inc.
SCE	1994	522	LR		Impact Evaluation of Pacific Gas & Electric Company and Southern California Edison 1994 Nonresidential New Constructionn Programs	01-Mar-97	RLW Analytics, Inc.
SCE	1994	561	NA	M&E Protocols used to set default value of 0.75	1994 Commercial CFL Evaluation: First-Year Impact Evaluation	01-Feb-96	Decision Sciences Research Associates, Inc.
SCE	1995	527	SR		Impact Evaluation of the 1995 Residential Direct Assistance Program	01-Feb-97	XENERGY, Inc.
SCE	1995	528A	LR		1995 In-Home Audit Program Evaluation	01-Feb-97	RER

Table 1. Study Information

Utility	PY	StudyID	NTG Analysis Type	Comments	Study Title	Study Date	Study Author
SCE	1996	537	SR		Final Report: Impact Evaluation of the Spare Refrigeratpr Recycling Program	01-Apr-98	XENERGY, Inc.
SCE	1996	539	SR		Southern California Edison 1996 DSM Bidding Program Evaluation	01-Apr-98	Ridge & Associates
SCE	1996	540	DD		1996 Commercial Energy Management Hardware Rebate Program Impact Evaluation	01-Mar-98	RER
SCE	1996	541	SR		1996 Industrial Energy Efficiency Incentive Program Impact Study	01-Mar-98	Alternative Energy Systems Consulting, Inc. & Ridg
SCE	1996	542	SR		1996 Agricultural/Water Supply Energy Efficiency Incentive Program: First-Year Load Impacts Evaluation	01-Feb-98	HDR Engineering, Inc.
SCE	1996	543	LR		Southern California Edison 1996 Non-Residential New Construction Evaluation	01-Feb-98	RLW Analytics, Inc.
SCE	1996	544	LR		Southern California Edison 1996 Commercial Energy Services Program: Load Impact Evaluation	01-Mar-98	Athens Research
SCE	1997	566	SR		1997 DSM Bidding Program Impact Study	01-Feb-99	Ridge & Associates
SCE	1997	567	DC		1997 Commercial Energy Efficiency Incentive Program Evaluation	01-Mar-99	RER
SCE	1997	568	SR		1997 Industrial Energy Efficiency Incentive Program Impact Study	01-Feb-99	Alternative Energy Systems Consulting, Inc. & Ridg
SCE	1997	569	SR		1997 Agricultural Efficiency Incentive Program Impact Study	01-Feb-99	Alternative Energy Systems Consulting, Inc. & Ridg
SCE	1998	5000	SR	This is a statewide study that was not filed. Given Study ID of 5000 for mapping purposes.	Evaluation of the 1998 Nonresidential Standard Performance Contract Program	01-May-99	XENERGY, Inc.
SCE	1998	572	DD		Southern California Edison Pre-1998 Non-Residential New Construction Evaluation	01-Dec-99	RLW Analytics, Inc.
SDG&E	1994	920	DD		Residential Appliance Efficiency Incentives Program--High Efficiency Lighting--1994 First Year Statewide Load Impact Study	01-Feb-96	Xenergy
SDG&E	1994	923	DD		1994 Commercial Energy Efficiency Incentives Program--First Year Load Impact Evaluation and Retention Studies	01-Feb-96	SDG&E/Xenergy
SDG&E	1994	926	DD	Used analysis from 923	1994 Industrial Energy Efficiency Incentives Program--First Year Load Impact Evaluation and Retention Studies	01-Feb-96	SDG&E/Xenergy
SDG&E	1994	929	NA	This was a retention study	1994 Agricultural Energy Efficiency Incentives Program--Miscellaneous Measures--First Year Retention Study	01-Feb-96	Xenergy
SDG&E	1994	932	DD		1994 Residential New Construction Program--First Year Load Impact Evaluation	01-Feb-96	SDG&E
SDG&E	1994	935	DD		1994 Nonresidential New Constructin Program--First Year Load Impact Evaluation	01-Feb-96	SDG&E
SDG&E	1995	959	DD		1995 Commercial Energy Efficiency Instives Program--First Year Load Impact Evaluation	01-Feb-97	SDG&E/Xenergy
SDG&E	1995	962	DD	Used analysis from 959	1995 Industrial Energy Efficiency Instives Program--First Year Load Impact Evaluation	01-Feb-97	SDG&E/Xenergy

Table 1. Study Information

Utility	PY	StudyID	NTG Analysis Type	Comments	Study Title	Study Date	Study Author
SDG&E	1995	965	NA	Used a default value	1995 Agricutural Energy Eficiency Incentives Program--First Year Load Impact Evaluation	01-Jan-97	Xenergy
SDG&E	1995	971	DC		1995 Nonresidential New Construction Program--First Year Load Impact Evaluation	01-Mar-97	RER
SDG&E	1996	1001			1996 Residential New Construction Program--First Year Load Impact Evaluation	01-Mar-98	
SDG&E	1996	1004	DC		1996 Nonresidential New Construction Program--First Year Load Impact Evaluation	01-Feb-98	RER
SDG&E	1996	980	DD		Residential Appliance Efficiency Incentives Program: High Efficiency Refrigeration--1996 First Year Statewide Load Impact Study--Net-To-Gross Analysis	01-Feb-98	Hagler Bailly
SDG&E	1996	983	SR		1996 Residential Appliance Efficiency Incentives Program--High Efficiency Lighting--First Year Load Impact Evaluation	01-Mar-98	SDG&E/Hagler Bailly
SDG&E	1996	989	DD		1996 Residential Weatherization Retrofit Incentives--First Year Load Impact Evaluation	01-Mar-98	SDG&E
SDG&E	1996	992	DD		1996 Commercial Energy Efficiency Incentives Program--First Year Load Impact Evaluation	01-Mar-98	SDG&E/Xenergy
SDG&E	1996	995	SR		1996 Industrial Energy Efficiency Incentives Program--First Year Load Impact Evaluation--Final Report	01-Feb-98	Xenergy
SDG&E	1996	998	NA	Used a default value	1996 Agricultural Energy Efficiency Incentives Program--First Year Load Impact Evaluation--Final Report	01-Feb-98	Xenergy
SDG&E	1997	1025	LR		1997 Commercial Energy Efficiency Incentives Program--First Year Load Impact Evaluation--Final Report	01-Feb-99	Xenergy
SDG&E	1997	1019	SR		1997 Industrial Energy Efficiency Incentives Program--First Year Load Impact Evaluation--Final Report	01-Feb-99	Xenergy
SDG&E	1997	1022	NA	Used a default value	1997 Agricultural Energy Efficiency Incentives Program--First Year Load Impact Evaluation--Final Report	01-Feb-99	Xenergy
SoCalGas	1994	703	LR		First Year Load Impact Study of Southern California Gas Company's 1994 Direct Assistance Program		
SoCalGas	1994	708	LR		First Year Load Imp Study of Southern California Gas Company's 1994 Home Energy Fitness Program		
SoCalGas	1994	709	LR		First Year Impact Study of Southern California Gas Company's 1994 Advantage Home Program		
SoCalGas	1995	705	DC		An Evaulation of Southern California Gas Company's 1995 Commercial New Construction Program	31-Jan-98	Planergy, Inc., Equipoise Consulting, and Pacific Consulting Services
SoCalGas	1995	710	LR		First Year Load Impact Study of Southern California Gas Company's 1995 Industrial Energy Management Services	28-Feb-97	Business Economic Analysis and Research and Mykytyn Consulting Group, Inc.

Table 1. Study Information

Utility	PY	StudyID	NTG Analysis Type	Comments	Study Title	Study Date	Study Author
SoCalGas	1996	711	DD		First Year Load Impact Study of Southern California Gas Company's Program Year 1996 Commercial Energy Efficiency Incentive Program	28-Feb-98	Applied Econometrics, Inc. and Decision Sciences Research Associates
SoCalGas	1996	712	LR		First Year Load Impact Study of Southern California Gas Company's 1996 Commercial Energy Management Services	28-Feb-98	Business Economic Analysis and Research and Mykytyn Consulting Group, Inc.
SoCalGas	1997	714	LR		First Year Load Impact Study of Residential Energy Efficiency Program (DSM Pilot Bidding Program)	01-Apr-99	Energx Controls Inc.
SoCalGas	1997	715	LR		1997 Residential Energy Management Services First Year Load Impact Evaluation (Home Energy Fitness Program)	01-Mar-99	AAG & Associates

Table 2. Historical Net to Gross Values by Utility

				Energy			Demand			Therm		
Sector	**Program**	**End Use**	**Program Year**	**PG&E**	**SDG&E**	**SCE**	**PG&E**	**SDG&E**	**SCE**	**PG&E**	**SDG&E**	**SCG**
AGRICULTURAL	AGRICULTURAL ENERGY EFFICIENCY INCENTIVES PROGRAM [AEEI]	Greenhouse HC	1997	0.75			0.75			0.75		
		Greenhouse HC	Pre-1998	0.75			0.75			0.75		
		HVAC	1994			0.47			0.47			
		HVAC	1996			0.75			0.75			
		Indoor Lighting	1995	0.95			0.95					
		Indoor Lighting	1996	0.45			0.75					
		Lighting	1994			0.47			0.47			
		Lighting	1996		0.75			0.75				
		Lighting	1997		0.75			0.75				
		Miscellaneous	1994	0.72	0.84		0.66	0.84		0.79	0.75	
		Miscellaneous	1995		0.75			0.75				
		Miscellaneous	1996		0.75			0.75				
		Miscellaneous	1997		0.75	0.75		0.75	0.75			
		Motors	1994			0.47			0.47			
		Process	1997		0.75	0.75		0.75	0.75			
		Pumping	1994	0.90		0.47	0.90		0.47			
		Pumping	1995	0.42	0.75		0.42	0.75		0.34		
		Pumping	1996	0.68	0.75	0.75	0.54	0.75	0.75	0.39		
		Pumping	1997	0.75	0.75	0.75	0.75	0.75	0.75	0.75		
		Pumping	Pre-1998	0.75			0.75			0.75		
		Refrigeration	1997	0.75		0.75	0.75		0.75	0.75		
		Refrigeration	Pre-1998	0.75			0.75			0.75		
		Space Conditioning	1997		0.75						0.75	
	AGRICULTURAL ENERGY MANAGEMENT SERVICES PROGRAM [AEMS]	All	1994	1.00			1.00					
		All	1996	0.75			0.75					
		HVAC	1994			0.74			0.74			
		Lighting	1994			0.74			0.74			
		Motors	1994			0.74			0.74			
		Pumping	1994			0.74			0.74			
	COMMERCIAL CFL MANUFACTURER REBATE	Lighting	1994			0.75			0.75			
		Cooking	1994		0.75						0.75	
		Cooking	1996									-3.95
		HVAC	1994	0.70	0.80	0.87	0.70	0.80	0.87	0.70	0.90	
		HVAC	1995	0.85	0.98		0.85	0.98		0.85	0.90	
		HVAC	1996	0.54	0.90	0.92	0.62	0.90	0.92	0.92	0.90	

Table 2. Historical Net to Gross Values by Utility

				Energy			Demand			Therm		
Sector	**Program**	**End Use**	**Program Year**	**PG&E**	**SDG&E**	**SCE**	**PG&E**	**SDG&E**	**SCE**	**PG&E**	**SDG&E**	**SCG**
COMMERCIAL	COMMERCIAL ENERGY EFFICIENCY INCENTIVES PROGRAM [CEEI]	HVAC	1997	0.84	1.06	0.89	0.81	0.78	0.89	0.81	0.90	
		HVAC	Pre-1998	0.87			0.87			0.90		
		Lighting	1994	1.08	0.80	0.77	1.08	0.80	0.77			
		Lighting	1995	0.97	0.93		0.97	0.93				
		Lighting	1996	0.81	0.83	0.78	0.84	0.83	0.79	0.87	0.90	
		Lighting	1997	0.82	1.14	0.96	0.80	1.09	0.96	0.79	0.90	
		Lighting	Pre-1998	1.06			1.06			1.11		
		Miscellaneous	1994		0.75			0.75			0.75	
		Miscellaneous	1995		0.75			0.75			0.75	
		Miscellaneous	1996		0.75	0.79		0.75	0.82		0.75	
		Miscellaneous	1997		0.75			0.75			0.75	
		Other	1994			0.90			0.90			
		Process	1996			0.77			0.79			
		Process	1997			1.00			1.00			
		Process	Pre-1998	0.64			0.63			0.86		
		Refrigeration	1995	0.51			0.62					
		Refrigeration	1996			1.00			1.00			
		Refrigeration	1997			0.80			0.80			
		Traffic	Pre-1998	0.83			0.83					
	COMMERCIAL ENERGY MANAGEMENT SERVICES PROGRAM [CEMS]	All	1994	0.91			0.91					
		All	1996	0.68			0.70			0.28		
		HVAC	1994			0.74			0.74			
		HVAC Equipment	1996			0.98			0.98			
		Lighting	1994			0.51			0.51			
		Lighting Equipment	1996			0.80			0.80			
		Lighting Practices	1996			0.80			0.80			
		Other	1994			0.91			0.91			
	INDUSTRIAL ENERGY EFFICIENCY INCENTIVES PROGRAM [IEEI]	HVAC	1994	0.51		0.49	0.51		0.35	0.51		
		HVAC	1995	0.73			0.73			0.73		
		HVAC	1996	0.46		0.70	0.47		0.22	0.20		
		HVAC	1997			0.67			0.50			
		HVAC	Pre-1998	0.65			0.53					
		Indoor Lighting	1994	0.92			0.91					
		Outdoor Lighting	1994	0.81			0.81					
		Lighting	1994		0.89	0.76		0.89	0.82			
		Lighting	1995	0.84	0.89		0.84	0.89		0.84		
		Lighting	1996	0.67	0.86	0.67	0.60	0.86	0.72	0.81	0.90	
		Lighting	1997	0.70	0.75	0.59	0.69	0.75	0.60	0.70	0.90	
		Miscellaneous	1994	0.75	0.75		0.75	0.75		0.75	0.75	
		Miscellaneous	1995		0.75			0.75			0.75	
		Miscellaneous	1996		0.75			0.75			0.75	

Table 2. Historical Net to Gross Values by Utility

				Energy			Demand			Therm		
Sector	**Program**	**End Use**	**Program Year**	**PG&E**	**SDG&E**	**SCE**	**PG&E**	**SDG&E**	**SCE**	**PG&E**	**SDG&E**	**SCG**
INDUSTR		Miscellaneous	1997		0.75	0.71		0.75	0.67		0.75	
		Motors	1994		0.87			0.84				
		Motors	1995		0.29			0.28				
		Motors	1996		0.54			0.51				
		Motors	1997		0.47			0.64				
		Process	1994	0.47	0.89	0.69	0.47	0.92	0.70	0.47	0.91	
		Process	1995	0.59	0.73		0.59	0.70		0.59	0.11	
		Process	1996	0.61	0.94	0.71	0.62	0.92	0.66	0.60	0.50	
		Process	1997	0.49	0.74	0.67	0.55	0.75	0.61	0.87	0.90	
		Process	Pre-1998	0.84			0.89			0.82		
		Process Boiler	Pre-1998							0.90		
	INDUSTRIAL ENERGY MANAGEMENT SERVICES PROGRAM [IEMS]	All	1994	0.84			0.84					
		All	1996	0.66			0.54			0.49		
		HVAC	1994			0.40			0.42			
		Lighting	1994			0.50			0.50			
		Process	1994			0.49			0.88			
NONRESIDENTIAL	NONRESIDENTIAL DSM BIDDING	HVAC - Commercial	1996			0.99			1.00			
		HVAC - Commercial	1997			0.32			0.26			
		HVAC - Industrial	1996			0.92			1.00			
		HVAC - Industrial	1997			1.00			0.00			
		Lighting - Commercial	1996			0.95			0.95			
		Lighting - Commercial	1997			0.60			0.60			
		Lighting - Industrial	1996			0.83			0.84			
		Lighting - Industrial	1997			0.86			0.83			
		Motors	1996			1.00			1.00			
		Process	1996			0.89			0.95			
		Process	1997			0.81			0.81			
	NONRESIDENTIAL NEW CONSTRUCTION PROGRAM [NRNC]	Cooking	1995									0.16
		Miscellaneous	1994		0.75			0.75			0.75	
		Miscellaneous	1996								0.75	
		Whole Building	1994	0.75	0.58	0.64	0.75	0.58	0.62			
		Whole Building	1996	0.78	0.69	0.73	0.75	0.65	0.89			
		Whole Building	1998			0.62			0.52			
		Whole Building	Pre-1998	0.41			0.40					
	NONRESIDENTIAL SPC	Whole Building	1998			0.53						
	RESIDENTIAL APPLIANCE EFFICIENCY INCENTIVES	A/C	1994	0.88			0.88					
		HVAC	1994			0.76			0.76			
		Lighting	1994		0.90	0.90		0.90	0.90			
		Lighting	1996	0.45	0.86		0.50	0.86				
		Miscellaneous	1996		0.75			0.75			0.75	
		Miscellaneous	1997		0.75			0.75			0.76	

Table 2. Historical Net to Gross Values by Utility

				Energy			Demand			Therm		
Sector	**Program**	**End Use**	**Program Year**	**PG&E**	**SDG&E**	**SCE**	**PG&E**	**SDG&E**	**SCE**	**PG&E**	**SDG&E**	**SCG**
RESIDENTIAL	EFFICIENCY INCENTIVES PROGRAM [RAEI]	Refrigeration	1994	0.97	0.97	0.97	0.97	0.97	0.97			
		Refrigeration	1996	1.30	1.30	0.54	1.30	1.30	0.54			
		Freezer	1994			0.65			0.65			
		Water Heating	1997									1.00
	RESIDENTIAL DIRECT ASSISTANCE	All	1995	1.00			1.00			1.00		
		HVAC	1995			1.01			1.01			
		Lighting	1995			1.00			1.00			
	RESIDENTIAL ENERGY MANAGEMENT SERVICES [REMS]	All	1997	0.63			0.63					
		Whole Building	1994									0.50
		Whole Building	1995			0.72			0.72			
	RESIDENTIAL NEW CONSTRUCTION PROGRAM [RNC]	Miscellaneous	1994		0.75			0.75				
		Miscellaneous	1996		0.75			0.75				
		Space Conditioning	1994		0.81			0.81			1.10	
		Whole Building	1994									0.94
		Whole Building	1996		0.81			0.81			1.10	
	RESIDENTIAL WEATHERIZATION RETROFIT INCENTIVES [RWRI]	Cooling	1996		1.00			1.00				
		Heating	1996		1.00						1.00	
		Insulation	1994	0.80			0.80			0.80		
		Weatherization	1995			1.01			1.01			

Table 3. Classification of PY2000 Programs into Historical Program Types

	Historical Program Types			
Current Program Types	**Rebates**	**EMS**	**SPC**	**Default**
Up-Stream Incentives				X
Down-Stream Incentives	X			
Mass Information/ Education				X
Services (On-Site and Mail-In Audits)		X		
Tools/Demonstrations/ Design Assistance, Energy Centers, Training				X
Codes/Standards/Local Government Initiatives				X
TPI				X
Large SPC			X	
Small SPC				X
RCP	X			

Table 4. NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
Residential	Residential Appliances	Appliance Early Retirement and	1.30			
		CEEREEE		0.80		
		CHEERS		0.72		
		Energy Centers		0.80		
		Energy-Star Appliance Incentives			0.80	
		Mass Market Information		0.80		
		Residential Audits		0.72		
		Residential Refrigerator Recycling		0.54		
		Select Technologies				0.80
		Statewide Residential Appliance	0.80	0.80		0.80
		Targeted Information and Market Facilitation	0.80		0.80	
		Third Party Initatives		0.80		
	Residential Heating and Cooling	CEEREEE		0.80		
		CHEERS		0.72		
		Duct Efficiency				0.80
		Efficient Residential Equipment Information and Education			0.80	
		Emerging Technologies	0.80	0.80		
		Energy Centers		0.80		
		Improved HVAC Sizing and Installation Practices			0.80	
		Linked HVAC Financial Incentives	0.88		1.00	
		Mass Market Information		0.80		
		Regional and National Initiatives	0.80			
		Residential Audits		0.72		
		Residential Upstream Gas AC				0.80
		Targeted Information Delivery	0.80			
		Technical Support to Trade Allies	0.80			
		Third Party Initatives		0.80		
	Residential Lighting	CEEREEE		0.80		
		CHEERS		0.72		
		Energy Centers		0.80		
		Improved CFL and Emerging Technolgies	0.80			
		Improved Residential Lighting Fixtures			0.80	
		Mass Market Information		0.80		
		Residential Audits		0.72		
		Residential Contractors Program		0.89		
		Statewide Residential Lighting Program	0.80	0.80		
		Targeted Information and Market Facilitation	0.80		0.80	
		Third Party Initatives		0.80		
		CEEREEE		0.80		
		CHEERS		0.72		
		Emerging Technologies		0.83		

Table 4. NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
	Residential Retrofit & Renovation	Energy Centers		0.80		
		Energy Efficiency Centers	0.80			
		Energy Facts				0.80
		Facilitation of Efficiency Retrofit and Renovation at Time of Sale	0.80		0.80	
		General Information, Education, Branding, Labeling and Alliances	0.80			
		Home Energy Fitness				0.80
		HVAC Diagnostics		0.80		
		Mass Market Information		0.80		
		Promotion and Facilitation of Comprehensive, Discretionary Retrofit Services	0.96		0.97	
		Residential Audits		0.72		
		Residential Contractors Program		0.89		0.91
		Third Party Initatives		0.80		0.80
		Window/Frame System Labeling		0.80		

Table 4. NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
Nonresidential	Large Nonresidential Comprehensive Retrofit	Ag/Pumping Services		0.83		
		Commercial EE Info. Services		0.83		
		Emerging Technologies		0.80		
		Energy Centers		0.80		
		Industrial EE Info. Services		0.83		
		Information and Education	0.80		0.80	
		Large SPC	0.53	0.53	0.53	
		Tools, Demonstrations, and Design Assistance	0.80			
	Nonresidential HVAC Equipment Turnover	Check Me - Contractor Program		0.83		
		Commercial EE Info. Services		0.83		
		Emerging Technologies		0.80		
		Energy Centers		0.80		
		High Efficiency HVAC	0.87		0.80	
		HVAC Contractor Incentive Program		0.80		
		Industrial EE Info. Services		0.83		
		Large SPC		0.53		
		NR Upstream Gas AC				0.80
	Nonresidential Motor Turnover	Industrial EE Info. Services		0.74		
		Ag/Pumping Services		0.74		
		Agricultural/Dairy Incentives		0.75		
		Commercial EE Info. Services		0.74		
		Emerging Technologies		0.80		
		Energy Centers		0.80		
		High Efficiency Motors	0.80		0.80	
		Large SPC		0.53		
		Premium Efficiency Motor Distributor Incentive Program		0.80		
		Tools, Demonstrations, and Design Assistance	0.80			
	Nonresidential Process Overhaul	Advanced Engine Technology				0.80
		Ag/Pumping Services		0.83		
		Commercial/Industrial/Agricultural Process			0.80	
		Emerging Technologies		0.80		
		Energy Centers		0.80		
		Furnace / Kiln / Oven				0.80
		Heat Recovery Application				0.80
		Industrial EE Info. Services		0.83		
		Information and Education	0.80			
		Large SPC	0.53	0.53		
		Process Energy Conservation Program				0.80
		Tools, Demonstrations, and Design Assistance	0.80			
	Nonresidential Renovation and	Commercial EE Info. Services		0.80		
		Emerging Technologies		0.80		
		Energy Centers		0.80		
		Express Efficiency	0.96			

Table 4. NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
	Renovation and Remodeling	Large SPC	0.53	0.53		
		Savings By Design	0.78	0.62	0.75	
		Tools, Demonstrations, and Design Assistance	0.80			
	Small Nonresidential Comprehensive Retrofit	Advanced Water Heating Systems				1.00
		Ag/Pumping Services		0.83		
		Coin Laundry and Dry Cleaner Eduation				0.70
		Comprehensive Space Cond.				1.00
		Emerging Technologies		0.80		
		Energy Centers		0.80		
		Energy Edge				0.80
		Financial Incentives			1.11	
		Information and Education	0.80		0.80	
		Integrated Food Services Equipment Retrofit				1.00
		Lodging Education				0.70
		NR Small/Medium C/I Standard Incentives	0.96	0.94		
		Small C/I Energy Survey		0.83		
		Small NR Mass Market Info.		0.80		
		Small/Medium EMS		0.83		
		Small/Medium NR SPC	0.80	0.80	0.80	
		Tools, Demonstrations, and Design Assistance	0.80			

Table 4. NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
New Construction	Codes & Standards Support, Local Gov't. Initiatives	Codes and Standards	0.80	0.80	0.80	0.80
		Energy Centers		0.80		
		Local Government Initiatives	0.80	0.80	0.80	0.80
		Third Party Initatives		0.80		
	Commercial New Construction	Emerging Technologies		0.80		
		Energy Centers		0.80		
		Energy Design Resources	0.80	0.80	0.80	
		Savings By Design	0.78	0.62	0.75	0.75
		Third Party Initatives		0.80		0.80
	Industrial & Agricultural New Construction	Emerging Technologies		0.80		
		Energy Centers		0.80		
		Industrial and Agricultural Process			0.94	
		Industrial NC Incentives		0.62		
		Savings By Design		0.62		
		Targeted Information	0.80			
		Third Party Initatives		0.80		
	Residential New Construction	Capability Development	0.80		0.80	
		Emerging Technologies		0.80		
		Energy Advantage Home				0.80
		Energy Centers		0.80		
		Infrastructure Development	0.80		0.80	
		Integrated New Home Produce: Energy Star Showcase Homes	0.80		0.80	
		Local Government Planning	0.80			
		Market Leader Incentives	0.80		0.80	
		Residential New Construction		0.80		
		Targeted Consumer Promotion and Information	0.80		0.80	
		Third Party Initatives		0.80		

Table 5. Basis for NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
Residential	Residential Appliances	Appliance Early Retirement and	373-1			
		CEEREEE		Default		
		CHEERS		528A		
		Energy Centers		Default		
		Energy-Star Appliance Incentives			Default	
		Mass Market Information		Default		
		Residential Audits		528A		
		Residential Refrigerator Recycling		537		
		Select Technologies				Default
		Statewide Residential Appliance	Default	Default		Default
		Targeted Information and Market Facilitation	Default		Default	
		Third Party Initatives		Default		
	Residential Heating and Cooling	CEEREEE		Default		
		CHEERS		528A		
		Duct Efficiency				Default
		Efficient Residential Equipment Information and Education			Default	
		Emerging Technologies	Default	Default		
		Energy Centers		Default		
		Improved HVAC Sizing and Installation Practices			Default	
		Linked HVAC Financial Incentives	384C		989	
		Mass Market Information		Default		
		Regional and National Initiatives	Default			
		Residential Audits		528A		
		Residential Upstream Gas AC				Default
		Targeted Information Delivery	Default			
		Technical Support to Trade Allies	Default			
		Third Party Initatives		Default		
	Residential Lighting	CEEREEE		Default		
		CHEERS		528A		
		Energy Centers		Default		
		Improved CFL and Emerging Technolgies	Default			
		Improved Residential Lighting Fixtures			Default	
		Mass Market Information		Default		
		Residential Audits		528A		
		Residential Contractors Program		512, 513, 514		
		Statewide Residential Lighting Program	Default	Default		
		Targeted Information and Market Facilitation	Default		Default	
		Third Party Initatives		Default		
		CEEREEE		Default		
		CHEERS		528A		

Table 5. Basis for NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
	Residential Retrofit & Renovation	Emerging Technologies		544		
		Energy Centers		Default		
		Energy Efficiency Centers	Default			
		Energy Facts				Default
		Facilitation of Efficiency Retrofit and Renovation at Time of Sale	Default		Default	
		General Information, Education, Branding, Labeling and Alliances	Default			
		Home Energy Fitness				Default
		HVAC Diagnostics		Default		
		Mass Market Information		Default		
		Promotion and Facilitation of Comprehensive, Discretionary Retrofit Services	384A, 384C		980, 983	
		Residential Audits		528A		
		Residential Contractors Program		512, 513, 514		512, 513, 514, 384a, 384c, 980, 983
		Third Party Initatives		Default		Default
		Window/Frame System Labeling		Default		

Table 5. Basis for NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
Nonresidential	Large Nonresidential Comprehensive Retrofit	Ag/Pumping Services		544		
		Commercial EE Info. Services		544		
		Emerging Technologies		Default		
		Energy Centers		Default		
		Industrial EE Info. Services		544		
		Information and Education	Default		Default	
		Large SPC	5000	5000	5000	
		Tools, Demonstrations, and Design Assistance	Default			
	Nonresidential HVAC Equipment Turnover	Check Me - Contractor Program		544		
		Commercial EE Info. Services		544		
		Emerging Technologies		Default		
		Energy Centers		Default		
		High Efficiency HVAC	404B		Default	
		HVAC Contractor Incentive Program		Default		
		Industrial EE Info. Services		544		
		Large SPC		5000		
		NR Upstream Gas AC				Default
	Nonresidential Motor Turnover	Industrial EE Info. Services		518A		
		Ag/Pumping Services		518A		
		Agricultural/Dairy Incentives		569		
		Commercial EE Info. Services		518A		
		Emerging Technologies		Default		
		Energy Centers		Default		
		High Efficiency Motors	Default		Default	
		Large SPC		5000		
		Premium Efficiency Motor Distributor Incentive Program		Default		
		Tools, Demonstrations, and Design Assistance	Default			
	Nonresidential Process Overhaul	Advanced Engine Technology				Default
		Ag/Pumping Services		544		
		Commercial/Industrial/Agricultural Process			Default	
		Emerging Technologies		Default		
		Energy Centers		Default		
		Furnace / Kiln / Oven				Default
		Heat Recovery Application				Default
		Industrial EE Info. Services		544		
		Information and Education	Default			
		Large SPC	5000	5000		
		Process Energy Conservation Program				Default
		Tools, Demonstrations, and Design Assistance	Default			
		Commercial EE Info. Services		Default		
		Emerging Technologies		Default		
		Energy Centers		Default		

Table 5. Basis for NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
	Nonresidential Renovation and Remodeling	Express Efficiency	404A, 404B			
		Large SPC	5000	5000		
		Savings By Design	389	572	389 & 572	
		Tools, Demonstrations, and Design Assistance	Default			
	Small Nonresidential Comprehensive Retrofit	Advanced Water Heating Systems				404A, 404B, 567, 1025
		Ag/Pumping Services		544		
		Coin Laundry and Dry Cleaner Eduation				544, 358, 359
		Comprehensive Space Cond. Efficiency Improvements				404A, 404B, 567, 1025
		Emerging Technologies		Default		
		Energy Centers		Default		
		Energy Edge				Default
		Financial Incentives			1025	
		Information and Education	Default		Default	
		Integrated Food Services Equipment Retrofit				404A, 404B, 567, 1025
		Lodging Education				544, 358, 359
		NR Small/Medium C/I Standard Incentives	404A, 404B	567		
		Small C/I Energy Survey		544		
		Small NR Mass Market Info.		Default		
		Small/Medium EMS		544		
		Small/Medium NR SPC	Default	Default	Default	
		Tools, Demonstrations, and Design Assistance	Default			

Table 5. Basis for NTGRs by Program Element and Utility

Program Areas	Programs	Elements	PG&E	SCE	SDG&E	SoCalGas
New Construction	Codes & Standards Support, Local Gov't. Initiatives	Codes and Standards	Default	Default	Default	Default
		Energy Centers		Default		
		Local Government Initiatives	Default	Default	Default	Default
		Third Party Initatives		Default		
	Commercial New Construction	Emerging Technologies		Default		
		Energy Centers		Default		
		Energy Design Resources	Default	Default	Default	
		Savings By Design	389	572	389 & 572	389 & 572
		Third Party Initatives		Default		Default
	Industrial & Agricultural New Construction	Emerging Technologies		Default		
		Energy Centers		Default		
		Industrial and Agricultural Process			995	
		Industrial NC Incentives		572		
		Savings By Design		572		
		Targeted Information	Default			
		Third Party Initatives		Default		
	Residential New Construction	Capability Development	Default		Default	
		Emerging Technologies		Default		
		Energy Advantage Home				Default
		Energy Centers		Default		
		Infrastructure Development	Default		Default	
		Integrated New Home Produce: Energy Star Showcase Homes	Default		Default	
		Local Government Planning	Default			
		Market Leader Incentives	Default		Default	
		Residential New Construction		Default		
		Targeted Consumer Promotion and Information	Default		Default	
		Third Party Initatives		Default		

Table 6. Statewide Programs

Program Area	Program	NTGR	NTGR Documentation
Residential	Residential Mass Market Informmation	0.80	Default
Residential	Residential Lighting	0.80	Default
Residential	Residential Appliances	0.80	Default
Residential	Residential Contractors Program	0.91	512, 513, 514, 384a, 384c
Nonresidential	Express Efficiency	1.00	404A, 404B, 567, 1025
Nonresidential	Small/Medium NR SPC	0.80	Default
Nonresidential	Large SPC	0.53	5000
Nonresidential	Business Energy Guide	0.80	Default
New Construction	Business Resource Guide	0.80	Default
New Construction	Codes and Standards	0.80	Default
New Construction	Energy Design Resources	0.80	Default
New Construction	Savings by Design	0.75	389 & 572

Table 7. Downstream Incentive Program Elements with Historical NTGR at the End Use Level

Program Area	Program	Element	Proposed NTGR	Utility	Based on Study ID(s)	Study ID	End Use	NTGR	Weighting Percent*
Residential	Residential Heating and	Linked HVAC Finanacial Incentives	0.88	PG&E	384C	384C	HVAC	0.88	100%
			1.00	SDG&E	989	989	Cooling	1.00	100%
	Residential Lighting	RCP	0.89	SCE	512, 513, 514	512	HVAC	0.76	8%
						513	Lighting	0.90	84%
						514	Refrigeration	0.97	8%
	Residential Appliances	Appliance Early Retirement and Recycling	1.30	PG&E	373-1	373-1	Refrigeration	1.30	100%
		Residential Refrigerator Recycling	0.54	SCE	537	537	Refrigeration	0.54	100%
	Residential Retrofit and Renovation	Promotion and Facilitation of Comprehensive, Discretionary Retrofit Services	0.80	PG&E	DEFAULT	NA			
			0.80	SDG&E	DEFAULT	NA			
		RCP	0.89	SCE	512, 513, 514	Same Residential Lighting, RCP			
			0.91	SoCalGas	512, 513, 514, 384A, 384C, 980, 983	512	HVAC	0.76	5%
						513	Lighting	0.90	50%
						514	Refrigeration	0.97	5%
						384A	Refrigeration	0.97	12%
						384C	HVAC	0.88	2%
						980	Refrigeration	1.30	6%
						983	Lighting	0.86	20%

Table 7. Downstream Incentive Program Elements with Historical NTGR at the End Use Level

Program Area	Program	Element	Proposed NTGR	Utility	Based on Study ID(s)	Study ID	End Use	NTGR	Weighting Percent*
Nonresidential	Small NR Comprehensive Retrofit	NR Small/Medium CI Standard Incentives	0.94	SCE	567	567	HVAC	0.89	31%
						567	Lighting	0.96	38%
						567	Refrigeration	0.80	6%
						567	Process	1.00	25%
		Integrated Food Services Equipment Retrofit	1.00	SoCalGas	404A, 404B, 567, 1025	404A	Lighting	1.06	6%
						404B	HVAC	0.87	7%
						567	HVAC	0.89	15%
						567	Lighting	0.96	19%
						567	Refrigeration	0.80	12%
						567	Process	1.00	3%
						1025	HVAC	1.06	12%
						1025	Lighting	1.14	25%
		Comprehensive Space Cond. Efficiency Improvements	1.00	SoCalGas	404A, 404B, 567, 1025	Same as Integrated Food Service Equipment Retrofit			
		Advanced Water Heating Systems	1.00	SoCalGas	404A, 404B, 567, 1025	Same as Integrated Food Service Equipment Retrofit			
	NR HVAC Equipment Turnover	High Efficiency HVAC	0.87	PG&E	404B	404B	HVAC	0.87	100%
	NR Motor Turnover	High Efficiency Motors	0.80	PG&E	DEFAULT	NA			
	NR Process Overhaul	Heat Recovery Application	0.80	SoCalGas	DEFAULT	NA			
	Commercial Remodeling / Renovation	Savings By Design	0.75	SDG&E	389, 572	389	Whole Building	0.78	78%
						572	Whole Building	0.62	22%

Table 7. Downstream Incentive Program Elements with Historical NTGR at the End Use Level

Program Area	Program	Element	Proposed NTGR	Utility	Based on Study ID(s)	Study ID	End Use	NTGR	Weighting Percent*
	NR Remodeling / Renovation	Savings By Design	0.62	SCE	572	572	Whole Building	0.62	100%

Table 7. Downstream Incentive Program Elements with Historical NTGR at the End Use Level

Program Area	Program	Element	Proposed NTGR	Utility	Based on Study ID(s)	Study ID	End Use	NTGR	Weighting Percent*
New Construction	Commercial New Construction	Savings By Design	0.78	PG&E	389	389	Whole Building	0.78	100%
			0.62	SCE	572	572	Whole Building	0.62	100%
			0.75	SDG&E	389, 572	389	Whole Building	0.78	78%
						572	Whole Building	0.62	22%
			0.75	SoCalGas	389, 572	Same as CNC Savings By Design for SDG&E			
	Industrial and Agricultural New Construction	Industrial NC Incentives	0.62	SCE	572	572	Whole Building	0.62	100%
		Savings By Design	0.62	SCE	572	572	Whole Building	0.62	100%
		Industrial and Agricultural Process	0.94	SDG&E	995	995	Process	0.94	100%

*Weighting percent based on first year net kWh impact

*Table 8. PY2001 Planned Program Mappings**

Program Areas	Programs	Elements	Financial Incentives - Downstream	Financial Incentives - Upstream	Mass Information and Education	Audits	Tools, Demonstrations, Design Assistance, Energy Centers,	Codes / Standards / Local Gov't. Initatives	TPI	SPC	NTGR Type**
Residential	Residential Heating and Cooling	Targeted Information Delivery			X						D
		Technical Support to Trade Allies					X				D
		Emerging Technologies					X				D
		Linked HVAC Finanacial Incentives	X								R
		Regional and National Initiatives						X			D
		Residential Audits, CHEERS				X					E
		CEEREEE, Mass Market Information			X						D
		Energy Centers					X				D
		Third Party Initatives							X		D
		Efficient Residential Equipment Information and Education			X						D
		Duct Efficiency							X		D
		Improved HVAC Sizing and Installation Practices					X				D
		Residential Upstream Gas AC		X							D
	Residential Lighting	Targeted Information and Market Facilitation			X						D
		Improved CFL and Emerging Technolgies					X				D
		Statewide Residential Lighting Program			X						D
		Residential Audits, CHEERS				X					E
		CEEREEE, Mass Market Information			X						D
		Energy Centers					X				D
		Third Party Initatives							X		D
		Residential Contractors Program	X								R
	Residential Appliances	Targeted Information and Market Facilitation			X						D
		Appliance Early Retirement and Recycling (Residential Refrigerator Recycling)	X								R
		Statewide Residential Appliance Program			X						D
		Residential Audits, CHEERS				X					E
		CEEREEE, Mass Market Information			X						D
		Energy Centers					X				D
		Third Party Initatives							X		D
		Select Technologies			X						D
	Residential Retrofit & Renovation	Promotion and Facilitation of Comprehensive, Discretionary Retrofit Services	X								R
		Facilitation of Efficiency Retrofit and Renovation at Time of Sale					X				D
		Energy Efficiency Centers					X				D
		General Information, Education, Branding, Labeling and Alliances			X						D
		Window/Frame System Labeling			X						D
		HVAC Diagnostics					X				D
		Residential Contractors Program	X								R

*Table 8. PY2001 Planned Program Mappings**

Program Areas	Programs	Elements	Financial Incentives - Downstream	Financial Incentives - Upstream	Mass Information and Education	Audits	Tools, Demonstrations, Design Assistance, Energy Centers,	Codes / Standards / Local Gov't. Initatives	TPI	SPC	NTGR Type**
		Residential Audits, CHEERS				X					E
		CEEREEE, Mass Market Information			X						D
		Energy Centers					X				D
		Third Party Initatives							X		D
		Home Energy Fitness				X					E
		Energy Facts			X						D
Nonresidential	**Large Nonresidential Comprehensive Retrofit**	Large SPC								X	S
		Information and Education			X						D
		Tools, Demonstrations, and Design Assistance					X				D
		Commercial & Industrial EE Info. Services, Ag/Pumping Services				X					E
		Emerging Technologies					X				D
		Energy Centers					X				D
	Small Nonresidential Comprehensive Retrofit	Financial Incentives	X								R
		Information and Education			X						D
		Tools, Demonstrations, and Design Assistance					X				D
		Small C/I Energy Survey, Small/Medium EMS, Ag/Pumping Services				X					E
		Small NR Mass Market Info.			X						D
		Emerging Technologies					X				D
		Energy Centers					X				D
		Coin Laundry and Dry Cleaner Education				X					E
		Lodging Education				X					E
		NR Small/Medium CI Standard Incentives	X								R
		Small/Medium NR SPC								X	S
		Third Party Initatives							X		D
		Integrated Food Services Equipment Retrofit	X								R
		Comprehensive Space Cond. Efficiency Improvements	X								R
		Advanced Water Heating Systems	X								R
		Energy Edge					X				D
	Nonresidential HVAC Equipment Turnover	High Efficiency HVAC (PG&E)	X								R
		Large SPC								X	S
		Commercial & Industrial EE Info. Services, Check Me - Contractor Program				X					E
		HVAC Contractor Incentive Program		X							D
		Emerging Technologies					X				D
		Energy Centers					X				D
		High Efficiency HVAC (SDG&E)		X							D
		NR Upstream Gas AC		X							D
		High Efficiency Motors (PG&E)	X								D
		Large SPC								X	S

*Table 8. PY2001 Planned Program Mappings**

Program Areas	Programs	Elements	Financial Incentives - Downstream	Financial Incentives - Upstream	Mass Information and Education	Audits	Tools, Demonstrations, Design Assistance, Energy Centers,	Codes / Standards / Local Gov't. Initatives	TPI	SPC	NTGR Type**
New Construction	**Nonresidential Motor Turnover**	Tools, Demonstrations, and Design Assistance					X				D
		Agricultural/Dairy Incentives	X								R
		Premium Efficiency Motor Distributor Incentive Program		X							D
		Commercial & Industrial EE Info. Services, Ag/Pumping Services				X					E
		Emerging Technologies					X				D
		Energy Centers					X				D
		High Efficiency Motors (SDG&E)		X							D
	Nonresidential Process Overhaul	Large SPC								X	S
		Information and Education			X						D
		Tools, Demonstrations, and Design Assistance					X				D
		Industrial EE Info. Services, Ag/Pumping Services				X					E
		Emerging Technologies					X				D
		Energy Centers					X				D
		Commercial/Industrial/Agricultural Process				X					E
		Heat Recovery Application	X								R
		Furnace / Kiln / Oven					X				D
		Process Energy Conservation Program					X				D
		Advanced Engine Technology					X				D
	Nonresidential Renovation and Remodeling	Express Efficiency	X								R
		Tools, Demonstrations, and Design Assistance					X				D
		Savings By Design	X								R
		Large SPC								X	S
		Commercial EE Info. Services					X				D
		Emerging Technologies					X				D
		Energy Centers					X				D
	Residential New Construction	Targeted Consumer Promotion and Information			X						D
		Infrastructure Development					X				D
		Integrated New Home Produce: Energy Star Showcase Homes					X				D
		Capability Development					X				D
		Market Leader Incentives		X							D
		Local Government Planning						X			D
		Residential New Construction			X						D
		Emerging Technologies					X				D
		Energy Centers					X				D
		Third Party Initatives							X		D
		Energy Advantage Home					X				D
	Commercial New Construction	Savings By Design	X								R
		Energy Design Resources					X				D
		Third Party Initatives							X		D
		Emerging Technologies					X				D
		Energy Centers					X				D

*Table 8. PY2001 Planned Program Mappings**

Program Areas	Programs	Elements	Financial Incentives - Downstream	Financial Incentives - Upstream	Mass Information and Education	Audits	Tools, Demonstrations, Design Assistance, Energy Centers,	Codes / Standards / Local Gov't. Initatives	TPI	SPC	NTGR Type**
	Industrial & Agricultural New Construction	Targeted Information			X						D
		Industrial NC Incentives	X								R
		Savings By Design	X								R
		Third Party Initatives							X		D
		Emerging Technologies					X				D
		Energy Centers					X				D
		Industrial and Agricultural Process	X								R
	Codes & Standards Support, Local Gov't. Initiatives	Codes and Standards						X			D
		Local Government Initiatives						X			D
		Third Party Initatives							X		D
		Energy Centers					X				D
		Number of each Type	20	7	21	13	45	4	10	6	126
		Percent of Total	16%	6%	17%	10%	36%	3%	8%	5%	

*Information from September 27, 1999 Filing

**R=Rebate	15%
**E=EMS	10%
**D=Default	70%
**S=SPC	5%

Appendix C2

(Discussion Paper #2)

(Proposed Effective Useful Life for Measures for PY2001 Program Elements)

Proposed Effective Useful Life for Measures for PY2001 Program Elements

Response to Ordering Paragraph #8

Pacific Gas and Electric Company

Southern California Edison Company

San Diego Gas and Electric Company

Southern California Gas Company

September 22, 2000

1. Introduction

On July 6, 2000, Decision 00-07-017 was issued by the California Public Utilities Commission (CPUC). This decision addressed a number of issues and included 96 ordering paragraphs covering energy efficiency programs, their cost-effectiveness, and the need for public workshops. The focus of this report is Ordering Paragraph #8, which states:

> The utilities shall, jointly with interested stakeholders, after engaging in a public process, devise a table showing the proposed measure life for each energy efficiency measure included in their programs. The table shall be included in the PY 2001 applications and include a description of any remaining areas of disagreement. The utilities shall use the agreed upon values in their PY 2001 applications subject to our approval. As a general rule, the utilities shall use the same measure life in the cost-benefit calculations, particularly for statewide programs. Where there is a reason for varied measurement lives, the table should include agreed-upon variations, and, in the PY 2001 application, the utilities shall explain the basis for the variations. (Decision 00-07-017, Ordering Paragraph #8, pp. 251)

Beginning with the PY 1994 demand-side management (DSM) programs, evaluations of these programs implemented by PG&E, Edison, SDG&E, and SoCalGas were conducted in accordance with a specific set of measurement and evaluation protocols, the *Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management (DSM) Programs* (M&E Protocols). The M&E Protocols Appendix A includes two definitions of measure life. The Effective Useful Life (EUL) which is defined as "an estimate of the median number of years that the measures installed under the program are still in place and operable." The Engineering Useful Life is defined as "An engineering estimate of the number of years that a piece of equipment will operate if properly maintained." Since Ordering Paragraph 8 is unclear on which "measure life" the utilities are to document, it is assumed that the EUL is the "measure life" referred to in Ordering Paragraph 8. The EUL is the term used throughout the M&E Protocols to calculate utility earnings so it would be the more referenced.

The M&E Protocols include Appendix F that lists the EUL for each measure planned as of approximately 1993 (Appendix F is undated). Where the measures listed in Appendix F are still being offered in PY 2001, these values were used as a point of reference in the analysis.

As required by the M&E Protocols, one of the products of planned DSM evaluations were EUL studies at prescribed intervals. As of July 7, 2000, about 45 of these studies have been

completed. A list of these studies is included in Table 1. To date, since most measures are still early in their EUL, these studies have resulted in a change in EUL for only one measure (compact fluorescent lamps in the commercial sector for SCE).

The remainder of this report will discuss the methods used to comply with Ordering Paragraph #8 and the recommendations for EULs for anticipated PY 2001 measures.

2. Methods

Ordering Paragraph #8 requires documentation of the EULs for planned PY 2001 measures. Since actual PY 2001 programs have not yet been filed, the utilities current measures for the PY 2000 programs were used as the basis for approximating PY 2001 measure mix.

The first step in the assessment was to document all current information on measures planned for PY 2001 by the utilities. To obtain this information, each utility was asked for a complete list of PY 2000 measures and current EULs. There were approximately 775 measures from the four utilities that were then mapped to the measure numbers from the M&E Protocols Appendix F and sorted by end use and measure type. However, since new measures had been added since Appendix F was compiled, some measures had no Appendix F historical data. These were given new measure numbers.

The next step was attempt resolve the EUL for measures where conflicting values existed. Three "rules" were applied to resolve many of the issues.

- Where two utilities had one value and one utility had another, the "mode" (the most common value) was selected as the appropriate EUL value.
- Some values were changed to create consistency across common measure types (e.g., common types of lighting fixtures) when the change was small.
- When numbers were very close (e.g., 15.3, 15.0, and 15.4) the nearest round number was proposed (e.g., 15.0)

This process left a limited number of measure types requiring input from utility staff. These remaining measures were jointly reviewed by the four utilities and agreed default values were

selected. In many cases, the EUL was resolved simply by confirming existing values as valid or supplying information previously unavailable.

(a) 3. Recommendations

Tables 2 and 3 present the proposed EULs for the PY 2001 Programs by sector. Table 2 presents the proposed EULs for the Nonresidential measures and Table 3 has the Residential Measures.

Proposed Effective Useful Life for Measures for PY2001 Program Elements – Attachment Tables

Response to Ordering Paragraph #8

Pacific Gas and Electric Company

Southern California Edison Company

San Diego Gas and Electric Company

Southern California Gas Company

September 22, 2000

Num	*Utility*	*Title*	*Publ*	*Summary*	*Prog Yr*
322.00	PG&E	1994 Residential New Construction	1-Mar-97		1994
384.00	PG&E	Retention Study of Pacific Gas and Electric Company's 1994 and 1995 Residential Appliance Efficiency Incentives Program: 1994 Lighting Third Year Retention	1-Mar-97	See study 384CR1, which incorporates this study.	
384.00	PG&E	Retention Study of Pacific Gas and Electric Company's 1994 and 1995 Residential Appliance Efficiency Incentives Program: 1994 Refer. Fourth Year Retention	1-Mar-97	See study 384CR1, which incorporates this study.	
524.00	SCE	Southern California Edison 1994 Residential CFB Manufacturers' Incentive Program: Fourth Year Retention Study	1-Mar-98	This report estimates survival of residentially installed compact fluorescent bulbs subsidized by SCE's 1994 manufacturers' incentive program -- using conservative survival modeling techniques over a collection of sample surveys performed by various vendors in 1995, 1997 and 1999. The study reveals that (1) bulb estimated expected useful life, allowing for burnouts, remodels, accidents, and migration from the SCE territory, is approx. 6.1 years over the sample: (2) the standards error of 0.59 years obtained from the study indicates that SCE's filed assumption of 5.8 years for residential CFB expected useful life should remain in effect.	

915.00	SDGE	1994 & 1995 Residential Appliance Efficiency Incentives: Refrigerators: Fourth Year Retention Evaluation	1-Mar-98	Fourth year retention evaluation of refrigerators component of the 1994 and 1995 residential appliance efficiency incentives. Telephone research was contracted to CIC Research, Inc. Used a model for lifetime estimation consisting of survivor function, hazard function, and median lifetime components. Data are applied to a maximum-likelihood framework to produce estimated median lifetime. Realization rates were shown to be 1.	
921.00	SDGE	1994 & 1995 Residential Appliance Efficiency Incentives: Compact Fluorescent Lights: Fourth Year Retention Evaluation	1-Mar-98	Same approach as study #915. Results showed realization rate of 1.36 for CFL Bulbs and 1 for CFL Fixtures.	
924.00	SDGE	1994 & 1995 Commercial Energy Efficiency Incentives: Fourth Year Retention Evaluation	1-Mar-98	See Study #960 which incorporates this study.	
927.00	SDGE	1994 & 1995 Industrial Energy Efficiency Incentives: Fourth Year Retention Evaluation	1-Mar-98	See Study #963 which incorporates this study.	
930.00	SDGE	1994 & 1995 Agricultural Energy Efficiency Incentives: Fourth Year Retention Evaluation	1-Mar-98	See Study # 966 which incorporates this study.	
933.00	SDGE	1994 & 1995 Residential New Construction Program: Fourth Year Retention Evaluation	1-Mar-98	This study attempted to review the *ex ante* retention estimates of the 1994 and 1995 residential new construction program measures. Measures were A/C SEER 11 and 11.1, High performance glass, and r19 Wall Insulation. Surveys were made of participants from a sample. Econometric framework included modules for survivor function, hazard function, median lifetime. These concepts are applied to the data and a maximum-likelihood framework (which brings the modules and data together) to produce estimated median lifetimes. Dependent and independent failures were accounted for. Results showed realization rates for EUL were same *ex ante* and *ex post*.	

936.00	SDGE	1994 & 1995 Nonresidential New Construction Program: Fourth Year Retention Evaluation	1-Mar-98	See Study #972 which incorporates this study.	
939.00	SDGE	1994 Commercial Multiple End Uses - 1st Persistence Study	1-Mar-98		
942.00	SDGE	1994 Industrial Multiple End Uses - 1st Persistence Study	1-Mar-98		
945.00	SDGE	1994 Agricultural Multiple End Uses - 1st Persistence Study	1-Mar-98		
341.00	CADMAC	Final Report: Statewide Study of the Retention of Measures Installed Under the Direct Assistance Program (DAP)	29-Dec-98	See Study #975 which incorporates this study.	
571.00	CADMAC	Final Report: Statewide Study of the Retention of Measures Installed Under the Direct Assistance Program (DAP)	29-Dec-98	See Study # 975 which incorporates this study.	
713.00	CADMAC	Final Report: Statewide Study of the Retention of Measures Installed Under the Direct Assistance Program (DAP)	29-Dec-98	See Study # 975 which incorporates this study.	

525.00	SCE	1994 Residential Appliance Efficiency Incentive Program Fourth Year Retention Study: Final Report	1-Feb-99	This is a study of the 4th year retention of space cooling appliances and refrigerators installed by customers of SCE in 1994 under its res. appliance efficiency incentive program. Data was collected via phone and mail. Appliances were: Central A/C, heat pumps, evaporative. coolers, and refrigerators. The percent of appliances retain since 1994 to 1998 were from 94% for evaporative. coolers to 98.2% for central A/C units. Effective useful life for refrigerators. was 21.8 years, for central A/C was 22.04 years, and for others "was not developed."	
525.00	SCE	Persistence Study of Southern California Edison's 1994 through 1997 Appliance Recycling Programs	25-Feb-99	This is a fourth-year retention study of SCE 1994 through 1997 Appliance Recycling Programs. See Studies #515 and #537. Measure retention data was collected from a sample of participants and a parametric survival function was fitted to the data. The median life of the direct measure removal, -- i.e. the time until half the removed units have been replaced -- is estimated at 6.3 years, with an 80 percent confidence interval of 5 to 7.5 years. The result is based on the combined analysis of retention data from 1994 and 1996 participants.	
310.00	PG&E	Fourth Year Retention Study for Pacific Gas & Electric Company's 1994 Commercial Energy Efficiency Incentives Programs: Lighting and HVAC Technologies: Lighting	1-Mar-99	See Study 312R1 which incorporates this study.	
311.00	PG&E	1994 - 1995 Industrial Energy Efficiency Incentive Programs: Third - Year Retention Study: Process End Use (1994)	1-Mar-99	See Study 325R1 which incorporates this study.	

312.00	PG&E	Fourth Year Retention Study for Pacific Gas & Electric Company's 1994 Commercial Energy Efficiency Incentives Programs: Lighting and HVAC Technologies	1-Mar-99	This study measures the effective useful life (EUL) for all HVAC and lighting EE technologies for which rebates were paid in 1994 by PGE's Commercial EEI programs. We have attempted to employ classical survival analysis techniques to our study approach. Most measures were in place less than 5 years; because the *ex ante* EUL is 15-20 years for most measures, the data will not likely be capable of accurately est. the survival function for these measures. The method was to (1) compile summary statistics on the raw retention data; (2) visually inspect the retention data--this showed the lack of needed data for analysis; (3) develop a trend line from the survival plots; (4) develop a survival function using classical survival techniques such as exponential, logistic, lognormal, Weibull and gamma. Results. Later studies are needed to determine true values of EUL. Realization rates for all measures were 1 (i.e. same *ex ante* and *ex post*).	
314.00	PG&E	1994 - 1995 Industrial Energy Efficiency Incentive Programs: Third - Year Retention Study: Indoor Lighting End Use (1994)	1-Mar-99	See Study 325R1 which incorporates this study.	
315.00	PG&E	Retention Study of Pacific Gas and Electric Company's 1994 and 1995 Energy Efficiency Incentives Program, Agricultural Sector Measures	1-Mar-99	See Study 331R1 which incorporates this study.	
321.00	PG&E	Retention Study of Pacific Gas and Electric Company's 1994 and 1995 Energy Efficiency Incentives Program, Agricultural Sector Measures	1-Mar-99	See Study #331R1 which incorporates this study.	1994 1995

322.00	PG&E	Pacific Gas and electric Company: PY94 Residential New Construction: Retention Study	1-Mar-99	The purpose of the 1994 Res. New Construction retention study was to collect data on the fraction of installed measures that are still 'in place and operating' to produce a revised est. of PY94 effective useful lifetimes (EULs) of the measures. The method was divided into (1) EUL calculations and (2) determining technical degradation factors (TDFs). EUL calculation method used phone or on-site interviews or both to determine if measures were actually installed and operating. For sites with changes, surveyors called back to get exact status of equipment. Results: Insufficient failures were documented to allow creating a credible *ex post* EUL for the measures. TDF calculation was restricted to one technology (HVAC) -- it has TDFs that are greater than one, resulting in a negative decrease savings versus standard units. Conclusion: the small number of failures among surveyed sites make significant statistical estimates impossible. Recommendation: use *ex ante* estimates.	1994
323.01	PG&E	Pacific Gas & Electric Company PY94 Nonresidential New Construction Retention Study	1-Mar-99	This study evaluated the retention of electric energy (kWh) and demand (kW) savings from the 1994 and 1996 non-res new construction programs. It developed estimates of effective useful life and technical degradation factors for savings from the combined PY94/96 programs. Methodology involved "effective useful life analysis", "technical degradation factor analyses" for the 24 technologies. the absence of any kWh failures among surveyed sites made estimation of any statistical models impossible. As a result, the *ex ante* EUL estimate of 16 years was retained as the *ex post* estimate. EUL for the "whole building" was 16 years, agreeing with *ex ante* estimate. Program level technical degradation factors for demand (kW) was 0.986, and for energy (kWh) was 0.99.	1994
324.00	PG&E	Fourth Year Retention Study for Pacific Gas & Electric Company's 1995 Commercial Energy Efficiency Incentives Programs: Lighting and HVAC Technologies	1-Mar-99	See Report 326R1	

325.00	PG&E	1994 - 1995 Industrial Energy Efficiency Incentive Programs: Third - Year Retention Study: Indoor Lighting End Use (1995)	1-Mar-99	Incorporates Studies # 311R1, 328R1, and 314R1. This study measures the effective useful life (EUL) of indoor lighting and process measures for which rebates were paid through PGE's 1994-5 industrial EEI programs. General method is to collect measure retention data from samples of participants, and fit parametric survival function to them. Survival function gives probability of surviving to any positive time 't'. Parameters of the function are estimated from retention data. Once the survival function parameters are estimated, median lifetime or EUL is determined as the time 't*' such that the survival probability is equal to 50 percent. All study data were collected via on-site surveys. Results showed three of the process measures had no failures and so no results calculated for them. The '251-400W HID' lighting measure's *ex post* estimate is formally significantly different from the *ex ante* EUL. However these estimates are not considered reliable, and revision of *ex ante* EUL based on these results isn't recommended. All other process measures *ex post* and *ex ante* estimates were very close.	1994-5
326.00	PG&E	Fourth Year Retention Study for Pacific Gas & Electric Company's 1995 Commercial Energy Efficiency Incentives Programs: Lighting and HVAC Technologies	1-Mar-99	Contains Study 324R1: Lighting. This study measures the effective useful life for all HVAC and Lighting energy efficiency tech. for which PGE paid rebates in 1995 under its Com EEI Programs. Retrofits were performed under 3 PG&E programs: Retrofit Express, Retrofit Efficiency Options, and customize Incentives Programs. Approach was to compile summary statistics on raw retention data, visually inspect the retention data, develop a trend line from the survival plots, and develop a survival function using classical survival techniques. Results showed the realization rate mated the EUL for the claim (at least for the 5 years since the devices were installed and until the report was compiled.)	1995
328.10	PG&E	1994 - 1995 Industrial Energy Efficiency Incentive Programs: Third - Year Retention Study: Process End Use (1995)	1-Mar-99	See Study 325R1 which incorporates this study.	
329.00	PG&E	Retention Study of Pacific Gas and Electric Company's 1994 and 1995 Energy Efficiency Incentives Program, Agricultural Sector Measures	1-Mar-99	See Study 331R1 which incorporates this study.	

331.00	PG&E	Retention Study of Pacific Gas and Electric Company's 1994 and 1995 Energy Efficiency Incentives Program, Agricultural Sector Measures	1-Mar-99	Incorporates Studies #315R1, 321R1, 329R1. This study documents the level of measure retention in the third year after installation and estimates the *ex post* effective useful life (EUL) for PGE 1994 and 1995 Ag energy efficiency incentives (AEEI) programs. Measures include pump retrofit, greenhouse heat curtain, ag pumps other, and high intensity discharge lighting measures. Surveys were analyzed using 3 basic approaches to estimating EULs. These were the standard ordinary lest squares, a classic survival analysis, and the assumed functional form approach. The only measure with *ex post* EULs were "pump retrofit" which had *ex ante* EUL of 9.0 and *ex post* EUL of 9.1 (for 1994 and 1995). Other measures had no observed failures, so no *ex post* EULs were derived.	
332.00	SDGE, PGE	Final Report: Measure Retention Study -- 1994 & 1995 Residential Weatherization Programs (RWRI)	1-Mar-99	See Study # 957 which incorporates this study.	
338.00	PG&E	1995 Commercial Retrofit 4th Year Retention Study (All Measures)	1-Mar-99	Error? Study not identified.	
339.00	PG&E	1995 Industrial Retrofit 4th Year Retention Study (All Measures)	1-Mar-99	Error? Study not identified.	
340.00	PG&E	1995 Agricultural Retrofit 4th Year Retention Study (All Measures)	1-Mar-99	Error? Study not identified.	
341.00	PG&E	1995 Residential Direct Assist. Retrofit 4th Year Retention Study	1-Mar-99		
342.00	PG&E	1995 Residential EMS Retrofit 4th Year Retention Study	Not Required		

384.00	PG&E	Retention Study of Pacific Gas and Electric Company's 1994 and 1995 Residential Appliance Efficiency Incentives Program: 1994 Space Conditioning. Fourth Year Retention	1-Mar-99	Incorporates Studies 384BR1, 401BR1, and 384AR1 This study measures the effective useful life (EUL) of lighting, space conditioning and refrigerator. measures for which rebates were paid through PGE 1994-5 residential appliance efficiency incentives program. Method for the study collected measure retention data from a sample of participants, and fit a parametric survival function to those data. Survival function gives the probability of surviving to any positive time 't'. These parameters of the function are estimated from the retention data. Once the survival function parameters are estimated, median lifetime or EUL is determined as the time 't*' such that the survival probability is 50%. For lighting measures, retention data were collected via onsite inspections for a sample. For central A/C and refrigerator. studied, retention data were gathered via phone surveys. A supplemental 'new occupant' sample provided info on measure loss due to customer' leaving the service territory with their rebated units.	1994-95
399.00	PG&E	Measure Retention Study of 1994 Power Savings Partners Program: Commercial Sector	1-Mar-99	This study evaluated the measure retention from commercial lighting technology for which rebates were paid in 1994 by PGE's power saving partners program. The PSP contract specifies that participants must submit results of monitoring data for each site. This data is used to revise savings estimates and corresponding payments annually and is included in this report. For the retention study, representatives of PGE performed annual inspections for each customer type of all projects implemented in 1994. The ratio of the corrected wattage to the total wattage originally claimed was used to calculate effective useful life (EUL) factors. Results showed the EUL for PY94 commercial lighting projects was 0.994 years.	
401.00	PG&E	Retention Study of Pacific Gas and Electric Company's 1994 and 1995 Residential Appliance Efficiency Incentives Program:1995 Lighting Third Year Retention	1-Mar-99	See study 384CR1, which incorporates this study.	
525.00	SCE	1994\95 Residential 4th Year Retention Study	1-Mar-99		
525.00	SCE	1994\95 Residential 4th Year Retention Study	1-Mar-99		

529.00	SCE	Southern California Edison 1993-1994 Commercial/ Industrial/ Agricultural energy Efficiency Incentives Program Fourth Year Retention Study	1-Mar-99	Studies retention of measures installed by customers of SCE in 1993 and 1994 under the CIA EEI program. Commercial measures include: electronic ballasts, CFBs, T8 Lamps, Delamping/ Reflectors, HVAC EMS systems, High-Efficiency Chiller System, Adj. Speed Drives. Industrial and Ag sector measures include: Adj. speed drives, pumps, pump system hardware improvements, ballasts, T8 lamps, Lighting EMS, injection molding, process cooling, insulation on process equipment, air compressors, high efficiency chillers for process. Data was collected through a longitudinal survey effort over 4 years via on-site visits and phone surveys. Retention (after 4 years) was over 90 percent for all commercial measures except T8 lamps (67%) and CF lamps (75%). Retention (after 4 years) was over 90 percent for all ag. and industrial measures except T8 lamps (80%), adjustable speed drives (90%), injection molding machines (82%) plastic extrusion equipment (64%) , process equipment insulation (80%) and air compressors (83%).	1993--94
529.00	SCE	1994 Commercial CFL [Compact Fluorescent Lights] Manufacturers' Rebate Persistence Study	1-Mar-99	This research performs a measure retention study for SCE's 1994 Commercial CFL Manufacturers' Rebate Program. The evaluation estimates expected useful lives (EUL) for fixtures covered in the program and compares them to *ex ante* EUL estimates filed earlier. Bulb EULs are also estimated. A follow-up inspection sample was used to determine retention with inspectors looking for tags applied in the first year evaluation. Statistical models were used to extrapolate the retention rates to the time when half the units will remain. Much uncertainty is discovered regarding the EUL findings relating to fixtures, due to the short period of the study. Bulb EULs are estimated to be 2.8 years and forecasts are not particularly sensitive to model specification; prior predictions for 2.2 years are conservative.	
529.00	SCE	Southern California Edison 1993-1994 Commercial/ Industrial/ Agricultural energy Efficiency Incentives Program Fourth Year Retention Study	1-Mar-99	See Study #529C which incorporates this study.	
529.00	SCE	Southern California Edison 1993-1994 Commercial/ Industrial/ Agricultural energy Efficiency Incentives Program Fourth Year	1-Mar-99	See Study #529C which incorporates this study.	

		Retention Study			
530.00	SCE	SCE Non-Residential New Construction Persistence Study: Final Report	1-Mar-99	See Study #554 which incorporates this study.	
535.00	SCE	1994\95 Residential Lighting 6th Year Retention Study	Future		
552.00	SCE	1996\97 Residential DSM Bidding 4th Year Retention Study	Future		
553.00	SCE	1996\97 Non-Residential 4th Year Retention Study	Future		
554.00	SCE	SCE Non-Residential New Construction Persistence Study: Final Report	1-Mar-99	Estimates the persistence of savings and retention of measures installed in new construction and large remodeling applications for the two-year 1994 and 1996. conducted at the whole building level. Used a combination of telephone and on-site surveys to est. survival proportion of the savings and estimate EUL of 11 installed measures. Found persistence of savings high for first few years but too soon to determine how long savings will last; statistical method of the present study seemed to work well.	
716.00	SoCalGas	1994 Residential New Construction Fourth-Year Retention Evaluation (Energy Advantage Home Program)	1-Mar-99	This study assesses and verifies useful lifetimes of various measures installed through SoCalGas 1994 Energy Advantage Home Program. Eleven DSM measures and 2 fuel substitution measures were reviewed. The approach consisted of: assessment to primary and secondary data sources; on-site survey, and statistical analysis (summary statistics, life table method, and parametric models). Retention fractions for the measures was nearly 1. *Ex ante* EULs and the retention study EULs were identical except for gas ovens (20 for *ex ante* and 18 for the retention study EUL). Determined that the sample in this study was relatively small and did not necessarily provide needed variation in the observed lifetimes required to produce robust EUL estimates.	1994

957.00	SDGE	Final Report: Measure Retention Study -- 1994 & 1995 Residential Weatherization Programs (RWRI)	1-Mar-99	Incorporates Study #332R1. This is the measure retention study for the 1994/5 residential weatherization retrofit incentives programs operated by SDGE and PGE. Measures include attic and ceiling insulation (SDGE and PGE), infiltration (SDGE) wall insulations (PGE), floor insulation (PGE). The sampling plan was designed to ensure representation across study measures for each utility. Two hundred fifty site visits were conducted by auditors. Findings were that the *ex post* EULs were the same or higher than the *ex ante* estimates.	
958.00	SDGE	1995 Residential DSM Bidding - 2nd Persistence Study	Future		
960.00	SDGE	1994 & 1995 Commercial Energy Efficiency Incentives: Fourth Year Retention Evaluation	1-Mar-99	Contains study # 924 also. Ten measures were studied. Lighting and HVAC end uses were covered. The econometric framework is similar to Study #933 Results were that the EULs were usually the same *ex ante* and *ex post*.	
961.00	SDGE	1995 Commercial Multiple End Uses - 2nd Persistence Study	Future		
963.00	SDGE	1994 & 1995 Industrial Energy Efficiency Incentives: Fourth Year Retention Evaluation	1-Mar-99	Fourth year retention evaluation for 1994-5 industrial energy efficiency incentives (process and lighting measures). Data was from surveys and the method was same as Study 933 (vs.). Eighteen measures were evaluated. *Ex post* EULs were same as *ex ante* except for exist sign kit (LED) which had a 10X higher EUL *ex post* (207 years).	
964.00	SDGE	1995 Industrial Multiple End Uses - 2nd Persistence Study	Future		
966.00	SDGE	1994 & 1995 Agricultural Energy Efficiency Incentives: Fourth Year Retention Evaluation	1-Mar-99	Fourth year retention evaluation for 1994-5 agricultural EEI Data was from one customer survey and the method was same as Study 933 (qv).One measure (variable frequency drive on a trickling filter pump motor) was evaluated. *Ex post* EUL was same as *ex ante*.	
967.00	SDGE	1995 Agricultural Multiple End Uses - 2nd Persistence Study	Future		

972.00	SDGE	1994 & 1995 Nonresidential New Construction Program: Fourth Year Retention Evaluation	1-Mar-99	Fourth year retention evaluation for 1994-5 non-res. new const. program. The program was called Savings through Design. It was a rebate program and the info on the participant was used to create a sample for this study. Econometric methodology is described in Study 933. Results showed EULs were virtually the same *ex post* and *ex ante*.	
975.00	CADMAC	Final Report: Statewide Study of the Retention of Measures Installed Under the Direct Assistance Program (DAP)	1-Mar-99	Incorporates Study #341R, #571, and #713. Retention of effects of 6 primary measures offered in the 1994, 1995 and 1996 residential direct assistance programs operated by SCE, PG&E, SDGE and SoCalGas. Site surveys were used to determine installation and operation. Results for "percent overall retention" were: evaporative. coolers =100; evaporative. cooler covers = 70; attic / ceiling insulation = 97; low flow showerhead = 86; door weather stripping = 94; caulking = 52; water heater blankets = 82. Most of these installations were in low-income areas.	
976.00	SDGE	1995 Residential Direct Assistance - 2nd Persistence Study	Future		
978.00	SDGE	1995 Residential All End Uses - 1st Persistence Study	1-Mar-99		
979.00	SDGE	1995 Residential All End Uses - 2nd Persistence Study	Future		
361.00	PG&E	1996 Commercial Retrofit 4th Year Retention Study (All Measures)	Future	Error? Study not identified.	
362.00	PG&E	1996 Industrial Retrofit 4th Year Retention Study (All Measures)	Future	Error? Study not identified.	
363.00	PG&E	1996 Agricultural Retrofit 4th Year Retention Study (All Measures)	Future	Error? Study not identified.	
364.00	PG&E	1996 Commercial EMS 4th Year Retention Study	Future	Error? Study not identified.	

365.00	PG&E	1996 Industrial EMS 4th Year Retention Study	Future	Error? Study not identified.	
366.00	PG&E	1996 Agricultural EMS 4th Year Retention Study	Future	Error? Study not identified.	
707.00	SoCalGas	SoCalGas' 1995 Non-Residential New Construction 4th Year Retention Study	2-Mar-99		
982.00	SDGE	1996 Refrigerator\Freezer Engineering\Statewide - 2nd Persistence Study	Future		
985.00	SDGE	1996 Lighting Engineering\Statewide - 2nd Persistence Study	Future		1996
988.00	SDGE	1996 Residential Miscellaneous - 2nd Persistence Study	Future		1996
991.00	SDGE	1996 Residential DSM Bidding - 2nd Persistence Study	Future		
994.00	SDGE	1996 Commercial Multiple End Uses - 2nd Persistence Study	Future		
997.00	SDGE	1996 Industrial Multiple End Uses - 2nd Persistence Study	Future		
1000.00	SDGE	1996 Agricultural Multiple End Uses - 2nd Persistence Study	Future		

1003.00	SDGE	1996 Res New Construct Multiple End Uses - 2nd Persistence Study	Future		
1006.00	SDGE	1996 Nonresidential New Construction - 2nd Persistence Study	Future		
1009.00	SDGE	1996 Commercial Multiple End Uses - 2nd Persistence Study	Future		
1012.00	SDGE	1996 Industrial Multiple End Uses - 2nd Persistence Study	Future		
1015.00	SDGE	1996 Agricultural Multiple End Uses - 1st Persistence Study	Future		
344.00	PG&E	1995 Industrial Retrofit 6th Year Retention Study (All Measures)	Future	Error? Study not identified.	
345.00	PG&E	1995 Agricultural Retrofit 64th Year Retention Study (All Measures)	Future	Error? Study not identified.	
347.00	PG&E	1995 Residential EMS Retrofit 6th Year Retention Study	Future	Error? Study not identified.	
556.00	SCE	1996\97 Residential Lighting 6th Year Retention Study	Future		
368.00	PG&E	1996 Industrial Retrofit 6th Year Retention Study (All Measures)	Future	Error? Study not identified.	

369.00	PG&E	1996 Agricultural Retrofit 6th Year Retention Study (All Measures)	Future	Error? Study not identified.	
546.00	SCE	1994\95 Residential 9th Year Retention Study	Future		
547.00	SCE	1994\95 Non-Residential 9th Year Retention Study	Future		
548.00	SCE	1994\95 Non-Residential New Construction 9th Year Retention Study	Future		
343.00	PG&E	1995 Commercial Retrofit 9th Year Retention Study (All Measures)	Future	Error? Study not identified.	
346.00	PG&E	1995 Residential Direct Assist. Retrofit 9th Year Retention Study	Future	Error? Study not identified.	
557.00	SCE	1996\97 Residential DSM Bidding 9th Year Retention Study	Future		
558.00	SCE	1996\97 Non-Residential 9th Year Retention Study	Future		
559.00	SCE	1996\97 Non-Residential New Construction 9th Year Retention Study	Future		
367.00	PG&E	1996 Commercial Retrofit 9th Year Retention Study (All Measures)	Future	Error? Study not identified.	

370.00	PG&E	1996 Residential Direct Assistance 9th Year Retention Study	Future	Error? Study not identified.	
706.00	SoCalGas	Sag's 1995 Non-Residential New Construction 9th Year Retention Study	Future		
718.00	SoCalGas	1995 Commercial New Construction Program: Fourth Year Retention Study	1-Feb-00	This retention survey primarily addressed cooking equipment in commercial kitchens installed under the SoCalGas 1995 Commercial New Construction Program. The measures were: oven, fryer, range, griddle, broiler, packaged HVAC Systems, steamer, hot food table, kettle, braising pan, other cooking, storage hot water, and boiler. Over 150 onsite inspections were made. Percentage of measures retained after 5 years were highest for braising pans (100%) and lowest for kettles and "other" (35%). All retention estimates were within the levels predicted in the program.	1995
406.30	PG&E	1995 Residential Appliance Efficiency Incentives Program: Space Conditioning Fourth Year Retention Table 6b	1-Mar-00	Contains Protocol Table 6.b; results of retention study for 1995 residential space conditioning 4th year retention. For completed analysis see related studies: 384bR1, 384cR1 and 384aR1.	1995
551.00	SCE	1996\97 Residential Lighting 3rd Year Retention Study	Future		
916.00	SDGE	1994 Refrigeration Engineering\Statewide - 2nd Persistence Study	1-Mar-00		
922.00	SDGE	1994 Lighting Engineering\Statewide - 2nd Persistence Study	Future		
925.00	SDGE	1994 Commercial Multiple End	Future		

		Uses - 2nd Persistence Study			
928.00	SDGE	1994 Industrial Multiple End Uses - 2nd Persistence Study	Future		
931.00	SDGE	1994 Agricultural Multiple End Uses - 2nd Persistence Study	Future		
934.00	SDGE	1994 Res New Construction Multiple End Uses - 2nd Persistence Study	Future		
937.00	SDGE	1994 Nonresidential New Construction - 2nd Persistence Study	Future		
940.00	SDGE	1994 Commercial Multiple End Uses - 2nd Persistence Study	Future		
943.00	SDGE	1994 Industrial Multiple End Uses - 2nd Persistence Study	Future		
946.00	SDGE	1994 Agricultural Multiple End Uses - 2nd Persistence Study	Future		
981.00	SDGE	1996 Refrigerator\Freezer Engineering\Statewide - 1st Persistence Study	Future		
984.00	SDGE	1996 Lighting Engineering\Statewide - 1st Persistence Study	Future		1996

987.00	SDGE	1996 Residential Miscellaneous - 1st Persistence Study	Future		1996
990.00	SDGE	1996 Residential DSM Bidding - 1st Persistence Study	Future		
993.00	SDGE	1996 Commercial Multiple End Uses - 1st Persistence Study	Future		
996.00	SDGE	1996 Industrial Multiple End Uses - 1st Persistence Study	Future		
999.00	SDGE	1996 Agricultural Multiple End Uses - 1st Persistence Study	Future		
1002.00	SDGE	1996 Res New Construct Multiple End Uses - 1st Persistence Study	Future		
1005.00	SDGE	1996 Nonresidential New Construction - 1st Persistence Study	Future		
1008.00	SDGE	1996 Commercial Multiple End Uses - 1st Persistence Study	Future		
1011.00	SDGE	1996 Industrial Multiple End Uses - 1st Persistence Study	Future		
1014.00	SDGE	1996 Agricultural Multiple End Uses - 1st Persistence Study	Future		
534.00	SCE	1994\95 Non-Residential DSM	Future		

		Bidding 1st Persistence Study			
549.00	SCE	1994\95 Non-Residential DSM Bidding 2nd Persistence Study	Future		
555.00	SCE	1996\97 Non-Residential DSM Bidding 1st Persistence Study	Future		
560.00	SCE	1996\97 Non-Residential DSM Bidding 2nd Persistence Study	Future		

		Original EUL				Proposed
#	Measure	PG&E	SCE	SDG&E	SoCalGas	EUL
5	COOKING EQUIPMENT - EFFICIENT				12	12.0
13	ENGINE - HIGH EFFICIENCY				15	15.0
14	BALLAST - DIMMABLE	16	10			16.0
15	BALLAST - ELECTRONIC	16	10			16.0
34	CF SCREW-IN REPLACEABLE LAMP (MODULAR)	7.7	10	7.7		7.7
40	COMPACT FLUORESCENT HARDWIRE FIXTURE	16	10	16		16.0
41	DELAMPING / FIXTURE MODIFICATION / REMOVE LAMPS	16		16		16.0
42	EXIT SIGN - CF HARDWIRE KIT / LED / ELECTRO-LUMINESCENT	16	15	16		16.0
45	FLUORESCENT FIXTURE - T8	16	16			16.0
48	HALOGEN LAMP	0.6				0.6
51	HID FIXTURE	16	10	16		16.0
60	OCCUPANCY SENSOR	8	10	8		8.0
62	PHOTOCELL	8	10			8.0
66	T8 FIXTURES - 17-WATT LAMP, 2 FT.	16				16.0
71	T8 FIXTURES - 32-WATT LAMP, 4 FT.	16				16.0

75	TIME CLOCK - LIGHTING	8				8.0
212	FIXTURE: T-8 LAMP & ELEC BLST, (FEM or NEW FIXTURE), 3 FT FIXT	16				16.0
214	HIGH EFFICIENCY LIGHTING	16				16.0
216	HIGH OUTPUT T-5 FIXTURE	16				16.0
218	INDUCTION LAMPS	1.7				1.7
219	INDUCTION FIXTURE	16				16.0
230	INDOOR SYSTEM MODIFICATION		15			16.0
231	LIGHTING CONTROLS		15			16.0
232	OUTDOOR SYSTEM MODIFICATION		15			16.0
266	LIGHTING - SPC			16		16.0
278	DAY LIGHTING CONTROLS	16	10			16.0
190	LIGHTING POWER DENSITY		10			16.0
77	KILN / OVEN / FURNACE				25	25.0
78	KILN / OVEN / FURNACE - HEAT RECOVERY				25	25.0
80	THERMAL NIGHT CURTAINS	5				5.0
226	CUSTOMIZED - SPC		15			15.0
235	LOCAL GOVERNMENT INITIATIVES (Community Facilities)		11.4			11.4
242	EXTRUSION EQUIPMENT		15			15.0
245	INJECTION MOLDING EQUIPMENT		15			15.0
247	MISC. EQUIPMENT		15			15.0

248	AUDITS				3	3.0
251	PLUG LOAD SENSOR		10			10.0
255	INFORMATION				1	1.0
267	OTHER - SPC			10		10.0
83	MOTORS - HIGH EFFICIENCY	15.3	15	15		15.0
236	VFD		15	16		15.0
259	PROCESS OVERHAUL				25	25.0
239	PUMP TEST		15			15.0
243	SYSTEM CONTROLS		15			15.0
93	AUTO CLOSER FOR COOLER / FREEZER	8	8			8.0
97	DOOR GASKETS	4	4	4		4.0
100	FLOATING HEAD PRESSURE	16				16.0
101	HEATLESS DOOR	16	16			16.0
102	HUMIDISTAT CONTROL FOR ANTI-SWEAT HEATER	12	12			12.0
103	INSULATION ON REFRIGERATION SUCTION LINE	11	11			11.0
105	NIGHT COVERS FOR DISPLAY CASES	4.8	5			5.0
106	PSC EVAPORATOR MOTOR - WALK-IN / DISPLAY	16				16.0
107	REFRIGERATION CASE DOORS - GLASS/ACRYLIC, LOW/MEDIUM TEMP	12	12			12.0
108	REFRIGERATOR CASE WITH DOORS, LOW/MEDIUM TEMP	16	16			16.0
109	REFRIGERATOR CONDENSATE EVAPORATOR - ELECTRIC / NON-ELECTRIC	8				8.0

111	STRIP CURTAINS FOR WALK-INS	4	4			4.0
206	BALLAST: ELECTRONIC, FOR DISPLAY CASE	16	16			16.0
208	DEFROST	16				16.0
211	FHP & EFF COND	16				16.0
215	HIGH EFFICIENCY LIQUID SUCTION HEAT EXCHANGERS	16				16.0
220	NIGHT SHIELDS ON REFRIGERATOR AND FREEZER CASES	16				16.0
224	REFRIG: EVAPORATOR FAN CONTROLLER	5				5.0
246	SUPERMARKET SYSTEMS		13.8			14.0
116	AIR-CONDITIONERS - HIGH EFFICIENCY	15	15.4	15		15.0
118	BOILER - HIGH EFFICIENCY	19.5				20.0
121	BYPASS / DELAY TIMER - HVAC	16				15.0
122	CHILLER - HIGH EFFICIENCY		20			20.0
124	CHILLER - VSD	16				20.0
126	COOLING TOWERS / EVAP CONDENSER		15			15.0
135	FURNACE - HIGH EFFICIENCY	25				25.0
136	GLAZING - HIGH VLT AND HIGH SHADE COEFFICIENT	24				24.0
138	HEAT PUMP - PACKAGED	15				15.0
139	HVAC / SPACE HEATING / EFFICIENT DESIGN (GAS)				15	15.0
141	INSULATION	20				20.0
147	REFLECTIVE WINDOW FILM / WINDOW	10	10	10		10.0

	TREATMENT					
148	SET-BACK THERMOSTAT	11	10	11		11.0
150	TIMECLOCK - HVAC	10	10			10.0
201	HEAT PUMP - SPLIT SYSTEM	15				15.0
202	A/C PACKAGED TERMINAL UNITS	15	15			15.0
204	ADJUSTABLE SPEED DRIVE	16	15			15.0
213	GROUND SOURCE HP	15				15.0
217	HP WITH INTEGRATED WATER HEATING	15				15.0
222	PACKAGED HVAC SYSTEMS	16	15			15.0
225	WATER COOLED CHILLERS	20				20.0
227	INSULATION PACKAGE	20				20.0
229	ENERGY MANAGEMENT SYSTEM		15			15.0
233	REDUCE INTERNAL LOAD		15			15.0
240	EVAPORATIVE COOLERS		15			15.0
241	ENERGY REDUCTION		10			10.0
265	HVAC / REFRIGERATION - SPC			20		20.0
272	NONRESIDENTIAL GAS A/C				20	20.0
153	WATER HEATER - EFFICIENT GAS				15	15.0
263	HORIZONTAL WASHER			10		10.0
264	EFFICIENT DISHWASHING			5		5.0
274	WATER HEATER CONTROLS				15	15.0

209	DOMESTIC HOT WATER BOILER (GAS)	24				24.0
221	WHOLE BUILDING (NRNC)	16		15		16.0
273	ENERGY EDGE				10	10.0

Table 3: Residential Measures

Effective Useful Life Values for Major Energy Efficiency Measures

			Original EUL				Proposed
End Use	**#**	**Measure**	**PG&E**	**SCE**	**SDG&E**	**SoCalGas**	**EUL**
LIGHTING	158	CF SCREW-IN DISPOSABLE (INTEGRAL)		7.2	9		6 for SCE, 9 for SDG&E
LIGHTING	160	CF HARDWIRE FIXTURE (MODULAR)	16	6**			20.0
LIGHTING	244	INDOOR FIXTURES		14	20		20.0
LIGHTING	249	OUTDOOR FIXTURES		20	20		20.0
LIGHTING	260	TORCHIERE			9.4		9.4
LIGHTING	262	FLUORESCENT FIXTURES			17		17.0
LIGHTING	269	LIGHTING - RCP			16		16.0
MISCELLANEOUS	234	WHOLE HOUSE ENERGY USE		19		13	19.0

MISCELLANEOUS	252	ENERGY USAGE PROFILE AUDIT		1			1.0
MISCELLANEOUS	254	LOCAL GOVERNMENT INITIATIVES (Residential Housing)		38.6			38.6
MISCELLANEOUS	270	OTHER - RCP			10		10.0
MISCELLANEOUS	275	AUDITS				3	3.0
MISCELLANEOUS	276	INFORMATION				1	1.0
REFRIGERATION	161	REFRIGERATOR - HIGH EFFICIENCY	15	15	13		15.0
REFRIGERATION	253	SPARE REFRIGERATOR RECYCLING		6			6.0
SPACE CONDITIONING	162	AIR CONDITIONERS - CENTRAL HIGH EFFICIENCY	18	18	18		18.0
SPACE CONDITIONING	163	EVAPORATIVE COOLER	7				7.0
SPACE CONDITIONING	169	GLAZING - LOW E DOUBLE / LOW SHADE COEFFICIENT		25	20		25.0
SPACE CONDITIONING	170	HEAT PUMP - ELECTRIC	16		18		18.0
SPACE CONDITIONING	173	INSULATION FOR CEILING / FLOOR	25	25			25.0
SPACE CONDITIONING	175	INSULATION FOR WALLS	25	25	20		25.0

SPACE CONDITIONING	203	A/C WITH INTEGRATED WATER HEATING	15				15.0
SPACE CONDITIONING	205	ADVANCED HVAC TUNE UP	18				18.0
SPACE CONDITIONING	207	BASIC HVAC DIAGNOSTIC TUNE UP	10	10	10		10.0
SPACE CONDITIONING	223	PROGRAMMABLE THERMOSTAT	12		12		12.0
SPACE CONDITIONING	228	INSULATION PACKAGE		25			25.0
SPACE CONDITIONING	238	DUCT TESTING (AND SEALING)	25	25	20		25.0
SPACE CONDITIONING	250	ROOM A/C		15	11		15.0
SPACE CONDITIONING	261	ADVANCED HVAC DIAGNOSTIC TUNE UP			15		15.0
SPACE CONDITIONING	268	HVAC / REFRIGERATION - RCP			20		20.0
SPACE CONDITIONING	271	RESIDENTIAL GAS A/C				25	25.0
WASHER*	181	CLOTHES WASHER - HORIZONTAL AXIS		10	13		14.0
WASHER*	237	DISHWASHER		10	9		13.0
WATER HEATING	183	INSULATION FOR PIPE	15		15		15.0
WATER HEATING	184	SHOWERHEAD - ENERGY EFFICIENT	10		10		10.0
WATER HEATING	187	WATER HEATER - EFFICIENT GAS	12.2		15	13	13.0

WATER HEATING	277	WATER HEATER CONTROLS				15	15.0

*The Proposed EUL taken from an Energy Star Internet Site

** Original value of 6 years actually for lamp, but measure is for fixture.

*** Set to 20 years to establish consistency across residential 160, 244, and 249 since they are similar measures.

Appendix C3

(Discussion Paper #3)

(Energy Efficiency Saturation Compilation for PY 2001)

Energy Efficiency Saturation Compilation for PY2001

Report Issued Public Meeting

Response to Elements of Ordering Paragraphs #51 and #54

Discussion Paper 3

Pacific Gas and Electric Company

Southern California Edison Company

San Diego Gas and Electric Company

Southern California Gas Company

September21, 2000

1. Background

This document summarizes work conducted by the California utilities related to the compilation of energy-efficiency measure saturation and penetration data in response to Ordering Paragraphs 51 and 54 of CPUC Decision (D.) 00-07-017, July 6, 2000. Ordering Paragraphs 51 and 54 state the following:

> 51. For nonresidential programs, in the PY 2001 applications, the utilities shall gather and provide data regarding the extent of free-riders and market saturation by product and customer markets and market segments. The utilities shall convene a public process with interested stakeholders to determine how best to obtain and report the information.
>
> 54. The utilities shall immediately, and jointly with interested stakeholders, conduct an investigation of saturation rates for T-8 lighting and other measures, by market and market segment. The utilities, together with interested stakeholders shall also develop protocols for determining when a measure has reached saturation so that incentives should be phased out or eliminated. In the PY 2001 applications, the utilities shall report on the proposed saturation rates of specified measures, the proposed saturation protocols, and how they intend to incorporate such agreements and protocols in the programs.

This summary document describes the process employed, sources utilized, and database developed to compile the requested information. This document does not provide *protocols for determining when a measure has reached saturation so that incentives should be phased out or eliminated. A discussion of guidelines for when to terminate promotion of measures is provided in a separate workshop summary document.*

2. Approach

Because of the need for quick development of the requested energy-efficiency measure (EEM) saturation information, an expedited approach to compilation is being employed. The key steps in the process are as follows:

1. Develop a simple structure for compiling the EEM saturation and penetration data in a single spreadsheet (at least on an interim basis)
2. Identify the most recent, relevant sources of EEM saturation and penetration data.
3. Obtain the identified sources and any associated databases.

4. Compile EEM saturation and penetration data either directly from reports, or extract relevant data from original project databases.

5. Identify gaps among sources or temporary limitations in extracting desired data from original sources.

6. Develop examples of saturation/penetration results for presentation at workshop on September 12-13, 2000.

7. Present results of saturation/penetration compilation process at workshop on September 12-13, 2000.

8. Obtain stakeholder input on EEM process and preliminary results at workshop.

9. Incorporate stakeholder input into workshop summary.

10. Finalize saturation/penetration compilation.

3. EEM Saturation/Penetration Spreadsheet

The key product developed from this research effort is currently a spreadsheet containing energy efficient measure saturation and penetration. A simple template was developed for compiling the database quickly into a standardized, well documented format. The spreadsheet is a work-in-progress containing draft results. The following table lists each field in the spreadsheet and provides a brief field description.

Table 1
EEM Saturation/Penetration Spreadsheet Fields

Field	Field Description
Sector	Residential, Commercial, Industrial (no Industrial yet)
Vintage	Existing or New Construction
Building Type/Segment	SF, MF, Office, Retail, etc.; Large/Small, etc.
End Use	Lighting, HVAC, Refrigerators, etc.
Measure	Energy efficient measure description, e.g. 4-foot T-8s, High Efficiency AC
EEM Saturation	Percent of all applicable applications that are energy efficient (as defined by Measure). Saturation pertains to the entire existing stock of buildings/systems. Percent between 0 and 100%.
Saturation Date	Time period when saturation data were collected.
Saturation Region	Utility, California, US
Saturation Source	Document, Database name
Saturation Source Type	End user survey, supply side survey/panel, onsite, phone, etc.
Saturation sample size	The sample size from which the saturation is calculated.
Saturation Comments	Description of additional information about saturation, e.g., calculation methodology.
Penetration	Percent of all applicable *new purchases* over a specified period that are energy efficient (as defined by Measure). Percent between 0 and 100%.
Penetration Date	Time period for which penetration data were collected.
Penetration Region	Utility, California, US
Penetration Source	Document, Database name
Penetration Source Type	End user survey, supply side survey/panel, onsite, phone, etc.
Penetration sample size	The sample size from which the penetration is calculated.
Penetration Comments	Description of additional information about penetration, e.g., calculation methodology

For each measure, in addition to obtaining saturation (and/or penetration) by sector and vintage, an attempt was made to obtain the saturation by region (statewide and by utility), customer size (for non-residential) and building type (for non-residential). This process was sometimes constrained by sample sizes and availability of data by these segments. In addition, the limited amount of time available for compilation and presentation at the workshop constrained the amount of segmentation analysis that could be done for this effort.

4. Primary Data Sources and Markets Covered

A number of prospective data sources were considered for inclusion in the draft compilation. As a result of an initial review of this list of sources, a subset of sources was identified as high priority for inclusion based on the following criteria:

- Whether the source included information on T8 lamps and electronic ballasts.
- Relevance of the source to other EEM saturation/penetration needs.
- How recently the data were collected.
- Quality of the data, including how representative of the target population.
- Availability of the data in electronic format.
- Ease of working with the data.
- Geographical relevance. Versatility of the data in supporting both Statewide and utility-specific EEM reporting. Non-California or national-only studies were excluded.

Six primary data sources were chosen to analyze and populate the initial, draft database. The sources selected are listed in the following table. The right-hand column describes the current status of our analysis of each source.

Table 2

Primary Data Sources

#	Source	Status
1	RLW Statewide Non-residential New Construction (NRNC) Database and Report	Lighting complete; cooling requires further analysis
2	RLW Statewide Residential Existing Appliance and Lighting (REAL) Database and Report	Complete
3	PG&E Commercial End Use Survey (CEUS)	Complete
4	SCE Commercial End Use Survey (CEUS)	Extract complete, needs to be compiled into database.
5	RER Residential Market Share Tracking Study (MSTS), First-Year Interim Report	RER data extract complete; data needs to be compiled into database.
6	XENERGY Statewide 1999 Small/Medium Nonresidential MA&E Study (Small Nonres)	Data needs to be compiled into database

The markets covered by these sources are shown in Table 3 below, as well as those that have not yet been addressed or for which no high-value sources have been identified. Note that no saturation or penetration data have been compiled for the industrial sector. Our current assessment is that only one recent industrial saturation survey is available in the state. However, the report format for this study does not lend itself to easy inclusion in this compilation; the feasibility of using the study's original data may be considered further. In addition, the California Energy Commission's study of nonresidential energy efficiency market shares, which has recently commenced, may address the current gap in information on the industrial sector.

Table 3

Markets Covered by Source

Market	Sources
Residential New Construction	RER MSTS
Residential Existing Construction	RLW REAL, RER MSTS
Commercial New Construction	RLW NRNC, XENERGY Small Nonres
Commercial Existing Construction	PG&E CEUS, SCE CEUS, XENERGY Small Nonres
Industrial	None to date
Other	None to date

5. Measure Saturation and Penetration Draft Results

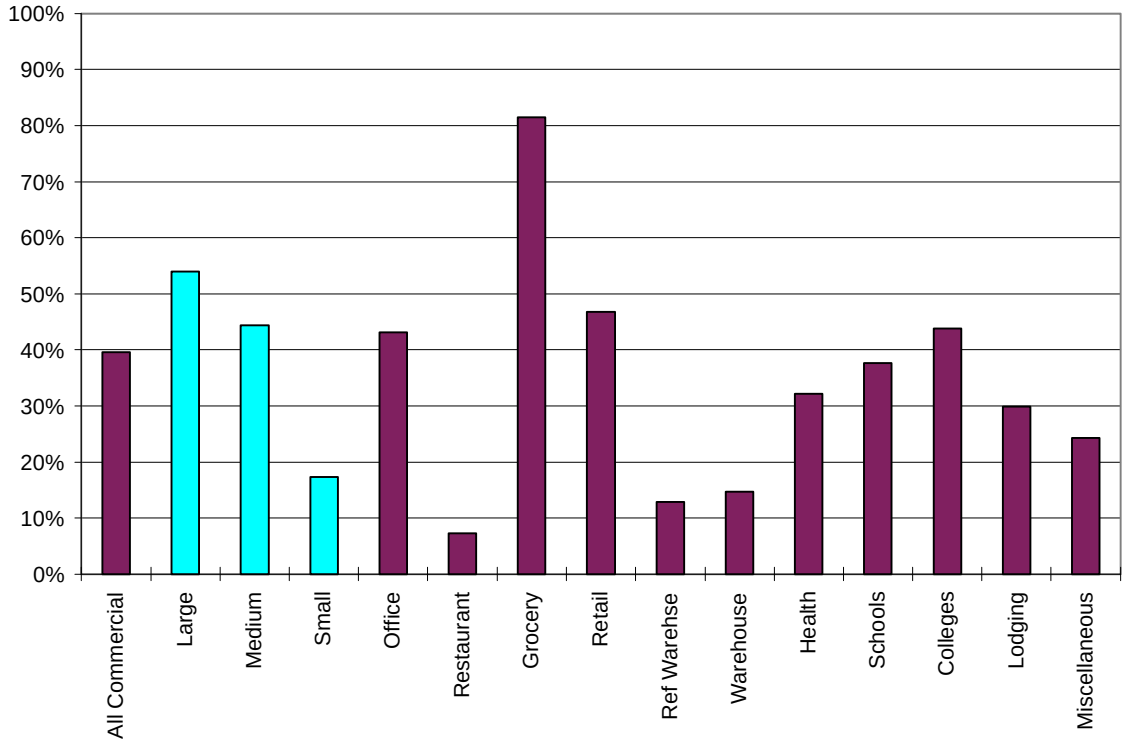
Attachment A to this document provides summary graphs that present saturation and penetration for wide variety of measures and markets. ***These figures are draft and are considered a work in progress***. Therefore any further citation of the figures through the workshop process should include the qualifier "draft". Also note that the information presented comes from data collected at various times throughout the 1990s and up to the present. Thus, the vintage of the data must be taken into account when analyzing these results, particularly for the SCE CEUS data for which half of the buildings were surveyed in 1992.

Attachment

Discussion Paper 3 - Attachment A - Selected Measure Saturation and Penetration Summaries

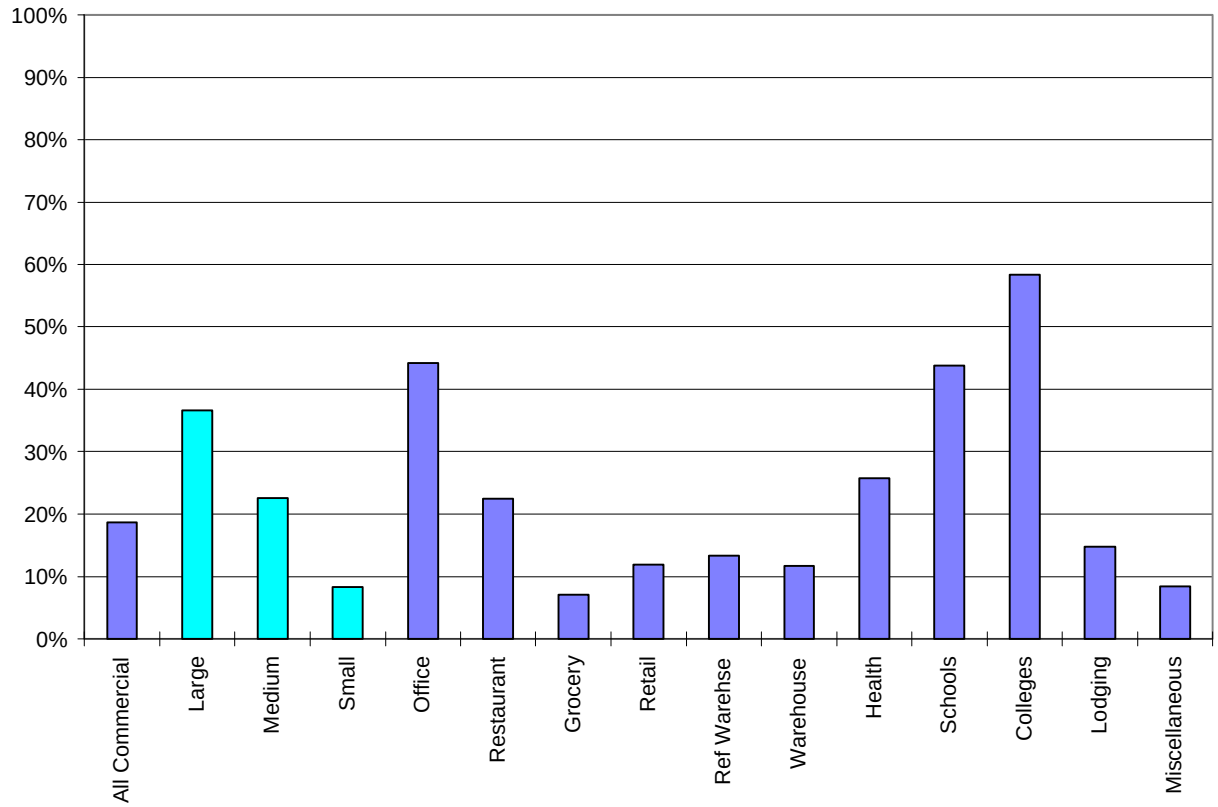
A.1. Commercial Existing Construction

Figure 1
PG&E 4' T8/EB Saturation.
Source: PG&E CEUS. Date of Data Collection: 1996/1997



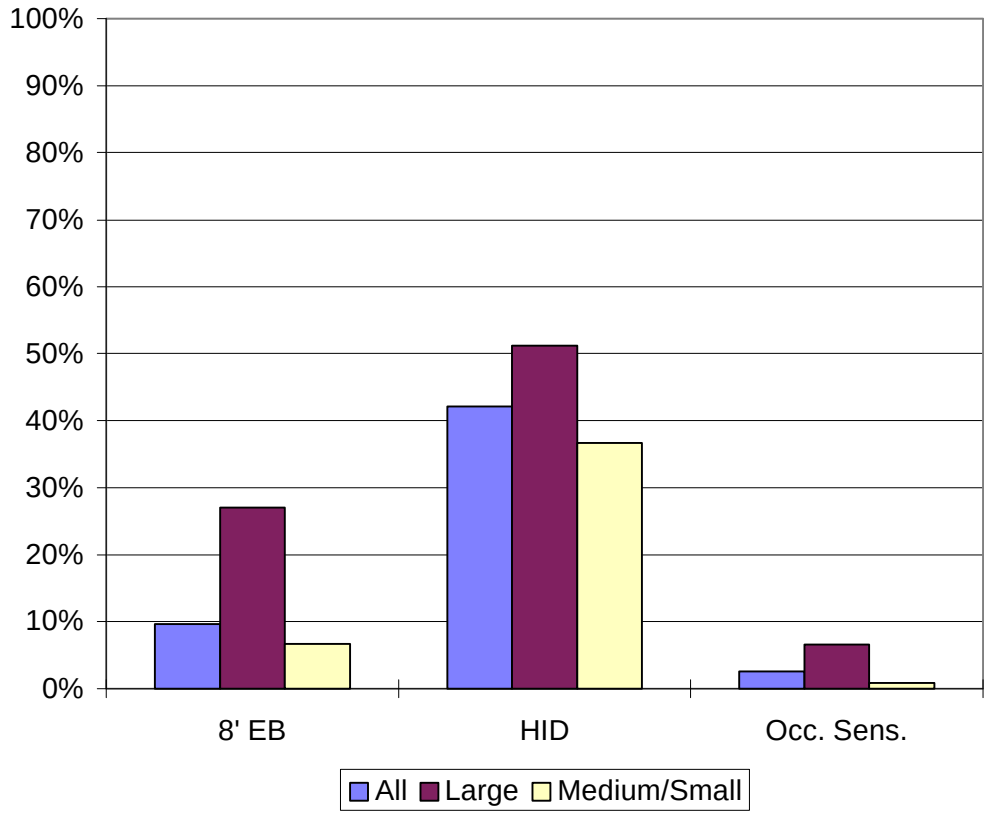
*Size is estimated based on energy consumption and full-load hours. Definitions are: Small < 50 kW, Medium 50 - 499 kW, Large >=500 kW.

Figure 2
PG&E Commercial CFLs
Source: PG&E CEUS. Date of Data Collection: 1996/1997



*Size is estimated based on energy consumption and full-load hours. Definitions are: Small < 50 kW, Medium 50 - 499 kW, Large >=500 kW.

Figure 3
Other PG&E Lighting
Source: PG&E CEUS. Date of Data Collection: 1996/1997



*Size is estimated based on energy consumption and full-load hours. Definitions are:
Small/Medium <500 kW, Large >=500 kW.

Table 1
Other PG&E
Source: PG&E CEUS. Date of Data Collection: 1996/1997

Equipment	Saturation
Day lighting/dimming	<1%
8' T8s	<1%
Exterior HID	~71%

EMS Full Building	~20%
EMS Part of building	~24%
Economizer	~45%

Figure 4

SCE CFL

Source: SCE CEUS. Date of Data Collection:

1992: Large/Small Office, Retail, Grocery, Restaurants, Warehouse

1995: All Other Buildings

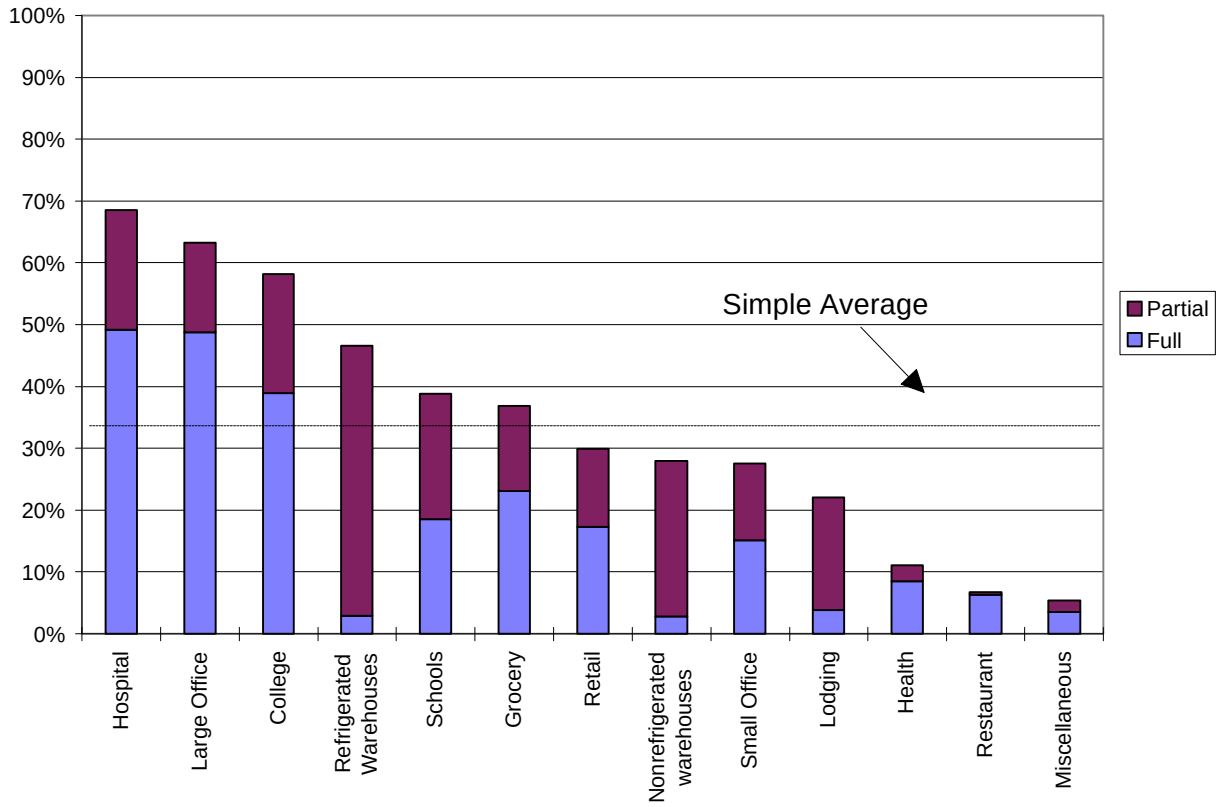


Figure 5
SCE Occupancy Sensors
Source: SCE CEUS. Date of Data Collection:

1992: Large/Small Office, Retail, Grocery, Restaurants, Warehouse

1995: All Other Buildings

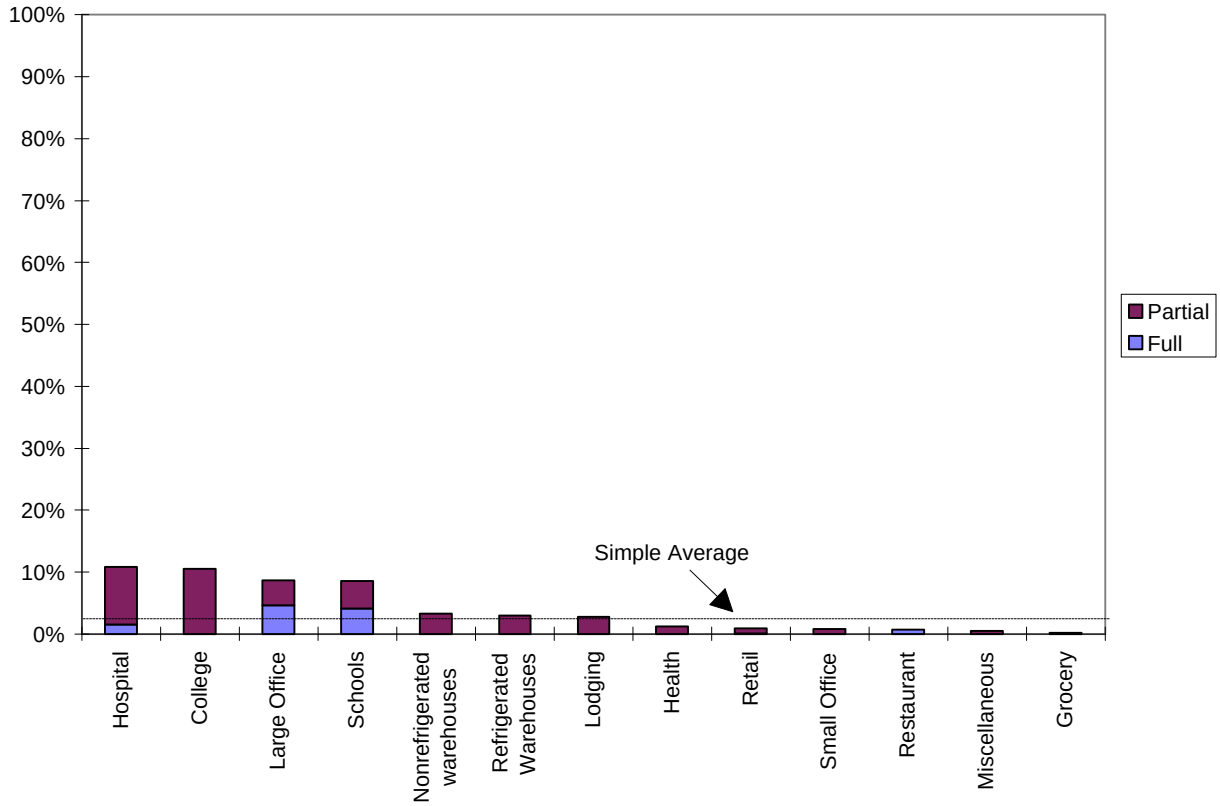


Figure 6
SCE VSD Motors
Source: SCE CEUS. Date of Data Collection:

1992: Large/Small Office, Retail, Grocery, Restaurants, Warehouse

1995: All Other Buildings

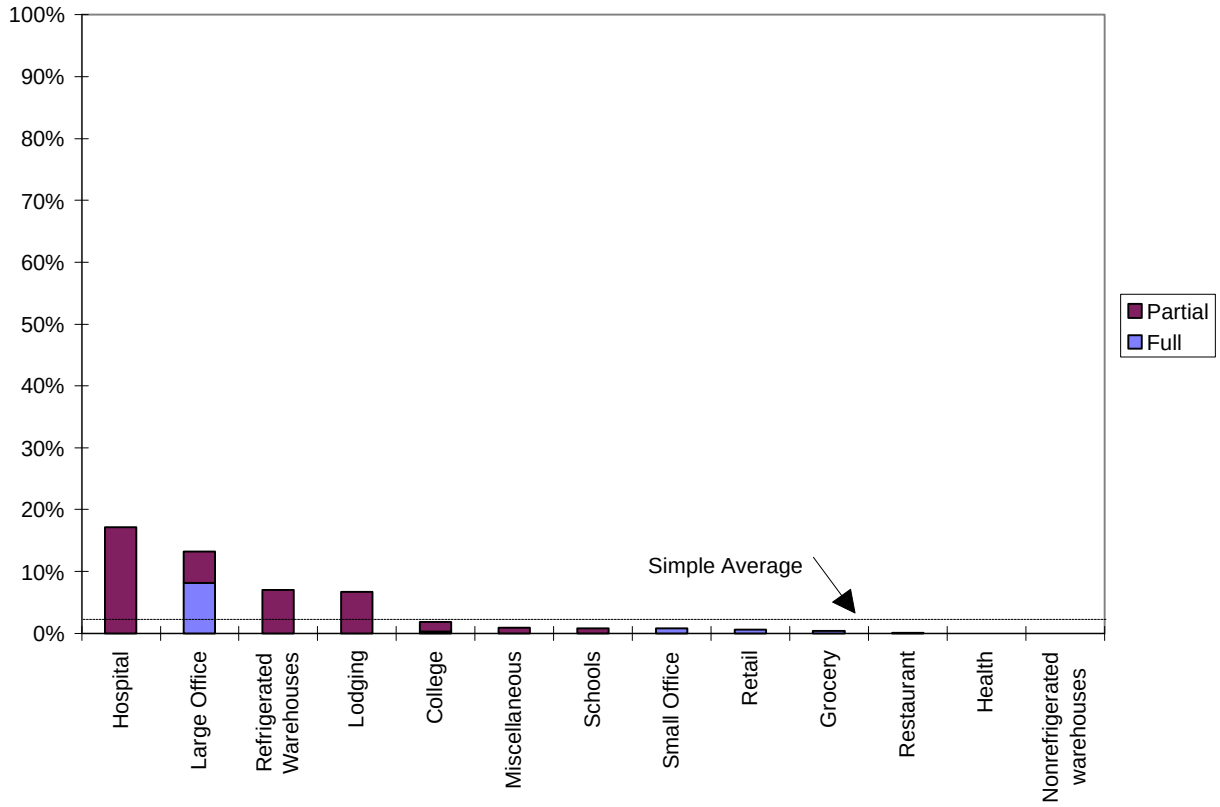


Table 2
SCE Other: Simple Averages of Full + Partial
Source: SCE CEUS. Date of Data Collection:

1992: Large/Small Office, Retail, Grocery, Restaurants, Warehouse

1995: All Other Buildings

Equipment	Simple Average

Window treatment	~52%
EMS	~14%
Economizer	~10%
Evaporative pre-cooler	~2%

A.2. Commercial New Construction

Figure 7
Lighting Measures for Statewide Commercial New Construction
Source: Statewide Nonresidential Baseline Study. Date of Data Collection: 1994-1998

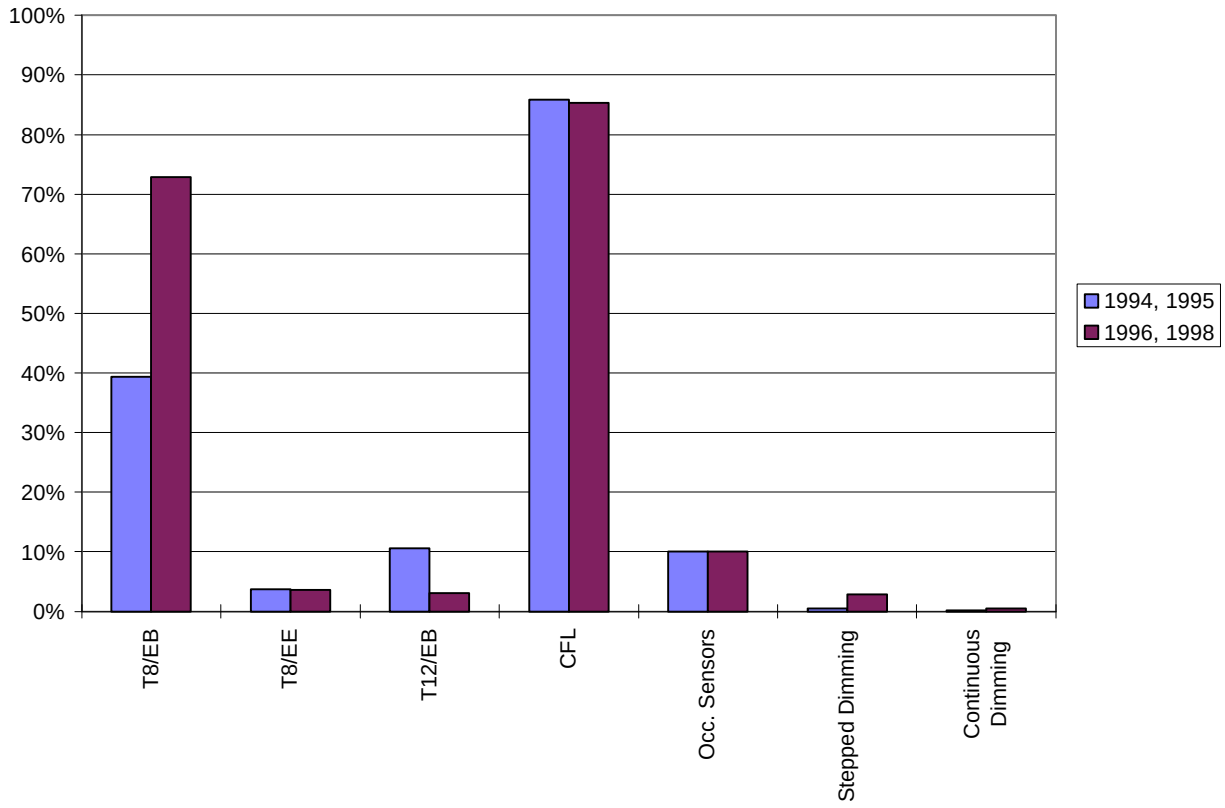


Figure 8
Lighting Measure Penetration, Distributor Self-Reports of Percent of Relevant Sales
Source: Statewide Small/Medium Nonresidential MA&E Study.
Date of Data Collection: Spring 2000

Note: Includes product sales to both new and existing buildings

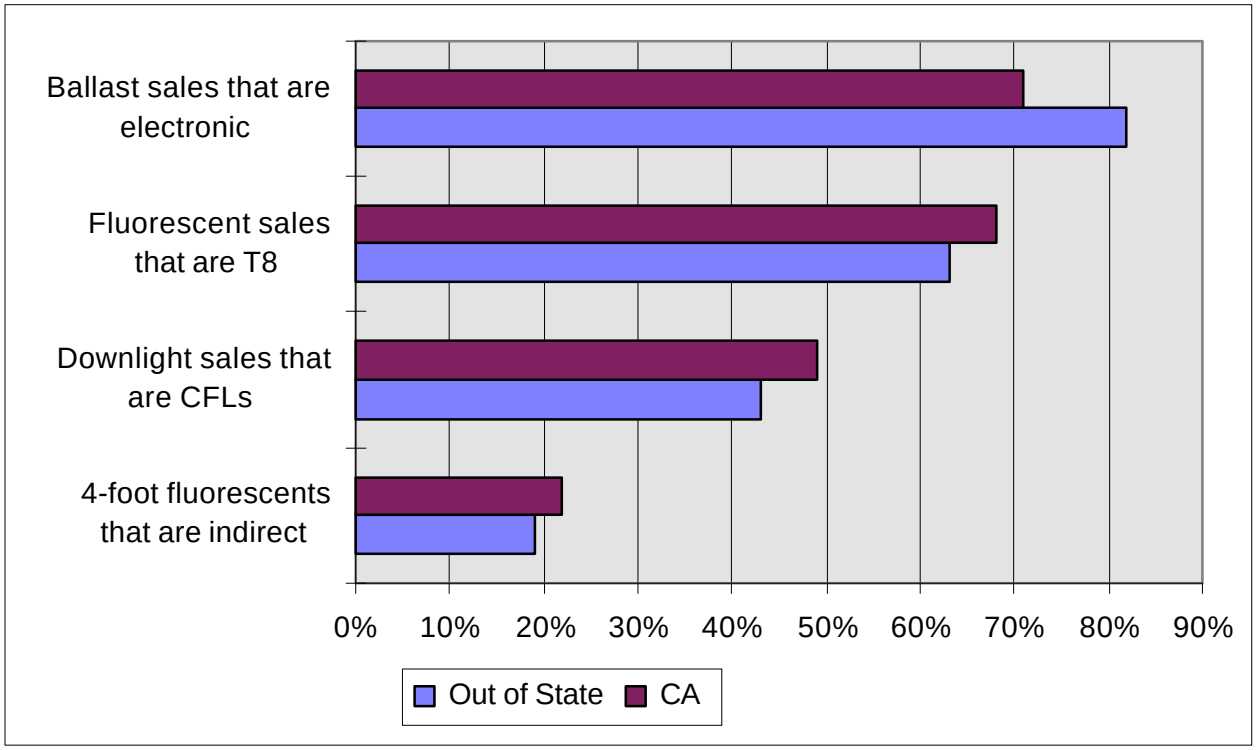
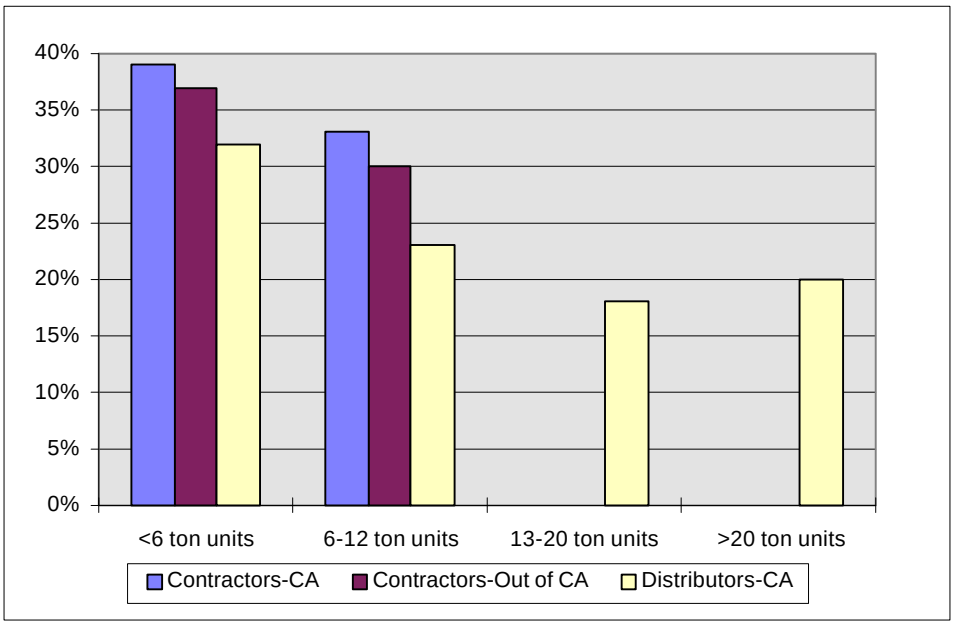


Figure 9
High-Efficiency Packaged A/C Penetration, Self-Reports of Percent of Relevant Sales
Source: Statewide Small/Medium Nonresidential MA&E Study.
Date of Data Collection: Spring 2000

Note: Includes product sales to both new and existing buildings



A.3. Residential Existing Saturations

Figure 10
Statewide Residential Non-Shell Measures for Existing Construction.
Source: Statewide Residential Lighting and Appliance Saturation Study. Date of Data Collection: 1999/2000

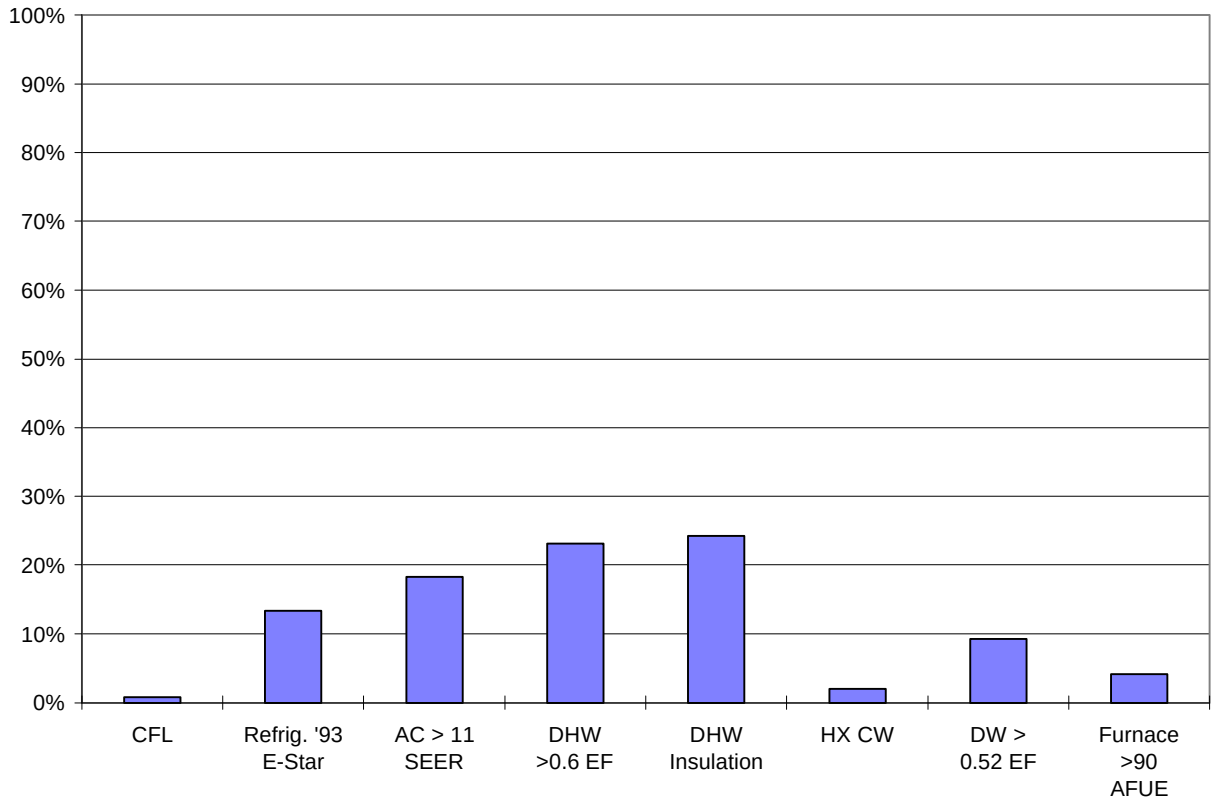
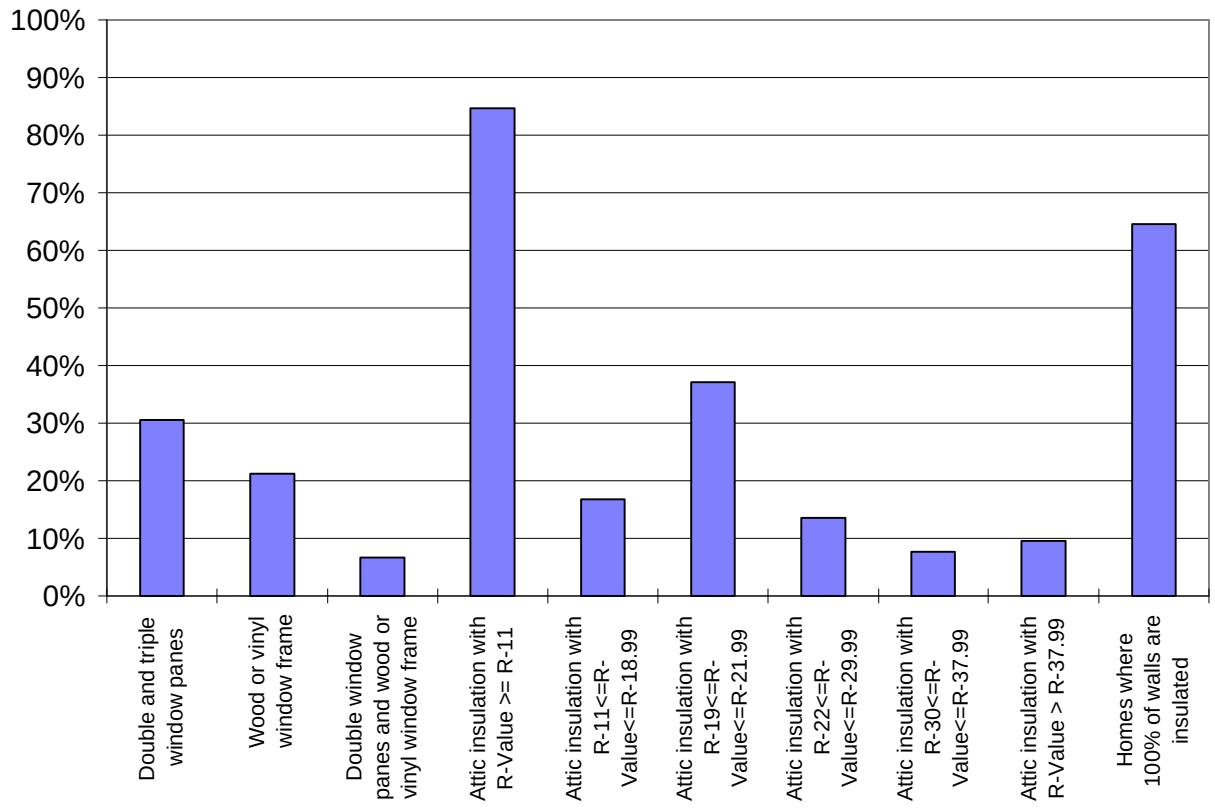


Figure 11
Statewide Residential Shell Measures for Existing Construction.
Source: Statewide Residential Lighting and Appliance Saturation Study. Date of Data Collection: 1999/2000



A.4. Residential Sales Data (Note these are measure penetrations that include purchases for both existing and new homes. Results are from RER's Draft Residential Market Share Tracking Study, First-Year Interim Report)

Table 3
Central Air Conditioners, Percent of Statewide Sales by SEER Level
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See table.

	<= 10 SEER	> 10 and <= 11 SEER	> 11 and <= 12 SEER	> 12 and <= 13 SEER	> 13 and <= 14 SEER
1999:1	84.5%	0.0%	15.5%	0.0%	0.0%
1999:2	88.4%	0.0%	11.6%	0.0%	0.0%
1999:3	91.1%	0.0%	8.9%	0.0%	0.0%
1999:4	87.5%	0.0%	12.5%	0.0%	0.0%
2000:1	71.1%	5.4%	20.4%	2.1%	0.7%
2000:2	50.0%	41.8%	1.8%	4.5%	1.8%

Table 4
Gas Furnaces, Percent of Statewide Sales by AFUE Level
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See table.

	< = 78% AFUE	**> 78% and < = 80% AFUE**	**> 80% and < = 90% AFUE**	**> 90% AFUE**
1999:1	0.00%	88.11%	11.89%	0.00%
1999:2	0.00%	89.62%	10.38%	0.00%
1999:3	0.00%	86.49%	13.51%	0.00%
1999:4	0.00%	84.58%	15.42%	0.00%
2000:1	0.00%	90.86%	1.79%	7.35%
2000:2	0.00%	93.66%	0.00%	6.34%

Table 5
Heat Pumps, Percent of Statewide Sales by SEER Level
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See table.

	<= 10 SEER	> 10 and <= 11 SEER	> 11 and <= 12 SEER	> 12 and <= 13 SEER	> 13 and <= 14 SEER	> 14 SEER
1999:1	95.70%	0.00%	4.30%	0.00%	0.00%	0.00%
1999:2	87.14%	0.00%	12.86%	0.00%	0.00%	0.00%
1999:3	86.38%	0.00%	13.62%	0.00%	0.00%	0.00%
1999:4	97.76%	0.00%	2.24%	0.00%	0.00%	0.00%
2000:1	78.57%	12.60%	6.37%	1.98%	0.37%	0.11%
2000:2	97.56%	2.44%	0.00%	0.00%	0.00%	0.00%

Table 6
Percent of Gas Water Heater Statewide Sales, by percent-Above-Standard
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See table.

	> -2% and <= 2%	> 2% and <= 5%	> 5% and <= 10%	> 10% and <= 15%	> 15% and <= 20%	> 20%
2000:1	10.02%	21.80%	15.98%	46.76%	5.45%	0.00%
2000:2	0.00%	23.88%	47.76%	20.90%	7.46%	0.00%

Table 7
Statewide Refrigerator Statewide Sales, Distribution of ENERGY STAR Qualified Units
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See table.

	1998	1999	2000
At least 20% Less Energy	8.50%	15.83%	13.03%
At least 25% Less Energy	7.64%	15.36%	12.05%
At least 30% Less Energy	0.72%	4.52%	4.36%

Table 8
Clothes Washer Statewide Sales, Distribution of ENERGY STAR Qualified Units
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See table.

	1998	1999	2000
EF=> 2.5, 111% Above Std.	4.71%	9.68%	15.01%
EF=> 3.25, 175% Above Std.	4.47%	8.00%	12.52%

Table 9
Dishwasher Statewide Sales, Distribution of ENERGY STAR Qualified Units
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See table.

	1998	1999	2000
EF => 0.52, 13% Above Std.	15.94%	37.92%	19.28%
EF => 0.58, 26% Above Std.	4.00%	18.58%	14.98%

Table 10
Room Air Conditioner Statewide Sales, Distribution of ENERGY STAR Qualified Units
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See table.

	Annual	Q1	Q2	Q3	Q4
1998	6.35%	2.53%	6.37%	6.41%	5.10%
1999	7.54%	.	5.38%	10.46%	.

A.5. Residential New Construction (Results are from RER's Draft Residential Market Share Tracking Study, First-Year Interim Report)

Figure 12
Central Gas Furnace Shares by AFUE - On-Site Data
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See figure.

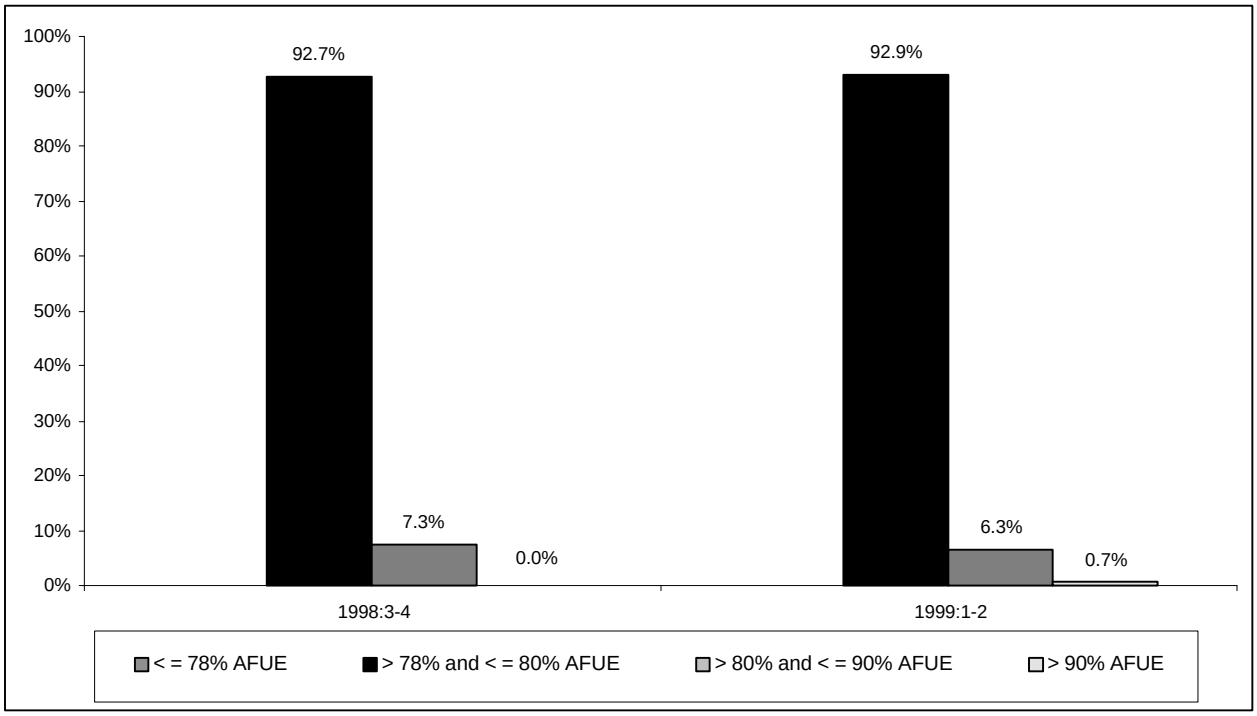


Figure 13
Central Air Conditioner Shares by SEER - On-Site Data
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See figure.

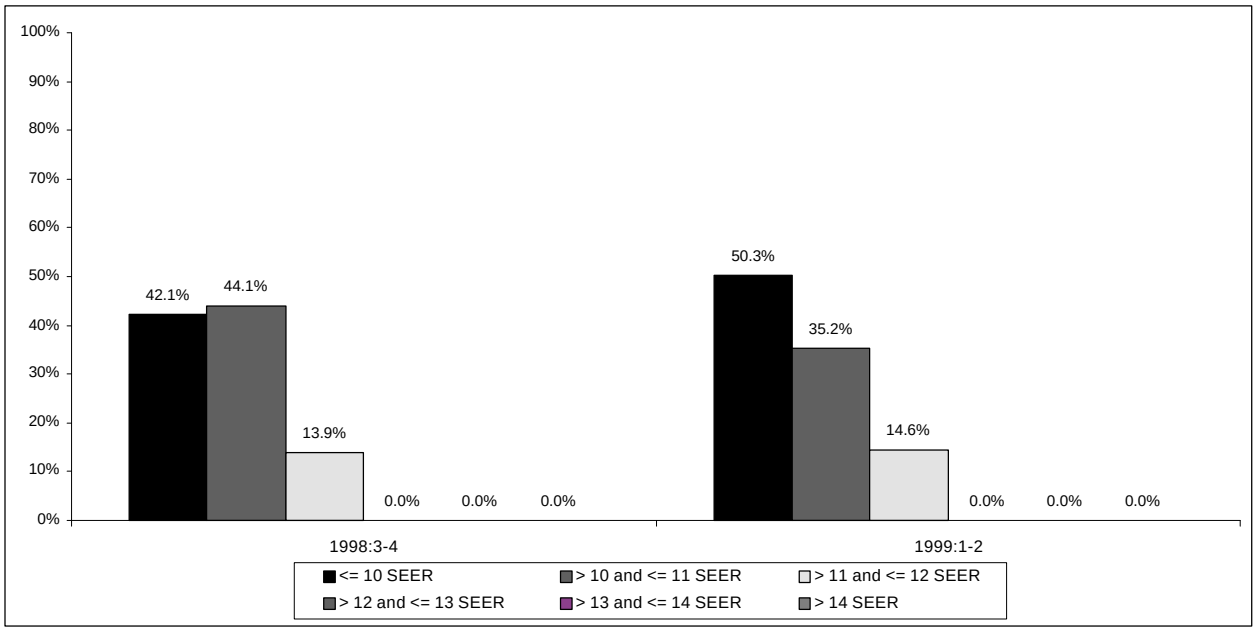


Figure 14
Gas Water Heater Distribution by Percent Above Standard - On-Site Data
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See figure.

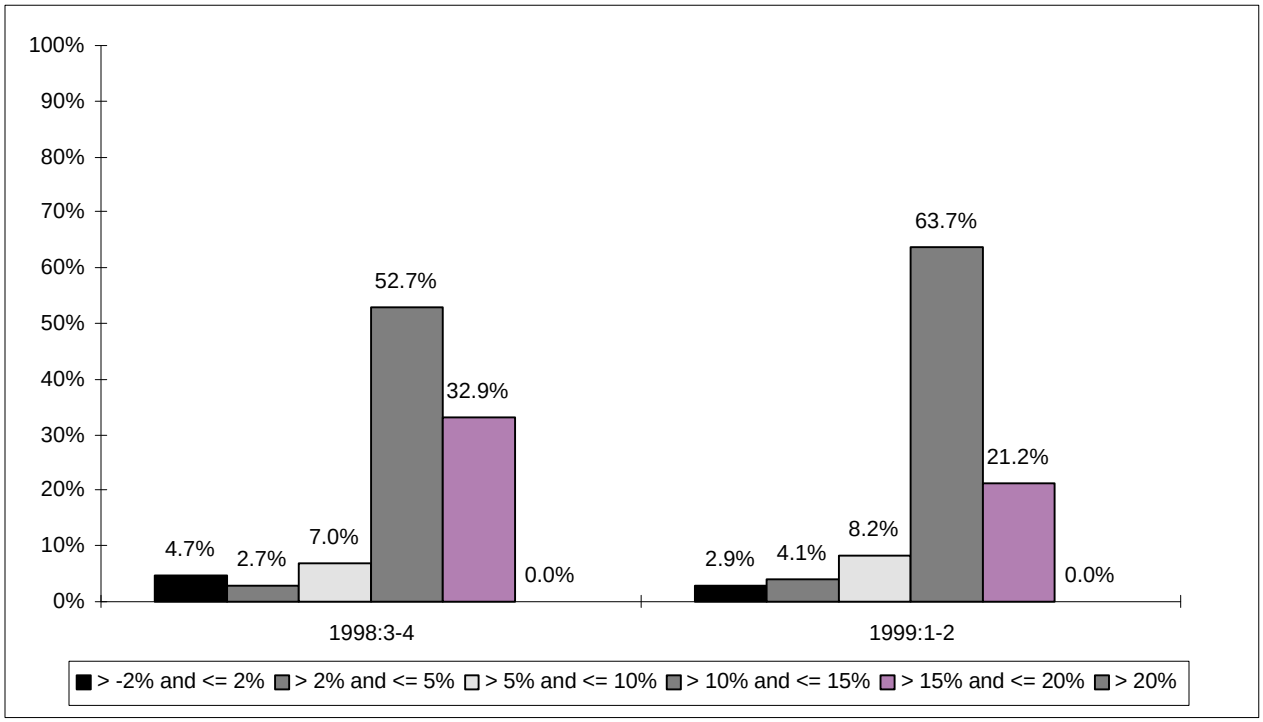
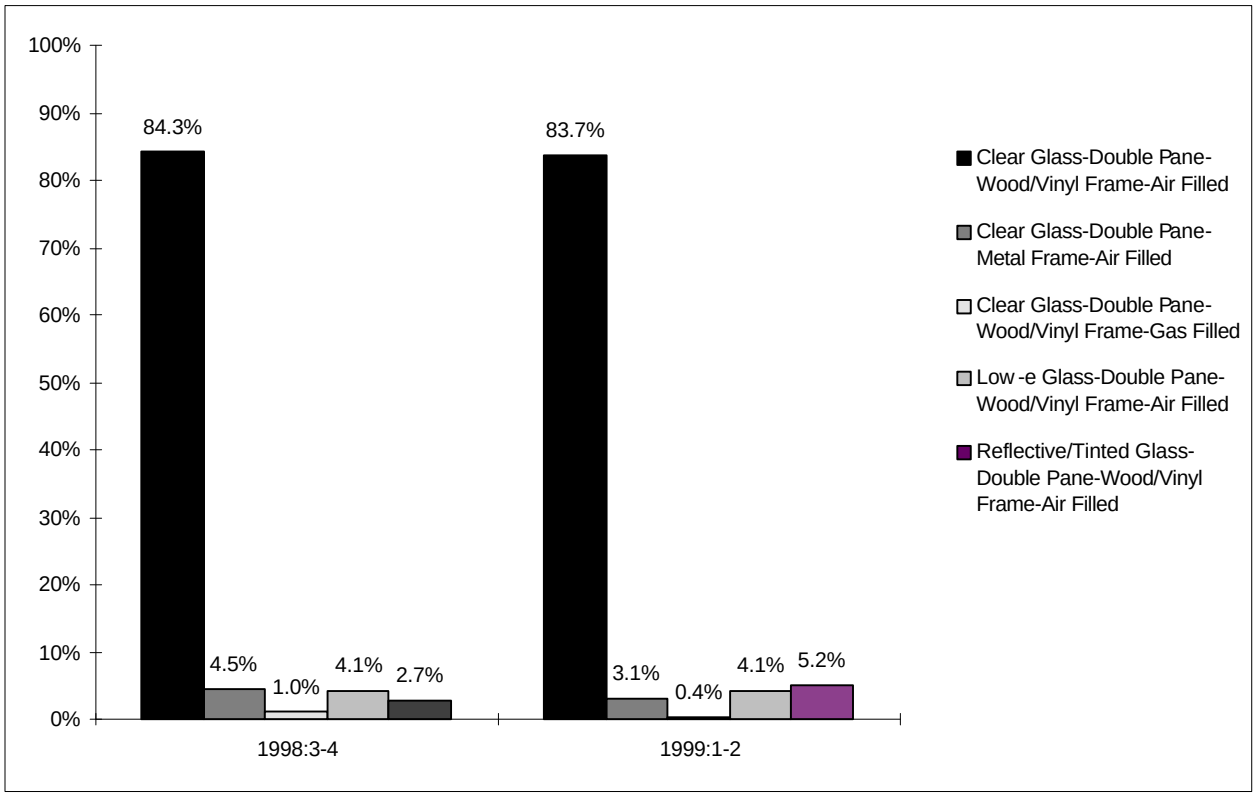


Figure 15
Distribution of Window Types - On-Site Data
Source: Residential Market Share Tracking Study, First-Year Interim Report
Date of Data Collection: See figure.



Appendix C4

(Discussion Paper #4)

(Draft Protocols for Decisions to Terminate Incentive

Support for Energy Efficiency Measures)

PROPOSED PROTOCOLS FOR DECISIONS TO TERMINATE PROMOTION OF ENERGY EFFICIENCY MEASURES

A. Introduction

Ordering Paragraph 54 of California Public Utilities Commission Decision 00-07-017 directs the utilities to:

'… immediately and jointly with interested stakeholders, conduct an investigation of saturation rates for T-8 lighting and other measures. The utilities shall also develop protocols for determining when a measure has reached saturation so that incentives should be phased out or eliminated."

This paper identifies the issues, including saturation, that should be considered when making decisions to phase out or terminate incentive payments or other methods of promotion of specific high-efficiency measures. It also places the task of considering continuation or termination of promotion as part of the annual program planning and review process.

The descriptions and discussion demonstrate that the incentive termination decision should be a judgment based on a number of market and program factors, not just one or two. The multiplicity of factors makes it infeasible to reduce the decision criteria to a numerical value or formula.

These factors include:

- overall measure saturation and trends in market share;

- the overall goals and duration of the programs and program effectiveness and cost-effectiveness;

- market characteristics and the likelihood of market regression in the absence of utility promotion;

- changes in equipment or building energy efficiency standards, and improvements in measure technology.

B. Factors to Consider in Assessing Termination or Phasing Out of Financial Assistance for Measures

1. Saturation or market share of the high-efficiency measure in the building stock or its market share in current sales.

High saturation or market share of an efficiency measure should indeed trigger a careful examination and sometimes continued monitoring of whether it is fruitful to continue providing incentives or other promotion. The specific level of saturation or market share depends on the other issues listed below. Once saturations or market share are over 50%, it is generally time to examine the situation by reviewing all of the factors listed below. Often, the results of a quick examination will demonstrate that there is a good basis for continuing promotion of the measure. There is no single level of saturation that unequivocally signals that it is time to withdraw. Instead, the appropriate time varies depending upon these additional factors.

2. Overall program goals, program theory, program duration, and program effects and cost-effectiveness

The use of any particular program strategy, including incentives, is based on a theory of how the program activity will affect the market. When considering continuation or discontinuation of a program strategy, program managers should assess whether the program theory is being confirmed by observed market effects. Even if measure saturation is low, if the program is not producing the theory-predicted changes after a reasonable period of time, and there is no good evidence that instead it is being successful under an alternative program theory, the program should be significantly modified or eliminated.

Currently, programs are reviewed and program revisions are considered and recommended on an annual basis. Where there is particular concern, mid-year reviews and revisions are undertaken. So there is ample opportunity to monitor whether a program or a specific intervention strategy (e.g., a particular rebate) is having the desired effect. Beyond this, however, at the measure level, it is important to review continuation of a rebate or other promotion for a specific technology after it has been in place for three or more years, to assure that continued promotion is still justifiable, based on the other considerations described in these guidelines

The saturation at which promotion should cease may differ by the current overall goals of energy efficiency programs. Thus, in a situation where long-term market transformation is the goal, it may make sense to withdraw incentives and other forms of promotion as soon as it appears that a product is on the way to increasing adoptions in an unassisted market. This could be at a relatively low level of saturation or market penetration. However, rebates need to be understood as an effective means of providing information to the public about energy efficiency in general. They are not simply a form of cost reduction, but also a powerful form of advertising and consumer information provision. This cannot be ignored when there is a goal of increasing overall consumer and supplier focus on energy efficiency as a significant product characteristic.

When short-term resource acquisition is the goal, a program manager must simply assess whether it remains cost-effective, taking free ridership and spillover into account, to continue promoting the measure.

For both market transformation and resource acquisition programs, examining program evaluation results is important in making this decision. High free ridership and low rates of free drivership and spillover will generally push a program towards not being cost-effective. Presence or absence of expected market changes will signal whether a program theory seems to be working or not.

3. Market characteristics and the likelihood of market share regression

There are several well-known examples of situations in which program managers believed that the market for a measure had been transformed, withdrew incentives, and found that the subsequent market share of the efficient technology dropped sharply. If such a retrenchment is

acceptable, then the promotion may be ended. If the potentially reduced market share of new purchases is not acceptable, then it may be important to push the market to a higher saturation and market share level before ending the promotion, so that the retrenchment will only be to an acceptable level.

As market share and saturation increase, program managers and evaluators need to assess to what extent customers' and suppliers' favorable experience with the efficient product or service is likely to be transmitted by the usual channels of product innovation. In some markets, reaching a small proportion of the market may be enough to justify reduction or elimination of rebates if the communication channels are strong and the innovators' experience with the new product can be translated easily to others who will imitate the innovators and early adopters. In other cases the program may need to reach a majority of the market before these experiences are translated via media or informal communication channels.

A particular issue here is appropriately defining "the market." New technologies do not always flow readily from one segment to another of a broadly defined market. The decision-maker should analyze the market to determine if saturation varies substantially by market segment. If there are low-saturation segments, are customers in these segments unsuitable candidates for the measure? (For example, a low saturation of more costly but highly efficient light bulbs and fixtures is probably appropriate for applications where the lights are used very little.) If not, what are the market barriers that seem to be limiting adoption in these segments? Are there ways to cost-effectively modify the design of the program to effectively reach and increase the adoption rates in these segments?

4. Building and equipment standards and improvements in technology

One of the goals of several programs has been to pull enough of the market towards a more efficient technology that it becomes politically feasible and demonstrably cost-effective for government to establish that efficiency level as the standard. Once a new standard is adopted, the program often continues, targeting promotion to the next higher level of efficiency, and preparing the way for the next round of new standards. A similar dynamic can exist for markets without standards, since continuing improvements in technology often occur. The role of the

energy efficiency program then becomes to champion each new technology to speed and ensure a sustainable path of increased diffusion.

If the focus of a program is market transformation, it may be reasonable to stop promotion as soon as a new standard is announced, before it is effective. However, if the program focuses on resource acquisition, then it may be reasonable to continue a rebate right until the time when consumers are forced by standards to buy the high-efficiency option. Failing to do so will lead to lower adoption rates in the period between rebate termination and the date at which the inefficient technology is no longer on the market.

C. Implementation of the Promotion Review Process

The program planning process is the forum within which review of continued promotion of specific measures occurs. Program plans will include expectations fore appropriate indicators and the source of the data. As part of their normal program planning and monitoring process, program planners assess available data to determine whether some measures may no longer require promotion. Program planning workshops, quarterly or annual reports will be used as appropriate to report progress and needed changes, including termination.

Appendix C5

(Discussion Paper #5)

(Proposed Measure Cost Guidelines for PY 2001)

Response to Ordering Paragraph #14

Discussion Paper 5

Pacific Gas and Electric Company

Southern California Edison Company

San Diego Gas and Electric Company

Southern California Gas Company

September 21, 2000

1. Purpose and Approach

This document was developed in response to Ordering Paragraph 14 of Decision (D.) 00-07-017 and the schedule and requirements laid out in the *Administrative Law Judge's Ruling Establishing Schedule And Process For PY 2001 Energy Efficiency Program Planning*. Ordering Paragraph 14 states the following:

> 14. The utilities shall develop, with interested stakeholders, in a public process, 1) protocols, including mechanism and standards, for the collection and use of Incremental Measure Cost (IMC) data, including the use of a statewide database such as Database for Energy Efficiency Resources (DEER); 2) guidelines or standards for estimating IMC costs associated with the various program strategies and elements, including possible default assumptions; 3) other mitigations, or avenues to ensure that the cost-effectiveness calculations are reasonable where credible IMC data is not available, such as those set forth in Policy Rule V-4. The utilities shall attempt to have at least a preliminary agreement in place prior to filing PY 2001 applications. The utilities' PY 2001 applications shall report on the development of IMC standards and protocols, use uniform, agreed upon IMC for like measures, and explain the basis for any deviations.

This document provides a brief summary of an initial draft of IMC guidelines (subject to the 5-page maximum length constraint included in the ALJ's ruling). This initial draft is intended as a starting point for obtaining stakeholder input in the public workshop referenced in OP14 (this workshop is scheduled for September 12-13, 2000). This draft will be updated in response to input obtained at the workshop.

This document builds primarily upon research previously conducted in Statewide Measure Cost Studies (MCS). These studies include the following:

- *1992 Measure Cost Study*. This first measure cost study was managed by the California Conservation Inventory Group.
- *1994 Measure Cost Study*. The second MCS was managed by the California DSM Measurement Advisory Committee (CADMAC). The data from this study were input into the California Energy Commission's (CEC) Database of Energy-Efficient Resources (DEER).
- *1996 Measure Cost Study*. The third MCS also was managed by CADMAC. The data from this study also were input into the California Energy Commission's (CEC) Database of Energy-Efficient Resources (DEER).

In addition, this document is being developed in parallel with an MCS update study being managed by the CEC (the *DEER Update 2001 Study*). This document is consistent with the planned approaches to sampling, data collection, and analysis in the DEER Update 2001 Study. In addition, the first draft of this document was developed with input from utility staff. As noted above, the next version of this document will incorporate feedback obtained during the public workshop at which these draft IMC guidelines will be presented and discussed.

2. Proposed Change in Terminology - "Measure Costs" Versus "Incremental Measure Costs"

Ordering Paragraph 14 refers to the need for protocols for "Incremental Measure Cost (IMC) data". As discussed in Sections 3 and 4 of these guidelines, incremental costs often present estimation challenges that exceed those encountered in the estimation of full measure costs, i.e., the costs of measures implemented on a purely retrofit basis; however, many of the issues associated with estimating incremental measure costs also apply to full measure costs. As a result, we propose to include both full and incremental measure costs under the proposed protocols and to do so under the broader umbrella term *measure costs* (MC). Determination of whether a full or incremental measure cost estimate is appropriate for a particular measure should be based on whether the measure is typically installed on a retrofit basis (full cost) or replace-on-burnout/new construction basis in which a like-for-like standard or lower efficiency equipment or system alternative exists (incremental cost).

3. Recent History of Shared, Default Database of Measure Costs

As noted in the enumeration of the three MCS conducted in California in the 1990s, the first measure cost study was conducted in 1992. Prior to 1992, regulators were faced with the time-consuming task of reviewing DSM forecast and cost-effectiveness inputs developed independently among utilities in California. The utilities, CPUC, and CEC agreed prior to the first MCS that development of a measure cost study would provide value to both utility planners and regulators. In the former case, data collection and cost estimation work would be reduced across utilities, and, in the latter case, regulators would be provided with estimates of costs that they could use in their own models, or, as comparison points for reviewing utility estimates developed independently of the cost study. Thus, the purpose of the first and subsequent studies

was to provide a default database of estimated costs to both utilities and regulators that would facilitate program planning and expedite regulatory review. Historically, when a utility used a value in the MCS database, no documentation other than citing the database was required. At the same time, utilities were still free to develop their own independent cost estimates so long as they provided documentation of how their estimates were developed and why they were superior to the default values.

4. Previous Measure Cost Protocol

The following protocol for use of measure costs was previously developed and adopted in *Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management Programs*, CPUC Decision 93-05-063, March 1998:

> Measure cost estimates must be based on (a) costs shown on collected customer invoices adjusted to calculate incremental measure costs, or if not available, (b) incremental costs collected and reported in the biennial Measure Cost Study filed by the California DSM Measurement Advisory Committee (CADMAC), or if not available, (c) incremental measure costs collected and used to conduct customer cost-effectiveness analysis, or if not available (d) estimates of incremental costs filed in the target earnings forecast.

5. Proposed Measure Cost Protocol

Our proposed measure cost protocol is similar to the previous protocol but provides some modifications. The proposed protocol is summarized as follows:

> Costs for individual energy-efficiency measures should be obtained from any one of the following: a) the most recent Measure Cost Study (MCS) or b) data collection and estimation processes equivalent or superior to those used in the most recent Measure Cost Study for similar measures or c) appropriate analysis of normalized costs obtained from program participation records (usually for retrofit, i.e., full-cost measures only); or if none of the above are available, d) secondary sources, such as other industry research studies, may also be utilized if they have publication dates of 1996 or later. Per unit measure costs will be developed and reported on an *ex ante* basis. Reported per unit measure costs will be the same as forecasted.

Because the most recent MCS was completed in 1996 and the current update study is slated for completion in 2001, the cost values from the 1996 MCS should continue to be utilized for element a) above until the 2001 update study is completed.

6. Applying Measure Costs to Program Strategies and Elements

Program strategies and elements are often made up of multiple types of measures. In these cases, for *ex ante* cost effectiveness calculations, total measure costs should be developed by including per unit measure costs for all measures to be implemented in the program (based on the protocol provided above) and multiplying these per unit costs by the total number of units expected. If cost effectiveness is being calculated on an *ex post* basis, total measures costs should be derived by multiplying the per unit costs of each measure by the actual number of units implemented in the program.

7. Recommended Data Collection Approaches

Because of the large number and variety of technologies and measures included in utility program filings, no single data collection strategy is appropriate for developing accurate cost data. Instead, different data collection strategies must be appropriately matched to the unique estimation challenges that each technology or measure presents. The portfolio of data collection approaches should include:

- Cost surveys of manufacturers and wholesalers;
- Cost surveys of retailers;
- Cost surveys of contractors;
- Cost data from program databases and invoices; and
- Other secondary sources.

8. Recommended Target Precision and Minimum Sample Sizes

An objective of the previous CADMAC-managed measure cost studies and the current DEER Update 2001 Study is to develop as many cost estimates as possible with a 10 percent precision at the 90 percent confidence interval (so-called "90/10" precision). Though a laudable goal, the resources available for previous MCS have not allowed the 90/10 goal to be achieved for more than about one-third of the measures in scope. In response, minimum number of sample point targets were also set in the previous and current MCS. Consistent with these previous minimums, we recommend the following target minimum samples by level on the distribution

value chain: 3 to 5 manufacturer or 5 to 10 wholesale or 10 to 15 retail cost estimates/quotes for each technology.

9. Data Development Guidelines

Once representative cost data are collected, several types of analyses can be conducted, depending on the type of technology, to develop final estimates of full and incremental costs. Simple averages can be calculated and, in some cases, these averages can provide the best possible estimate of the costs of base and high-efficiency technologies/measures. In other cases, however, using the average cost is likely to lead to errors because the averages will not control for important differences between base case and high-efficiency technologies. In addition, where sample sizes are small, use of the average price may be significantly biased by outliers. Another problem with comparing the average "base" technology price to the average "high-efficiency" technology price has to do with whether the sample of sources is identical for both cases. That is, if there is not a *matched pair* of costs for the base case and high-efficiency option from every source, the difference in the averages could be significantly biased due to differences in price levels between the sources that have nothing to do with energy-efficiency levels.

To minimize the effects of such potential biases, we recommend that individualized cost analyses always be conducted for every measure. In addition, where large enough samples are available, regression models should be developed (sometimes referred to as *hedonic price models* - see Attachment B for explanation). In cases for which such models cannot be used effectively, one should analyze the raw data directly to determine if there are any significant biases in the average cost estimates. In these cases, it is appropriate to exclude outliers or develop average incremental costs using only matched pairs of base case and high-efficiency technology costs obtained from the same sources. In other cases, the examination may simply confirm that the average cost is unbiased and no further analyses need be conducted. We present in Attachment C, a summary of the methods employed to develop the final recommended cost values in the 1996 MCS. We expect that the methods used on related analyses will likely follow those used previously by technology type. When the principal raw data are collected at the manufacture or wholesale level, then an informed estimate of the typical markup applied by contractors or

retailers, as appropriate, must be made and applied to develop the final estimates of end-user level costs.

Attachments

Discussion Paper 5 - Attachment A - Inherent Limitations of Program/Invoice Data

Measure costs are important because they are a critical input to energy-efficiency program cost-effectiveness analyses. At first glance, measure costs may seem to represent simple, easy-to-obtain, empirical inputs which should be readily available from utility program records. Although that is in fact the case for some measures, it is not the case for most. There are a number of real-world limitations to the value of cost data collected through normal program participation processes. Invoices associated with program records are seldom useful for accurate estimation of measure costs because of the following:

It is difficult to obtain invoice data as part of programs that do not provide financial incentives, since this information is often considered proprietary. It often takes the inducement of incentives to successfully require project invoice data. This often limits the availability of invoice data to those programs with significant financial incentives.

Project invoices typically bundle both equipment and labor costs. Most contractors bundle equipment and labor costs in both their bids and their invoices. This is typical practice in most equipment and building trades and not one that can be easily undone. Experience has shown that even when a utility requires vendors that participate in a program to unbundle their invoices into equipment and labor costs, the unbundling is typically done in a haphazard or generic way after the invoice is generated. Without accurate separation of equipment versus labor costs, invoices are of limited value to estimation of incremental measure costs.

Project labor costs are highly variable and difficult to control for.. As anyone who has obtained multiple bids for a major piece of equipment or renovation project in their own home can attest, labor costs can be highly variable even for jobs that appear to be well specified. For a particular project, estimated labor charges may vary based on different contractors' availability (e.g., opportunity costs), their perceptions of the customer's willingness (or ability) to pay, their ability to assess the extent of the work required, as well as a host of other factors. Across projects, the factors influencing variation in labor costs only multiply and are difficult to control for on an *ex post* basis (e.g., costs of removing existing equipment, ease of access to equipment, costs of getting to the job site, etc.).

Project equipment costs also are variable and difficult to control for. Although typically somewhat less variable than labor costs, equipment costs can also be highly variable. One of the key factors affecting equipment price variation as it relates to typical invoice data is that there are often a multitude of dimensions that affect price but are excluded from invoice documentation. Consider, for example, the case of compact fluorescent lighting systems (CFLs). There are a number of underlying attributes of CFLs that may affect their prices, including ballast type (electronic or magnetic), whether they are integral or modular, adapter type (screw-in versus hard-wired), wattage (at least 10 levels), and inclusion of a reflector. Invoices rarely provide documentation at this level of equipment specificity and, hence, are of limited value in estimating specific rather than generic measure costs.

Project invoices are more useful for estimating the full costs of retrofit measures than they are for estimating the incremental costs associated with measures installed in new construction or on a replace-on-burnout basis. Invoices typically provide cost data only for the energy-efficient project implemented; they do not provide any data on the costs of any base case (usually standard efficiency) equipment considered. For example, an invoice may be available for a project on which a high-efficiency 5-ton air conditioning unit with an SEER of 12 was installed; however, the invoice typically provides no information on what the cost of a project involving a unit of standard efficiency unit would have been. As a result, the invoice available cannot be used to estimate incremental measure costs.

Discussion Paper 5 - Attachment B - Description of Hedonic Price Approach, by Leon Taylor Economics Department Tulane University New Orleans La 70118

An hedonic price index relates the market price of an object to its characteristics. For instance, you can think of a house as a bundle of such traits as three marble bathrooms, a carpeted poolroom, a spectacular view of Lake Superior, and proximity to a fine elementary school. Each amenity increases the value -- and price -- of the house. Suppose that adding a bedroom increases the market price of the house by $10,000. Then the hedonic price of the bedroom is $10,000. Statistically, the hedonic approach builds the house from the ground up -- adding features, and toting up the value of those features, until the sum of the values accounts for the full price of the house (or nearly does so).

In economics, researchers often gather data on the price, property characteristics, neighborhoods, accessibility and environmental quality of thousands of houses at a given time. Using a statistical package such as SAS or SPSS, they fit the data to an equation such as ln Property Price = a*ln SQFT + b*ln NHOOD + c*ln ACCESS + d*ln ENV For instance, "ln SQFT" is the natural log of the number of square feet in the house, and "a" is a coefficient that the statistical program will estimate. In a double-log equation like this, the coefficient tells you something useful: If you increase the number of square feet by 1 percent, then the property price will rise by "a" percent. To estimate the hedonic price of a square foot, multiply "a" by (Property Price / Square Feet). Suppose that a $100,000 house has 1,000 square feet and that "a" is .05. Then the hedonic price of an additional square foot is .05*$100,000/1,000 = $5.

It's tempting to interpret the hedonic price of a housing characteristic -- say, a good view of the Utah mountains -- as its value. To make that leap, though, you must assume a few things, particularly that well-informed buyers were bidding for a fixed housing supply. Suppose that you and I bid for a house in the mountains. This house differs from those in the valley only in its breath-taking view. Suppose that I bid $10,000 more than you for the mountain house. Then we might interpret the net value of the view as $10,000. But suppose that a developer races to build another house in the mountains with an equally spectacular view. You can have that house and I'll take the other. Because housing supply increased, I won't have to outbid you by $10,000. Yet

the view is still worth $10,000 to me. In short, when housing supply is elastic, hedonic price might underestimate value.

A good introduction to the hedonic approach is in A. Myrick Freeman III, "The Benefits of Environmental Improvement: Theory and Practice," Resources for the Future: Baltimore, 1979. ISBN 0-8018- 2195-9 (paperback).

Discussion Paper 5 - Attachment C- Summary of Cost Methods Employed for 1996 Measure Cost Study

SECTOR	ENDUSE	CATEGORY	TECHNOLOGY	METHOD
Residential	CW	Equipment	Clothes Washer	Unweighted Ave
Commercial	DHW	Equipment	Storage Water Heater	Weighted Ave
Residential	DHW	Equipment	Storage Water Heater	Regression
Commercial	HVAC	Controls	Chilled Water Reset	Weighted Ave
Commercial	HVAC	Controls	Energy Management System	Weighted Ave
Both	HVAC	Controls	Thermostat/Controls	Unweighted Ave.
Commercial	HVAC	Equipment	Chillers	Weighted Ave. + markup
Commercial	HVAC	Equipment	Cooling Tower	Weighted Ave
Commercial	HVAC	Equipment	DX Air Conditioners-Air Cooled	Weighted Ave.
Commercial	HVAC	Equipment	Evaporative Systems	Weighted Ave
Residential	HVAC	Equipment	Furnaces-Warm Air	Regression
Residential	HVAC	Equipment	Heat Pumps-Air Cooled	Regression
Commercial	HVAC	Equipment	Oversized Condenser	Weighted Ave
Residential	HVAC	Equipment	Packaged AC/Furnace	Regression
Residential	HVAC	Equipment	Room & Terminal Units	Regression
Commercial	HVAC	Equipment	Thermal Energy Storage	Weighted Ave
Commercial	HVAC	Maintenance	Chiller	Unweighted Ave
Residential	HVAC	Maintenance	Duct Repair	Weighted Ave.
Commercial	HVAC	Maintenance	DX	Unweighted Ave
Residential	HVAC	Shell	Infiltration Reduction	Weighted Ave
Residential	HVAC	Shell	Insulation	Weighted Ave. + mark-up
Commercial	HVAC	Shell	Window-Exterior	Weighted Ave. + mark-up
Residential	HVAC	Shell	Window-Exterior	Weighted Ave. + mark-up
Commercial	HVAC	Shell	Window-Retrofit Film	Windows cost model
Commercial	HVAC	Shell	Window-Upgrade	Windows cost model
Commercial	Lighting	Controls	Dimming System	Weighted Ave. + markup
Commercial	Lighting	Controls	Occupancy Sensor	Unweighted Ave.
Commercial	Lighting	Equipment	Compact Fluorescent	Unweighted Ave. + markup
Commercial	Lighting	Equipment	Exit Signs	Unweighted Ave. + markup
Commercial	Lighting	Equipment	Fluorescent	Unweighted Ave. + markup
Commercial	Lighting	Equipment	High-Pressure Sodium	Unweighted Ave. + markup
Residential	Lighting	Equipment	Incandescent	Unweighted Ave. + markup
Commercial	Lighting	Equipment	LED Traffic Signal	Unweighted Ave. + markup
Commercial	Lighting	Equipment	Metal Halide	Unweighted Ave. + markup
Commercial	Motor	Equipment	Variable-Speed Drive	Regression
Commercial	Motor	Equipment	Motor	Regression
Commercial	Refrig	Multiple	Multiple technologies	Unweighted Ave. + markup
Residential	Refrig	Equipment	Refrigerator	Regression

Appendix C6

(Discussion Paper #6)

(Standards for Assessing Cost Effectiveness of Third Party Initiatives)

STANDARDS FOR ASSESSING COST EFFECTIVENESS OF THIRD PARTY INITIATIVE PROGRAMS

Introduction

Ordering Paragraphs 72 and 73 of Decision 00-07-017, issued by the California Public Utilities Commission on July 6, 2000, direct the utilities to deal with cost and cost effectiveness issues for Third Party Initiatives (TPI) programs as follows:

> 72. For PY 2001, the utilities shall jointly, with interested stakeholders, develop a standard to use for IMC [Incremental Measure Cost] in the cost-effectiveness calculations, such as a default ratio or a requirement that all TPI meet a minimum threshold of cost-effectiveness (e.g., SoCalGas' convention of requiring each TPI to show a cost/benefit ratio of 1 or greater and using 1 in the analysis). The utilities shall jointly, with interested stakeholders, develop protocols to govern the cost-effectiveness analyses conducted by TPI bidders. The utilities shall convene a public process and report the results of any agreement reached and any remaining areas of disagreement in the PY 2001 applications. The utilities shall also propose use of the jointly developed IMC standards in the PY 2001 applications.
>
> 73. The utilities, for PY 2001 programs, shall convene a public process for purposes of developing, with interested stakeholders, reporting requirements, procedures and standards for post-program data collection of IMC and other cost data for TPI programs.

The approach proposed below meets the Commission's requirements and attempts to maintain consistency in the measure cost and cost-effectiveness analysis requirements imposed upon the Third Party Initiatives program and other programs.

Proposed Standards

The utility must choose one of the following two approaches, if a Third Party Initiatives Program is included as part of its energy efficiency program portfolio.

Substitute Program Approach

A utility may use the TPI Program as a way to solicit alternative designs for program elements it might otherwise have developed itself. In this situation, the utility will be planning to count the benefits of its TPI projects as part of the benefits of its program portfolio. In order to assign benefits and to assess the cost-effectiveness of its program portfolio, the utility's program plan filing shall assign the program a Public Purpose Test (PPT) ratio of one. In its ensuing TPI program solicitation, the utility shall require that accepted proposals be demonstrated to be cost-effective. This shall be defined to mean that the project attains a PPT ratio of one or greater, using the same rules for calculating cost-effectiveness as are used for the utility's own programs. This will includes rules for measure costs (including Incremental Measure Costs, if applicable), unit energy savings estimates, net-to-gross ratios, effective useful life of measures, and avoided costs.

If *ex post* cost-effectiveness analysis is required for the other programs in the utility's portfolio, the Third Party Initiative Program shall be subject to the same requirements as all the other programs.

Pilot Program Approach

Alternatively, a utility may use the TPI Program as a way to solicit and test, on a one-year basis, innovative new approaches to increasing energy efficiency. Typically, the total funding for such a TPI Program will be relatively small (perhaps under $3 million or 3% of the total energy efficiency budget), and the funding for individual projects will be low (below $1 million each). In this case, the utility will have an option to assign the TPI Program an *ex ante* PPT ratio of zero

in its program plans filing. Any TPI project found sufficiently promising to justify inclusion in the utility's regular program portfolio in later years would be required to meet the same standards for calculation of cost-effectiveness inputs and ratios as any other program. Because of their small and short-term scope, projects not included in the following year's program plans would not be required to be subject to any *ex post* cost-effectiveness analysis. They could retain a conservative PPT estimate of zero.

Proposed Annual Reporting Requirement for TPI Programs

Whichever approach is used, each utility with a TPI program would be required to include in its annual energy efficiency reports an overall assessment of the effectiveness of its TPI portfolio at meeting that utility's specific goals for its TPI program. Utilities should also report any *ex post* cost and benefit information provided by the TPI implementers.