FINAL REPORT

Evaluation
Of The
Southern California Edison
1997 DSM Bidding Program

Submitted to
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Appendices

Executive Summary

In accordance with CPUC Decision No. 9209-080, the Southern California Edison Company (Edison) developed a DSM bidding pilot to test the use of third parties to provide energy-efficiency services to Edison's industrial and large commercial customers. This pilot is limited to two of Edison's seven service regions (Southern and San Gabriel Valley). The pilot involves a two-year installation period, which began in 1994, followed by a three-year performance period.

Energy Services Companies (ESCOs) were invited to submit bids to Edison in order to deliver kWh and kW savings. In 1997, five winning bidders signed a total of 6 contracts involving 26 projects and 51 measures with Edison. Payments to ESCOs were based on verified savings using measurement techniques consistent with NAESCO standards. Eligible measures include, but are not limited to, indoor lighting-system replacement, lighting efficiency modifications, packaged air conditioners, heat pumps, window treatment, daylighting controls, electronic adjustable-speed drives, electric motors, electric chillers, and thermal energy storage.

The purpose of this evaluation is to estimate net-to-gross ratios (NTGRs) for 1997 projects only. The NTGRs were estimated at the measure, end-use, and sector levels consistent with the self-report methods described in Chapter 4 of the *Quality Assurance Guidelines for Statistical, Engineering, and Self-Report Methods for Estimating DSM Program Impacts* (QAG). Chapter 4 was most recently revised in March 1999. The QAG is contained in Appendix J of the *Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management Programs*.

A census of the 16 decision-makers associated with the 26 projects covering 51 measures was successfully completed. Of the 26 projects, 20 were completed at commercial sites and 6 were completed at industrial sites. Of the 51 measures, 43 were installed at commercial sites while 8 were installed at industrial sites. These installations covered three end uses: 1) HVAC, 2) Lighting, and 3) Process. Structured interviews were conducted either in person or by telephone.

The resulting commercial and industrial end-use net-to-gross ratios that take into consideration the size of the kW and kWh impacts at the measure level are presented in Tables E-1 through E-5. Also included are the 80% and 90% confidence intervals.

Table E-1.Standard and Custom Commercial NTGRs
For HVAC and Lighting by kWh, kW, and Overall End Use

	HVAC kWh	HVAC kW	HVAC Overall	Lighting kWh	Lighting kW	Lighting Overall
Standard NTGR	0.322	0.259	0.316	0.586	0.589	0.586
80% Confidence	+/- .053	+/- .031	+/- .051	+/- .040	+/- .042	+/- .040
90% Confidence	+/- .068	+/- .040	+/- .065	+/- .051	+/- .054	+/- .051
Custom NTGR	0.322	0.259	0.316	0.600	0.598	0.599
80% Confidence	+/- .053	+/- .031	+/- .051	+/- .043	+/- .044	+/- .043
90% Confidence	+/- .068	+/- .040	+/- .065	+/- .055	+/- .057	+/- .055

Table E-2.Standard and Custom Industrial NTGRs
For HVAC and Lighting by kWh, kW, and Overall End Use

	HVAC kWh	HVAC kW	HVAC Overall	Lighting kWh	Lighting kW	Lighting Overall
Standard NTGR	0.667	n/a	0.667	0.630	0.606	0.626
80% Confidence	+/- .153	n/a	+/- .153	+/- .083	+/- .067	+/- .081
90% Confidence	+/- .196	n/a	+/- .196	+/- .106	+/- .087	+/- .104
Custom NTGR	1.0	n/a	1.0	0.857	0.833	0.855
80% Confidence	+/- .229	n/a	+/- .229	+/- .126	+/- .112	+/- .124
90% Confidence	+/- .293	n/a	+/- .293	+/- .162	+/- .143	+/- .159

Table E-3.Standard and Custom Industrial NTGRs
For Process by kWh, kW, and Overall End Use

	Process kWh	Process kW	Process Overall
Standard NTGR	0.808	0.808	0.808
80% Confidence	n/a	n/a	n/a
90% Confidence	n/a	n/a	n/a
Custom NTGR	0.808	0.808	0.808
80% Confidence	n/a	n/a	n/a
90% Confidence	n/a	n/a	n/a

Table E-4. Standard and Custom Commercial NTGRs by kWh, kW, and Overall Sector

	All Commercial kWh	All Commercial kW	All Commercial Overall
Standard NTGR	.480	0.455	0.478
80% Confidence	+/-.037	+/- .036	+/- .036
90% Confidence	+/-.047	+/- .046	+/- .046
Custom NTGR	.489	0.461	0.487
80% Confidence	+/-.038	+/- .037	+/- .038
90% Confidence	+/-.049	+/- .047	+/- .048

Table E-5. Standard and Custom Industrial NTGRs by kWh, kW, and Overall Sector

	All Industrial kWh	All Industrial kW	All Industrial Overall
Standard NTGR	.656	0.613	0.653
80% Confidence	+/-.062	+/- .066	+/- .062
90% Confidence	+/-.080	+/- .085	+/- .080
Custom NTGR	.854	0.832	0.853
80% Confidence	+/-.093	+/- .107	+/- .094
90% Confidence	+/-.119	+/- .137	+/- .112

1 Introduction

In accordance with CPUC Decision No. 9209-080, the Southern California Edison Company (Edison) developed a DSM bidding pilot to test the use of third parties to provide energy-efficiency services to Edison's industrial and large commercial customers. This pilot is limited to two of Edison's seven service regions (Southern and San Gabriel Valley). The pilot involves a two-year installation period, which began in 1994, followed by a three-year performance period.

Energy Services Companies (ESCOs) as well as customers were invited to submit bids to Edison in order to deliver kWh and kW savings. In 1997, six winning bidders signed a total of 6 contracts involving 26 projects involving 51 measures with Edison. Payments to ESCOs and customers were based on verified savings using measurement techniques consistent with NAESCO standards. Eligible measures include, but are not limited to, indoor lighting-system replacement, lighting efficiency modifications, packaged air conditioners, heat pumps, window treatment, daylighting controls, electronic adjustable-speed drives, electric motors, electric chillers, and thermal energy storage.

2 Research Objectives

The objective of the pilot was to test the effectiveness and efficiency of using third-party energy services suppliers to deliver persistent and sustainable electric-energy services to selected Edison customers as a strategy to reduce utility administrative costs. The objective of the research presented in this report was to produce NTGRs for the pilot program. These NTGRs can then become part of the assessment of the effectiveness of the program.

2.2 Unit of Analysis

NTGRs were estimated at the measure, end-use and sector (commercial and industrial) levels. Within each end use and at the sector level, separate NTGRs were estimated for kWh and kW. NTGRs were also estimated for each end use that included the impacts of the combination of both kWh and kW together. Finally, sector level NTGRs were estimated across all end uses that included the impacts of both kWh and kW.

2.3 Compliance with M&E Protocols

Edison is complying with NAESCO standards with respect to estimates of gross impacts. However, Edison also wishes to know how many of the observed gross impacts would not have happened anyway in the absence of the program, i.e., the net impacts. While technically the requirements of the *Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management Programs* (Protocols) with respect to the estimation of net impacts do not apply to performance contracts, Edison has chosen to comply, *to the extent feasible*, with the methods and reporting requirements contained in the Protocols.

More specifically, the self-report method used in this evaluation for estimating NTGRs is, *to the extent feasible*, in compliance with Chapter 4 of the *Quality Assurance Guidelines for Statistical, Engineering, and Self-Report Methods for Estimating DSM Program Impacts* (QAG). Chapter 4 was most recently revised in March 1999. The QAG is contained in Appendix J of the Protocols.

Note also that the language in Table 7 refers to Appendix J for those utilities that are relying on participant self report in estimating net-to-gross ratios.

3 Research Approach

The method used to estimate the NTGR involves interviewing the key person responsible for making energy efficiency decisions for the sites in which efficient equipment was installed as a part of the DSM Bidding Program. This method, referred to as the "self-report" method, attempts to determine what these key decision-makers would have done in the absence of the Program. Guidelines for using this approach are contained in Chapter 4 of the QAG. Section 6 of this report describes how this approach was implemented.

Once the Standard NTGRs were calculated, each was customized by taking into account other information in the rest of the interview, including open-ended questions, and from the program file. The customization process sometimes resulted in changes to the Standard NTGR.

The objective of this research did not include estimating gross or net savings. However, an estimate of gross savings was necessary to weight the end-use level and sector-level NTGRs properly. This purpose was served by the use of the gross savings estimates contained in the program tracking system.

Details on how each of these pieces of information was used are presented in the following sections.

4 Sample Design

4.2 Sample Frame

The population of participants consists of 51 efficiency measures associated with 26 projects that are in turn associated with 6 contracts. Of the 26 projects, contracts with public agencies accounted for 4 (15%%) and contracts with traditional ESCOs accounted for the remaining 22 (85%). Of these 26 projects, 20 are associated with commercial sites while 6 are associated with industrial sites. Table 4-1 presents the breakdown of all efficiency measures by sector.

Table 4-1. Measures Installed by Sector

Measure	Commercial	Industrial	Total
Adjustable Speed Drive	6	0	6

Chilled Water Controls	2	0	2
Chiller 200 - <600 Tons	1	0	1
Chiller 600 - <2000 Tons	1	0	1
Cooling Tower	4	0	4
Indoor Lighting System Modification	4	0	4
Indoor Lighting System Replacement	15	5	20
Interactive Savings	6	2	8
Motors - Three Phase	1	0	1
Occupancy Sensor	2	0	2
Outdoor Lighting System Replacement CFL	1	0	1
Pump System Controls (Process)	0	1	1
Total	43	8	51

Note that Interactive Savings is treated as a separate measure. These savings are often associated with lighting measures that were installed in buildings with HVAC systems. In SCE's "E" Tables, these interactive savings have been separated from the lighting measures and placed in the HVAC end-use category. Thus, they have been treated similarly in this study.

These measures were grouped into three end uses: 1) HVAC, 2) Lighting, and 3) Process. Table 4-2 presents the frequency of these end uses by sector.

Table 4-2. End Use Frequency by Sector

End Use	Commercial	Industrial	Total
Lighting	22	5	27
HVAC	21	2	23
Process	0	1	1
Total	43	8	51

There were 16 customer decision-makers associated with these 26 projects covering the 51 measures.

4.3 Sample Selection

Given the number of projects, sites, and unique decision-makers, it was decided to perform a census of all 16 decision-makers and the related projects, covering all 26 projects and the associated 51 measures.

5 Data Collection

5.2 Questionnaire Design

The questionnaires were designed to estimate the extent to which Edison or the ESCOs influenced the customers to invest in energy efficiency measures. One questionnaire was

designed for those contractors who are traditional ESCOs and another was designed for those contractors who are customers.. This was done to account for differences in customer perceptions regarding the source of financial assistance. The ESCO questionnaire referred to financial assistance from *the ESCO* while the customer questionnaire referred to financial assistance from the *Southern California Edison Company*. The only other difference was that the ESCO questionnaire included a question about satisfaction with the performance of the ESCO.

Both questionnaires are included in Appendix A.

5.3 Interviewer Training

Since the questionnaires are nearly identical to the one used by the same consulting firm in the evaluation of Edison's 1997 Industrial Energy Efficiency Incentive (IEEI) Program, there was no need for a formal interviewer training session. Rather, the small differences in the Bidding questionnaire and the IEEI questionnaire were discussed fully in the kickoff meeting.

5.4 Participant Interviews

The telephone interviews took approximately ten minutes to complete and were conducted by AESC, Inc. Data collection for all projects went as expected, except for one. This one decision-maker refused to be interviewed over the phone but did complete a copy of the questionnaire that was faxed to him.

In some cases, one decision-maker was responsible for multiple sites, projects, and measures. In such cases, at the completion of the questionnaire for the first project, the decision-maker was asked whether their responses also applied to the other sites, projects and measures. This was done since such projects involved similar equipment, square footage, and investment economics. Table 4-3 presents a breakdown of the number of decision-makers and the number of projects with which each is associated.

As one can see, 11 decision-makers are associated with only one project, three are associated with 2 projects each, one is associated with four projects, and one is associated with 5 projects..

Table 4-3. Number of Decision-Makers and the Number of Projects with Which Each is Associated

	Number of Decision-Makers	Number of Projects For Each Decision-Maker	Total Number of Projects
	11	1	11

	3	2	6
	1	4	4
	1	5	5
Total	16		26

5.5 Sample Disposition

Of the 16 decision-makers, interviews were completed with all. In no cases in which there were multiple sites, projects, or measures did the decision-makers indicate that their answers were different for other sites, projects, or measures. In one case, one decision-maker completed two questionnaires since he was responsible for two different *contracts* requiring different responses. Thus, the 16 decision-makers accounted for 17 completed questionnaires covering 26 projects and 51 measures.

5.6 Data Preparation

Once the data from the 16 decision-makers were entered in an EXCEL spreadsheet, they were examined for data entry errors and out-of-range values. Next the responses for each decision-maker were duplicated for all those sites, projects and measures to which their answers were applicable. The data were then merged with the master program database so that the analysis could begin. This process is illustrated in Figure B-1 in Appendix B.

Additional details regarding the relevant datasets are presented Table B-1 in Appendix B. All relevant EXCEL files and SAS files listed in Table B-1 will be submitted to the California Public Utilities Commission at a later date.

6 Methods for Estimating Net-To-Gross Ratios

6.2 Levels of NTGRs

NTGRs were estimated using two approaches. The first was based only on decision-maker responses to closed-ended questions. This is referred to as the Standard NTGR analysis. The second was based on all available information including program files and the answers to other closed-ended and open-ended questions on the decision-maker questionnaire. This is referred to as the Custom NTGR analysis. These two methods are described below. Also, note that, using these two methods, we estimated NTGRs at the measure level, the end-use level, and the program level for both kWh and kW. Within each end use and at the program level, we also estimated the overall NTGRs that took into account both the kWh and kW impacts. All of these NTGRs are also broken down by sector.

6.2.1 Standard NTGRs

The standard free-ridership analysis draws on information obtained from the Decision-Maker survey. An analysis of closed-ended questions included in the Decision-Maker survey is carried out in order to derive the Standard NTGR. These core, closed-ended questions are sometimes referred to as “pre-quantified” questions since each potential answer has a specific number assigned to it.

The central inputs to the calculation of the Standard NTGR come from the decision-maker survey question numbers 8, 9, 21, 22, and 23. First the core questions 8, 9, 21, 22, and 23 are averaged, with question 9 and 21 values transposed to cause the large values to have the same meaning as the large values of the other questions, i.e., a large value means a high NTGR.

A potential conflict within the questionnaire occurs with question 9 which asks how likely it is that the customer would have installed the same thing without the rebate. It is known that question 9 is subject to misunderstanding because of the necessarily negative phrasing of the question. It was necessary to ask if the customer would have made the same installation if the program had *not* been in effect. This negative in the question sometimes causes misunderstandings and, therefore, answers that imply the opposite of what the respondent wanted to communicate. This potential was handled by incorporating automatic checks into the survey form that detected clear contradictions between questions 8 and 9 since this is where such a misunderstanding would become visible. Where there was a contradiction between these two answers, the interviewer is instructed in how to resolve the contradiction with suggested phrasing for presenting the apparent conflict to the respondent and requesting resolution. However, if the inconsistency was not or could not be resolved within the interview, the two questions, together with the other three core questions (21, 22 and 23) were averaged with equal weights.

Next, the issue of timing was considered. The decision-maker, in Question 14, was asked if, before he/she talked with the ESCO about the rebated project, their company had been planning to do a project within the same end use for which the rebate was received. If they indicated that their company had been planning to do such a project, then they were asked in Question 15 when, in this plan, would the project have been done without the influence of the financial assistance from the ESCO or Edison. Their answer to this question was then associated with a NTGR using the forecast conversion information in Table 6-1.[1]

Table 6-1. Forecast Conversion

Forecasted Installation of Same Equipment	Implied NTGR
Less than 6 months	0
6 to 12 months	.125
1 to 2 years	.25
2 to 3 years	.5
3 to 4 years	.75

[1] Spanner, G, and Riewer, S, 1990. ‘‘The Energy $avings Plan: Incentives for Efficiency Improvements in the Industrial Sector.’’ Proceedings of the ACEEE Summer Study. Washington DC. Pp. 7.251 to 7.260.

Spanner, G., Dixon, D. and Fishbaugher, M, 1990. ‘‘Impact Evaluation of an Energy $avings Plan Project at Bellingham Cold Storage.’’ Bonneville Power Administration, Portland OR. Pp. 2.8-2.9.

4 or more years	1.0
Never	1.0

The implied NTGR from Table 6-1 was then averaged with the answers to questions 8, 9, 21, 22, and 23 to produce the Standard NTGR.

6.2.2 Custom NTGRs

The custom free-ridership analysis includes the individual examination of a variety of quantitative and qualitative data. This more thorough approach is taken since a small number of decision-makers were responsible for some fairly large and complex projects. This, in turn, raises the concern that the core questions used to estimate the Standard NTGR could miss some critical pieces of the decision process. It is important to understand the entire story of the process of thinking about the change, considering alternatives, balancing costs and benefits, making decisions, etc. Energy efficiency could be the single reason for the change or it could be a small part of a larger picture. Because of these complexities, a wide variety of data, beginning with the Standard NTGR, were examined in estimating the Custom NTGR. The thrust of the method is to reconstruct the entire "story" (a comprehensive, internally consistent description), of the decision process.

Each data source, beyond the Standard NTGR, considered in estimating the Custom NTGR is described briefly below.

6.2.2.1 Financial Information

In cases in which financial calculations made prior to the installations were a part of the Program files, or where that or other financial information was reported in the decision-maker interview, it was taken into account in the assessment of the Standard NTGR. This was accomplished by building in a probe contingent on the answer to question 9 and the financial information from two sources: payback information in the program file (when present), and the self-reported financial information from the interview. For example, when financial figures met or exceeded the criteria set by the customer for investment, without the rebate, but the Standard NTGR questions indicated high program influence (NTGR > .5), the respondent was questioned about why the rebate was necessary given the favorable financial calculations. The information gathered by such questioning was considered in the context of the larger qualitative analysis of information for these projects.

6.2.2.2 Decision-Maker Open-Ended Interview Questions

This type of question had two uses. The first was to contribute to painting the whole picture of the decision process related to the rebated equipment. The second, was to detect misunderstandings embedded in the decision-maker’s answers to the Standard NTGR questions or to pick up complexities in the process that could not fit into structured categories, thus producing unexpected combinations of answers, including contradictory ones. Therefore, the answers to these questions could be compared to the pre-quantified answers to see if there were contradictions across those types of questions.

6.2.2.3 File Information

Any information contained in program files pertaining to timing and motivational issues was examined and used in estimating the final Custom NTGR.

6.3 Reliability of the NTGR Analysis

For the NTGR analysis, there was a combination of quantitative and qualitative data from a variety of sources that was integrated in order to produce a final Custom NTGR. It was essential that all the projects be evaluated consistently using the same instrument. However, in a situation involving both quantitative and qualitative data, different interpretations of the data may vary from one item to another, which means that, in effect, the measurement instrument may vary from one item to another. Thus, the central issue here is one of reliability, which can be defined as obtaining consistent results over repeated measurements of the same items. The following section describes the process by which reliability was maximized.

6.4 The Integration of Data into Case Studies

To ensure and to measure reliability, several steps were taken by the two-person NTGR team. First, several principles were established to guide the integration of qualitative and quantitative data from the various sources associated with each site and project. Following is a list of the principles used together with an explanation of the principles. The principles themselves are shown in bold type, and the explanation of them, sometimes using examples based on retrospective experience with the customization process, is written in regular type.

1. **The Standard NTGR should stand except when there is strong evidence that it should not. No one piece of information should be used to override the Standard NTGR. Specifically, more than one piece or source of information should form a larger picture that contradicts the Standard NTGR before an override is considered**.

   The Standard NTGR is based on six pre-quantified questions in the decision-maker interview. The use of five items reduces greatly the possibility that the NTGR will be distorted in a large way by measurement error. Because of this multi-question approach, it was judged that this result should not be overridden easily. There were a number of instances where one comment in the interview could be interpreted to contradict the final Standard NTGR. However, given the care with which the Standard NTGR was measured, it would be a mistake to override it with one piece of information, which could be misinterpreted by the interviewer or by the analyst. Only when there were multiple items that contradicted the Standard NTGR were they seriously considered for forming the basis for changing the Standard NTGR.

2. **The Standard NTGR should not be changed unless the change is substantial**.

   This principle is based on several ideas. Although it was not possible to know the error band around any individual Standard NTGR, conceptually there is some band of uncertainty around any estimate. It seemed unwise to tinker in relatively small ways with the quantified Standard NTGR, the results of which could well fall within reasonable error bands. Such tinkering would be based on qualitative information, which has to be quantified by the analysts. Unless the potential adjustment is fairly large, it seems less risky to stay with the

direct, customer-based quantity than to rely on a qualitative judgement from a third party, such as the analysts, when that judgement is not based on any legitimate quantitative anchors such as payback or evidence of accelerated installations. Even where there are quantitative anchors, if the difference between the Standard NTGR and the potential customized NTGR is not great, it was judged better to use the standardized approach.

Another basis for estimating a NTGR in the custom process was through the use of payback periods. A conversion of paybacks into NTGR terms was provided in the Protocols.[2] This table (Table 6-2) is repeated below for convenient reference.

Table 6-2. Payback Conversion

Payback Period	Implied NTGR
6 months or less	.40
More than 6 months and less than 2 years	.75
2 years or more	1.00

While this mapping of paybacks into NTGRs was designed for those measures and end uses that comprise the bottom 50 percent of a program's savings, it can be used to put a customer's payback into context so that it can be used, *along with all the other available information*, to estimate the final Custom NTGR.

With these principles in mind, the following steps were followed:

1. Each member of the team summarized information thought important to consider in customizing the NTGR. These summaries were not compared at this point.

2. Each member made independent judgments and categorized interviews and file information related to 26 combinations of contracts and projects. Each project and its related measures was put into one of three groups:

    - Standard NTGR should be the same as the Custom NTGR
    - Standard NTGR should be higher than the Custom NTGR
    - Standard NTGR should be lower than the Custom NTGR

3. These judgements were compared and an inter-rater reliability calculation was made. There was an agreement rate of 92 percent on these ten cases.

[2] *Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand Side Management Programs*, adopted by the California Public Utilities Commission in May of 1993, and most recently revised in January of 1997. Table C-5:Impact Measurement Protocols for the Industrial Energy Efficiency Incentives Program

4. Disagreements on the 8 percent of the cases were resolved using the principles and further refinements of them. The disagreements fell into two categories.

    - One rater had missed a critical piece of information in the interview or program file, or

    - Disagreement about the weight to put on different pieces of conflicting information

    Neither of these bases for disagreement can be systematically corrected by rules or principles; they are a matter of judgement.

5. The reviewers then independently estimated the magnitude of the adjustment for those NTGRs that required an adjustment.

6. The recommended adjustments were compared and any differences resolved.

7. Finally, the rationales for the custom results were written (see Appendix C).

6.4.1 End-Use and Sector-Level NTGRs

Of course, when one attempts to estimate a NTGR beyond the measure level, one must combine all the NTGRs in a way that reflects the magnitude of the gross kW and kWh impacts specific to each measure. These gross impacts are *ex ante* estimates taken from the DSM Bidding Program database.

6.4.1.1 End-Use and Sector-Level NTGRs for kWh and kW

The NTGRs for kWh and kW at the end-use level were calculated in four steps. They are:

1. For each measure, the ex ante gross kWh and kW were multiplied by the final NTGR to produce measure-level *net* kWh and kW,

2. Within each sector, the measure-level *net* kWh and kW impacts were then summed within each end use, and

3. Within each sector, the measure-level ex ante *gross* kWh and kW impacts were then summed within each end use,

4. Within each sector within each end use, the *net* kWh and kW impacts were divided by the ex ante *gross* kWh and kW impacts.

To estimate the sector-level kWh and kW NTGRs, the end use net and gross kWh and kW impacts within each sector are then summed *across* all end uses. Next, the net kWh and kW

impacts are divided by the gross kWh and kW impacts to produce the sector-level kWh and kW NTGRs.

The procedures described above produced estimates of the NTGRs for both kWh and kW within each sector within each end use and at the sector-level (i.e., *across* all end uses).

6.4.1.2 Overall End-Use and Sector NTGRs

Before the overall end-use (across both kWh and kW) and sector-level NTGRs (across both kWh and kW *and* end uses) could be calculated, both the gross and net kWh and kW impacts were converted into a common monetary unit, dollars. This was accomplished by multiplying both the net and gross kWh and kW impacts by the marginal costs to produce *monetized* net and gross impacts. However, before the net and gross kWh and kW impacts could be multiplied by the marginal energy and capacity costs, these net and gross kWh and kW impacts had to be allocated to the various costing periods presented in Tables 6-3 and 6-4. Once the net and gross kWh and kW impacts were allocated to costing periods, they were then multiplied by the marginal cost associated with each costing period. Appropriate marginal costs were obtained from Edison's "C" Table, which contains data needed to support its earnings claims. Tables 6-3 and 6-4 present the 1997 marginal kWh and kW costs by time of day and season.

Once calculated, these monetized net and gross kWh and kW impacts could then be summed within each end-use and sector. Finally, within each end-use and sector, the net monetized impacts were divided by the gross monetized impacts. These calculations yielded the overall end-use and sector-level NTGRs.

Table 6-3. Costing Period Allocations for Energy

	Summer On Peak	Summer Partial Peak	Summer Off Peak	Winter Partial Peak	Winter Off Peak
Industrial Process	.11	.13	.22	.24	.30
Industrial Indoor Lighting	.13	.12	.10	.44	.21
Commercial Outdoor Lighting	0	.06	.24	.07	.63
Commercial Indoor Lighting	.13	.13	.08	.52	.14
Commercial Miscellaneous	.10	.13	.10	.42	.25
Commercial HVAC	.29	.23	.06	.37	.05

Table 6-3. Costing Period Allocations for Capacity

	Summer On Peak	Summer Partial Peak	Summer Off Peak	Winter Partial Peak	Winter Off Peak
Industrial Process	1	.96	.81	.70	.52
Industrial Indoor Lighting	1	.99	.65	.99	.88
Commercial Outdoor Lighting	0	.71	1	.73	1
Commercial Indoor Lighting	1	1	.55	1	.83
Commercial Miscellaneous	1	.96	.95	.97	.89
Commercial HVAC	1	.94	.35	.62	.32

Table 6-4: 1996 Marginal Energy Costs

Costing Period	$/kWh
Summer On Peak	.0451
Summer Partial Peak	.0321
Summer Off Peak	.0289
Winter Partial Peak	.0381
Winter Off Peak	.0316

Table 6-5. 1996 Marginal Capacity Costs

Costing Period	$/kW-yr
Summer On Peak	8.83
Summer Partial Peak	1.06
Summer Off Peak	.55
Winter Partial Peak	1.20
Winter Off Peak	1.22

6.4.2 NTGR Confidence Intervals

Both the 80 percent and 90 percent confidence intervals for the final, Custom NTGRs were calculated for both kWh and kW within each end use, for the end use as a whole, and for the program. The 80 percent and 90 percent confidence intervals were also calculated for realization rates. Since these are the critical ratios, these confidence intervals were calculated in two steps. First, the variance of the ratio (either realization rate or NTGR) was estimated using the following equation:

$$v(\hat{R}) = \frac{(1-f)}{n\bar{x}^2}(s_y^2 + \hat{R}^2 s_x^2 - 2\hat{R}s_{yx}) \quad (1)$$

where

$v(\hat{R})$ = Variance of the NTGR

$\hat{R}$ = $\frac{\bar{y}}{\bar{x}}$,the NTGR

f = Sampling fraction

n = Size of sample

$\bar{x}$ = Mean of gross impacts

$\bar{y}$ = Mean of net impacts

s_x^2 = Variance of the gross impacts

s_y^2 = Variance of the net impacts

s_{yx} = Covariance of the gross and net impacts

Once the variance of $\hat{R}$ was estimated, then the following equation was used to estimate the 80 percent and 90 percent confidence intervals:

$$\hat{R} = \pm z\sqrt{v(\hat{R})} \quad (2)$$

where z = the critical values for the 80% and 90% levels of confidence, i.e., 1.28 and 1.64.

Confidence intervals for the measure-level NTGR was calculated using the following formula:

$$\overline{NTGR} \pm ts \quad (3)$$

where t = the critical value from the t distribution
s = the standard error of the mean NTGR.

The critical values for the 80% and 90% levels of confidence are 1.28 and 1.64 respectively.

7 Results of Net-To-Gross Ratio Analysis

In this section, the net NTGRs for kWh and kW for the commercial and industrial sectors will first be presented at both the end-use and sector level. Next, the overall end-use NTGRs across both kWh and kW will be presented. Finally, the overall sector NTGRs across both kWh and kW *and* end use will be presented.

The results of the Standard NTGR analysis will be presented first followed by the results of the Custom NTGR analysis.

7.2 Standard NTGR Results

7.2.1 Measure-Level Standard NTGRs

For the 26 projects, the Standard NTGR was calculated by sector. The Standard NTGR was based *only* on the responses to the core questions in the decision-maker survey. The unweighted, overall *commercial* NTGR based on information for all 43 measures is .596 with a standard deviation of .24. The NTGR for the 8 measures in the *industrial* sector is .568 with a standard deviation of .26.

7.2.2 End-Use Level Standard NTGR Results

The Standard NTGR, weighted by savings, was calculated for kWh, kW, and overall for each end use. Also included are the confidence intervals at the 80% and 90% confidence levels. Table 7-1 presents these results for commercial HVAC and Lighting end uses. Table 7-2 presents the results for industrial HVAC, Lighting end uses. Table 7-3 presents these results for industrial Process end use.

Table 7-1. Standard Commercial NTGRs
For HVAC and Lighting by kWh, kW, and Overall End Use

	HVAC kWh	HVAC kW	HVAC Overall	Lighting kWh	Lighting kW	Lighting Overall
Standard NTGR	0.322	0.259	0.316	0.586	0.589	0.586
80% Confidence	+/- .053	+/- .031	+/- .051	+/- .040	+/- .042	+/- .040
90% Confidence	+/- .068	+/- .040	+/- .065	+/- .051	+/- .054	+/- .051

Table 7-2. Standard Industrial NTGRs
For HVAC and Lighting by kWh, kW, and Overall End Use

	HVAC kWh	HVAC kW	HVAC Overall	Lighting kWh	Lighting kW	Lighting Overall
Standard NTGR	0.667	n/a	0.667	0.630	0.606	0.626
80% Confidence	+/- .153	n/a	+/- .153	+/- .083	+/- .067	+/- .081
90% Confidence	+/- .196	n/a	+/- .196	+/- .106	+/- .087	+/- .104

Table 7-3. Standard Industrial NTGRs
For Process by kWh, kW, and Overall End Use

	Process kWh	Process kW	Process Overall
Standard NTGR	0.808	0.808	0.808
80% Confidence	n/a	n/a	n/a
90% Confidence	n/a	n/a	n/a

7.2.3 Sector-Level Standard NTGR Results

Across the Lighting and HVAC end uses for the commercial sector and across the Lighting, HVAC, Motors, and Process end uses for the industrial sector, the Standard NTGRs for kWh, kW, and the overall sector, weighted by savings, are presented in Tables 7-4 and 7-5. The 80 percent and 90 percent confidence intervals are also presented.

Table 7-4. Standard Commercial NTGRs
by kWh, kW, and Overall Sector

	All Commercial kWh	All Commercial kW	All Commercial Overall
Standard NTGR	.480	0.455	0.478
80% Confidence	+/-.037	+/- .036	+/- .036
90% Confidence	+/-.047	+/- .046	+/- .046

Table 7-5. Standard Industrial NTGRs
by kWh, kW, and Overall Sector

	Industrial kWh	Industrial kW	Industrial Overall
Standard NTGR	.656	0.613	0.653
80% Confidence	+/-.062	+/- .066	+/- .062
90% Confidence	+/-.080	+/- .085	+/- .080

7.3 Custom NTGR Results

Finally, the NTGR was adjusted further by taking into account additional information so that a more complete picture of the conditions surrounding the installation of the efficient equipment could be gained. The case studies for each of the completed questionnaires are presented in Appendix E. This qualitative information was then used to *modify* the Standard NTGRs or *support* them.

7.3.1 Measure-Level Custom NTGRs

In the custom analysis of the 43 *commercial* measures, the Standard unweighted NTGR was modified for two. Of these two modifications, both were increases. The increase for each was .12. These changes produced by the custom analysis produced an overall increase in the commercial Standard, unweighted NTGR of .005, yielding a Custom NTGR of .601 with a standard deviation of 245.

In the custom analysis of the 8 *industrial* measures, the Standard unweighted NTGR was modified for six. Of these six modifications, five were increases and one was a decrease. The average increase was .322. The magnitude of the one decrease was .35. These changes produced by the custom analysis produced an overall increase in the industrial Standard, unweighted NTGR of .158, yielding a Custom NTGR of .726 with a standard deviation of .453.

For the remaining 41 commercial measure and the one industrial measure, the Standard NTGR did not change since any information identified provided insufficient grounds for *changing* the Standard NTGR or served only to *confirm* the Standard NTGR.

7.3.2 End-Use Level Custom NTGRs

The Custom NTGR was calculated for kWh, kW, and overall for each end use. Also included are the confidence intervals at the 80% and 90% confidence levels. Table 7-6 presents these results for commercial HVAC and Lighting end uses. Table 7-7 presents the results for industrial HVAC, Lighting end uses. Table 7-8 presents these results for industrial Motors and Process end uses.

Table 7-6. Custom Commercial NTGRs
For HVAC and Lighting by kWh, kW, and Overall End Use

	HVAC kWh	HVAC kW	HVAC Overall	Lighting kWh	Lighting kW	Lighting Overall
Custom NTGR	0.322	0.259	0.316	0.600	0.598	0.599
80% Confidence	+/- .053	+/- .031	+/- .051	+/- .043	+/- .044	+/- .043
90% Confidence	+/- .068	+/- .040	+/- .065	+/- .055	+/- .057	+/- .055

Table 7-7. Custom Industrial NTGRs
For HVAC and Lighting by kWh, kW, and Overall End Use

	HVAC kWh	HVAC kW	HVAC Overall	Lighting kWh	Lighting kW	Lighting Overall
Custom NTGR	1.0	n/a	1.0	0.857	0.833	0.855
80% Confidence	+/- .229	n/a	+/- .229	+/- .126	+/- .112	+/- .124
90% Confidence	+/- .293	n/a	+/- .293	+/- .162	+/- .143	+/- .159

Table 7-8. Custom Industrial NTGRs
For Process by kWh, kW, and Overall End Use

	Process kWh	Process kW	Process Overall
Custom NTGR	0.808	0.808	0.808
80% Confidence	n/a	n/a	n/a
90% Confidence	n/a	n/a	n/a

7.3.3 Sector-Level Custom NTGRs

Across the Lighting and HVAC end uses for the commercial sector and across the Lighting, HVAC, Motors, and Process end uses for the industrial sector, the Custom NTGRs for kWh and kW are presented in Tables 7-9 and 7-10. Also presented in these tables are the NTGRs for each sector across end uses *and* kWh and kW. The 80 percent and 90 percent confidence intervals are also presented.

Table 7-9. Custom Commercial NTGRs
by kWh and kW and Overall Sector

	All Commercial kWh	All Commercial kW	All Commercial Overall
Custom NTGR	.489	0.461	0.487
80% Confidence	+/-.038	+/- .037	+/- .038
90% Confidence	+/-.049	+/- .047	+/- .048

Table 7-10. Custom Industrial NTGRs
by kWh and kW and Overall Sector

	All Industrial kWh	All Industrial kW	All Industrial Overall
Custom NTGR	.854	0.832	0.853
80% Confidence	+/-.093	+/- .107	+/- .094
90% Confidence	+/-.119	+/- .137	+/- .112

Appendix A

Questionnaires

Decision-Maker Survey For ESCO Projects: SCE's DSM Bidding Program

Before Beginning an Interview:

1. Review the 1997 measure list for this ESCO contract.
2. Group sites by corporate ID
3. Make one copy of the survey for each measure.
4. Group similar measures, e.g., all lighting capacity changes or all efficient motors.

A. Introduction

Hello, this is (Surveyor Name). I'm calling on behalf of the Southern California Edison Company and (ESCO Name). Edison records indicate that during 1997 your company participated in Edison's Demand-Side Management Bidding Program. Through this Program, (ESCO Name) provided your company with financial assistance in selecting and installing energy efficient (End Uses) equipment. I am working with Edison to help them evaluate the products and services that you received.

Are you the person in your business who is most familiar with the energy efficient products or services you received from (ESCO Name)?

If yes: (Go to **B**)

If no: Could you give me the name of the person who might be most familiar with your company's participation in this program?

Contact Name: _____

Contact Number: _____

If customer is concerned that this is a sales call: Today, I just want to ask you a few questions about your reasons for participating in this program. This should take only 10 to 15 minutes. This is not a marketing or sales call. If you would like to verify this research, I can give you the name and number of an Edison contact:

Grant Hjelsand 626-302-8131

Richard Pulliam 626-302-8289

B: **Say**: I want to assure you that your answers will be kept strictly confidential and will not be shared with anyone outside of Southern California Edison.

C: Say: **Edison records indicate that your company received financial assistance from (ESCO) for the installation of the following energy efficient equipment at (Site Address):**

Equipment Installed	**Is this correct? If not, probe for correct information)**
	(1) Yes **(2) No**
	(1) Yes **(2) No**
	(1) Yes **(2) No**
	(1) Yes **(2) No**
	(1) Yes **(2) No**

---

1. When and how did you first learn about the financial assistance from (ESCO Name)?

   _____
   _____

2. How satisfied have you been with the (**insert measure 1**) that was installed by (ESCO Name)?

   1 Very Satisfied

   2 Somewhat Satisfied

   3 Somewhat Dissatisfied

   4 Very Dissatisfied

3. For (**insert measure 1**), how satisfied have you been with the work performed by (ESCO Name)?

   1 Very Satisfied

   2 Somewhat Satisfied

   3 Somewhat Dissatisfied

   4 Very Dissatisfied

4. Did you first hear about the financial assistance from (ESCO Name) BEFORE you began to think about (**insert measure 1**) or was it AFTER you began to think about it? (**Circle One**)

   1 Before (**Go to Q.8**) **2** After
   8 Don't Know (**Go to Q.8**) **9** Refused to Answer (**Go To Q.8**)

5. Was it BEFORE or AFTER you began to actually look at or collect information about the (**insert measure 1**)? (**Circle One**)

   1 Before (**Go to Q.8**) **2** After
   8 Don't Know (**Go to Q.8**) **9** Refused to Answer (**Go To Q.8**)

6. Did you hear about the financial assistance from (ESCO Name) BEFORE or AFTER you selected or decided on the exact specifications for (**insert measure 1**)? (**Circle One**)

   1 Before (**Go to Q.8**) **2** After
   8 Don't Know (**Go to Q.8**) **9** Refused to Answer (**Go To Q.8**)

7. Finally, did you hear about the financial assistance from (ESCO Name) BEFORE or AFTER you installed (**insert measure 1**)?

   1 Before **2** After
   8 Don't Know **9** Refused to Answer

8. There is more than one way that the financial assistance from (ESCO Name) might have influenced your decision to install (**insert measure**). It might have influenced *what* you installed (**the type of equipment or its efficiency**) or

the influence might have been just on *when* you installed it. Now, when answering the next six questions, please consider only the possible influence of the financial assistance from (ESCO Name) on *what* you installed, *not* the possible influence of the financial assistance from (ESCO Name) on *when* you installed it. After that, I will ask you about possible influence on the *timing* of the project.

How much influence did the financial assistance from (ESCO Name) have on your decision to install (**insert measure 1**)? Please use a scale from 0 to 10, with 0 being no influence at all and 10 being a lot of influence

___ Response (**0-10**) **98** Don't Know **99** Refused to Answer

9. If the financial assistance from (ESCO Name) had not been available, how likely is it you would have installed exactly the same (**insert measure 1**) anyway? Please use a scale from 0 to 10, with 0 being not at all likely and 10 being very likely.

___ Response (**0-10**) **98** Don't Know **99** Refused to Answer

Special Instruction for Contradictory Responses: If [**Q.8 is 0,1,2** *and* **Q9 is 0,1,2**] *or* [**Q.8 is 8,9,10** *and* **Q.9 is 8,9,10**]. **Probe for the reason. However, it is important not to communicate a challenging attitude when posing the question. For example, say,**

When you answered "8" for the question about the influence of the financial assistance from (ESCO Name), I would interpret that to mean that the financial assistance was quite important to your decision to install; then, when you answered "8" for how likely you would be to install the same equipment *without* the financial assistance, it sounds like the financial assistance was *not* very important in your installation decision. I want to check to see if I am misunderstanding your answers or if the questions may have been unclear.

If they volunteer a helpful answer at this point, respond by changing the appropriate answer. If not, follow up with something like:

Will you explain in your own words, the role the financial assistance played in your decision to install this efficient equipment?

If possible, translate the answer into a question 8 or 9 response that makes them consistent with each other, and check the response with the respondent for accuracy. If the answer doesn't allow you to decide what answer should be changed, write the answer down and continue the interview.

Answer: _____

_____

10. **Use if the installed equipment has specific efficiency ratings such as SEER, COP, KW/TON, Premium Motors.** If the financial assistance from (ESCO Name) had not been available, how likely is it that you would have installed equipment of the same efficiency? Please use a scale of 0 to 10, with 0 being not at all likely and 10 being very likely.

    ___ Response (**0-10**) **98** Don't Know **99** Refused to Answer

If [**Q.8 is 0,1,2** *and* **Q10 is 0,1,2**] *or* [**Q.8 is 8,9,10** *and* **Q.10 is 8,9,10**]. **Probe for the reason, in the same manner as described after Question 9**.

Answer: _____

_____

11. Did you consider any alternatives to the (**insert measure 1**) installed with the financial assistance from (ESCO Name)?

1 Yes **2** No **(Go to Q.14)**

98 Don't Know **(Go to Q.14)** **99** Refused to Answer **(Go to Q.14)**

12. Please describe the alternative (Not the Paid Measure) which you were most likely to have installed in the absence of the financial assistance from (ESCO Name). **Ask them to be as specific as possible. This will define the customer baseline condition and you will have to estimate savings using this baseline.**

_____
_____

_____
_____

_____
_____

13. In the absence of the financial assistance from (ESCO Name), is it more likely that you would have done:

1 Nothing **2** The alternative you described (**in Q.12**)
2 The same thing later **4** The same thing regardless of time
98 Don't Know **99** Refused to Answer

Say: Now I would like to ask you two questions about what [**insert end use**] projects you might have been planning to

do before you decided to talk to (ESCO Name) about a possible contract.

14. Before you talked to (ESCO Name) about this project, were you planning to do a [**insert end use**] project?

1 Yes **2** No **(Go to Q. 18)**

8 Don't Know (**Go to Q. 18**) **9** Refused to Answer (**Go To Q. 18**)

15. *In this plan, when* would the [**insert end use**] project have been done without the influence of the financial assistance from (ESCO Name)? (**Don't read response categories**)

1 _____ ____ ...within 6 months of when it actually was installed?

2 _____ ____ ...6 months to one year later?

3 _____ ____ ...one to two years later?

4 _____ ____ ...two to three years later?

5 _____ ____ ...three to four years later?

6 _____ ____ ...four or more years later?

7 _____ ____ ...Never **(Go to Q. 17)**

98 _____ ____ ...Don't Know **(Go to Q. 18)**

99 _____ ____ ...Refused to Answer **(Go to Q. 18)**

<u>Time relative to the installation date</u>. For measures that consist of more than one piece of equipment, the Count and % columns allow you to record changes which would have occurred over time. Ultimately, <u>you must indicate the %</u> that would have occurred in each period. 100% will appear in one period for single-piece measures. The percentages must always sum to 100%.

16. Why do you think you would have installed the same (**insert 1st group**) in _____ mos/yrs

_____

_____

If more than one time period used:

Why do you think you would have installed the same (**insert 2nd group**) in _____ mos/yrs

_____
_____

If more than two time periods used:

Why do you think you would have installed the same (**insert 3rd group**) in _____ mos/yrs

_____
_____

Go To Q. 17

17. Why do you think you *never* would have installed the same (**insert measure 1**)

_____
_____

18. What were the main **reasons** for installing the (**insert measure 1**)? **Ask them to describe up to three reasons**. **If necessary read examples:** *Increase output, Reduced maintenance, Reduced energy costs, Favorable Payback*.

_____
_____

_____
_____

19. Where did the **idea** come from to install (**insert measure 1**)? **If necessary read examples:** *Consultant, Previous experience with energy efficiency projects, Edison, Equipment supplier or installer, Internal staff, (ESCO name).*

_____
_____

If answer is *INTERNAL STAFF* probe here to find out

1. **How the internal staff knew about the technology, and**

2. If and how they knew that financial assistance might be available from the (ESCO Name) for this installation.

_____

_____

20. Which of the following provided the most assistance in the design or specification of **(insert measure)? (Read the list)**

1 (ESCO Name)
2 Consultant (**Read if necessary**) (e.g., architects, lighting designers, engineering firms, etc.)
3 Equipment Distributor or Manufacturer's Representative
4 Installer

5 Internal Staff
6 Edison Representative
98 Don't Know
99 Refused to Answer

Here are some statements that may be more or less true for your company about this project. Please assign a number between 0 and 10 to register how true it is. Please use a 10 to indicate that it is completely true, and a 0 to indicate that it is completely untrue.

21. The financial assistance from (ESCO Name) was nice but it was *unnecessary* to cause the energy-efficient version of this equipment to be completed.

_____ Response (0-10)

22. The financial assistance from (ESCO Name) was a *critical factor* in doing the version of the equipment that we did.

_____ Response (0-10)

23. We would not have installed the equipment that we did without the financial assistance from (ESCO Name).

_____ Response (0-10)

The following questions are the last ones for this measure. They are about the financial calculations your company may or may not use to make capital decisions.

24. What financial calculations are usually made, if any, to help your company make capital decisions *of this type* such as equipment installations or modifications, e.g., payback, return on investment or break-even analysis?

1 None **(Go to CHECK)**

2 Payback

3 Return on Investment (ROI)

4 Break-even Analysis

5 Other, specify: _____

25. What is the cut-off point that your company uses to decide to go ahead? _____ (**for payback: maximum yrs, for ROI: minimum %)**

98 Don't Know **(Go to CHECK)**
99 Refused **(Go to CHECK)**

(**Transfer answer to Q.9 here**) _____

26. Which calculations, if any, were used for this equipment installation? ___ **(If none, go to CHECK)**

27. What was the result of the calculation for this project? _____

    A. _____ **With** the financial assistance from (ESCO Name).

    B. _____ **Without** the financial assistance from (ESCO Name).

28. Using a scale from 0 to 10, 10 being extremely important, and 0 being not at all important, how important was this figure in your decision to make this equipment installation?

    ___ Response (**0-10**) **98** Don't Know **99** Refused to Answer

29. **If a *financial figure* (without the financial assistance) *was* calculated by the company and the financial figure calculated *meets* or *exceeds* the company's own criterion, and answer to Q.9 is less than 5, say**:

    This is quite a short payback. (**Or**) the ROI (**or other calculation**) was very good by your standards, I wonder why you wouldn't have installed (**insert measure 1**) even without the financial assistance from (ESCO Name)?

30. Were there any competing investments under consideration at the same time that **(insert measure 1)** was being considered?

    1 Yes, specify _____ **2** No **(Go to CHECK)**

    98 Don't Know **(Go to CHECK)** **99** Refused to Answer **(Go to CHECK)**

31. Were these more or less attractive investments than the **(insert measure 1**)?

1	More Attractive	**98**	Don’t Know
2	Less Attractive	**99**	Refused to Answer

CHECK:

D. If more than one measure was a part of the contract, say: You also received financial assistance from (ESCO Name) for:

Other Measures Installed
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Would any of the answers to these questions be different than the ones you just gave for (**insert measure 1**), including whether alternatives were considered, the timing of the installation, the financial criteria used, and the role of the financial assistance?

If any answers would be different, go through the interview for the measure numbers with different answers. If answers would not be different, then go to END.

E. If no more than one measure was a part of the contract, go to END.

END: I have one final question. Is there another person working for your company who is familiar with the impact of the financial incentive from (ESCO Name) on your company's decision to install the energy efficient equipment?

____ Yes Name_____ Telephone Number _____

____ No

____ Don't Know

____ Refused

Those are all the questions I have. I greatly appreciate your time and cooperation.

Decision-Maker Survey For Governmental Projects: SCE's DSM Bidding Program

Before Beginning an Interview:

1. Review the 1997 measure list for this government contract.
2. Group sites by government agency/department ID
3. Make one copy of the survey for each measure.
4. Group similar measures, e.g., all lighting capacity changes or all efficient motors.

A. Introduction

Hello, this is (Surveyor Name). I'm calling on behalf of the Southern California Edison Company. Edison records indicate that during 1997 your company participated in Edison's Demand-Side Management Bidding Program. Through this Program, Edison provided your (city or county) with financial assistance in selecting and installing energy efficient (End Uses) equipment. I am working with Edison to help them evaluate the products and services that you received.

Are you the person in your agency/department who is most familiar with the energy efficient products or services you received through Edison's Bidding Program?

If yes: (Go to **B**)

If no: Could you give me the name of the person who might be most familiar with your agency's/department's participation in this program?

Contact Name: _____

Contact Number: _____

If customer is concerned that this is a sales call: Today, I just want to ask you a few questions about your reasons for participating in this program. This should take only 10 to 15 minutes. This is not a marketing or sales call. If you would like to verify this research, I can give you the name and number of an Edison contact:

Grant Hjelsand 626-302-8131

Richard Pulliam 626-302-8289

B: **Say**: I want to assure you that your answers will be kept strictly confidential and will not be shared with anyone outside of Southern California Edison.

C: Say: **Edison records indicate that your (city or county) installed the following energy efficient equipment at (Site Address) through Edison's Bidding Program:**

Equipment Installed	Is this correct? If not, probe for correct information)
	(1) Yes **(2) No**
	(1) Yes **(2) No**
	(1) Yes **(2) No**
	(1) Yes **(2) No**
	(1) Yes **(2) No**

Say: I'm now going to ask you a series of questions regarding each piece of equipment installed through Edison's Bidding Program.

---

32. When and how did you first learn about the financial assistance provided by Edison's Bidding Program?

    _____
    _____

33. How satisfied have you been with the (**insert measure 1**) that you installed through the Bidding Program?

    1 Very Satisfied

    2 Somewhat Satisfied

    3 Somewhat Dissatisfied

    4 Very Dissatisfied

34. Did you first hear about the financial assistance from Edison's bidding program BEFORE you began to think about (**insert measure 1**) or was it AFTER you began to think about it? (**Circle One**)

1 Before (**Go to Q.7**) **2** After
8 Don't Know (**Go to Q.7**) **9** Refused to Answer (**Go To Q.7**)

35. Was it BEFORE or AFTER you began to actually look at or collect information about the (**insert measure 1**)? (**Circle One**)

1 Before (**Go to Q.7**) **2** After
8 Don't Know (**Go to Q.7**) **9** Refused to Answer (**Go To Q.7**)

36. Did you hear about the financial assistance from Edison's bidding program BEFORE or AFTER you selected or decided on the exact specifications for (**insert measure 1**)? (**Circle One**)

1 Before (**Go to Q.7**) **2** After
8 Don't Know (**Go to Q.7**) **9** Refused to Answer (**Go To Q.7**)

37. Finally, did you hear about the financial assistance from Edison's bidding program BEFORE or AFTER you installed (**insert measure 1**)?

1 Before **2** After
8 Don't Know **9** Refused to Answer

38. How much influence did the financial assistance Edison's bidding program have on your decision to install (**insert measure 1**)? Please use a scale from 0 to 10, with 0 being no influence at all and 10 being a lot of influence

___ Response (**0-10**) **98** Don't Know **99** Refused to Answer

39. There is more than one way that the financial assistance from Edison's Bidding Program might have influenced your decision to install (**insert measure**). It might have influenced *what* you installed (**the type of equipment or its efficiency**) or the influence might have been just on *when* you installed it. Now, when answering the next six

questions, please consider only the possible influence of the financial assistance from Edison's Bidding Program on *what* you installed, *not* the possible influence of the financial assistance from Edison's Bidding Program on *when* you installed it. After that, I will ask you about possible influence on the *timing* of the project.

If the financial assistance from Edison's bidding program had not been available, how likely is it you would have installed exactly the same (**insert measure 1**) anyway? Please use a scale from 0 to 10, with 0 being not at all likely and 10 being very likely.

___ Response (**0-10**) **98** Don't Know **99** Refused to Answer

Special Instruction for Contradictory Responses: If [**Q.7 is 0,1,2** *and* **Q8 is 0,1,2**] *or* [**Q.7 is 8,9,10** *and* **Q.8 is 8,9,10**]. **Probe for the reason. However, it is important not to communicate a challenging attitude when posing the question. For example, say,**

When you answered "8" for the question about the influence of the financial assistance from Edison's bidding program, I would interpret that to mean that the financial assistance was quite important to your decision to install; then, when you answered "8" for how likely you would be to install the same equipment *without* the financial assistance, it sounds like the financial assistance was *not* very important in your installation decision. I want to check to see if I am misunderstanding your answers or if the questions may have been unclear.

If they volunteer a helpful answer at this point, respond by changing the appropriate answer. If not, follow up with something like:

Will you explain in your own words, the role the financial assistance played in your decision to install this efficient equipment?

If possible, translate the answer into a question 7 or 8 response that makes them consistent with each other, and check the response with the respondent for accuracy. If the answer doesn't allow you to decide what answer should be changed, write the answer down and continue the interview.

Answer: _____

_____

40. **Use if the installed equipment has specific efficiency ratings such as SEER, COP, KW/TON, Premium Motors.** If the financial assistance from Edison's bidding program had not been available, how likely is it that you would have installed equipment of the same efficiency? Please use a scale of 0 to 10, with 0 being not at all likely and 10 being very likely.

___ Response (**0-10**) **98** Don't Know **99** Refused to Answer

If [**Q.7 is 0,1,2** *and* **Q9 is 0,1,2**] *or* [**Q.7 is 8,9,10** *and* **Q.9 is 8,9,10**]. **Probe for the reason, in the same manner as described after Question 9**.

Answer: _____

_____

41. Did you consider any alternatives to the (**insert measure 1**) installed with the financial assistance from Edison's bidding program?

1 Yes **2** No **(Go to Q.13)**

98 Don't Know **(Go to Q.13)** **99** Refused to Answer **(Go to Q.13)**

42. Please describe the alternative (Not the Paid Measure) which you were most likely to have installed in the absence of the financial assistance from Edison's bidding program. **Ask them to be as specific as possible. This will define the customer baseline condition and you will have to estimate savings using this baseline.**

_____
_____

_____
_____

_____
_____

43. In the absence of the financial assistance from Edison's bidding program, is it more likely that you would have done:

1 Nothing
2 The alternative you described (**in Q.11**)
2 The same thing later
4 The same thing regardless of time
98 Don't Know
99 Refused to Answer

Say: Now I would like to ask you two questions about what [**insert end use**] projects you might have been planning to do before you decided to talk to the Edison representative about participating in the Bidding Program.

44. Before you talked to the Edison representative about this project, were you planning to do a [**insert end use**] project?

1 Yes
2 No **(Go to Q. 17)**

8 Don't Know (**Go to Q. 17**)
9 Refused to Answer (**Go To Q. 17**)

45. *In this plan, when* would the [**insert end use**] project have been done without the influence of the financial assistance Edison's Bidding Program? (**Don't read response categories**)

1 _____ ____ ...within 6 months of when it actually was installed?

2 _____ ____ ...6 months to one year later?

3 _____ ____ ...one to two years later?

4 _____ ____ ...two to three years later?

5 _____ ____ ...three to four years later?

6 _____ ____ ...four or more years later?

7 _____ ____ ...Never **(Go to Q. 16)**

98 _____ ____ ...Don't Know **(Go to Q. 17)**

99 _____ ____ ...Refused to Answer **(Go to Q. 17)**

<u>Time relative to the installation date</u>. For measures that consist of more than one piece of equipment, the Count and % columns allow you to record changes which would have occurred over time. Ultimately, <u>you must indicate the %</u> that would have occurred in each period. 100% will appear in one period for single-piece measures. The percentages must always sum to 100%.

46. Why do you think you would have installed the same (**insert 1st group**) in _____ mos/yrs

_____
_____

If more than one time period used:

Why do you think you would have installed the same (**insert 2nd group**) in _____ mos/yrs

_____
_____

If more than two time periods used:

Why do you think you would have installed the same (**insert 3rd group**) in _____ mos/yrs

_____
_____

Go To Q. 16

47. Why do you think you *never* would have installed the same (**insert measure 1**)

_____
_____

48. What were the main **reasons** for installing the (**insert measure 1**)? **Ask them to describe up to three reasons**. **If necessary read examples:** *Increase output, Reduced maintenance, Reduced energy costs, Favorable Payback*.

_____
_____

_____
_____

49. Where did the **idea** come from to install (**insert measure 1**)? **If necessary read examples:** *Consultant, Previous experience with energy efficiency projects, Edison, Equipment supplier or installer, Internal staff, (ESCO name).*

_____
_____

If answer is *INTERNAL STAFF* probe here to find out

1. **How the internal staff knew about the technology, and**
2. **If and how they knew that financial assistance might be available from Edison's bidding program for this installation.**

_____
_____

50. Which of the following provided the most assistance in the design or specification of **(insert measure 1)? (Read the list)**

1 Consultant (**Read if necessary**) (e.g., architects, lighting designers, engineering firms, etc.)

2 Equipment Distributor or Manufacturer's Representative
3 Installer

4 Internal Staff
5 Edison Representative
98 Don't Know
99 Refused to Answer

Here are some statements that may be more or less true for your company about this project. Please assign a number between 0 and 10 to register how true it is. Please use a 10 to indicate that it is completely true, and a 0 to indicate that it is completely untrue.

51. The financial assistance from Edison's bidding program was nice but it was *unnecessary* to cause the energy-efficient version of this equipment to be completed.

_____ Response (0-10)

52. The financial assistance from Edison's bidding program was a *critical factor* in doing the version of the equipment that we did.

_____ Response (0-10)

53. We would not have installed the equipment that we did without the financial assistance from Edison's bidding program.

_____ Response (0-10)

The following questions are the last ones for this measure. They are about the financial calculations your company may or may not use to make capital decisions.

54. What financial calculations are usually made, if any, to help your organization make capital decisions of this type such as equipment installations or modifications, e.g., payback, return on investment or break-even analysis?

1 None **(Go to CHECK)**

2 Payback

3 Return on Investment (ROI)

4 Break-even Analysis

5 Other, specify: _____

98 Don't Know **(Go to CHECK)**
99 Refused **(Go to CHECK)**

55. What is the cut-off point that your organization uses to decide to go ahead? _____ (**for payback: maximum yrs, for ROI: minimum %)**

98 Don't Know **(Go to CHECK)**
99 Refused (**Go to CHECK**)

100 (Transfer answer to Q.8 here) _____

56. Which calculations, if any, were used for this equipment installation? ___ **(If none, go to CHECK)**

57. What was the result of the calculation for the (**insert measure 1)**? _____

A. _____ **With** financial assistance from Edison Bidding Program

B. _____ **Without** financial assistance from Edison Bidding Program

58. Using a scale from 0 to 10, 10 being extremely important, and 0 being not at all important, how important was this figure in your decision to make this equipment installation?

___ Response (**0-10**) **98** Don't Know **99** Refused to Answer

59. **If a *financial figure* (without the financial assistance) *was* calculated by the company and the financial figure calculated *meets* or *exceeds* the organization's own criterion, and answer to Q.8 is less than 5, say**:

This is quite a short payback. (**Or**) the ROI (**or other calculation**) was very good by your standards, I wonder why you wouldn't have installed (**insert measure 1**) even without the financial assistance Edison's bidding program?

_____

_____

98 Don't Know
99 Refused

60. Were there any competing investments under consideration at the same time that **(insert measure 1)** was being considered?

1 Yes, specify _____ **2** No **(Go to CHECK)**

98 Don't Know **(Go to CHECK)** **99** Refused to Answer **(Go to CHECK)**

61. Were these more or less attractive investments than the **(insert measure 1**)?

1 More Attractive **98** Don't Know

2 Less Attractive **99** Refused to Answer

CHECK:

D. If more than one measure was a part of the contract, say: You also received financial assistance from Edison's bidding program for:

Other Measures Installed
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Would any of the answers to these questions be different than the ones you just gave for (**insert measure 1**), including whether alternatives were considered, the timing of the installation, the financial criteria used, and the role of the financial assistance?

If any answers would be different, go through the interview for the measure numbers with different answers. If answers would not be different, then go to END.

E. If no more than one measure was a part of the contract, go to END.

END: Is there another person working for your company who is familiar with the impact of the financial incentive from (ESCO Name) on your company's decision to install the energy efficient equipment?

____ Yes Name_____ Telephone Number _____

____ No

____ Don’t Know
____ Refused

Those are all the questions I have. I greatly appreciate your time and cooperation.

Appendix B

Data Management

Table B-1 presents the relevant input files, number of observations and variables, the related SAS code, and resulting output files and their number of observations and variables. Figure B-1 presents the sequence of file development.

Figure B-1. Flow of Data Development

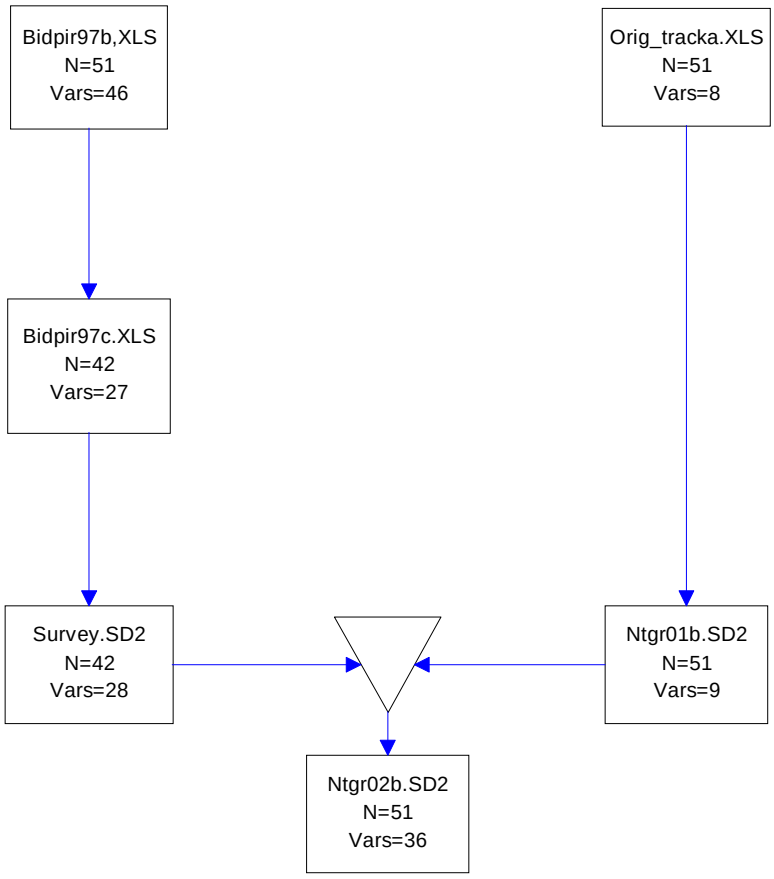

Table B-1. Data Used in the Evaluation of the Southern California Edison DM Bidding Program

	INPUT FILE	INPUT FILE OBS.	INPUT FILE VARS.	SAS CODE	OUTPUT FILE	OUTPUT FILE OBS.	OUTPUT FILE VARS.	
1	BIDPIR97B.XLS	51	46	N/A	N/A	N/A	N/A	Contains all c
2	BIDPIR97C.XLS	42	27	N/A	N/A	N/A	N/A	Contains all s quantitative a
3	BIDPIR97C.XLS	42	27	BID972.SAS	SURVEY.SD2	42	28	Contains all s quantitative a
4	ORIG_TRACKA.XLS	51	8	BID971A.SAS	NTGR01B.SD2	51	9	Converts bas database into
5	SURVEY.XLS NTGR01B.SD2	42 51	28 9	BID973A.SAS	NTGR02B.SD2	51	36	Master datas NTGRs.
6	NTGR02B.SD2	51	36	Bid97C1.SAS	N/A	N/A	N/A	Estimates sta commercial N
7	NTGR02B.SD2	51	36	BID97IB.SAS	N/A	N/A	N/A	Estimates sta NTGRs

These data are contained in the self-extracting zip file, SCEBID97.EXE.

Appendix C

Case Studies

Introduction

Following is a listing of contract and project numbers for each of the completed 18 decision-maker questionnaires, together with their NTGRs produced by the standard calculation methods and by the custom process. Also included are the rationales used for either accepting the Standard NTGRs or for changing them. The details of this customization process are discussed in Chapter 7. In this introduction, however, the principles used to make judgements about changing or not overriding Standard NTGRs are reviewed to help the reader understand the reasons for the decisions that were made.

Principles

1. The Standard NTGR should stand except when there is strong evidence that it should not.
2. The Standard NTGR should not be changed unless the change is substantial.
3. No one piece of information should be used to override the Standard NTGR. More than one piece or source of information should form a larger picture that contradicts the Standard NTGR before an override is considered.

In some instances, payback period was an important (and sometimes the only) component of the customer's decision process. When that was a central factor, it was sometimes necessary to base a NTGR estimation partially or entirely on this factor. The following payback conversion table, based on the Protocols[3], was used to quantify this information.

Payback Conversion Table

Payback Period	Implied NTGR
6 months or less	.40
More than 6 months and less than 2 years	.75
2 years or more	1.00

[3] Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand Side Management Programs, adopted by the California Public Utilities Commission in May of 1993, and most recently revised in January of 1997. Table C-5:Impact Measurement Protocols for the Industrial Energy Efficiency Incentives Program

In addition, the issue of timing was also considered. The decision-maker, in Question 14, was asked if, before he/she talked with the ESCO about the rebated project, their company had been planning to do a project within the same end use for which the rebate was received. If they indicated that their company had been planning to do such a project, then they were asked in Question 15 when, in this plan, would the project have been done without the influence of the financial assistance from the ESCO or Edison. Their answer to this question was then associated with a NTGR using the forecast conversion information in the table below.

Forecast Conversion

Forecasted Installation of Same Equipment	Implied NTGR
Less than 6 months	0
6 to 12 months	.125
1 to 2 years	.25
2 to 3 years	.5
3 to 4 years	.75
4 or more years	1.0
Never	1.0

Summary

In summary, the five core, pre-quantified, questions were considered the best estimate of the customer's experience of program impact on *what* was installed. Question 15 was considered to be the best estimate of the influence of the incentive on *when* it was installed. The average of these six questions was used to derive the Standard NTGR. Systematic efforts were made to follow the principles listed above in reviewing the Standard NTGR in light of all the information. However, judgement was also applied. Thus, the rationales provided below are intended to reflect the principles listed as well as to describe the judgements applied.

Contract Number: 111 & 110
Project Number: For 111: 4, 11, 13; For 110: 26
Core NTGR: .80
Custom NTGR: .80

Rationale

This project involved the installation of indoor lighting and variable speed drives on HVAC supply fans. The reason for installing this equipment included reduced energy cost, aesthetics, lighting quality, and a lack of replacement parts for the old lighting. The idea for these projects came from the ESCO who also provided the most assistance in the design and specification of the measures.

Before talking to the Edison representative, the customer was planning to do some lighting and HVAC projects. The customer was very confident that they would have eventually retrofitted/installed the same equipment, probably through the Edison Rebate Program in which the customer had been a past participant. In fact, the interviewer noted that the customer's confidence that they would have made these installations anyway was based on the assumption of future Edison help. His answers to questions #8 and #9 were completely contradictory, implying NTGRs of 1 and 0 respectively. He explained this contradiction by saying that they eventually would have installed the same equipment, but it would have been several years later. Later, in question #15, the customer underscored his statement by saying that he would have, in the absence of the program, done the project more than four years later due to financial problems. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR.

This customer typically requires a payback analysis for capital investments. For lighting the cutoff is 3-4 years while for HVAC it is 7-10 years. The customer indicated that the financial assistance from the ESCO reduced the payback to an acceptable payback.

The influence of the incentive appears to be on what was installed and when it was installed, both of which are already captured in the Standard NTGR. Thus, the Standard NTGR is allowed to stand.

Contract Number: 119
Project Number: 8
Standard NTGR: .72
Custom NTGR: 1

Rationale

This project consisted of a retrofit of indoor lighting. The reasons for installing this equipment included energy cost reduction, maintenance cost reduction, and improved lighting levels in work areas. The customer had not been planning any lighting projects before the ESCO came into the picture. The idea for the project came from the ESCO, and they provided the most design and maintenance assistance to the customer. One question that lowered the Standard NTGR was the question, ‘‘The financial assistance from (ESCO Name) was a critical factor in doing the version of the project that we did.’’ The answer given to this question was ‘‘4’’ out of a possible 10. However, this distorts the picture somewhat as the exact version of the equipment chosen was not the issue-—the fact is that this project would almost certainly not have been considered without the ESCO’s presentation of the idea. This idea is reflected in the respondent’s statement in support of the answer to the above question, paraphrased by the interviewer: ‘‘He stated that if they were ever to have done the project they would have selected the same equipment. But he said the likelihood of them doing the project was slight. So this number should probably be higher…’’

The respondent was sure that the financial calculations met their own criteria with the incentive, he didn’t remember the exact numbers. It was difficult to justify the project even with the incentive, because refinery lighting isn’t high on the pecking order at an oil company. For instance, there were certainly competing investments but the lighting project won because: 1) the ESCO packaged the project so the risk and the amount of effort needed to manage and implement it was reduced, and 2) the incentive made the project more attractive than other capital projects.

A very clear weight of evidence is that this project would not have been considered without the ESCO and without the financial assistance made possible by Edison. This implies a NTGR of 1.

Contract Number: 119

Project Number: 9
Core NTGR: .65
Custom NTGR: .65

Rationale

This project involved the installation of indoor lighting, occupancy sensors, and outdoor lighting. The reasons for installing this equipment are reduced energy costs, reduced maintenance, and improved lighting. Much of the lighting was over 50 years old. The idea for these projects came from the ESCO who also provided the most assistance in the design/specification of the equipment.

The customer indicated that they were already routinely upgrading the lighting as a part of maintenance activities. However, the decision to do a *district-wide* project was heavily influenced by the financial assistance from the ESCO. They did not consider any alternative to the measure installed. In the absence of the program, they would have done the project anyway four or more years later, because it would have taken at least that long to get the lighting systems upgraded using maintenance funding. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR.

He said they probably use a payback analysis for capital decisions, but he couldn't recall any of the details. This was probably because he came on board very late in the project and his knowledge of the decision process was therefore very sketchy. There was no one else at the company who knew more about these projects. Ultimately, his responses were based on his perception of the school district as an organization that wouldn't have originated the project without the help of the ESCO.

On the face of it, there is an argument for increasing the NTGR. However, the respondent's lack of knowledge regarding these projects casts some doubt on his claim that the project was *heavily* influenced by the financial assistance from the ESCO. Thus, the Standard NTGR cannot be overridden.

Contract Number: 119
Project Number: 10
Standard NTGR: .35
Custom NTGR: 0

Rationale

This project was an indoor lighting retrofit. The customer had been having maintenance problems and was experiencing low lighting quality and had been planning to do the project before ever talking to the ESCO. The respondent said that, without the incentive, the project would have been done within six months of the actual date. Their reasons for the project were: better lighting quality and quantity, reduced energy use, and the need to reduce maintenance. The respondent was uncertain where the idea came from, but a consultant provided the most design and specification assistance.

The interviewer's summary was: ''a lighting contractor developed the project and brought the ESCO on-board in order to secure the incentive/credits. They had a variety of lighting in place that was in need of replacement…''

The customer, on its own initiative, had brought in a lighting contractor who designed and specified the project. The contractor knew about the ESCO, so brought them in to provide some financial assistance. However, the project would have gone ahead anyway if the ESCO and the program were not in place. Therefore, the NTGR should be 0.

Contract Number: 119
Project Number: 16
Standard NTGR: .658
Custom NTGR: .658

Rationale

This project involved an indoor lighting retrofit. The reasons for the retrofit were reduced energy costs, reduced maintenance, and improved lighting quality. In addition, they had to replace the HO lighting since it had become obsolete. The idea for this project came from internal staff based on their experience and exposure to Edison literature. The ESCO provided the most assistance in the design/specification of the project.

Before talking to the ESCO, they were planning a lighting project as a part of their routine retrofitting of lighting systems. The customer did not consider any alternatives to the measure installed. The customer also stated that the presence of financial assistance and the anticipated lack of such assistance in the future caused them to do the work sooner than they would have otherwise. In the absence of the financial assistance from the ESCO, they would have installed the measure one to two years later since that's when they would have gotten to the retrofits in their retrofit schedule. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR. The customer also noted that the financial assistance allowed them to make changes to fixtures that they would not have done otherwise.

This company uses a 1.5-year payback cutoff when making capital decisions. However, he was uncertain about the specific numbers calculated for this project but said that the incentives pushed the project under their cutoff point. There were numerous other competing, although less attractive, investments. The incentive allowed the project to win over competing projects. Finally, the customer stated that there is another building that they have not as yet retrofitted because of the lack of financial assistance. Presumably, this building will be retrofitted within the next one to two years as a part of routine maintenance.

It seems clear that Edison influenced both what was installed and when it was installed, both of which are already captured in the Standard NTGR. Thus, there is no compelling reason to overriding the Standard NTGR.

Contract Number: 119
Project Number: 17
Standard NTGR: .488
Custom NTGR: .488

Rationale

This was an indoor lighting retrofit project. The customer had 25-year-old lighting and planned to upgrade it, but had limited capital resources. The respondent indicated that, without the financial assistance, the project would have been carried out over a three-year period so that the cost would be spread out over that time. So, the effect of the program was mainly on the timing of the project, and this fact was taken into account in the Standard NTGR algorithm. The customer calculates a ROI for their decisions. The decision-maker's recollection was that the project exceeded their cut-off both with and without the incentive. However, because of their limited capital resources, many projects that meet their criteria still are not implemented. The Standard NTGR seems to reflect the picture painted by the more detailed custom analysis, so no change was implied.

Contract Number: 119

Project Number: 25
Core NTGR: .175
Custom NTGR: .175

Rationale

This project involved a lighting retrofit done for the purpose of reducing energy use. The idea for this project came from Edison and from a meeting with staff of the California Energy Commission. An installer provided the most assistance in the design/specification of the lights.

If they had not participated in the Edison Program, they probably would have participated in a CEC program. In the absence of the financial assistance from the ESCO, they would have done the same thing later since they were planning to do a lighting project before talking to the ESCO. In the absence of the Program, they would have installed the same equipment one to two years later because it would have taken that long to participate in the CEC Program. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR.

The customer typically uses payback in evaluating capital investments and normally requires a one-year payback as a maximum. Without the financial assistance of the ESCO, the payback was 2.2 years. The customer could not recall what the payback was with the incentive. This may not matter much since the customer only ranked the importance of the payback as a 3 on a 10-point scale. There was an alternative to the Edison Program, i.e., the CEC grant and loan program.

The customer does not state that in the absence of the incentive that they would have done the lighting retrofit *on their own*. Rather, they say they would have eventually would have funded the project through participated in the CEC program. This suggests that the influence of the incentive may be higher than their answers to questions #8, 9, 21, 22, and 23 would suggest. However, the payback of 2.2 years was already reasonably low implying a low NTGR. In the end, there is insufficient information to override the Standard NTGR.

Contract Number: 119
Project Number: 28
Core NTGR: .88
Custom NTGR: 1

Rationale

This project involved a lighting retrofit and the installation of occupancy sensors. The reasons for these projects were reduced energy costs, favorable economics, and reduced maintenance. The idea for these projects came from the ESCO, who also provided the most assistance in the design/specification of the projects.

Before talking to the ESCO, they were *not* considering a lighting project. They typically use present-value analysis in evaluating capital investments. However, while he was uncertain regarding the outcome of the analysis for this lighting project, he maintained that the project wouldn't have happened without the incentive from the ESCO. There were various other competing investments, but they were all less attractive. Timing was not an issue on these projects.

The customer also stated that, since they are a non-profit, R&D organization, most of their projects have little or no return. Presumably this means that this customer is not usually focused on minimizing costs in order to maximize profits. On the other hand, when a third party takes the initiative, and presents a project that will save the customer money, and that requires little or no capital investment, the customer will likely respond positively to it. Such seems to have been the case here. The customer was not thinking at all about a lighting project until approached by the ESCO. The respondent states directly that, if the ESCO had not approached them, the project probably would not have been done. Since the customer wasn't even considering a lighting project before being approached by the ESCO, the NTGR should be 1.

Contract Number: 119
Project Number: 29
Core NTGR: 0
Custom NTGR: 0

Rationale

This project was an indoor lighting retrofit. The reasons the decision-maker gave for installing the lighting were: reduced energy costs, aesthetics, light quality, reduced maintenance, and availability of replacement parts. The idea came from a lighting contractor several years ago. They had been planning to do the project before the ESCO approached them, in fact it was already in process. The incentive was just "icing on the cake." The payback period was about 13-14 months with assistance, and 18 months without, and two years is the cut-off for this customer. Thus, it was a financially viable project without the assistance. The Standard NTGR is 0, and there is no reason to change that number based on the open-ended questions of the interview.

Contract Number: 119
Project Number: 30, 31
Core NTGR: .75
Custom NTGR: .75

Rationale

This project involved the installation of indoor lighting. The reasons for these installations were reduced energy costs and better quality lighting. The idea came from internal staff. However, the ESCO provided the most assistance in the design/specification of the equipment.

Before talking to the ESCO, they were planning to do a lighting project and did not consider any alternatives to the measure installed. They had received proposals from other parties. However, these other parties were unable to offer the same type of financing package that the ESCO offered. This package allowed them to proceed with no up-front expenditure of funds. In the absence of the Program, they would have installed the same equipment, they would have installed the same equipment two to three years later because they wouldn't have been able to justify the capital outlay until then. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR.

This company typically uses payback as a way of evaluating capital investments. However, they have no cutoff. Rather they are simply concerned about the cash outlay. Cash flow is the most basic problem.

The ESCO offered them a financial package that allowed them to proceed with the project with no up-front expenditure of funds. This is the only reason that the project went forward. As a hospital organization, projects related to patient care have the highest priority. So, competing projects involving patient care would win over a lighting project. It wasn't until the ESCO was able to offer them a project without any up-front outlay that the project was able to move forward.

The financial assistance from the ESCO appears to have influenced both what was installed and when it was installed. The influence of the incentive seems greater than what is reflected in the answer to the closed-ended questions #8, 9, 21, 22, and 23. However, timing is also an issue. If timing had been the *only* issue a somewhat lower NTGR would be implied. Since both of these elements are already captured in the Standard NTGR, the Standard NTGR is allowed to stand.

Contract Number: 119
Project Number: 34
Standard NTGR: .725
Custom NTGR: .725

Rationale

This project involved the installation of indoor lighting. The primary reasons for this installation were reduced energy costs, although improved lighting was also a factor. The idea for the project came from internal staff based on his past experience as an energy manager.

The customer did not consider any other alternatives to the equipment installed and there were no other competing investments. Before talking to the ESCO, they had been planning a lighting project. Actually, the customer seemed rather vague about this. It appeared he had ideas for projects but nothing really formal. In the absence of the program, they would have done the same project in one to two years because it would have taken that long to find the money in his normal annual capital budget. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR.

This company typically uses simple payback for evaluating capital investments, with a cutoff of 10 years. With financial assistance, the payback was 5-7 years. Without assistance, it was 10 years. The customer ranked the importance of the payback figure as an 8 on a 10-point scale.

This information does not constitute compelling evidence for overriding the Standard NTGR.

Contract Number: 120
Project Number: 13
Core NTGR: .808
Custom NTGR: .808

Rationale

This project involved the installation of pump off controllers (POCs). The reason for their installation included reduced energy costs, reduced maintenance costs, and increased reliability. The idea came from internal staff who learned about it from the use of the equipment elsewhere in the oil industry and from journals. The internal staff also provided the most assistance in the design/specification of the equipment.

Before talking to the ESCO, they had been planning a POC project and would have, in the absence of the program, installed the same measures in three to four years because it would have taken that long to gather the data on secondary benefits of the technology. The secondary benefits (reduced maintenance, downtime etc.) are difficult to estimate so he felt that it would take 2-3 years of experience with the equipment previously installed with the SCE incentive to quantify the secondary benefits and justify the project. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR.

They had installed POCs using SCE incentives prior to this project. They knew that this technology would qualify for an incentive and it was just a question of whether the ESCO or SCE paid the money. This implies that the company had become reliant on Edison incentives. One interpretation of this fact is that, in the absence of incentives, the company would *not* be willing to pay for the POCs, suggesting a high NTGR. Another interpretation would be that if the incentives were removed, the company would then be forced to use it's own resources to fund energy efficiency projects. This would suggest a low NTGR. Because of the ambiguity in interpreting the reliance of this customer on Edison incentives, neither can be legitimately used to alter the Standard NTGR.

Typically they require a 40% return on investment (ROI). While he didn't remember what the ROI was for this project, he was certain that the incentive made the difference. They were considering other projects (de-bottlenecking pipelines) but these were less attractive as investments.

Given all of the ambiguities in these data, there is no compelling evidence to override the Standard NTGR.

Contract Number: 133
Project Number: 8
Standard NTGR: .483
Custom NTGR: .483

Rationale

This project involved both an indoor lighting retrofit, and VSDs on VAV supply fans for HVAC equipment. The respondent was a newcomer to the company. His view was that the building owner was interested in reducing energy consumption from the time that he purchased the building, resulting from the report of a consultant hired to perform due diligence during the purchase period. However, this does not necessarily mean that the same project would have been done in the same time that it happened under the influence of the ESCO. Clearly, there was substantial internal motivation to conserve energy, and this is reflected in the low Standard NTGR. However, there is not enough first-hand knowledge represented in the interview to justify overriding the Standard NTGR. The Standard NTGR is not well founded either, since it is based on the answers of a non-participant in the process, but it is low, reflecting their apparent interest in the project prior to the involvement of the ESCO. Therefore, the Standard NTGR will be allowed to stand.

Contract Number: 133
Project Number: 17, 18, 20, 21
Standard NTGR: .725
Custom NTGR: .725

Rationale

This project involved the installation of indoor lighting and a variable speed drive on an HVAC system. The primary reasons for these installations were reduced energy costs, although improved lighting was also a factor. The idea for the project came from internal staff based on his past experience as an energy manager.

The company did not consider any other alternatives to the equipment installed and there were no other competing investments. Before talking to the ESCO, they had been planning lighting and HVAC projects. The respondent seemed rather vague about this. It appeared that he had ideas for projects but nothing really formal. In the absence of the program, they would have done the same project in one to two years because it would have taken that long to find the money in his normal annual capital budget. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR.

This customer typically uses simple payback for evaluating capital investments, with a cutoff of 10 years. With financial assistance, the payback was 5-7 years. Without assistance, it was 10 years. The customer ranked the importance of the payback figure as an 8 on a 10-point scale.

This information does not provide a compelling reason for overriding the Standard NTGR.

Contract Number: 133
Project Number: 19, 24
Standard NTGR: .238
Custom NTGR: .238

Rationale

These projects involved both HVAC and lighting installations. The customer’s reasons for installing this equipment were: reduced energy consumption, increased comfort, tenant improvements, favorable payback, and reduced maintenance. The payback period was reduced from 6.5 years to five years by the incentive, as remembered by the respondent. There were competing tenant improvement projects but the incentive pushed this project ahead, according to the respondent. However, the interviewer indicates that some of the projects were underway at the time. Several parties had made proposals, but the ESCO’s package included incentives which made that package more appealing than the others. The main effect of the program was to accelerate the installation somewhat (they would have done the same thing 6 months to one year later). This effect is taken into account by the Standard NTGR, and there is no reason, based on the rest of the interview to change that low number.

Contract Number: 133
Project Number: 22, 23
Standard NTGR: .667
Custom NTGR: 1

Rationale

This project involved the installation of indoor lighting. The reasons for these installations included reduced energy costs, better lighting, and favorable payback. While the idea came from internal staff, the ESCO provided the most assistance in the design/specification of the equipment.

They did not consider any other alternatives. Prior to talking to the ESCO, they were planning a lighting project, but they didn't have this *particular* project in the works. They had been retrofitting routinely and had upgraded other lighting systems without the benefit of incentives, since as a government contractor they were already committed to reducing energy use to comply with federal programs. However, he also stated that, in the absence of the Program, they would have installed the same equipment four or more years later because it would have been five years before the money would have been available in their normal budgeting process. Note that this information regarding the timing of the project is already taken into account in the calculation of the Standard NTGR.

This company typically uses payback and return on investment as ways to evaluate capital investments. The cut-off for payback is normally two years. However, for this project, they made an exception and accepted a payback of 2.5 years. He felt that the incentives enabled the project to be done and was certain that a longer payback would have killed the project's chances since there were numerous competing investments.

The effect of the incentives appears to have been only on the timing of the installation and not on what was installed. That is, the customer's answers to the questions about the influence of the incentive should be discounted given their responses to the open-ended questions and the fact that most of the pre-quantified questions deal with *what* was installed. If timing is the only issue and if they would not have installed the same equipment until four or more years later, then the implied NTGR is actually 1. Thus, the Standard NTGR is changed to 1.

Contract Number: 138
Project Number: 3
Standard NTGR: .05
Custom NTGR: .05

Rationale

This was a chiller replacement project. The old chillers were near the end of their lives, and the customer was planning to expand their facilities. These factors both indicated the need to replace the chillers. The internal staff had the idea to replace them with energy-efficient ones, and the information came from trade journals, seminars, etc. The respondent said that the financial calculations had very little impact because they would have done the project anyway within six months of the actual installation date. There was no basis in the interview for changing the extremely low Standard NTGR.

Appendix D

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