Final Report

The California 2006-2008 Energy Efficiency Portfolio

A Review of Early IOU Planning Documents

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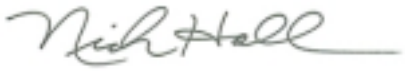
Nick Hall, TecMarket Works



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Introduction

This document presents the results of a preliminary review of California's statewide and IOU energy efficiency portfolios submitted to the CPUC on June 1, 2005. The TecMarket Works Team is under contract to the CPUC to review and provide advice to the California Public Utilities Commission - Division of Energy (CPUC-ED) regarding the ability of the portfolios to meet the energy savings targets provided to the IOUs in decision D0409060/R0108028. The review also consists of the identification and discussion of a number of issues of importance to the CPUC-ED staff.

Through the review of the portfolio and program materials by the TecMarket Team (Team) and by other groups examining the portfolios (Program Advisory Groups and Peer Review Groups), the CPUC is able to conduct a more informed or expanded assessment of the IOU portfolio and portfolio construction process.

This process provided the Team a limited amount of time to conduct the review. As a result, this review is not an exhaustive review, but does present and discuss many of the issues and concerns identified by the CPUC-ED staff during project planning meetings. The primary issues and concerns identified by the CPUC–ED staff include:

- ✓ The portfolio's ability to reach energy goals
- ✓ The reasonableness of the savings projections
- ✓ The coverage of the programs in the portfolios
- ✓ The range and magnitude of administrative costs
- ✓ Lost opportunities that can be identified during the review
- ✓ The various risks associated with the programs and the portfolios
- ✓ The relative balance between the budgets and the programs offered
- ✓ Other issues that can be identified by the Team during the review process

These review objectives focused the Team's efforts and allowed the Team to assess the portfolio and the mix of programs offered in time to meet the CPUC's review timelines.

Summary of Results

The review of the 2006–2008 IOU portfolios reached the following conclusions.

1. The IOUs will meet the goals projected in their submitted portfolios if the following conditions apply:

    a. If the Policy Manual's Net to Gross (NTG) ratios are confirmed to be substantially accurate via the ex-post evaluation efforts,
    b. If the IOUs are able to wind up their programs to install the number of units projected consistent with the projected increase in program size,
    c. If the IOU's measure-level energy savings projections are used as the basis for the accomplishment assessment (rather than evaluation confirmed measure-level savings), and
    d. If the partnership, third-party, and bid programs achieve a rapid start-up and are able to meet their measure installation goals.

If these conditions do not apply and the evaluation-confirmed savings act to lower estimated savings by 20% or more, the goals may not be reached unless energy saving credits from the information, education, and marketing programs are applied.

2. The IOU portfolios are expected to be cost effective (TRC>1.0) even after evaluation-confirmed savings are applied.

3. The kW savings estimates across the IOUs are calculated using different dates for the period at which kW impacts are estimated. This condition causes the IOU kW impacts to be incomparable.

4. The majority of the electric and gas savings included in the statewide portfolio are non-DEER, IOU-calculated estimates. The portfolios are lacking complete measure estimate documentation, or the documentation provided does not provide a clear path for replicating the estimate for a significant number of these measures. This condition typically applies to measures that are difficult to estimate. However, all IOU submissions should contain a complete presentation of the calculation approach used for each non-DEER-based measure included in their portfolios. As a result, for some measures we are unsure if the impact projections are reasonable because the documentation was not clearly presented or was not presented early enough to allow a complete review. The CPUC should require an IOU-specific Energy Savings Dictionary with every filing, clearly presenting transparent and fully documented calculation formulas and input data and data sources so that CPUC staff can easily replicate and assess the calculations provided.

5. The KEMA potentials estimates do not reflect 2006 codes and standards conditions or current technology penetrations. These studies need to be updated if they are going to be used for 2006–2008 goal planning.

6. The energy savings estimates assume a growth economy consistent with the potentials study. If the economic growth projected is not realized, goal attainment is additionally at risk.

7. PG&E and SCE have moved to a Flagship approach to providing programs and have structured their portfolios around market sectors instead of individual programs operated separately. This is a positive change that will require expert management and new tracking system designs. The tracking systems will need to be expertly managed and populated if the CPUC's impact evaluation efforts are to succeed. The new tracking systems should be reviewed and approved by CPUC evaluation staff early in the program cycle.

8. Administrative costs seemed to be calculated differently by the IOUs and may not be comparable.

9. The CPUC should consider establishing a formal mid-course program design and funding change policy and convey that policy to the IOUs to be incorporated into their portfolios. That policy should allow the CPUC to function in their public oversight responsibilities, but provide a level of flexibility that allows the programs to be modified within a public approval process. The current portfolio planning process allows the IOUs, working with the Program Advisory Groups, to recommend the oversight function and process.

10. The current portfolios assume that the Policy Manual's NTG ratios accurately project savings potential. For several measures, the Policy Manual NTG values are not consistent with evaluation findings, causing projected savings to be higher than what the EM&V efforts will confirm. The NTG values need to be updated if they are to accurately predict program impacts. Moving to a single NTG value of 0.8 for all measures does not solve the issue.

11. There needs to an agreement and consistency of the calculation approach used in the E3 Calculators and the California Standard Practice Manual. At this time they do not appear to be consistent. Using the Policy Manual as a guide, we would not expect to see the PAC as a larger number than the TRC. Upon review of this issue, it appears that the condition is E3-based and is associated with program conditions that occur when an incentive equals the full cost of the measure, such as when a refrigerator is given away at no cost to the participant or when a program is offering incentives above the incremental cost of the measure

12. The IOUs do not have consistent energy impact estimates or estimate approaches at the measure level, even after adjusting for climate differences.

13. Some program TRCs are higher than we expected. However, the wide range of TRC results across the portfolio were expected as a result of the wide range of programs offered.

14. The IOU portfolios seem to be consistent with the incentive and reward structures in that they focus on kWh savings. However, the primary needs of the state may be kW impacts. To obtain high kW impacts, the incentive structure may need to focus on kW impacts. Emphasizing lowest cost kWh and high TRC values acts to focus the portfolio on fewer high performing measures, such as lighting upgrades. However, the portfolio appears to be reasonably well-balanced, considering the planning and award approaches in operation.

15. There is no contingency fund to allow for rapid capturing of short-term market opportunities without reducing funding for other planned efforts. The CPUC should consider establishing a contingency fund to allow programs to rapidly capture market short-term emerging market opportunities without needing to pull funds from planned activities or other programs. This fund should be capable of deploying resources in a few days when a new or emerging cost-effective market opportunity is identified.

16. Several measures incentivized in the IOU portfolios are already required by law (codes and standards). Whether these measures should be included in the portfolios is questionable. Because several of the measures in the portfolios are already covered by the new codes and standards, we are assuming that these are being incentivized because of lack of code compliance. If this is the case, it may be more cost-effective to operate compliance programs out of a governmental agency such as the CEC or through local jurisdictions. The CPUC should consider assessing the level of compliance in late 2005 or early in 2006 to determine if a compliance initiative should be launched.

17. This portfolio contains a significant increase in past program funding levels. We are concerned that program delivery ramp up may be slower than expected, causing 2006 savings to be difficult to deliver. If the IOUs are aggressive and manage the ramp up well, this may not be an issue. Previous program cycles have experienced start-up delays and logistical issues, slowing program implementation. We have concerns if these programs, as a whole, can acquire the projected savings for 2006.

18. There are very large budgets for marketing and outreach programs that have not yet demonstrated their value in producing direct or indirect energy effects. Before the CPUC approves a three-year budget for these programs, these efforts need to have an effects evaluation to document how energy consumption is directly or indirectly influenced by these efforts.

19. The On-Bill Financing program may pose a public image risk in that the ratepayers will be paying the IOUs over 8 percent return on their loan investment, when the risks of default are low and the consequences high.

20. There may be substantial savings opportunities by placing all programs that deal with construction or construction-related services into a coordinated statewide umbrella structure that delivers these efforts into the market.

21. There appears to be lost additional opportunities in some key areas. These include:

    a. Agriculture programs,
    b. Manufactured housing retrofits,
    c. Manufactured housing, and
    a. HID replacements.

We hope that the suggestions and issues identified in this report will further strengthen the portfolios and their ability to achieve their savings goals.

The remaining sections of this report provide more detailed information on the assessment process and findings.

Methodology

This assessment was conducted under a compressed review period and covered a wide range of IOU-provided documents. The review approach consisted of five sequenced steps:

1. Participation in key Program Advisory Group (PAG) and Peer Review Group (PRG) meetings in California, including IOU PAG and PRG and statewide PAG and PRG meetings.
2. Participation in discussions and presentations of the portfolios by IOU portfolio managers.
3. Discussions with CPUC-ED staff concerning components of the material provided for review between May 10 and May 20, 2005.
4. Team reviews and discussions of June 1, 2005 portfolio documents, including descriptive documents in addition to energy and cost projections (spreadsheets and EZ-Calculators).
5. Development and review of draft sections of this report and TecMarket Works Team agreements on the report's contents.

The contents of this report are presented in three levels. These are:

1. Statewide Portfolio Assessment
2. IOU Portfolio Assessment
3. IOU Programs- Assessment.

The following sections of this report convey the results of the assessment to the CPUC.

Statewide Portfolio Assessment

Goal Attainment

Comparison with CPUC Goals, Potentials, and Utility Plans

Table 1 provides a comparison of the IOU energy goals, their savings potentials, and their utility plans. Due to inconsistencies found in the reporting of demand savings, these goals have not been included in this table. In all cases the utilities' forecast of kWh and therm savings exceed not only the 100 percent achievable potential estimates, but also in most cases, the CPUC goals.

Table 1. Statewide – CPUC Energy Goals, Potentials and Utility Plans

Mth	Residential	Non-Residential	Industrial	All Sectors		
	100% Ach	100% Ach	100% Ach Proxy	100% Ach Proxy	CPUC Goal	Utility Plan
SDG&E	2.82	2.47	1.44	6.73	9.50	9.07
SCG	15.38	8.88	11.46	35.72	57.30	60.7
SCE						0.00
PGE	14.53	11.04	11.51	37.08	44.9	51.8
Total	32.73	22.39	24.41	79.53	111.70	121.57
GWh	**Residential**	**Non-Residential**	**Industrial**	**All Sectors**		
	100% Ach	100% Ach	100% Ach Proxy*	100% Ach Proxy	CPUC Goal	Utility Plan
SDG&E	209.81	192.68	46.54	449.03	850.00	1,003
SCG						36.98
SCE	814.62	889.46	424.40	2128.48	3135.00	3,365
PGE	873.64	751.39	354.42	1979.45	2826.00	3,021
Total	1898.07	1833.53	825.36	4556.96	6811.00	7,425.98

*Proxy numbers were developed by the TecMarket Team using estimated values based on IOU-specific potentials presented in the KEMA potentials reports[1].

Goal Attainment Sensitivity Analysis

In addition to the NTG sensitivity analysis, we also examined the relationship between a reduction in the NTG levels and the ability of the portfolios to achieve the CPUC's energy savings goals. In assessing the portfolio's ability to reach CPUC energy goals with various NTG ratios, we used an abbreviated examination approach because of time restrictions for the analysis. In this analysis we compared the IOU energy savings goals with reductions in achieved savings (taken from Table 2) showing the IOU-specific goals. We reduced the expected savings using the same levels of reduction conducted in the NTG sensitivity analysis and compared the resulting savings with the CPUC goals for each IOU. We would have preferred to use recalculated E3 outputs for this analysis, but there was insufficient time to conduct an E3 recalculation approach. However, the approach used does provide a reasonable vision of the sensitivity of how close the portfolios are to goal attainment at different NTG values.

[1] The KEMA potentials reports referenced for this study included:
California Statewide Commercial Sector Energy Efficiency Potential Study, July 2002.
California Statewide Commercial Sector Natural Gas Energy Efficiency Potential Study, May 2003 (Revised July, 2003).
California Statewide Residential Sector Energy Efficiency Potential Study, April 2003.
For the industrials potential, we used preliminary estimates from the yet to be published 2005 industrial potentials study.

In summary, the energy acquisition programs within the portfolios are at risk of not reaching the CPUC's energy goals if the realized NTG values are less than those assumed in the Policy Manual. For example, for the CPUC's natural gas savings goals, none of the IOUs will meet the goals if the NTG values are adjusted downward by 20% (although PG&E is quite close). And as one further reduces the NTG ratios, every utility moves further away from the CPUC goals.

A similar, but less dramatic shift is seen when we reduce the kWh savings. For example, at a 20% reduction in kWh attainment, PG&E is unable to reach their goals, drawing the statewide savings below the CPUC statewide goal. However, SCE and SDG&E are able to meet their electricity goals. At a 40 percent reduction, SDG&E is the only IOU able to meet its electricity (kWh) goals.

We do not think that there is substantial risk of a 40% reduction in electric energy NTG values across all IOU portfolios. However, in view of the measure savings estimation process and the risk issues identified in this report, we are unable to predict that the evaluation results will not erode less than 20 percent of the predicted savings.

As a result of these assessments, we conclude that there is a high probability that the portfolios will be cost-effective and provide energy resources to California at attractive prices. However, we are unable to conclude that the portfolios will reach their CPUC goals once ex-post EM&V adjustments have been applied to the predicted savings for the resource acquisition programs. However, we would expect that the energy savings from the information and education programs will offset the adjustments from the evaluation findings, providing portfolios that will reach the CPUC's energy savings goals. For example, the addition of savings from the Codes and Standards program will drive the portfolio above the CPUC's goals if the CPUC will allow these to be credited to the portfolio. In addition, energy savings from the Flex Your Power program and other marketing and promotional efforts can also be expected to increase savings. If we count these savings that are currently not being counted, the IOU portfolios should meet the CPUC's goals and be cost-effective. If the CPUC wants to be assured that the portfolios will reach their energy savings goals with only the acquisition program, we recommend that resources be shifted from low performing programs to higher performing programs. Table 2 presents the results of the abbreviated goal attainment analysis. However, we again point out that this analysis does not compare the energy savings projections from reruns of the E3 calculator and are therefore not as accurate as what could have been projected if more time were available for this assessment.[2]

[2] This analysis does not include assessing other risks beyond the NTG assessment presented above. There are other risks discussed later in this report that impact the ability of the portfolios to be cost effective and reach their energy impact goals. These risks, along with the risks of the NTG ratios, could prove additive in lowering the post-evaluation TRCs from those cited in the filings. Those upwardly biasing risks include potential over-estimation by not incorporating Title 24 requirements properly into baseline conditions, net savings projected for incentives for code compliance, risk in 2006 projected savings from assumed immediate full operation of all programs, and risks from those programs where the TRCs appear unrealistically high. At the same time, this assessment and the nature of some counterbalancing (i.e., positive potential of uncounted savings in some areas) suggests that overall it is likely that the portfolios as proposed would be found cost-effective based on evaluation findings.

Table 2. Statewide and IOU Portfolios – CPUC Energy Goals and NTG Sensitivity

Mth	CPUC Goal	Utility Plan	NTG Reductions		
			80%	60%	40%
PG&E	44.90	51.80	44.75	37.06	28.20
SDG&E	9.50	9.07	8.54	7.82	6.79
SCE			0.00	0.00	0.00
SCG	57.30	60.70	56.20	50.33	42.09
Total	111.70	121.57	109.51	95.21	77.12
GWh					
PG&E	2,826.00	3,021.00	2,610.13	2,161.17	1,647.33
SDG&E	850.00	1,003.00	944.61	865.32	750.99
SCE	3,135.00	3,365.00	3,158.78	2,869.97	2,438.57
SCG			34.25	30.66	25.64
Total	6,811.00	7,425.98	6,747.76	5,927.12	4,862.53

Energy Savings Overview

Looking across the four IOU's portfolio budgets and projected impacts for 2006–2008, shows significant variance. While this variance is expected, some costs (administrative) that were expected to be similar in their proportional relationships across the IOUs are significantly different. Overall, according to the submitted June 1, 2005 IOU workbooks, the total budget for the statewide portfolio is $2,185,843,966 over the years 2006–2008. This funding makes this round of programs the largest state energy efficiency portfolio in history, and again establishes California as the energy efficiency leader of the United States. The individual IOU budgets are representative of the size and service structures of the IOU territories. As expected, the lowest portfolio budget is the SCG budget at $182.2 million. The largest budget is PG&E's portfolio at $975.1 million. Between these two boundaries is SCE's portfolio at $750.3 million and SDG&E's portfolio at $278.1 million. The following table provides a comparison of the IOU budgets and includes the general budget categories of administration, marketing, implementation, and evaluation. This table also includes the expected impact from the implemented portfolios. The portfolios are expected to provide a net summer peak load reduction of 1,585,096 kW; 7,554,178,128 kWh; and 116,239,318 therms of savings. However, because some of the IOUs did not fully estimate the therms that will be saved from the technologies being installed, this estimate may be conservative.

Table 3. Statewide – 2006–2008 IOU Portfolio Comparisons

	SCG	SDG&E	PG&E	SCE	Statewide
Budgets					
Administrative Costs	$37,427,973	$45,982,197	$51,258,301	$57,542,781	$192,211,252
Marketing/Outreach	$22,305,681	$20,730,828	$62,065,850	$47,575,678	$152,678,037
Direct Implementation	$109,187,979	$190,827,538	$754,144,092	$569,713,541	$1,623,873,150
EM&V Costs	$13,313,731	$20,603,245	$75,432,017	$53,986,560	$163,335,553
Budget	$182,235,364	$278,143,808	$942,900,260	$728,818,560	$2,132,097,991
Costs Recovered from Other Sources	$0	$0	$32,218,011	$21,527,964	$53,745,975
Total Budget	**$182,235,364**	**$278,143,808**	**$975,118,270**	**$750,346,524**	**$2,185,843,966**
Program Impacts					
Net Summer Peak (kW)	19,331	209,894	540,795	820,000	1,585,096
Annual Net kWh	36,984,861	1,003,871,693	2,964,641,966	3,548,679,608	7,554,178,128
Annual Net Therms	57,903,508	9,067,946	49,267,863	0	116,239,318
Cost-Effectiveness					
TRC BC Ratio	1.41	1.94	1.61	2.76	1.99

Comprehensiveness

There is a substantial mix of programs in the portfolios. Some are continuations of tried and true programs with long histories of results and corresponding evaluations for assessing impacts. There are also combinations of programs grouped into new, larger "Flagship" programs that seek to improve performance through integration of old and new program activities. Finally, there are some totally new programs, market partners, and approaches that will be tested. Within each utility program assessment included in this report, comments are provided that will describe some examples of portfolio and program design risk. Overall, the reviewers found that the program designs were built on historically proven foundations. However, there were some new programs that have new implementers / partners that are unproven. For these programs, the risk of goal attainment is higher and ramp up risk will be larger. The following table (Table 4) presents the IOU portfolios and their associated budgets as well as the distribution of savings across the targeted sectors.

Table 4. Statewide – Projected Funding and Energy Savings by Utility and Sector*

PGE	Funding	% of 2006 Total	Savings (Net kWh)	% of 2006 Total	Savings (Net Therms)	% of 2006 Total
Residential	$62,229,905	23.4%	230,703,135	26.9%	1,376,058	9.7%
Residential New Construction	$9,944,239	3.7%	5,407,627	0.6%	397,424	2.8%
Non-Residential	$114,088,159	42.9%	502,648,914	58.6%	9,133,065	64.1%
Non-Residential New Construction	$31,114,953	11.7%	118,370,884	13.8%	3,346,547	23.5%
Other [3]	$48,550,730	18.3%		0.0%		0.0%
Total Funding	$265,927,985		857,130,560		14,253,093	

SCE	Funding	% of Total	Savings (Net kWh)	% of Total	Savings (Net Therms)	% of 2006 Total
Residential	$184,720,318	27.4%	1,150,615,005	33.1%		
Residential New Construction	$18,332,158	2.7%	48,212,419	1.4%		
Non-Residential	$291,911,502	43.3%	1,893,122,655	54.5%		
Non-Residential New Construction	$30,932,770	4.6%	132,261,143	3.8%		
Other	$148,935,252	22.1%	251,587,233	7.2%		
Total Funding	$674,832,000		3,548,697,608			

SDG&E	Funding	% of Total	Savings (Net kWh)	% of Total	Savings (Net Therms)	% of Total
Residential	$21,487,200	7.7%	62,771,872	6.3%	1,732,676	19.1%
Residential New Construction	$8,334,580	3.0%	6,853,433	0.7%	249,143	2.7%
Non-Residential	$115,976,066	41.7%	441,110,531	43.9%	4,301,654	47.4%
Non-Residential New Construction	$13,599,939	4.9%	20,660,512	2.1%	351,503	3.9%
Other	$118,746,025	42.7%	472,475,346	47.1%	2,432,971	26.8%
Total Funding	$278,143,810		1,003,871,693		9,067,946	

SCG	Funding	% of Total	Savings (Net kWh)	% of Total	Savings (Net Therms)	% of Total
Residential	$30,900,000	17.0%	31,343,032	84.7%	9,717,735	16.8%
Residential New Construction	$8,750,000	4.8%	5,634,516	15.2%	220,489	0.4%
Non-Residential	$48,948,177	26.9%	0	0.0%	29,490,120	50.9%
Non-Residential New Construction	$11,400,000	6.3%	7,313	0.0%	8,510,164	14.7%
Other	$82,237,187	45.1%	0	0.0%	9,965,000	17.2%
Total Funding	$182,235,364		36,984,861		57,903,508	

* Information copied from the June 1,2005 filing.

The review team reviewed all the measures listed within the spreadsheets provided by the utilities. The team found that the utilities incorporated most of the measures and markets that should be covered by programs. However, the team identified some missing potential measures

or sector targets that can be characterized as lost opportunities. These are discussed later in this report.

Policy and Policy-Related Issues

During the review effort, the TecMarket Works Team identified a number of issues that have policy implications. They are discussed in this section of the report.

Administrative Costs

The administrative budgets of the four utilities show significant differences, with almost a 400% difference between the highest to the lowest. Administrative costs, as reflected in the June 1, 2005 workbooks, indicate PG&E is reporting the lowest percent of the budget allocated to administrative costs at 5.3 percent. The highest percent of the budget going to administration is for SCG's portfolio calculated at 20.5%. The average administrative costs at the statewide level are 8.8%. With PG&E having the largest portfolio budget, and the lowest administrative costs, their budgets significantly affect the average percent of budget.

SCE	7.7%
PG&E	5.3%
SDG&E	16.5%
SCG	20.5%
Statewide	8.8%

While some variation is expected in these costs, it appears that there may be a difference in the definition of "administrative costs" among the utilities. This variation does not allow the reviewers or the Commission to determine if the programs are operating efficiently (e.g., Too much administration? Not enough administration?). The Commission clarified its definition of what should be included in the administrative cost category in a definitional spreadsheet provided to all IOUs prior to the submission of the filings. TecMarket Works requested a copy of this spreadsheet in order to identify administrative cost items provided to the IOUs. This spreadsheet provides all the categories to be included in the IOU's administrative budgets. Table 5 provides these definitional categories. In reviewing these categories, we remain concerned that the IOUs may be using different definitions in their filings. However, the IOUs confirmed that they are using the definitional categories required by the CPUC in submitting their portfolios. Clearly, utility administrative costs are lower when they contract with a third party to run and administer a program, but the total administrative burden may, in fact, be higher. In our Team's experience, administrative costs in the 15–20% range are normal and expected. From the spread of the administrative costs seen in the June 1, 2005 workpapers, we remain concerned that the IOUs are counting administrative costs differently, and therefore may not be comparable.

Table 5. CPUC Administrative Cost Categories

Administrative Cost Items	
• Benefits - Administrative Labor	• Equipment - Document Reproduction
• Benefits - Direct Implementation Labor	• Equipment - General Office
• Benefits - Marketing/Advertising/Outreach Labor	• Equipment - Transportation
• Labor - Human Resources	• Facilities - Lease/Rent Payment
• Labor - Staff Development and Training	• Food Service

- Payroll Tax - Administrative Labor
- Payroll Tax - Direct Implementation Labor
- Payroll Tax - Marketing/Advertising/Outreach Labor
- Pension - Administrative Labor
- Pension - Direct Implementation Labor
- Pension - Marketing/Advertising/Outreach Labor
- Subcontractor Benefits - Administrative Labor
- Subcontractor Benefits - Direct Implementation Labor
- Subcontractor Benefits - Marketing/Advertising/Outreach Labor
- Subcontractor Labor - Human Resources
- Subcontractor Labor - Staff Development and Training
- Subcontractor Payroll Tax - Administrative Labor
- Subcontractor Payroll Tax - Direct Implementation Labor
- Subcontractor Payroll Tax - Marketing/Advertising/Outreach Labor
- Subcontractor Pension - Administrative Labor
- Subcontractor Pension - Direct Implementation Labor
- Subcontractor Pension - Marketing/Advertising/Outreach Labor
- Labor - Clerical
- Labor - Program Design
- Labor - Program Development
- Labor - Program Planning
- Labor - Program/Project Management
- Labor - Staff Management
- Labor - Staff Supervision
- Subcontractor Labor - Clerical
- Subcontractor Labor - Program Design
- Subcontractor Labor - Program Development
- Subcontractor Labor - Program Planning
- Subcontractor Labor - Program/Project Management
- Subcontractor Labor - Staff Management
- Subcontractor Labor - Staff Supervision
- Equipment - Communications
- Equipment - Computing
- Labor - Conference Attendance
- Labor - Accounting Support
- Labor - Accounts Payable
- Labor - Accounts Receivable
- Labor - Administrative
- Labor - Automated Systems
- Labor - Communications
- Labor - Contract Reporting
- Labor - Corporate Services
- Labor - Facilities Maintenance
- Labor - Information Technology
- Labor - Materials Management
- Labor - Procurement
- Labor - Regulatory Reporting
- Labor – Shop Services
- Labor - Telecommunications
- Labor - Transportation Services
- Office Supplies
- Postage
- Subcontractor - Equipment - Communications
- Subcontractor - Equipment - Computing
- Subcontractor - Equipment - Document Reproduction
- Subcontractor - Equipment - General Office
- Subcontractor - Equipment - Transportation
- Subcontractor - Facilities - Lease/Rent Payment
- Subcontractor - Office Supplies
- Subcontractor - Postage
- Subcontractor Labor - Accounting Support
- Subcontractor Labor - Accounts Payable
- Subcontractor Labor - Accounts Receivable
- Subcontractor Labor - Administrative
- Subcontractor Labor - Automated Systems
- Subcontractor Labor - Communications
- Subcontractor Labor - Contract Reporting
- Subcontractor Labor - Corporate Services

- Subcontractor Labor - Facilities Maintenance
- Subcontractor Labor - Information Technology
- Subcontractor Labor - Materials Management
- Subcontractor Labor - Procurement
- Subcontractor Labor - Regulatory Reporting
- Subcontractor Labor - Shop Services
- Subcontractor Labor - Telecommunications
- Subcontractor Labor - Transportation Services
- Conference Fees
- Subcontractor - Conference Fees
- Subcontractor - Travel - Airfare
- Subcontractor - Travel - Lodging
- Subcontractor - Travel - Meals
- Subcontractor - Travel - Mileage
- Subcontractor - Travel - Parking
- Subcontractor - Travel - Per Diem for Misc. Expenses
- Subcontractor Labor - Conference Attendance
- Travel - Airfare
- Travel - Lodging
- Travel - Meals
- Travel - Mileage
- Travel - Parking
- Travel - Per Diem for Misc. Expenses

CPUC Oversight Responsibility

One of the issues that was discussed within each of the PRGs is the issue of program and portfolio oversight, and if it is a good public policy decision to allow a wide range of IOU flexibility in making changes to the portfolios. All PRGs are concerned with this issue. And all IOUs have considered the PRG comments in their June 1, 2005 filing.

While it is true that the IOUs are responsible for implementing their portfolios in a way that achieves the energy saving goals, the CPUC is the single organization with the ultimate authority and responsibility regarding the implementation of these efforts. In the end, the citizens of California must hold the CPUC responsible for the wise implementation of the ratepayer-funded energy efficiency programs. As a result of the PRG comments and IOU interactions, the IOUs have placed recommended oversight activities in their portfolios. These are discussed in each of the IOU chapters in this report. However, we do not think it should be the responsibility of the IOUs to define the state's oversight responsibilities. Rather, the level and degree of CPUC oversight should be set at the public policy level within the CPUC. The CPUC should then advise the IOUs of the policy decision and the details of how that policy decision will work. While the CPUC can obtain IOU recommendations for the oversight of their portfolios, the adopted level of oversight and the conditions on which it shall operate should be set by the CPUC and be identical across all IOU portfolios.

Projected Goal Attainment versus Evaluation Confirmed Effects

In the June 1, 2005 filings, the IOUs provided their recommended portfolios. These portfolios are based on projected net effects from the implementation of the efforts defined in the filings. For the majority of the savings included in the portfolios, the effects are based on IOU-calculated gross effects rather than the effects projected in the DEER database, multiplied by the Policy Manual's NTG ratio. For a significant number of these projected savings (see the DEER – Non-DEER analysis section of this report) the review team was unable to fully assess the accuracy of

the saving estimates provided (see Savings Data Dictionary section of this report) by the IOUs, because the detailed supportive calculations were not included in the June 1 filing. Additional post-June 1, 2005 measure data was requested and provided by the IOUs in order to confirm the savings estimates. This additional information allowed us to review additional measure estimates. However, there remain some key measures that we are unable to confirm. We do note that for the non-DEER estimates that we could assess, we think that the results of the IOU calculations are often reasonable. We are unable to make these same conclusions for the savings estimates not supported by a clear calculation approach. As a result, there is some level of uncertainty on the accuracy of the saving estimates. Even when applying the Policy Manual's NTG adjustment factor, when non-DEER savings estimates are used that are above the DEER estimates for that technology, the projected net savings can be well above the DEER estimates for that technology.

We suggest the CPUC revise the NTG ratios in the Policy Manual using the best evaluation results for sector-level end-use technology estimates, then provide these new NTG factors to the IOUs and have them recalculate the program and portfolio net savings estimates. While this effort cannot be accomplished with the next few weeks, it should nevertheless be considered during the next couple of months so that the energy projections can be updated.

If the CPUC allows the IOUs to choose whether or not use the DEER estimates, when non-DEER estimates are used, the CPUC should require that energy savings calculations, assumptions and supportive documentation be provided in an updated IOU-Specific Energy Savings Dictionary attached to the filing. If the CPUC allows the IOUs the choice of not using the updated NTG values, the IOUs should be required to document why a program or portfolio component is not using those values and describe the program implementation strategies that will act to change the net estimated NTG values from the evaluation based NTG. While it is true that NTG values are program-influenced, program designers must have a strategy or theory for why their program will have a different NTG than those identified in the evaluation based NTG estimates. It is critically important that the CPUC make sure that all estimates are based on the best available NTG information and that all savings estimates are fully transparent so that the calculation can be replicated, and the CPUC's analysts can understand the rationale behind all calculations. For example, it is insufficient to say only that the program will do a better job of screening out freeriders, the documentation must say how the program is going to improve freerider screening.

Net to Gross

Each utility provided NTG numbers for each measure. However, the NTG numbers were generally the same across all the measures within a program. As instructed, the utilities used default NTG numbers based on the CPUC Policy Manual. For example, PG&E's Mass Markets Program utilized a NTG of 0.96 for all C&I measures from LED exit signs to NEMA premium motors. PG&E did use the NTG of 0.80 for residential customers. However, using these numbers increases the risk that the portfolio will not produce the savings indicated by the program planners and may be inconsistent with evaluation findings that report different NTG values. Certainly, when the program description indicates that a particular measure has a 40-50 percent market share, the default NTG assumption of 0.80 or 0.96 may not be reasonable. This can be further seen when industrial program participants are given the prescriptive rebates with the attendant NTG more appropriate for a hard-to-reach sector than large industrial customers.

While these standard NTG levels make it easier for planning and analysis, they usually, but not always, increase the risk of overstating savings forecasts within the portfolio. Moving from the Policy Manual NTG to an assumed NTG of 0.7 or 0.8 does not solve the problem. The NTG estimates need to be reassessed and reapplied over the next couple of months allowing the energy saving estimated to be updated. An independent agent should be used to update the NTG values and these values should be program design sensitive.

Policy and Incentives and Rewards

At this time we are uncertain if the CPUC's policy on incentives and rewards are driving the selection of technologies to focus on kWh rather than kW. The CPUC policy seems to focus on kWh and this seems to be the focus of the portfolios. While the ALJ requested the IOUs focus both on kW and kWh, we are not sure how the ALJ's request is being addressed in the portfolios. We expect that organizations incentivized to produce kWh will focus on those measures that produce the highest kWh. Likewise, if the incentive is on kW, we would expect the portfolios to focus more on measures that deliver on-peak kW. The measures, as selected across the portfolios, seem to focus more on kWh that kW. We suggest that the CPUC establish an incentive policy that rewards both kW and kWh consistent with the energy needs of the state. During the portfolio planning process, if kW is of greater concern to the system then greater reward weight should be provided to achieving kW impacts. According to system planners and acquisition professionals interviewed by the TecMarket Works Team, the primary problem in California is peak kW shortages, not base-load shortages. This condition argues for incentives and rewards to be paid for peak reductions with little incentives provided for kWh. However, the reward process needs to consider all program offerings, including statewide procurement, demand reduction, and load control efforts in setting the reward levels. The technologies and markets targeted by the current portfolio seem to reflect a kWh focus that is consistent with the current incentive mechanism.

One of the considerations for the evaluation effort is to assess the IOU portfolio's system load factors and identify the impact on load at the program level and at the portfolio level.

Policies that Emphasize the Lowest Energy Cost

Over-emphasizing the cheapest kWh costs will direct utilities toward certain technologies and program strategies. Programs that emphasize residential lighting do so at the expense of not achieving impacts from the measures that have the highest kW impact, such as residential HVAC. This balance needs to be considered not only at the technology level, but at the sector level as well. For example, commercial and industrial lighting provide both kW and kWh savings because they are typically used during peak periods. This is a portfolio policy balancing issue that requires policy guidance from the CPUC-ED.

Inconsistency of Savings Estimates

Because each IOU elected to independently estimate savings for the measures included in their portfolio, the energy savings for similar measures installed in similar buildings and in similar climate zones are not similar. This means that the IOUs expect to obtain different levels of savings from the same measure. This is not an implausible scenario, as program implementation and operational characteristics play a profound role in how measures are selected, installed, and used. However, we suspect that the IOUs are using different estimation approaches for estimating savings as well as considering the different aspects of how the program will impact

achievable savings. The evaluation efforts will want to target key measures that reflect the highest levels of uncertainty early in the process and provide the IOUs with new estimates of impact for these measures as they are delivered, installed, and used.

Contingency Fund

A review of each utility's portfolio indicates that the available budget is completely allocated to planned programs or activities. This means that there is no "strategic opportunities set-aside budget" that can be used when one or more of the programs identify a new opportunity, or when a market condition makes an opportunity available. It appears that the current budgeting process will require a reduction in planned program efforts in order to free up resources to capture a newly identified opportunity.

While each of the IOUs recommended guidelines for moving funds across programs, and it is expected that the IOUs will have some degree of flexibility to change their portfolios to capture savings, these approaches may not be fast enough to capture time-sensitive opportunities. Markets change quickly, sometimes within a few days for specific opportunities, and what is an opportunity one day or week can be quickly closed the next. If a funded activity has to be de-funded to free up resources in order to capture the new opportunity, the funding change process and program redesign process can take more time than the opportunity allows. It would be a wise precaution to have a small percent of each utility's portfolio set aside for capturing unplanned opportunities as they are identified, and then have that money allocated to capturing these opportunities, or fed back into high TRC programs that can use the extra funds if an opportunity is not identified for a specific year.

Code Compliance May Have Potential

Because there are measures in the IOU portfolios that are already covered by California codes, we suspect that the programs are suggesting that code compliance may not be strong in California and that incentives are needed to boost compliance to acquire energy savings. If code non-compliance is high enough to make these code-required technologies energy savers, we recommend that the CPUC consider requiring a proportion of the portfolio budget be spent on code compliance efforts. Incentivizing those who do not comply with code requirements seems unfair to those who spend the extra money to comply. It would also seem to weaken the codes by establishing a policy in which customers are rewarded by the IOUs for not following applicable codes or standards. The end effect is to weaken the codes by not enforcing them and rewarding non-compliant behaviors. We do not suggest that the IOUs become a code police force. However, we do suggest that the issue of code compliance needs further investigation. We suspect that a strong code compliance program managed by the State of California in cooperation with local authorities may go a long way to moving non-code compliant technologies and services off the California market and out of the IOU portfolios. With that said, we also realize that non-compliance may offer opportunities for additional savings by offering a carrot that motivates people to comply. We suspect that incentivizing non-compliance is a short-term strategy that captures eroding opportunities that would, over a couple of years, be closed as enforcement efforts begin to take effect. However, if this is the strategy, it needs to be stated in the program theory and the program working papers with estimates of how long the temporary incentive structure should be offered and when the enforcement efforts will be successful. It seems to us that a dual approach can be very effective over a short-term period, but outside a

very short period of time incentivizing code-covered measures may not be the best approach. (This issue is also briefly discussed under the Risks section of this report.)

Information and Education Resource Effects
The current portfolio is counting savings from information and education programs (for example, SCG's Energy Efficiency Education and Training Program and SCE Energy Surveys). This is a change from past policy where these programs were not part of the resource acquisition programs. We support this move, as these programs must also be able to demonstrate value to California if they are to continue to be funded. We believe they are valuable and that they can produce impacts. With the IOUs starting to claim savings from these programs, there will be evaluation and attribution issues that need to be addressed and solved. The most critical component of these programs is the Codes and Standards programs that may have significant impacts. However, other programs, like marketing and promotion efforts and the energy audit programs, are providing savings that will be counted by the IOUs and will need to be evaluated.

Program Integration Opportunity Has Potential
There is the potential to provide a seamless program service offering among all the programs that provides construction-related services. These programs include advanced building concepts, efficient building design, construction techniques, technology applications, sustainability, and code change programs. These all deal, in one way or another, with similar technology applications in the same markets and with the same market actors. Yet these programs appear to be implemented as stand-alone programs with a non-integrated delivery approach. As the programs are currently planned, there seems to be an opportunity to aggregate the construction related programs into an umbrella program that deals with all phases of the new construction market, while streamlining and coordinating market initiatives and market strategies. Because all of these programs in one way or another address the same market actors, and are striving toward the same goal of improved building energy efficiency, they can be designed, implemented, evaluated, and rewarded as a unified, seamless, more powerful program.

Unifying these programs under an integrated delivery umbrella can more effectively work with key market actors via an integrated approach. This change will also influence the movement of new and developing technologies as well as proven energy efficient technologies into the market adoption cycle. If key market actors across the construction and technology supply industry see organized, integrated initiatives, that starts with new ideas and ends with changed codes and standards, the integrated portfolio can have a profound impact on how well the initiatives are received and how quickly they are adopted into the market as the new standard approach. We note, in particular that the PG&E portfolio is moving away from this possibility in non-residential new construction, which we discuss in our review of that portfolio.

Non-Comparable kW Estimates
In reviewing the kW results in each IOU's portfolio, we noticed that the kW ratings may not be comparable. This issue was also identified by PG&E following a review of the PRG reports containing the TecMarket Works early report to the PRGs. An investigation into these differences consisted of a discussion with the E3 Calculator's design engineer, Mr. Brian Horrii. In this discussion, we followed the calculation approach used by each utility to estimate kW impacts. We found each utility uses a different approach. The effect of these different approaches is that the kW estimates cannot be directly compared, especially for the PG&E kW

estimate. The PG&E calculator projects kW impacts for measures installed in 2006 in an output snapshot focused on the 3rd quarter of 2011. If PG&E installs a measure with less than a 5-year lifetime, it does not show up in the kW savings field. The other IOUs use a similar calculation, but have different snapshot periods. SDG&E uses a 3 year period, and SCE uses a 2 year period. The difference reflects a difference in the desire to count short-term versus longer-term savings. SCE's calculator incorporates shorter-term impacts than PG&E's calculator.

The effect of this approach is that the kW impacts counted by the IOUs will be different depending on the mix of measures contained in the portfolio and the effective useful life of those measures. However, this will only affect short life measures such as CFLs in the non-residential setting. Because PG&E is projecting to install about 65,000 bulbs in this setting, the loss of that impact from their portfolio count is significant. Due to this difference in counting approach, it will be necessary to adjust the outputs of the E3 Calculators so that the counting periods are the same, before an accurate assessment of the impact of these different approaches can be assessed.

Risk Issues

It is important to consider risk in assessing the achievable savings of each utility portfolio. The review team tried to assess risk on several levels:

- Does the program design have inherent risks?
- Are the energy savings from the measures reasonable, compared to DEER and non-DEER estimates?
- Is the scope of the program reasonable, compared to market potential?

This section of the report discusses issues relating to risks associated with implementing the portfolios as submitted in the June 1, 2005 filing.

DEER and Non-DEER

The information provided in the "measure lists" of the workbooks filed by the utilities on June 1, 2005 was used to identify the source for estimating per unit energy savings. For most of the utilities, the majority of their savings in their primary fuel type were estimated without reference to DEER (see Table 66). In some cases, independent engineering evaluations or other reference documents were cited. All estimates that were not related to DEER were supposed to be documented in "workpapers" filed by each utility and should have been easily referenced for measure review. Unfortunately, several of these estimates were not clearly linked to documentation, and in reviewing the documentation, the savings calculations and assumptions used for these energy savings estimates were difficult to decipher with some referencing reports in which we could not find the referenced data.

While the CPUC staff indicated that they wanted measures to be DEER-based when they were available from the database, only a small portion of their savings in their primary fuel type were estimated with reference to DEER. All of the measures that were estimated using DEER were reviewed for accuracy and consistency with the DEER 2005 Database. The DEER data was downloaded from http://www.rtf.nwppc.org/deer2005/# on May 13, 2005.

Table 6. Source of Energy Savings Estimates

IOU	Source	Number of Measures	% of Measures	Percent of IOU Savings		
				kWh	Therms	kW
PGE	Non-DEER	441	78%	57%	88%	65%
	DEER	123	22%	43%	12%	35%
SCG	Non-DEER	217	93%	15%	88%	32%
	DEER	16	7%	85%	12%	68%
SDG&E	Non-DEER	431	74%	49%	93%	55%
	DEER	148	26%	51%	7%	45%
SCE	Non-DEER	1,670	83%	85%		73%
	DEER	352	17%	15%		27%

In addition to the discussions of IOU specific energy savings estimates in each utility chapter, further details on the methodology and findings from reviewing DEER and non-DEER energy savings estimates are provided in Appendix A.

NTG Sensitivity Analysis on Portfolio Cost-Effectiveness

In order to assess the risk of not achieving portfolio-specific cost-effective energy savings, the TecMarket Team re-ran the E3 calculators for all programs in the IOU portfolios with the exception of PG&E's Mass Market program. In this effort, we adjusted the Policy Manual's NTG values down by 20%, 40%, and 60% for each measure and then re-ran the calculators to produce new TRC values. The procedure essentially provided a new TRC value for each program under a set of revised scenarios in which the programs only reached 80%, 60%, or 40% of the savings. We did not run calculations below 40% of the current NTG values because few programs achieve an ex-post net adjustment eliminating 60% or more of the estimated program savings from the Policy Manual's NTG values.

The Mass Market Program was not examined via the E3 calculator because the programmatic cost distributions associated with the Mass Market Program are not fully populated within the Mass Market E3 calculator, but are partially embedded in the other residential and non-residential programs. Essentially, the Mass Market Program is acting as a measure clearinghouse program that feeds into other programs and service offerings to support a market-sector approach. As a result, for the PG&E Mass Market program, we assessed the cost-effectiveness risk by reducing savings at levels consistent with the same percent NTG reductions we used to assess the effectiveness of the remaining programs. While this exercise does not allow for the identical TRC values provided in the June 1, 2005 PG&E filing, it is close and does allow for the risk assessment to include PG&E. While the Mass Market Program is a significant portion of the portfolio's savings, this approach does allow for cross-portfolio comparisons that are similarly accurate across the IOUs.

Because PG&E provided single year E3 calculators that needed to be run three times (once for each year), we looked at PG&E's 2006 submission in this assessment. For the remaining IOUs, we looked at all three years of the portfolios because the E3 submissions were calibrated for the three-year period.

The results provide a clear picture: the risk of the IOU portfolios achieving a NTG value of less than 1.0 during the implementation period is low. In all cases, the IOU portfolios were found to be cost-effective at 100% of the Policy Manual's NTG values, at 80% of these values, and at 60% of these values. This means that all of the portfolios will be cost-effective, even if they only achieve 60% of the projected savings. From a cost-effectiveness consideration, the current portfolios are a relatively safe risk as submitted.

SCE was found to have the portfolio with the lowest risk. With the PG&E and SCG portfolios having the highest risks, however, even these risks are low. The SCE portfolio will still be cost-effective by a 2:1 margin even if the portfolio achieves 40% of the projected savings. The SDG&E portfolio is still cost-effective if they achieve 40% of the projected savings, with a 1.41 TRC. However, both the PG&E and the SCG portfolios become non-cost-effective if they achieved 40% of their projected savings. However, again, both of these IOU portfolios appear to be cost-effective at the 60% savings level (not achieving 40% of the projected savings).

Table 7 presents the results of the recalculated E3 Calculator outputs for cost-effectiveness for all four IOU portfolios. The portfolio becomes non-cost-effective after the TRC value drops below 1.0. In this table, this event happens only at the 40% savings level for PG&E's and SCG's portfolios.

Table 7. IOU Portfolio TRC Values for Different Levels of NTG Achievements

TRC Values				
Portfolio	2006 only	2006-2008	2006-2008	2006-2008
	PG&E	SCE	SDG&E	SCG
100% of PM NTG	1.57	2.76	1.89	1.26
80% of PM NTG*	1.36	2.59	1.78	1.16
60% of PM NTG	1.13	2.36	1.63	1.04
40% of PM NTG	0.86	2.00	1.41	0.87

* For example, if the NTG ratio is reduced by 20%, then the TRC for PG&E goes from 1.57 to 1.36.

If the energy savings projected by the IOUs are reasonably accurate (see the DEER versus Non-DEER section of this report) and the IOUs can cause the installation of the projected number of measures, this analysis suggests that there is little risk that the portfolios, as currently submitted, will not be cost-effective.

Effect of the Economy and Other Conditions on Projections

In any market in which an energy efficiency program operates, the normal operations of the market can have a profound effect on the ability of a program to capture savings. If the economy is in a decline, there will be fewer investment dollars available for upgrades, retrofits and new construction projects. The portfolios submitted at this time are reflective of growth assumptions embedded in the potentials study. If these growth conditions are not realized in the market the IOUs may have a difficult time reaching their goals.

Flagship Programs versus Other Programs

Two utilities combined multiple past programs into "Flagship" programs that represent the majority of their savings. PG&E created a Mass Market Program covering both residential and non-residential customers. The savings from this program represents 67 percent of the kWh and

63 percent of the kW while using 44 percent of the budget in 2006. SCE's approach was similar, but split residential and commercial applications into the Residential Energy Efficiency Program and a Business Incentive Program. While the reviewers believe that the market strategies used for these programs are often sound, with some exceptions, there are some complexities and risks from this approach. The primary complexities and risks are operational, tracking, and accounting. Operationally, it will take a very disciplined approach to make sure that the consumers get a comprehensive suite of measures from multiple components. While this approach has been successful in Vermont, we point out that the State of Vermont is equal in size to a medium sized city in California. The successful implementation of a fully integrated market-sector approach in California will be more challenging. However, we think it is the right approach; customers don't care about programs, they care about efficiently provided services and the convenience of one place to go for these services. PG&E and SCE are moving toward this direction with their new portfolios.

However, these more integrated designs provide challenges for program managers in that the tracking systems will need to be more carefully designed, monitored, and managed if they are going to be able to track program implementation efforts and used to evaluate component effectiveness. Likewise, evaluators will need to work very closely with the developers of these new tracking systems to make sure that the evaluation information needed to conduct component-level evaluations can be readily obtained from these systems.

To understand the source of the savings and the application to sectors and delivery components, each customer must be tracked with cross-program indicators of component participation and measures. This customer specific tracking will be needed to avoid double counting and to assure savings are properly reported. For example, customized activity and account management are being provided for certain target segments such as schools. Lighting measures for PG&E were listed as both a customized measure under the Schools Program and as a standard measure under the Mass Market Program. In other cases, large commercial and industrial customers would be referred to prescriptive rebate programs for some of their measures, and provided custom incentives for others. This leads to potential difficulties for tracking and evaluation with respect to energy savings. If these programs are to proceed, careful tracking systems will need to be established early, and the accounting needs to be transparent.

Given this tracking challenge and the combining of the sectors, the reviewers were not able to determine definitively if individual components within the PG&E and SCE portfolios have achievable savings estimates and goals. It was also difficult to compare these data to the KEMA potential studies, which are sector-specific. To better understand whether these programs can achieve their potential, additional sector specific estimates will be required within the portfolio-program projections.

Start Up May Be Slower Than Expected

We believe that the movement of significant additional program efforts into the IOU, third-party, and partnership implementation arena over a short timeline carries a certain amount of risk. The industry will need time to ramp up and build the capacity to effectively use the dollars being placed into the market at this single point in time. The California experience in the 2002–2003 period demonstrated that several of the IOU, third-party, and partnership program providers had trouble meeting staffing needs to implement contracted programs, and many were slow to move

into the field. The 2006 increase will likely experience similar conditions. Thus, program providers will need to form and/or contract their programs early enough to allow for these programs to capture sufficient savings in 2006 to be cost-effective. This means that the third-party, partnership, and IOU programs may need to be getting ready to launch in the third or early fourth quarter of 2005 in order for these programs to be ready for expanded implementation in early 2006. The experience gained in 2002, 2003, and again in 2004 suggests that new programs and new implementers will need substantial time for these programs to be effective. The portfolio is heavily relying on these programs to capture early energy savings. Of concern to the review team is that some programs, particularly third-party and partnership programs, place direct program management responsibilities outside of the organizations directly responsible for reaching the energy goals. In the past, some programs were slow to develop services and slow to capture energy savings, and in several cases were poor performers at capturing energy savings early in their planned implementation periods. For such a significant increase in spending, the CPUC and the IOUs will want to make sure these programs are expertly managed and that goals are reached early in the program lifecycle. The IOUs will need to be ready to abandon or modify these programs if they are unable to demonstrate that they can capture savings in a reasonable period of time. The IOUs should not rely on the CPUC to continue these programs or grant extensions to these programs to capture the energy savings planned for 2006, 2007, and 2008 if early impact studies show that they are not reaching or on their way toward reaching their goals.

We are particularly concerned with the partnership programs that are included in three portfolios, with some utilities having larger efforts than others. In all, almost $80 million is being provided to partnership programs with almost $46 million listed in SCE's portfolio, just over $21 million listed in SDG&E portfolio, and $12 million in SCG's. Partnerships are primarily with local governments. While this strategy has benefits, there was inadequate information provided to determine if the savings estimates were realistic and achievable.

SCE had the largest number of partnerships and has savings attributed to them, as does SDG&E. SCG has partnerships but did not attribute savings. The review team feels it cannot comment at this time as to the potential effectiveness of these programs or their potential to achieve the goals. However, the team notes that partnership programs have had trouble getting organized, designed, launched, and achieving savings in the past. While valuable lessons have been learned from these experiences that, if used, can improve the current portfolio, it will be important for the IOUs to carefully monitor the partnership programs and be ready to move resources into other programs if these efforts are slow to produce results.

Heavily Dependent on Lighting

From a measure perspective, the portfolios are somewhat heavily dependent on lighting. However, this is not unusual for large portfolios that need to focus on cost-effectiveness. Lighting represents a large share of the California potentials study. The IOU portfolios are consistent with this statewide potential, in that lighting plays a key role in the IOU portfolios. Our primary concern is not on the level of lighting in the portfolios, but on the focus of residential lighting that does not have a strong effect on peak reduction and which consumes a large part of the portfolio budgets. However, from a balance and equity perspective, and from an energy savings perspective, a focus on residential lighting is expected. Focusing on measures that provide energy savings is also consistent with the current policy on rewards to the IOU for goal attainment.

In the review of the non-DEER lighting measures within the PG&E, SCE and SDG&E programs other than new construction, several concerns came to light regarding the methods used to calculate kWh and kW energy savings. These concerns center around the base lighting system used to calculate the reduction in lighting system power, the operating hours used to estimate kWh reduction, along with coincident and interactive factors. These concerns are heightened due to the large role lighting plays in the statewide portfolio savings estimate. Without significant added evaluation efforts, it is not possible to estimate how these concerns translate into risk relative to the estimated program savings versus the actual savings that may be documented in the EM&V efforts.

The primary concern relates to the base system used to calculate the reduction in lighting system power reduction; the non-DEER (and possibly some DEER) estimates do not seem to take into account Title 24 requirements. For example, incandescent lamps and T12 fluorescent lamps with magnetic ballasts are often referred to as the base systems in the workpapers for residential and express efficiency programs while a customer's existing system is referenced in the SPC program; these base case systems may not correctly account for the Title 24 requirements, that include minimum lamp efficacy and maximum watts/sqft requirements. Although there is some complexity to Title 24 lighting regulations for retrofits, basically, lighting efficacy requirements take effect upon replacement or addition of many indoor and outdoor fixtures while more restrictive watts/sq ft requirements are triggered upon replacement of 50% or more of the fixtures in a non-residential space. It is likely that a significant fraction of lighting measures across the utility programs should be using a Title 24 minimum efficacy or watts/sq ft as the base rather than the existing customer system or other workpaper-noted base systems unless these participants were not going to do any upgrade to these facilities over the life of the installed new measures. If the programs cause an upgrade to a more efficient technology, then the calculation of the program's attributable savings for that upgrade should be based on the new Title 24 rather than the old installed technology, because the project would have had to comply with the existing Title 24 requirements. This of course assumes there is Title 24 compliance; a separate enforcement issue that we believe also needs to be addressed. However, if the participant was not going to install an upgrade, and the program caused the upgrade to occur then the savings can be calculated using the old base level, because the program caused the entire upgrade to occur. We suspect that the program will cause a significant number of customers who were going to upgrade their systems anyway to move to the more efficient systems because of the program's actions. We suggest that the program's estimation approach account for the percent of the participants who would and who would not upgrade without the program so that the estimates reflect the current Title 24 requirements.

Our next concern relates to the workpaper assumptions used for lighting hours of operation. It appears that the non-DEER estimates do not take into account recent EM&V studies results that were used to update DEER; instead, older data from the 1990s is used that may over or under-estimate hours of use depending on the building type. The non-DEER workpapers also use the same assumptions for CFL and non-CFL lighting; this is known to be significantly in error for some occupancy types. For example, recent studies covering hotel rooms, offices, and industrial buildings show significantly lower CFL use hours than previously thought. Below are tables that present the hours of operation from submitted workpapers for lighting and the operating hours

that are included in the updated DEER database. There does not seem to be an explanation of why the IOUs have not elected to update these values that play a key role in lighting savings estimates.

Table 8. Operating Hours from Workpapers

Market Sector	Workpapers Annual Operating Hours, All Lighting
Process Industrial	6,650
Grocery	5,800
Hotel/Motel	5,500
Restaurant	4,600
All Other	4,500
Retail	4,450
Health Care/Hospital	4,400
Assembly Industrial	4,400
Office	4,000
College	3,900
Warehouse	3,550
School	2,150

Table 9. Operating Hours for Lighting from the DEER Database

Market Sector	DEER Annual Operating Hours, CFL Lighting	DEER Annual Operating Hours, Non-CFL Lighting
Education - Community College	3,792	3,792
Education - Primary School	1,440	1,440
Education - Secondary School	2,305	2,305
Education - University	3,073	3,073
Grocery	5,824	5,824
Health/Medical - Hospital	8,736	8,736
Health/Medical - Nursing Home	8,736	8,736
Lodging - Guest Rooms	1,145	8,736
Lodging - Hotel/Motel	8,736	8,736
Manufacturing - Light Industrial	2,860	2,860
Office - Large	2,739	2,808
Office - Small	2,492	2,808
Restaurant - Fast-Food	6188	6,188
Restaurant - Sit-Down	3444	4,368
Retail - 3-Story Large	4259	4,259
Retail - Single-Story Large	4368	4,368
Retail - Small	3724	4,004
Storage - Conditioned	2860	2,860
Storage - Unconditioned	2860	2,860
Warehouse - Refrigerated	2600	2,600

Additionally, there are other factors used in the lighting savings calculations that raise concerns. Lighting-HVAC demand interactive effects and lighting use diversity factors are applied to the installed lighting power reduction to estimate the impact of lighting system changes on the utility peak demand. Lighting-HVAC energy interactive effects factors are applied to the installed lighting power reduction, along with the annual lighting operating hours, to calculate the annual energy savings. The workpapers cite 1994/1995, and 1997 EM&V studies as the source of these

factors; those studies rely heavily on earlier work that used pre-1990 data. Although the values found in the workpapers do not match those listed in the studies cited, we are concerned that all these values are out-of-date and may not adequately reflect current HVAC or lighting system performance and operating schedules.

Because these issues end in under- and over-estimates of savings, depending on the individual program and assumption used, it is not possible within the time allowed to assess the overall impact on the IOU portfolio or on the statewide portfolio. However, we expect that the net result is that the portfolio over-estimates the savings from these measures. In order to quantify the level of over- or under-estimated savings, it would be necessary to recalibrate the E3 calculators to the new estimates and re-run the estimates for all programs that have lighting measures, or the IOUs will need to examine their estimates, make the appropriate adjustments, document why they make the assumptions made, and re-submit their savings estimates.

Providing Incentives for Title 20 and Title 24 Measures
The current IOU portfolios appear to be incentivizing measures that are, or will shortly be, required to be installed under current or new codes that apply to all buildings (residential and non-residential). We provide a few examples:

- Duct sealing is required for all residential and small commercial construction when those ducts are installed outside the conditioned space. This same requirement applies to retrofits when AC/HP/furnace units or ducts are replaced or added to existing structures. However, it appears that the IOU program may be incentivizing these measures in some cases when they are required by code.
- Title 24 has requirements on maximum AC sizing and can require refrigerant charge verification; it appears that the IOU programs may be incentivizing these measures in cases when they may be "required".
- Programmable thermostats are required in all locations (new or retrofit). Assuming programmable thermostats save energy, California residents are required to install programmable or setback thermostats in any thermostat change. This means that this measure may only save energy when installed to replace a non-programmable thermostat in an older structure that would not have been changed without the program, and then only when installed in a building in which the behavior of the occupant was not already regulating their non-programmable thermostat. It appears that the IOU program may be incentivizing these "required" measures.
- Title 24 requires that non-residential packaged terminal air conditioners or heat pumps have EERs of 9.31–11.01 for new construction and 7.71–9.41 for retrofits; similarly, for packaged and split AC/HP units with a capacity between 5 and 20 tons, Title 24 requires efficiencies between EER 9.7 and 10.3. The IOU programs appear to be assuming, based on their workpapers and program descriptions, a base requirement using the lower Title 20 requirements even though these particular requirements are pre-empted for buildings applications by Title 24.
- Title 24 requires that all permanently installed outdoor lighting be photo-controlled or daylight time switched, however, these technologies seem to be included in the program offerings to buildings covered by these codes.

We suggest that the CPUC request the IOUs to identify all measures that are currently in the IOU portfolio plans that are now or will be covered by codes and standards that will apply as of January 1, 2006, and provide supportive documentation on how the programs will produce savings from these measures. As noted earlier in this report, we are not saying that the program designs will not produce savings from required measures, but only that we are unable to identify in the workpapers how these "required" measures will save net energy by being incentivized by the programs. We suspect that the program theory for programs that include code-covered measures will indicate that noncompliance is high enough for the measures cited above that there is a need to incentivize noncompliant behaviors in order to move them to being at least as efficient as the code-covered technologies. If this is the case, the program implementation plan should describe how these noncompliant customers are identified. Without a screening mechanism, it would seem that the freerider levels for code-required measures may be high, and therefore net savings may be lower than projected. We also suspect that a more cost-effective approach for capturing noncompliant behavior is through an education and enforcement program operated by a governmental agency or via local jurisdictions. The CPUC should consider conducting a short-term assessment of the degree of noncompliance, and the degree of availability of noncompliant technologies within the market.

TRC Scores and Budget Balance

Several of the programs have very high TRC test scores, higher than we typically see from similar programs elsewhere. We question if the TRC tests are being calculated accurately for several programs, or if correct assumptions are being applied to the basis of the TRC calculations (see program discussions later in this report). The logic each utility used to arrive at the appropriate budget is not something that we can see from the filings.

It would help the assessment if the IOUs could explain their budget allocation decision process so that everyone can understand the rationale behind the allocation of budgets to programs within their portfolios.

TRC Range-of-Estimate Issues

The utilities provided cost-effectiveness analyses based on the E3 calculator and provided summaries within their portfolio spreadsheets. As can be seen in Table 3, the benefit cost ratio from the TRC test is 1.99 for the statewide portfolio, ranging from 1.41 for SCG to 2.76 for SCE. SDG&E's benefit cost ratio is estimated at 1.94 while PG&E estimates their benefit cost ratio at 1.61. These estimates indicated that with the energy assumptions used by the IOUs to project savings, all portfolios would be cost-effective as planned. If these estimates were calculated equivalently, there is almost a 100% difference between the SCG (a gas focused portfolio) and the SCE (an electric focused portfolio) portfolios. Of the electric focused portfolios, PG&E's has the lowest estimated benefit cost ratio.

Each IOU reported programs with both high and low TRC scores, indicating a range of cost-effectiveness within their portfolios. From reviewing the programs for which TRCs were provided (energy acquisition programs and some information programs), the following table was constructed to present the high and low TRC scores for programs within each portfolio.

Table 10. IOU TRC Scores

IOU	Lowest TRC	Highest TRC	Average TRC
SCE	0.43	6.57	2.76
PG&E	0.57	3.34	1.61
SDG&E	0.13	2.84	1.94
SCG	0.80	2.89	1.41

After reviewing the portfolios, and given this range of TRC scores, the reviewers are concerned that there may not be a consistent calculation of the TRC across the utilities. However, to confirm this hypothesis we would need to compare the mathematical formulas driving the E3 Calculators.

TRC and PAC Issues

The reviewers also saw variation in the relative values of the TRC and PAC numbers: sometimes the TRC was less than the PAC, sometimes the TRC was greater than the PAC, and sometimes they were nearly the same. Assuming that "cost" is the only input parameter that changes, one would expect the PAC to be greater than the TRC all of the time (since the TRC includes *all* costs). Upon review of this issue, it appears that the condition is E3-based and is associated with program conditions that occur when an incentive equals the full cost of the measure, such as when a refrigerator is given away at no cost to the participant or when a program is incentivizing above the incremental cost of the measure. That is, this calculation approach is embedded in the E3 calculator. This calculation approach appears to be different than the calculation approach described in the Standard Practice Manual. There is a need to confirm with the IOUs the calculation approach that should be used to assess the portfolios and make that approach consistant in the E3 calcuator and in the Standard Practice Manual.

The Portfolio and the NTG

There is also some concern that there are portfolios with TRC scores that are less than 1.75–2.0 (e.g., SCG). If the programs within these portfolios are not as effective as planned, especially the third-party and partnership programs, or if the evaluations document lower than projected energy savings, the portfolio as a whole runs the risk of not being cost-effective. This same concern is associated with using non-evaluation corrected NTG numbers from the Policy Manuals to project the cost-effectiveness of programs. The Policy Manual's NTG scores may be high for several key measures. If the *ex-post* evaluation-verified NTG numbers do not support the Policy Manual's numbers, these portfolios may be less effective than planned or not be cost-effective.

Large Budgets for Questionable Programs

Some programs have no energy acquisition goals, but are receiving very substantial budgets. The marketing and promotional programs, such as the Flex Your Power program, appear to be receiving over $50 million. Yet we cannot find any evidence that these programs are effective at causing market changes that result in energy saved. The utilities have not provided sufficient analysis to justify the large budgets being channeled into these efforts. We are not suggesting that Flex Your Power and similar programs are not effective, but we are suggesting that the CPUC needs to know if these programs are effective at changing behavior that directly or indirectly result in short- or long-term energy impacts before this large of a budget is approved

for these programs. While there seems to be general agreement across the IOUs that these programs are effective, and we believe they are to a certain extent, the CPUC must have some form of documented energy savings results before $50 million is provided to these programs. The evaluations of these efforts that we have reviewed provide little indication that they are causing significant energy savings to occur, but they are resulting in strong recognition, recall, and message understanding. This program needs to have an impact evaluation conducted to document if these programs result in energy being saved directly or indirectly. These study approaches are detailed in the Evaluation Framework as well as the Best Practices Reports, and have been used successfully in the energy efficiency field. Without these studies in California, we do not know if the proposed funding level is too small and should be increased, or if the programs are not producing savings and need to be reduced in scope. The CPUC may want to approve a portion of the proposed budget and fund an effects evaluation early in the first year and then approve a 2007–2008 budget after reviewing the evaluation results.

On-Bill Financing May Pose Image Risk to CPUC

The TecMarket Team agrees that the ability to obtain financing and the financing rate available to participants can be a barrier to program-produced savings. The On-Bill Financing programs/initiatives provide a way for participants to have access to a line of credit without financing costs and should help resource-constrained participants achieve savings that would not be achieved without this service. However, the TecMarket Works Team is concerned about the potential image that can be conveyed with the on-bill financing programs and suggests that the CPUC be ready for potential negative publicity associated with this program.

As we understand the On-Bill Financing submissions, rate-payer funds will be provided to the IOUs to cover the interest rate and associated costs for offering zero interest loans to customers. Our concern is not over the benefits of the program, but the level of interest being paid to the IOUs by the ratepayers. Essentially this program collects dollars from the ratepayers and gives it to the IOUs to cover the cost of loaning customers money for energy efficiency improvements that help everyone be assured that energy demands of the state will be available when needed. However, the current plan is to provide the IOUs with an annual return on the loaned dollars of over 8 percent. In view that many customers may not be able to acquire investment returns of this magnitude, there could be a negative public image associated with the State of California collecting a mandatory fee from customers and using it to pay the utilities a return on their loan investments to participating customers. The issue is one of appearance. This rate of return is especially high given that the risk of non-repayment is included in program costs; the risk of default is low and the consequences of default are high.

Again, we bring this risk to the attention of the CPUC because we suggest that the CPUC develop a public relations contingency plan that deals with this potential appearance issue. We agree that this program will reduce the barriers associated with participation and that the results of this program will be greater participation, increased energy efficiency, lower levels of pollution, and more reliable energy supplies. We also point out that public funds have been used for these types of programs all across the United States and we agree that this can be an important part of the portfolio. This program will also need to be evaluated early on in order to determine if the program should be modified. A key issue in this study will be the degree that the program can capture additional resources over and beyond what would have been captured without the financing option.

Implications for Long-Term Savings

The information provided describes programs that meet the 2006–2008 CPUC goals. While some measure savings were forecast to 2013, none of the utilities provided comprehensive plans to meet that long-term goal. The reviewers agree that plans further out than 2008 would be speculative, and thus, we cannot adequately determine whether the utilities are on track to meet the long-term 2013 goals. However, the reviewers do believe that continued innovation and adaptation of existing programs will be required over time and that the utilities should continue to get new ideas from outside sources on innovative programs and approaches. This could be through bid programs, Emerging Technology programs, the newly formed Program Advisory Groups (PAGs), the Peer Review Groups (PRGs), the California Measurement Advisory Council (CALMAC), or other processes.

Savings Data Dictionary

One of the key concerns of the review team is the very substantial amount of energy savings that are based on independent IOU calculations of measure savings that are substantially undocumented or can not be followed step-by-step in the workpapers provided. During the review process, the team requested back-up documentation from the IOUs, so that each measure and the estimated energy savings allocated to that measure could be reviewed. This effort was not totally successful. Much of the back-up documentation that was provided was not detailed to the extent that we could follow or replicate the estimation calculations. While we were able to conclude that many of the savings estimates were reasonable and seemed to be based on reasonable approaches, many other savings estimates could not be linked to an estimation approach that could be reviewed. We are not suggesting that the estimates are not based on reliable estimation approaches, but that we were not able to obtain information on a substantial number of measures. To further complicate matters, the referenced studies were old (e.g., 10-15 years old), and the reported data in the June 1 filing did not reflect findings from recent program evaluations (e.g., NTG, hours of use, base case information, etc.).

When assessing a portfolio, the CPUC must be able to confirm if the savings for every measure included in the portfolio are realistic. When portfolios are submitted for CPUC review, we recommend that every portfolio have a Measure Savings Data Dictionary that supports their energy savings estimates. This dictionary should be provided with the portfolio plans and have measure descriptions and savings estimates that match the measure descriptions and savings estimates presented in the portfolio.

At the current time, the IOUs have incorporated the following forms of data in their filings: (1) the use of DEER measure descriptions, but not the use of DEER saving estimates; (2) the use of non-DEER measure descriptions but the use of DEER estimates for the newly described measure; or (3) the use of new descriptions for new measures and provide new estimates of savings for that measure. Essentially, there needs to be a way the CPUC can examine the measures in a program or portfolio worksheet, and then go to a Measure Savings Data Dictionary and examine the calculations used to estimate the savings and review the sources of the assumptions used to drive the calculation. The Measure Savings Data Dictionary should contain detailed descriptions of the measure and its use conditions on which the savings are based and a full presentation of the calculation used to estimate savings (kW, kWh & therms), so that CPUC staff can replicate the calculations and come to an identical estimate. The Measure Savings Data Dictionary should include all measures that are included in the portfolio. When reference

documents are used to inform an estimate, full references and citations should be provided with each measure estimation approach, including the documents (e.g., title, author, publisher, date of publication, and page number for the referenced data point). The Measure Savings Data Dictionary also should provide web links to the citations where the publication can be found, or they should provide contact information that allows the CPUC staff to obtain the publication. This document should be updated every time a measure savings estimate is added, changed or updated.

Substantial Funding for "Other" Sector

In reviewing the portfolio budgets, we noticed that there were substantial funds listed as going to a sector or set of services called "Other". Follow up discussions with the IOUs and reviews of IOU data request responses indicate that the "Other" category includes measures that are not easily sorted into one of the CPUC sector classifications, and in the case of SCG and SDG&E, also include the third-party programs. This issue appears to be related not in uncertain measures or in unallocated budgets or efforts, but in how the IOUs sorted out measures across sectors and how third-party programs were classified. After reviewing the responses, we have no additional concerns regarding this issue. However, the CPUC may want to define what types of items are appropriate for the "Other" market classification and provide that definition to the IOUs for future filings.

Lost Opportunities

This section of the report discusses opportunities for additional energy impacts that are not addressed or not significantly addressed within the submitted portfolios. The opportunities are identified as program initiatives or as issues that impact lost opportunities. The CPUC should request the IOUs provide information on why the following initiatives are not major components of their portfolios.

Agricultural Programs

Some utilities pay more attention to the agricultural sector than others. Agriculture represents a major industry in California, and as noted in a recent report on energy efficiency savings in the agriculture sector by ACEEE,[3] potential electricity savings in California for the entire agricultural sector is 13 percent (and 1 percent for natural gas), resulting in a savings of 1.58 trillion BTU and $53 million a year. If these savings are to be captured, there will need to be a statewide emphasis and approach.

Important areas of concern in this sector include: greenhouse/nurseries, cattle feedlots, oilseed and grain farming, and fruit and tree production. Important end uses include: motors (pumps, fans and blowers, compressors, material handlers, material processors, and refrigeration), drying and curing, water heating, HVAC, and lighting (farm buildings, residential).

Accordingly, while it is too late to include "agricultural programs" as a stand-alone program for the June 1 filings, we strongly recommend that CPUC staff do the following:

- Conduct a study on the potential energy savings in the agricultural sector in California.

[3] Elizabeth Brown and R. Neal Elliott, "Potential energy efficiency savings in the agriculture sector," Report IE053, American Council for an Energy Efficient Economy, Washington, DC, 2005.

- Conduct a public workshop on the agricultural energy savings potential study and invite a wide range of agricultural industries, associations, and representatives to this workshop to obtain their comments and perspectives.

The CPUC may also want to require utilities to develop a stand-alone or statewide agricultural focus as part of their portfolio to capture this potential.

Manufactured Housing
There was inconsistent consideration of manufactured housing as a retrofit program target among the utilities:

- SCE included this market as part of their multi-family program
- SCG included this market in its potential bid process
- PG&E included this market in its Mass Market Program as a qualified customer group for rebates, and
- SDG&E included this market in its residential rebate program.

Without a comprehensive analysis of fully implemented programs, it is unclear whether this often lower income market is being adequately served and providing the potential savings in several of the utilities.

New Manufactured Housing Programs
Although there were some questions raised in the public review meetings about it, no utility has adopted a manufactured home new construction program, when there are large savings to be gained beyond national HUD standards. Programs in the Pacific Northwest have been very successful in this sector for 15 years, with more than 65 percent of the homes being built nearly as efficiently as site built code homes. This represents not only a lost opportunity but also a lost sector in the California program portfolios.

Replacements of HID Lights
There is no evidence that the utilities are taking advantage of the large efficiency opportunity to replace high intensity discharge (HID) lighting with high performance T-8s and T-5s in grocery, warehouse, large retail, and other places where a wattage reduction can be almost half of the installed wattage and the related additional benefits of dimming and the ability to work with occupancy sensors open up a lot of other savings opportunities. In fact, the program measure lists contain multiple measures that will install HID as the efficient alternative, when a more appropriate and efficient option is already available. In many places with lower avoided costs than California, it is often cost-effective to replace 5 year old T-8s with the new high performance ones if the fixtures can be moved around.

Program Consistency
Another lost opportunity can be found when program offerings are not consistent between utility programs. SCE does not run an Energy Star Clothes Washer program, although there are electric savings at no incremental costs, arguing that this is mainly a gas technology due to water heating savings. Unless clotheslines are being used to dry clothing there are additional electric savings to be gained. However, the SCG proposal only includes rebates for 19,000 Energy Star Clothes

Washers (2007 standard expected to be 1.72 MEF or higher), which is a small fraction of all the clothes washers that will be bought in the populous Southern California market.

Portfolio Components Not Reviewed

There were parts of the portfolios that had insufficient information to review in this assessment. These are discussed in this section of the report.

Bidding and Third-Party Issues

As instructed by the Commission, a minimum of 20 percent of the portfolio is to be bid to third parties (generally referred to as Third-Party Programs). This bid portion of the portfolio is to include programs that are either not defined or that have the flexibility to bring innovation to the market. Given that this information is intentionally not well defined, the team did not review these concepts.

Evaluation Issues

This section of the report discusses evaluation related issues that developed during the portfolio reviews. The CPUC should consider these issues during the evaluation planning and implementation efforts.

Evaluation Data and New Tracking Systems

PG&E's new market-sector approach to designing and implementing programs will require new tracking system designs and more aggressive management of those systems to assure data quality and availability. It will be important for evaluators to sign off on the design and operations of these systems so that the CPUC will have the program information they need to conduct the impact and effects evaluations. This same condition applies to SCE which is tending toward a more market-sector oriented approach to program design and delivery. One of the first impact evaluation-related issues for the CPUC to launch will need to be conducting evaluation tests of the PG&E and SCE tracking systems to help assure that evaluation-related information can be easily and rapidly obtained from these systems.

Process and Impact Evaluations for PG&E's and SCE's New Approach

The new market sector approach being used by PG&E and SCE should have some level of priority in structuring the impact evaluation efforts, but also for conducting process evaluations. The CPUC should expect that both PG&E and SCE will conduct early process evaluations of their new market-sector implementation approaches to identify how well these approaches are operating and also to identify ways to improve the operations of these programs. Likewise, it will be appropriate for the impact evaluation to focus early efforts on these delivery approaches to see if they are achieving energy savings and if the level of savings is consistent with expectations. These evaluations will also need to compare the success of the rate of impact acquisition with the rate of acquisition from the previous program structures. Although the new approaches will take some time to work out the issues that will come up, it will be important to understand if these approaches are going to be successful at reaching their impact goals.

Need to Conduct Marketing Effects Evaluation Early

The amount of funding going into non-program focused marketing efforts is now more than $50 million. The review team was able to review evaluations that indicate that these efforts are

successful at getting messages into the market and that the messages are understood by the targeted sectors. However, we are unable to find documentation that these efforts are successful at producing effects that result in energy savings. This is a substantial amount of money to allocate to programmatic efforts that have not proven to be effective. We suspect that these efforts are effective to some degree. However, without an effects evaluation documenting the direct or indirect savings from these efforts, it is impossible to determine if this funding should be reduced, kept at the same level as previous years, or increased. The CPUC will want to launch an effectiveness evaluation of these efforts early in 2006 and be ready to adjust program budgets to reflect the results of these studies.

Partnership Programs
These programs will need early process and impact evaluations to assess how well they get up and running and are achieving savings. Programs that are not achieving strong savings in the first year should be re-examined for cost-effectiveness and to determine if the programs are capable of providing cost-effective resources to the portfolio over the following two years.

Third-Party Programs
In the past, the impact evaluations of the third-party programs have not been as rigorous as the evaluations conducted on the IOU programs. The primary reason for this condition is that the third-party programs often under-budgeted for evaluation efforts and the program selection approach rewarded administrators that minimized the scope of their evaluations (evaluation dollars were counted against the program in comparing program costs with anticipated benefits). These programs should receive a rigorous impact evaluation that focuses on acquired net effects. Many of the previous third-party evaluations used measure counts times the DEER estimates as the basis for their impact estimates. A more rigorous approach is needed. Likewise, it will be important to conduct process evaluations of these programs early to identify those that are having problems getting started and capturing savings.

Natural Gas Programs
The natural gas programs conducted by SCG have not had the same level of evaluation focus as the electric programs. These programs should be evaluated to confirm the level of gas savings that can be achieved from these programs and to determine if they will meet or exceed their energy savings targets.

Bid Programs
These programs may hold considerable potential for the portfolios and be capable of capturing very cost-effective energy savings. It will be important for the process evaluation to look at the entire bidding and selection process, as well as program performance issues. Likewise, these programs should have rigorous impact evaluations as early as possible to determine their impacts and to confirm their potential.

Information and Education Resource Effects
The current portfolio is proposed as beginning to count savings from information and education programs. As a result, all program evaluations will need to address program enrollment, attribution, and information sources, so that savings are not double counted. The CPUC will need to move these programs into the grouping of programs that will require impact and effects

evaluations. Because most of these programs have not been evaluated from an impact perspective, they may need to be addressed early in these studies.

Confirm the TRC with Current Evaluation Data
Because the portfolios are predominantly based on IOU generated estimates of savings rather than DEER estimates, there is a need to conduct early impact evaluations on key program and market interventions to confirm the 'as delivered, as achieved' net energy impacts. The results from these new evaluations will need to be incorporated into the portfolio estimates of annual impacts so that the projections of savings will be updated to be more consistent with achieved savings.

KW versus kWh
The evaluation will want to address the balance of achieved kW and kWh and assess how the programs and the portfolios are impacting the system load factors.

Attribution Issues
With the addition of educational programs that are now counting savings and the potential for the Codes and Standards program to produce significant savings, the evaluation effort will need to develop an attribution policy and protocol. The policy will need to focus on how evaluations will deal with the issues of attribution across the many different types of programs and cross-program efforts. The protocol will have to focus on what evaluation efforts will be needed across the evaluations. Clearly there will be a need for all impact evaluations to include a knowledge and attribution aspect to how participants heard about the programs and what information they have been exposed to that is portfolio related.

Estimates Based on Old Data
Many of the assumptions used in the energy savings estimates are based on data 10 to 15 years old, most of which is not adjusted for code impacts or standards requirements. It will be important for the evaluation effort to be structured to update as much of these data as possible, including hours of operation, occupancy, current codes and standards, and NTG ratios.

Update the Potentials Studies
The California market has changed considerably since the residential and non-residential potentials studies were conducted. These studies should be updated to include new information on hours of technology use and recent codes and standards changes. Updating the potential studies may be linked to updating energy efficiency targets, since big reductions in potential due to adoption of codes and standards may mean the targets are too high.

Market Sector Grouping Evaluation Approach
The recent change to have the CPUC conduct the impact evaluations means that these studies can be more easily grouped together rather than conducted as single program studies. The CPUC will want to examine the IOU portfolios and structure the evaluations to deal with technology and market focuses rather than program focuses. This change will improve the evaluation quality, increase evaluation results comparability, and lower the relative cost of the evaluation effort.

Market Sector, Top-Down Assessment

Because PG&E and SCE are taking more of a market sector based approach to program implementation, and because of the extensive history of energy programs in California, the impact evaluation efforts will need to employ a top-down, sector based market effects evaluation in order to identify the ways in which the programs have impacted the operations of the market and to quantify the savings from these changes. The IOUs will also want to consider using market sector process evaluation approaches in their evaluation efforts to understand how market sector approaches can best fit in with and effect the operations of the markets in which they work.

Conclusion

Overall, the utilities have provided a robust set of program portfolios that have a good chance of meeting their near-term goals for energy savings, demand reduction, and therms based on the CPUC's Policy Manual net to gross estimates. The measures for which sufficient data were provided reflected reasonable savings assumptions, and with some noted exceptions, most program goals were realistic, though difficult.

PG&E Portfolio Overview

PG&E's New Portfolio Model called "*Market Integrated Demand Side Management* (MI DSM)" structures their programs around market segments. Programs are tailored to specific markets rather than technology groupings. The goal of this integrated approach is higher penetration resulting from being able to better serve the needs of their customers, vendors and industry experts. Our team would like to commend PG&E on moving to this market-based approach for providing energy efficiency services. It is our contention that this concept has the potential to substantially reduce lost opportunities and provide resources more cost-effectively.

The following market segments are in the PG&E program portfolio and have reported energy and demand savings. The percent of program budget has been included in Table 11 for each program. The total funding for PG&E's programs is $ 276,352,984 for 2006, and $975,118,270 for the portfolio period 2006–2008.

- Mass Market includes residential, multi-family residential and small commercial. These customers have similar purchasing patterns and strategies, use the same vendors, and have similar approaches to energy efficiency. A common approach to these customers, historically viewed as separate segments, could provide greater penetration into the small commercial market while eliminating the artificial boundary between them and providing for program delivery economies;
- Agricultural and Food Processing includes food processors, wineries, dairies, greenhouses, and refrigerated warehouses;
- Schools, Colleges, and Universities includes K-12 schools, community colleges, universities, and campus housing;
- Retail includes general retail, big box retail, supermarkets, restaurants and food services;
- Industrial includes fabrication industries, process industries (including waste water and water treatment), and heavy industrial manufacturing;
- Medical includes hospitals, assisted living facilities, skilled nursing facilities, and medical specialty facilities;
- Commercial includes office buildings, governmental facilities, and large institutional facilities;
- Hospitality Facilities include lodging, resort, and hotel facilities; and
- High Technology includes laboratories, clean-rooms, and data centers;
- Residential New Construction targets market actors involved in residential construction.

Programs classified as Information-Only include:

- Education and Training [4]
- Codes and Standards
- Emerging Technologies

[4] PG&E is investigating the possibility of energy savings for this program.

- Statewide Marketing and Information Program

The following table provides a presentation of PG&E's portfolio and the budgets allocated to each program. While included in the overall annual portfolio budget, PG&E did not include EM&V costs at the program level. In Table 11, 8 percent has been added to each of the program budgets to reflect the allocation of EM&V costs.

Table 11. PG&E – Overview of Program Budget

Programs with Reported Savings (2006)	Budget	Percent of Annual Budget
Mass Market	$133,832,354	48.4%
Industrial	$42,866,313	15.5%
Agricultural and Food Processing	$15,588,829	5.6%
Commercial (Office Buildings)	$12,075,108	4.4%
Residential New Construction	$11,106,092	4.0%
Medical	$8,751,916	3.2%
Retail	$5,897,664	2.1%
High Technology	$5,771,339	2.1%
Schools, Colleges, and Universities	$5,439,653	2.0%
Hospitality (Lodging)	$1,985,805	0.7%
Programs Without Reported Savings (2006)		
Education and Training	$15,731,443	5.7%
Statewide Marketing and Information Program	$9,701,418	3.5%
Emerging Technologies	$4,137,329	1.5%
Codes and Standards	$1,765,789	0.6%
Annual Overall (2006–2008) $975,118,270		
2006	$276,352,984	28.3%
2007	$314,463,937	32.2%
2008	$384,301,349	39.4%

Goal Attainment – PG&E

PG&E's portfolio of utility programs for the period 2006–2008 are estimated to save 3,021 GWhs and 51,756 Mtherms. Demand savings are estimated to be 563 MW in 2008. This will be funded with a budget of $975 million. This effort is forecast to be cost-effective: a TRC of 1.61 and a PAC of 2.24.

PG&E's budget for 2005 was approximately $131 million. The increases in the portfolio years are substantial. PG&E plans to significantly ramp up its budget in the next few years: going from $276 million in 2006 (111% increase from 2005) to $304 million in 2007 (a 10% percent increase) and $373 million in 2008 (a 35 percent increase compared to 2006, and almost three times the 2005 budget).

Comparison with CPUC Goals

According to the information available to the TecMarket Works Team during the review period, PG&E projects that their portfolio will surpass the energy goals provided by the CPUC in each of the program years 2006, 2007 and 2008. They project that PG&E's programs will achieve 106 percent of the CPUC's first year GWh goals, and 120 percent of the first year natural gas goals. PG&E forecasts that by the end of 2008 they will have achieved 109 percent of the GWh goals, and 113 percent of their natural gas savings goals. While demand savings do not appear to meet the CPUC's goals, it is likely that this is due to the way measure life is being accounted for with many of the measures. Demand savings are estimated to be seven to ten percent below the CPUC goals for each of the portfolio periods.

Table 12 presents PG&E's projections of their portfolio's ability to reach CPUC energy and demand savings goals. The MW achievements presented in this table are the average mega-watts projected to be captured and are not the critical summer peak MW.

Table 12. PG&E – Energy Goal Accomplishment (2006–2008)

Projected Program Impacts By Year	2006		2007		2008	
	Total	% of 2006 Goal	Total	% of 2007 Goal	Total	% of 2008 Goal
Energy Savings – Electricity						
Annual Net Electricity Savings (GWh/yr)	876	106%	996	106%	1,149	109%
CPUC Electricity Target (GWh/yr)	829		944		1,053	
Annual Net Peak Demand Savings (MW)	167	93%	185	90%	211	93%
CPUC Peak Demand Target (MW)	180		205		228	
Annual Net Therm Savings (MTh/yr)	15,082	120%	17,027	114%	19,647	113%
CPUC Therm Target (MTh/yr)	12,600		14,900		17,400	

The TecMarket Team's opinion of PG&E's goal projections is that the goals are reasonable given the portfolio being developed and programs being offered. The demand goals appear not to be meeting the CPUC goals due to measure life accounting described in the issues section below.

The main concern with the program budget relates to the difficulties inherent in ramping project spending up by over 100% in 2006. The team also has some concerns about the partnership programs being able to cost-effectively support PG&E's energy goals. There is limited information on how the goals will be supported by the third-party providers. A question arose during our review as to whether the portfolio of programs detailed in this filing by PG&E will remain constant – no matter who delivers the services (i.e. third-party). PG&E was asked to clarify this issue. PG&E responded that they do not know what the mix of programs and services would be, however they felt that any changes would be "improvements over current filings".

Comparison with Potential

In order to conduct the comparison of PG&E's portfolio goals with the CPUC energy potentials, we used KEMA's "100% achievable potentials" (potential amount of energy savings that could

be achieved if the program funding was increased by 100 percent). This allowed for a comparison of an expanded program portfolio that more closely matched the spending levels of the current portfolio. However, the current portfolio budget may be greater than the 100 percent increase reported in KEMA's potential reports for residential and non-residential programs. At this time, there is no published report for industrial potentials, however, there is an industrial potentials study currently being finalized by KEMA. For the PG&E industrials potential, we used preliminary estimates from the yet to be published 2005 industrial potentials study being completed by KEMA. The industrial potentials should be considered proxy estimates that will need to be adjusted once the KEMA study is released in 2005.

KEMA's published potential reports provide 10-year estimates of program potential, or the amount of energy impacts that can be achieved over a 10-year period. In order to adjust the KEMA potentials to the 3-year program cycle, we multiplied the KEMA potentials by 0.3. We use 3-year potentials in this assessment because the current program planning cycle is three years in length.

We were unable to segregate the programs into residential, non-residential and industrial sectors using the portfolio data, as several programs cut across sector lines. As a result, we summed the potential estimates for the 100 percent increase in funding levels across the residential, non-residential and industrial sectors (note: the non-residential sector does not include industrial potentials) and compared these potential estimates with PG&E's portfolio estimates. Table 13 provides the results of this comparison.

Table 13 indicates that if PG&E is successful in meeting its three-year goals for energy and gas savings, then it will easily meet the 100 percent Achievable Potential estimates.

Table 13. PG&E – Potential and Portfolio Savings Projections (2006–2008)

Energy	Residential	Non-Residential	Industrial*	All Sectors		
	100% Ach	100% Ach	100% Ach Proxy	100% Ach Proxy	CPUC Goal	Utility Plan
Mth	14.53	11.04	11.51	37.08	9.50	51.8
GWh	873.64	751.39	354.42	1979.45	2826	3021
MW (summer)						

*Preliminary data for industrial, not yet published or finalized.

Budgets and Service Offerings Balance

PG&E's portfolio is distributed among several sectors in terms of funding and expected energy savings (Table 14). Sixty percent of the funding, and almost ¾ of the savings (73 percent) are being obtained in non-residential sectors. The "Other" sector appears to be composed of information-only programs that are not included in the energy savings goals. One area of possible concern is the residential new construction sector, which has a 4 to 1 ratio of spending to energy savings.

Table 14. PG&E – Projected Funding and Energy Savings by Sector (2006)

PG&E	Funding	% of 2006 Total	Savings (Net kWh)	% of 2006 Total	Savings (Net Therms)	% of 2006 Total
Residential	$ 62,229,905	23%	230,703,135	27%	1,376,058	10%
Residential New Construction	$ 9,944,239	4%	5,407,627	1%	397,424	3%
Non-Residential	$ 114,088,159	43%	502,648,914	59%	9,133,065	64%
Non-Residential New Construction	$ 31,114,953	12%	118,370,884	14%	3,346,547	23%
Other [3]	$ 48,550,730	18%		0%		0%
Total Funding	**$ 265,927,985**		**857,130,560**		**14,253,093**	

Energy Savings Issues

To assess if the portfolio energy savings are reasonable for the measures used, we conducted a review of the measures included in the PG&E portfolio. First we sorted out all the measures that used DEER values to predict energy savings. We then examined all measures that did not use DEER for estimating impacts. Note in Table 15 the majority of PG&E's energy savings are not related to the DEER database.

Table 15. PG&E – Savings Estimates Developed Using DEER Data

	Number of Measures	Percent of IOU Savings		
		kWh	Therms	kW
No Relationship to DEER	441	57%	88%	65%
Relationship to DEER	123	43%	12%	35%

DEER Measures Estimates

The majority of measures included in PG&E's programs are not using DEER estimates of energy savings. Estimated energy savings that are not based on DEER represent 57 percent of kWh, 88 percent of therms, and 65 percent of the kW savings in PG&E's portfolio.

All of the measures that were estimated using DEER were reviewed for accuracy and consistency with the DEER 2005 Database. The DEER data was downloaded from http://www.rtf.nwppc.org/deer2005/# on May 13, 2005.

In the "measure list" tables of the utility workbooks, the "Measure ID" was typically a match with the "RUNID" field in the DEER data. In some cases averages across the DEER "Measure ID" were used instead of the more specific "RUN ID". Comparisons of the utility estimate and DEER estimate were made based on the information available in the filed workbooks. For example, if the utility noted that they used an average for all DEER refrigerators, the evaluation team attempted to replicate their calculations for a valid comparison.

Note in Table 16 the majority of the kWh savings using a DEER estimate matched nicely with the DEER measure estimates. Where estimates were not the same, PG&E had a larger

proportion of savings that were overestimated compared to DEER than were underestimated. Most of those overestimates were very close to the DEER estimate.

For a very small group of savings, it appears that the units used by the utility may have been off. These were both for insulation measures, so it is likely that PG&E and DEER used different assumptions for the size of the home.

Overall, PG&E offered a more conservative estimate of kWh energy savings than we think might have been generated by DEER.

Table 16. PG&E – Results of DEER Measure Savings Estimates (kWh)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kWh)	% of Portfolio Savings	DEER Estimated Savings (kWh)	% Difference
-	OK	781,641,913	26.4%	781,641,913	0.0%
- Total		781,641,913	26.4%	781,641,913	0.0%
Over	Close Enough	381,733,697	12.9%	374,321,084	2.0%
	Not Clear	8,061,080	0.3%	7,751,914	4.0%
	Not in DEER	7	0.0%	0	0.0%
Over Total		389,794,785	13.1%	382,072,997	2.0%
Under	Close Enough	22,761,430	0.8%	24,078,291	-5.5%
	Not Clear	77,012,917	2.6%	281,841,284	-72.7%
	OK	583,364	0.0%	583,517	0.0%
	Units	232,845	0.0%	104,210,301	-99.8%
Under Total		100,590,556	3.4%	410,713,393	-75.5%
Grand Total		1,272,027,254	42.9%	1,574,428,304	-19.2%

For PG&E's therm savings, a very small portion of the total portfolio savings was accounted for using DEER therm saving estimates. Even for those measures that were compared with DEER, the relationship between the utility's estimate and DEER was not clear. Even though it may appear that PG&E's estimate was considerably more conservative than DEER, accurate review is not possible until the actual relationship is clarified (See Table 17).

Table 17. PG&E – Results of DEER Measure Savings Estimates (Therms)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (Therms)	% of Total Portfolio Savings	DEER Estimated Energy Savings (Therms)	% Difference
-	OK	126,716	0.3%	126,716	0.0%
- Total		126,716	0.3%	126,716	0.0%
Over	Not Clear	4,812,628	9.8%	4,293,700	12.1%
	Not in DEER	673,675	1.4%	0	0.0%
Over Total		5,486,303	11.1%	4,293,700	27.8%
Under	No Utility Estimate	0	0.0%	77,744	-100.0%
	Not Clear	145,011	0.3%	78,655,865	-99.8%
	OK	46,716	0.1%	46,770	-0.1%
Under Total		191,727	0.4%	78,780,379	-99.8%
Grand Total		5,804,746	11.8%	83,200,795	-93.0%

Most of the demand savings that were included in the workbook filing that claimed to be based on DEER did not match with the DEER database. The relationship between the per unit demand savings and DEER was unclear (See Table 18).

Table 18. PG&E – Results of DEER Measure Savings Estimates (kW)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kW)	% of Total Portfolio Savings	DEER Estimated Energy Savings (kW)	% Difference
Over	Not Clear	167,828	30.5%	137,725	21.9%
	Not in DEER	242	0.0%	0	0.0%
Over Total		168,070	30.5%	137,725	22.0%
Under	Close Enough	351	0.1%	356	-1.2%
	No Utility Estimate	51	0.0%	211,453	-100.0%
	Not Clear	24,976	4.5%	89,506	-72.1%
Under Total		25,377	4.6%	301,314	-91.6%
Grand Total		193,448	35.1%	439,039	-55.9%

Non-DEER Measures Estimates

Among the energy savings estimates that were not developed using DEER, it was difficult to discern how the energy savings estimates were developed. Note in Table 19, that after reviewing the documentation for non-DEER measures about 39 percent of the kWh savings and 79 percent of the total therm savings could not be clearly defined by the TecMarket Team, which presented concerns. While the utilities generally have a solid basis in our opinion for the estimates we can understand, it would be a leap of faith to say that we are comfortable with so much being unclear.

Table 19. PG&E – Non-DEER Measure Energy Savings Assessment

Confidence in Per Unit Estimate	Measure as Described by IOU	% of IOU kWh Savings	% of IOU Therm Savings
Concerns	Process-RETRO-E	6.60%	0.00%
	VSDs for HVAC Fans - 100 hp maximum	4.00%	0.00%
	HVAC/AC-NC-E	3.50%	0.00%
	Lighting-NC-E	3.00%	0.00%
	HVAC/AC-RETRO-E	2.90%	0.00%
	Process-NC-E	2.90%	0.00%
	Lighting-RETRO-E	2.80%	0.00%
	Refrigeration/ Appliances-RETRO-E	2.60%	0.00%
	Lighting Controls-RETRO-E	1.40%	0.00%
	Refrigeration/ Appliances-NC-E	1.40%	0.00%
	Lighting Controls-NC-E	1.30%	0.00%
	Bldg Envelope-NC-E	1.20%	0.00%
	Bldg Envelope-RETRO-E	1.10%	0.00%
	Strip Curtains for Walk-ins	1.00%	0.00%
	Water Ht/Furnace/Boiler-RETRO-G	0.00%	18.90%
	Process-RETRO-G	0.00%	16.70%
	HVAC/AC-RETRO-G	0.00%	15.90%
	Water Ht/Furnace/Boiler-NC-G	0.00%	8.10%
	Process-NC-G	0.00%	7.10%
	HVAC/AC-NC-G	0.00%	6.80%
	Duct Test and Sealing CZs 2, 4, 11, 12 & 13	0.00%	2.20%
	Gas Furnace - 90 AFUE	0.00%	2.10%
	Process Boiler - Steam	0.00%	1.30%
Concerns Total		**35.8%**	**79.0%**
Reasonable	High Output (HO) T-5 Fixtures-4-Lamp-Conversion frm 400 watt Metal Halide<244 watts	4.9%	0.0%
	PREMIUM T8/T5 Lamp & Electronic Ballast/New Fixture-Replacement of T-12 Lamps & EnergySaver Ballast-4 ft	2.5%	0.0%
	T8-25 Watt Lamp-Replacement of T8-32 Watt Lamp (4 ft)	4.0%	0.0%
Reasonable Total		**11.4%**	**0.0%**

Cost-Effectiveness – PG&E

TRC and PAC Issues

With the exception of the Residential New Construction, PG&E's programs are all estimated to be cost-effective. Our review did not find any variation in the relative differences between TRC and PAC numbers: the TRC was always less than the PAC, which is what one would expect if one assumes that the only variation between the two indices is cost (the TRC includes ALL costs).

PG&E's Residential New Construction program is the only program not forecasted to be cost-effective (TRC<1). In 2006, this program has an estimated TRC of .57. The other nine programs - with cost-effectiveness tests - have estimates ranging from a low TRC of 1.06 for the Schools and Colleges program to a high TRC of 3.34 for the Schools and Colleges program. The average TRC across all ten programs was 1.74 for 2006 and a slightly lower TRC of 1.61 across the three-year portfolio. Table 20 shows the TRC estimates for 2006 for each of PG&E's programs with forecasted energy savings.

Table 20. PG&E – Program TRC Test Results (2006)

PG&E Program	TRC Test
Retail	3.34
Agricultural and Food Processing	3.28
Commercial (Office Buildings)	3.13
Industrial	3.11
Medical	2.76
Hospitality (Lodgings)	1.94
High Technology	1.93
Mass Market	1.66
Schools, Colleges, and Universities	1.06
Residential New Construction	0.57
Total	**1.74**

Issues Addressed – PG&E

Administrative Costs

In our review, the team noticed that PG&E's budget for administration for the 2006 portfolio year is very low (7.6 percent) compared to the other California IOUs and also to other utilities across the country. Administrative costs, as a percent of portfolio budget, range from around 5.3 percent for Emerging Technologies to 18.5% percent for Schools, Colleges, and Universities. Furthermore, administrative costs in 2007 and 2008 drop substantially to 4.5% in 2007 and 4.3% in 2008. These reductions in 2007 and 2008 result in an overall portfolio administrative percentage of only 5.3 for the 2006–2008 period. Estimates for the three years are shown in Table 21.

Table 21. PG&E – Administrative Costs as a Percentage of Program Budgets (2006)

PG&E Program	% of Budget 2006	% of Budget 2007	% of Budget 2008
Agricultural and Food Processing	6.5 %	3.9%	3.6%
Codes and Standards	13.4 %	12.3%	13.7%
Commercial (Office Buildings)	8.8 %	7.2%	6.4%
Education and Training	12.6 %	11.0%	12.3%
Emerging Technologies	5.3 %	3.9%	4.3%
High Technology	10.0%	8.6%	6.0%
Hospitality (Lodging)	13.1 %	10.8%	9.7%
Industrial	6.8 %	4.1%	4.3%
Mass Market	6.8 %	3.2%	3.0%
Medical	9.4 %	7.7%	5.8%
Residential New Construction	10.2 %	6.7%	6.4%
Retail	8.8 %	7.1%	6.0%
Schools, Colleges, and Universities	18.5 %	8.7%	5.4%
Statewide Marketing and Information	0%	0%	0%
Overall	**7.6%**	**4.5%**	**4.3%**

Net to Gross

As mentioned in the overall assessment of the utility portfolios, the spreadsheets for each utility have net to gross (NTG) numbers for each measure. However, the NTG numbers were generally the same across all the measures within a program. As instructed, the utilities used default NTG numbers based on the CPUC Policy Manual. However, using these numbers increases the risk of the portfolio not producing the savings indicated by the program and may be inconsistent with some evaluation findings that report different NTG values. While these standard NTG levels make it easier for planning and analysis, they increase the risk of overstating savings goals from the portfolio.

Workpapers

In their filing of June 1, 2005, PG&E states that the required technical documentation is supplied in the workpapers. The June filing and the supporting CD labeled "Workpapers" only contained the E3 calculator spreadsheets. On June 19th and approximately June 26th, additional documentation, including some workpapers, were provided. Due to the lateness of submittal, many of these documents have not been fully reviewed by the TecMarket team.

Demand Savings

The PG&E calculator projects kW impacts for measures installed in 2006 for a snapshot at the 3rd quarter of 2011. If a measure is installed in 2006, and has a life of less than five years, it is likely not counted in this impact projection. Therefore, for demand savings to be counted the life of the measure must be at least five years. Consequently, in terms of accuracy in the filing for kW saved in 2006, PG&E will be the least accurate for reporting short term savings. However, if the goal is to report longer-term savings, the PG&E calculator will be the most accurate as it counts "only" those measures that have a five year or longer life. In years 2007 and 2008, the snapshot shifts out one year, so it becomes a rolling snapshot across all IOUs.

Consequently, due to the different ways that kW impacts are being accounted for in the future, the demand savings are not comparable across the IOUs.

Flagship Programs versus Other Programs
While overall, the TecMarket team feels that PG&E's new market-based approach to serving their customers is very promising, we also feel that the market approach to serving all areas may, at times, be too encompassing. Specifically, the team has concerns about the mix of new non-residential construction activities being spread across several markets. Looking at the activities in this important sector across programs may not be the most efficient way to look at non-residential new construction. We also have some concerns that PG&E may not be using many of the relationships, experience and program foundations that they have built up over the past ten years.

Energy Accounting Issues
While we feel that this portfolio will provide PG&E customers enhanced delivery of program services, our review team had a great deal of trouble trying to identify measures by program and general accounting issues related to these measures. Our team contacted PG&E about this concern and was told that a tracking number for each measure would allow the tracking of each measure, and also ensure that double counting of savings did not occur. While this may be the case, from a reviewer's standpoint, it is not very transparent. In light of this issue, we remain somewhat uncertain as to the energy and demand saving estimates at the program level.

CPUC Oversight Responsibility
In Chapter 4, Volume 1 of their portfolio filing, PG&E has asked for 100% flexibility in shifting their funds between and among program categories. Citing *D.03-12-060* at p22, PG&E indicates the Commission's intention to allow this flexibility, PG&E feels that this fund shifting will optimize program operations and enhance abilities to meet the Commission's energy and demand savings goals.

One of the issues discussed within each of the PRGs is the issue of program and portfolio oversight and if it is a good public policy decision to allow a wide range of IOU flexibility in making changes to the portfolios. All PRGs are concerned with this issue, and all IOUs have considered the PRG comments in their June 1, 2005 filing.

While it is true that the IOUs are responsible for implementing their portfolios in a way that reaches the energy saving goals, the CPUC is the single organization with the ultimate authority and responsibility regarding the implementation of these efforts. In the end, the citizens of California must hold the CPUC responsible for the wise implementation of the ratepayer-funded energy efficiency programs. As a result of the PRG comments and IOU interactions, the IOUs have placed recommended oversight activities in their portfolios. These are discussed in each of the IOU chapters in this report. However, we do not think it should be the responsibility of the IOUs to define the state's oversight responsibilities. Rather, the level and degree of CPUC oversight should be set at the policy level within the CPUC. The CPUC should then advise the IOUs of the policy decision and the details of how that policy decision will work. While the CPUC should obtain IOU recommendations for the oversight of their portfolios, the adopted level of oversight and the conditions on which it shall operate should be set by the CPUC and be identical across all IOU portfolios.

Risk Issues
While PG&E's new Market Integrated approach to delivering programs and services has the potential to be very successful, there will be an increased risk in undertaking a change of this magnitude. It will require significant management and utility supervision to oversee this change, and to successfully implement these larger comprehensive programs.

We also want to point out other categories of risk associated with PG&E's programs:

Significant Size Increase
The overall increase of 111% in PG&E's annual budget in year 2006 is quite an undertaking and invites the question of whether this ramp up can actually be accomplished.

The Mass Market program has an inherent risk associated with the fact that 48% of PG&E's budget and 2/3 of savings are concentrated in this one program.

Delivery Risk
As mentioned previously, the channeling of customers from other programs into the mass market has risks associated with the tracking of customers and measures and the possibility of savings being double counted.

New Implementers
PG&E will be relying on new organizations to implement some of their programs, and it is unclear how reliable and effective they will be, compared to past implementers.

Energy Efficiency Collaborations (Partnerships) cannot be assessed at this time, since they will be designed after the third-party competitive bid programs are implemented. Similarly, the Third-Party Programs also cannot be assessed until the bids are in and accepted.

Comprehensiveness and Lost Opportunities – PG&E

The overall program descriptions provide very knowledgeable and comprehensive market analyses of the programs within PG&E's portfolio. However, a few issues and possible lost opportunities were uncovered during the TecMarket Team's review.

Gas Measures
One area of concern relates to the lack of any gas savings in the majority of PG&E's programs. While we understand that the measures are going to be promoted mainly in the Mass Market and Industrial sectors, programs such as Schools & Colleges and Medical also have gas savings opportunities. We are unsure if these opportunities are going to be addressed in the portfolio.

Program Measure Possible Lost Opportunities
In our review of PG&E's program plans, we have found some of the potential lost opportunities. Some examples of possible lost opportunities are included in Table 22.

Table 22. PG&E – Possible Lost Opportunities

Sector	Lost Opportunity
Agriculture	Pumping measures and motors that are not channeled through the Market Program
Commercial Lighting	Replacement of HID lighting with HO T-8s & T-5s
Hospitality	Guest room energy management systems
Industrial	Process changes
Residential New Construction	Renewables
Schools and Colleges	Energy Management Systems

Bidding and Third-Party Issues – PG&E

As instructed by the Commission, a minimum of 20 percent of the portfolio is to be bid to third parties (generally referred to as Third-Party Programs). Given that this information is not yet due, the team did not review these concepts.

Partnership Program – PG&E

Additional information is needed to assess these programs, however the assumption of partnership programs having neutral impact with a TRC of 1.0 is not realistic. This will act to drive the portfolio's overall TRC down.

Evaluation Issues – PG&E

Based on our review of PG&E's portfolio, the TecMarket team feels that both process and impact evaluations will be extremely important over the three-year portfolio due to the fact that:

- Program expenditures are increasing at a tremendous rate.
- PG&E's MI DSM approach, while laudable, is novel and will require comprehensive, state-of-the-art evaluation activities to ensure that the programs are operating and providing savings as designed.
- Natural gas savings have not received as much attention from the evaluation community as electricity savings.
- The documentation for many measures was not available, making the evaluation effort even more important.
- Many of the assumptions used in the calculation of energy savings are based on old data (10-15 years old): e.g., NTG ratio, hours of occupancy, and pre-codes and standards requirements.

As part of the evaluation effort, we also recommend the following:

1. Periodic updating of the potential studies in all sectors (residential, commercial, industrial, and agricultural).
2. Development of a data dictionary that all users can access for information on definitions of measures, baselines, energy savings, costs, and references.

3. Market-based evaluations to see how specific markets are changing, some of which may be due to the IOU programs.

Evaluation Policy Issues – New Construction Programs

Non-Residential Construction

Although the market-based concept pursued by PG&E is conceptually attractive, it is possible that the market segments may not be optimal as proposed. In fact, neglecting the specialized needs of new non-residential construction, which can get lost across the various market segments proposed, may be a big risk for future construction practices. Just as with the new home construction program, there are compelling arguments for maintaining a discrete market segment for Non-Residential New Construction. The target market actors are different from commercial retrofit, the timing of intervention is much more important, and the utility has extensive experience with an identifiable program – Savings by Design – and specialized relationships built up.

A natural grouping of programs exists within this market segment that target the same actors and allies with the same goals in mind would be Savings by Design, Emerging Technologies, Education and Training, and Codes and Standards. As with the residential new construction program, there is a need for a "carrier" program to bring innovation into the market, so that it can be shown to be cost-effective and become improved code. Because all of these programs address the same market actors and are targeted to the same goal of improved building energy efficiency, they should be designed, implemented, evaluated, and rewarded as a unified program. With all due deference to the segmentation planning by PG&E, the alternative to keep a unified non-residential new construction market as a target may be an overlooked opportunity

Residential New Construction

Given the concerns about cost-effectiveness of residential new construction programs and the need to focus on cost-effective programs, the TecMarket Team suggests that this program be evaluated with attention paid to how well these types of programs help develop a growing market for energy efficient homes.

The Public Advisory Group (PAG) express a strong interest in having Residential New Construction programs at the utilities. Combining residential new construction programs with related programs that are designed to attack the same market, such as the Emerging Technologies or Codes and Standards programs could provide a strategic initiative that is specifically designed to provide cost-effective long-term savings through adding innovations to a large dissemination program, and eventually to code changes. In that way, the efforts are strategically designed and would meet the criteria of actually being run to produce long-term cost-effective savings.

Conclusion

We offer the following conclusions from our review of PG&E's portfolio:

- PG&E's portfolio appears to be able to meet the energy goals set out by the CPUC. Demand goals are harder to estimate due to the way that measure life is accounted for by PG&E.
- Additional information on the program measures and saving estimates (workpapers) would be extremely useful for enhanced portfolio evaluation.

- The risk in not meeting the portfolio is likely not related to the cost-effectiveness of program offerings (in general the TRC estimates for the programs are very high), but rather in how well PG&E can incorporate the overall new market integrated program delivery strategy.
- The substantial increase in budgets, partnerships, and the use of third parties will present a major challenge that will require comprehensive program evaluation efforts.
- Administrative costs still appear to be quite low and the consistency of the administrative costs between the IOUs is an issue that should be addressed.

Program-Level Assessment – PG&E

This section of the report presents the program-specific assessment information and issue discussions that were identified during the portfolio review effort. The issues reviewed are presented in the left-most column of Table 23 and each subsequent column represents a specific program, allowing the reader to see if the review team determined there to be an issue associated with a specific program, and to understand the review team's perspectives associated with each issue.

Table 23. PG&E – Program Specific Summaries

PG&E (Year 2006)	Mass Markets
Short Description	This program is a new integrated approach to serve residential and small commercial customers with similar purchasing patterns, vendors and approaches to energy use. Large commercial and industrial customers will be channeled through this program for some measures.
% of IOU Budget	48.4%
MWh	575,503
MW (summer)	96.21
Mtherms (annual)	2.70
TRC	1.66
Assessment of Cost Effectiveness	PG&E hopes that their approach of integrating customers with similar purchasing patterns will provide easier program delivery, greater EE penetration and elimination of artificial boundaries
Results Reasonable & Achievable	The concept of the Mass Market is new, but the program components are all tried and successful elements. It is extremely hard to determine exactly what is going to be accounted for under this program, but the budget ratios and energy savings appear to be in line with historical figures prior to program consolidation.
Design & Delivery	This unique approach to serving the residential and commercial mass market customers (over 60% of kwh sales) is very logical and will likely result in better delivery of measures and services. We applaud PG&E's effort to try new design and delivery approaches.
Markets Targeted	While the main markets targeted by the program are residential and small commercial, PG&E's other offerings also use this category for accounting of various measures and technologies with deemed savings. An industrial customer, with a small item or limited number of items to replace (for example, a motor) could participate in the Mass Market program, but mid- and large-sized projects at industrial sites are not the main targets for the Mass Market program.
Lost Opportunities	On page 6 of the Mass Market program write-up, it states that thermostats will be dropped as a measure. However, programmable thermostats are included on the measure list and have savings associated with this measure in the commercial targeted sector. More details are also needed on the steps which will be taken in order to provide direct install measures to small commercial customers.
Risks	An increased risk is likely, due to the fact that 2/3 of PG&E's budget and 50% of savings are concentrated in this one program.
Other Issues	There are a large number of very high net to gross ratios, even in the residential sector. These customers may be considered hard to reach. For some measures, lower NTG ratio will likely result in marginal measures not passing the PAC test and could affect the inclusion of some measures. The NTG estimates by measure are more varied than those appearing the ED workbook values spreadsheet. There is confusion regarding how customers from other programs are channeled into the Mass Market program. A table that shows this process would be helpful. PG&E has assured the TecMarket team that there will be a unique measure id number that will tie into the customer account measure in order to track savings and to ensure that double counting of savings does not occur.
Past Experience/ Evaluations	While most of the measures have been included in past programs and program evaluations, the integrated approach that PG&E is taking is new. Across the country, this approach to delivery of programs and services has occurred in Vermont and to some extent, New York. Although the territories and program offerings are quite different, it could prove useful to review program results and evaluations from these efforts.

PG&E (Year 2006)	Agricultural and Food Processing	Schools and Colleges
Short Description	This new program will allow specialists in these areas to provide targeted services to agricultural customers.	This program will serve public and private k-12 schools, colleges, universities and campus student housing. It will provide support for deemed savings measures promoted through rebate activities, and provide assistance with new construction.
% of IOU Budget	5.6%	2.0%
MWh	49,456	7,187
MW (summer)	8.20	0.98
Mtherms (annual)	1.92	-
TRC	3.28	1.06
Assessment of Cost Effectiveness	This program has second highest TRC	The program becomes even more cost effective over time. We are assuming that this higher cost effectiveness is a reflection of the longer length of time to get things accomplished in these sectors..
Results Reasonable & Achievable	Very large energy savings potentials in this sector - High TRC should allow opportunity to cost effectively achieve savings estimates	Less risky as program has time to get up and running - TRC goes from 1.06 in 2006 to 1.93 in 2007
Design & Delivery	The program will use specialists from PG&E and third parties to facilitate a delivery of a portfolio of energy services. It will include statewide elements along with specific components tailored to PG&E's customers.	While this appears to be a sound approach to serving these sectors, there is some concern with the overall way that the market is being attacked. K-12 schools operate quite differently than colleges. It is unclear how PG&E plans to differentiate the services provided with decision makers which is so varied across the different school segments.
Markets Targeted	Targets new and existing agricultural and food processing facilities. The rationale for grouping agricultural and food processing customers into a single program is sound. Both have high energy intensities where energy bills are a large component in profit margins and both sectors have unique measures and systems that require experienced utility representatives.	This program will target existing and new construction for public and private k-12 schools, colleges, universities and campus student housing. The full spectrum of uses will be targeted including: classes, offices, gymnasiums, pools, and student housing.
Lost Opportunities	Additional clarification is needed related to the accounting of Pumping and irrigation measures. These are mentioned in the write-up as important (90% of the potential energy savings lie in pumping applications) – however in the measure list pumping measures such as motors, pumps, controls are not mentioned. It is unclear why these measures are included in Mass Market and not in agricultural.	There are quite a few measures that are not being implemented as part of this program and it appears that the program is not being very aggressive. While previous evaluations have shown this to be a tough sector, the program should not limit itself to these four opportunities only. New construction water heater, appliances, process measures, and Energy Management Systems have been mentioned in the program description but are not listed in the measures.
Risks	From the numbers provided in the program documentation, the program looks fairly aggressive - looking at historical information on the budgets and savings for agricultural and food processing programs would help ascertain the risk level	TRC in 2006 is very low and long lead times to get projects going could easily make this program not cost effective during the first year of operation. The slow process could also jeopardize the savings obtained.
Other Issues	Regarding potential estimates: The plan indicates that the potential energy efficiency savings in food processing over the next 10 years is 265 GWh – with 130 GWh of agricultural energy savings potential also mentioned. The source of these estimates is unclear.	There are no gas measures or therm savings goals for this program in the available documentation. Not pursuing gas measure savings will lead to lost opportunities
Past Experience/ Evaluations		Combining elementary, secondary and higher education into one single program will have unique evaluation issues. The market actors in each of these sectors are unique and will need to be targeted and evaluated differently

PG&E	Retail Stores	Fabrication, Process and Heavy Industrial Manufacturing	Hi-Tech Facilities
Short Description	This program will integrate diverse retail markets such as supermarkets, restaurants, and general retail stores.	This program serves the heavy industrial market including fabrication and process industries and water treatment plants. The program will support project development through on-site facility audits, facility benchmarking and customized design assistance and engineering support	This program serves hi-tech facilities using energy specialists to facilitate a wide range of energy efficiency services
% of IOU Budget	2.1%	15.5%	2.1%
MWh	25,396	96,827	13,786
MW (summer)	4.41	21.01	2.99
Mtherms	-	9.24	-
TRC	3.34	3.11	1.93
Assessment of Cost Effectiveness	Highest TRC estimate	Third Highest TRC estimate	
Results Reasonable & Achievable		Demand savings appear to be low. While 15% of historical peak load occurs in these sectors, the program is targeting only 13%. Industrial sector is historically a market where there is a large opportunity for peak demand savings. Are there other demand reduction programs (such as curtailment, or demand response programs) that will be targeting this opportunity?	PG&E appears to know this market well.
Design & Delivery	This program will address the energy needs of the big box retail, chain supermarkets and restaurants. While PG&E's Mass Market effort will support the smaller retail chains and restaurants. For chains and big box retailers the program will use energy experts that will be able to provide a package of services to centralized decision makers.	The program will have statewide elements and customized support.	The program will incorporate statewide rebate elements as well as elements specifically targeted to and customized for PG&E's hi-tech customers.
Markets Targeted	Diverse markets will be targeted under this program; including supermarkets, restaurants, and general retail	Markets targeted include: manufacturing, and process industries such as printing plants, plastic injection molding facilities, lumber and paper mills, metals processing, petroleum refineries, chemical industries assembly plants and water treatment plants	Markets targeted include existing facility operations, facility renovations, and new construction
Lost Opportunities	There are many measures which have been included in the measure list, but do not appear to be included as part of the program.	There appears to be a good balance of technologies covered; however, we would like to see more activities related to process change - as there may be lost opportunities.	Gas measures not included
Risks	The delivery method seems sound – only going after large customers – sending the rest of the customers to the Mass Markets program.		
Other Issues	There are no gas measures or therm savings goals for this program in the available documentation. Not pursuing gas measure savings will lead to lost opportunities	This program channels incentives for premium motors and other industrial measures into the Mass Market program. The MM program shows a very high NTG ratios for these industrial measures. For example there is a .96 NTG ration– 125 horsepower motor. The concern is that for many of these industrial applications – such as motors - channeling them through the mass market rebate structure providing with NTG of .96 may not be appropriate.	There are no gas measures or therm savings goals for this program in the available documentation. Not pursuing gas measure savings will lead to lost opportunities
Past Experience/ Evaluations	PG&E has a great deal of past experience in this area. Key will be working with national chains and franchises.		

PG&E	Medical Facilities	Large Commercial (Office Buildings, Government, Large Institutions)	Hospitality (Lodging) Facilities
Short Description	This program targets existing and new medical facilities. The new market integrated effort addresses the hospital segment while the Mass Market program will be used to serve the medical office and smaller nursing homes	This program provides services to large commercial customers using PG&E and third party specialists. It will also include statewide components and Mass Market Rebates as well as elements targeted to the large commercial facilities customers	This program targets new and existing lodging using PG&E and third party specialists
% of IOU Budget	3.2%	4.4%	0.7%
MWh	30,838	47,478	5,252
MW (summer)	4.32	10.30	0.68
Mtherms	-	-	-
TRC	2.76	3.13	1.94
Assessment of Cost Effectiveness			
Results Reasonable & Achievable	PG&E appears to know this market well.		
Design & Delivery	Hospitals account for 450 out of 20,000 medical industry accounts. PG&E experts will focus on reducing the barriers such as lengthy design and and capital constraints that hinder the introduction of higher energy efficiency equipment. Targeted third party proposals will be sought to address the medical office and small nursing home segments through direct install efforts.	Services offered will include: life cycle costing and finance education; case studies; financial incentives for construction; commissioning and retrocommissioning services and upstream activities targeting HVAC, lighting, and plug load devices.	The program will include statewide elements as well as those targeted to PG&E's customers. The market integrated program will address the energy needs of larger hotels, convention centers, and chains. While the Mass Market program will be the primary delivery channel for smaller hotels/motels. Services provided include promotion of efficiency services for their operations, education and training of customers and market actors on new energy efficiency equipment and practices in their industry. The program will also promote all energy options applicable to this segment.
Markets Targeted	Markets targeted include: hospitals, medical offices and nursing homes.	Markets targeted include: new and existing large commercial and institutional office facilities	Markets targeted include : new and existing hotels, resorts, convention centers and hotel chains as well as the architects, engineers, contractors, and vendors who specialize in this segment
Lost Opportunities			Have Guest room energy management systems been considered –might be a lost opportunity.
Risks			
Other Issues	There are no gas measures or therm savings goals for this program in the available documentation. Not pursuing gas measure savings will lead to lost opportunities	There are no gas measures or therm savings goals for this program in the available documentation. Not pursuing gas measure savings will lead to lost opportunities	There are no gas measures or therm savings goals for this program in the available documentation. Not pursuing gas measure savings will lead to lost opportunities
Past Experience/ Evaluations			

PG&E	Residential New Construction Programs	Education and Training	Statewide Marketing and Information Program
Short Description	This program targets new residential housing using specialists from PG&E and third parties to facilitate delivery of a portfolio of energy efficiency services	Information only program at this time with two physical training facilities in use. Residential audits are also part of this program	Includes activities providing general messaging of energy efficiency to wide audiences
% of IOU Budget	4.0%	5.7%	3.5%
MWh	5,408	-	-
MW (summer)	3.70	-	-
Mtherms	0.40	-	-
TRC	0.57	-	-
Assessment of Cost Effectiveness	The restarting of new construction accounting means that year one may not be cost effective, but should get more cost effective as time goes on. It is unclear why the TRC not improving.		
Results Reasonable & Achievable			This program did not have any associated administration costs…
Design & Delivery	The program will include statewide elements as well a those targeted specifically to residential construction developers and contractors in PG&E's territory. The program is changing and adding a prescriptive based program, along with the performance based program historically offered. The performance based program will be based on 15% improvement over Title 24 inland and 25% improvement in coastal areas. The prescriptive portion of the program will provide rebates for deemed savings measures.	The Energy Training Center and the Pacific Energy Center were created as the main delivery channels for education and training efforts.	Mass market outreach - television and radio advertising
Markets Targeted	The program will include statewide elements as well a those targeted specifically to residential construction developers and contractors in PG&E's territory.	Cross cutting	
Lost Opportunities	Will renewable measures (or renewable ready homes) be considered as part of this program?		
Risks	Program is not cost effective - and due to more stringent Title 24 - it is unlikely to become cost effective		
Other Issues	If only ten (small) builders are being targeted per year, we are assuming that the largest builders are already in the program. If not, then the largest builders should be targeted for inclusion. Also has PG&E considered zero energy homes as part of promoting new homes? Also the number of homes and builders that will be targeted for inclusion in this program is not known.		
Past Experience/ Evaluations			

PG&E	Codes and Standards	Emerging Technologies
Short Description	This is an existing statewide program	This program is similar to existing program. It is an information only program with a goal of accelerating the introduction of innovative energy efficiency technologies, applications and tools
% of IOU Budget	0.6%	1.5%
MWh	-	-
MW (summer)	-	-
Mtherms	-	-
TRC	-	-
Assessment of Cost Effectiveness	PG&E did not provide savings - but stated that they would be determined by June 1 2005	
Results Reasonable & Achievable	PGE estimates savings of 50 GWh by 2009	
Design & Delivery		
Markets Targeted		
Lost Opportunities		
Risks	Without saving information we are not able to evaluate this program at this time	This is a program inherent with risk. The key here will be to capitalize on the technologies with the greatest promise and incorporate them into other program offerings.
Other Issues		
Past Experience/ Evaluations	This program appears to be building on PG&E's past successful efforts. Recent white paper (SCE0240.01) on Codes and Standards Methods for Estimating Savings posted 04/05 on CALMAC	NYSERDA recently developed/conducted value/cost methodology for assessing R&D investments.

SDG&E Portfolio Overview

The SDG&E portfolio uses a standard program-oriented planning approach. While PG&E has moved to a market sector-based approach, and SCE has moved to an approach that integrates programs with larger primary crosscutting programs, SDG&E remains structured within a program-oriented planning and implementation structure.

The SDG&E portfolio is moving from a budget of $76.7 million in the 2004–2005 program cycle to a portfolio of $278.1 million (excluding evaluation dollars) for the 2006–2008 program cycle. This represents a move from an average of $38.4 million per year to $92.7 million per year, an increase of 141%, significantly more than doubling the portfolio's budget. Within the SDG&E portfolio, there is one program area focused on marketing and outreach efforts that includes such components as the Flex Your Power program, where energy savings are not being counted for these efforts. SDG&E is also planning on fielding eight partnership programs. These programs will cost a total of $25.5 million and provide 35.5 million annual kWh and 1.8 million annual therm savings. However, two of these programs do not have energy saving projected from their efforts.

In addition, there are four programs for which energy savings are not being counted. These include: Codes and Standards, On-Bill Financing, Residential Education and Information, and the Emerging Technology Program.

In total, there are eighteen program areas (including third-party programs) providing the projected energy savings from the portfolio. The programs making up the SDG&E portfolio are presented in Table 24. Table 24 presents the program, the program budget for 2006, and the percent of the budget that is allocated to each program.

Table 24. SDG&E – Overview of Programs

Portfolio Component	Budget ($M)	Percent of Budget
SDG&E Portfolio	278.14	100%
Programs Not Counting Savings		
Statewide Marketing & Outreach	8.38	3.01%
Emerging Tech Program	4.09	1.47%
On-Bill Financing for Energy Efficiency Equipment	3.75	1.35%
Residential Education and Information	2.20	0.79%
Partnership Programs		
Community College Partnership	6.00	2.16%
IOU/UC/CSU Partnership	6.00	2.16%
SDREO Energy Resource Center Partnership	4.13	1.49%
City of San Diego Partnership	2.88	1.04%
City of Chula Vista Partnership	2.19	0.79%
San Diego County Water Authority Partnership	2.14	0.77%
Department of Corrections Partnership	1.20	0.43%
Codes & Standards Program	1.20	0.43%
County of San Diego Partnership	0.99	0.36%
Programs Reporting Energy and Demand Savings		
Third-Party Programs	51.51	18.52%
Energy Savings Bids	50.94	18.32%
Small Business Super Saver	30.95	11.13%
Upstream Lighting Program	16.88	6.07%
Savings By Design	13.60	4.89%
Standard Performance Program	10.93	3.93%
Express Efficiency Rebate Program	9.96	3.58%
Single Family Rebate Program	7.69	2.76%
Multi-Family Rebate Program	6.78	2.44%
Advanced Home Program	6.64	2.39%
Limited Income Refrigerator Replacement & Lighting	3.27	1.18%
Sustainable Communities Program	1.69	0.61%
Lighting Exchange and Education	1.55	0.56%

Goals Attainment – SDG&E

Comparison with CPUC Goals

According to the information available to the TecMarket Works Team during the review period, SDG&E projects that their portfolio will surpass the energy goals provided by the CPUC in each of the program years 2006–2008. They project that SDG&E's programs will achieve 109 percent of the CPUC's first year GWh goals, 166 percent of their first year MW goals, and 103 percent of the first year natural gas goals. SDG&E forecasts that by the end of 2008 they will have achieved 120 percent of the GWh goals, 131 percent of their MW goals and 100 percent of

their natural gas savings goals. These figures suggest that as the programs wind up they will tend to become more efficient at achieving the electric energy goals. Table 25 presents SDG&E's projections of their portfolio's ability to reach CPUC energy savings goals.

Table 25. SDG&E – Energy Goal Accomplishment (2006–2008)

	2006		2007		2008	
	Total	% of 2006 Goal	Total	% of 2007 Goal	Total	% of 2008 Goal
SDG&E						
Annual Net Electricity Savings (GWh/yr)	306.83	109.39%	337.33	118.32%	377.93	132.89%
LIEE (GWh/yr)	6.07		6.07		6.07	
EE (GWh/yr)	300.75		331.26		371.86	
Annual Net Electricity Goal (GWh/yr)	280.50		285.10		284.40	
Cumulative Net Peak Savings (MW)	63.49	116.28%	133.71	122.89%	213.36	131.05%
LIEE (MW)	1.15		2.31		3.46	
EE (MW)	62.34		131.40		209.89	
Cumulative Net Peak Goal (MW)	54.60		108.80		162.80	
Annual Net Therm Savings (MTh/yr)	2,775.01	102.78%	3,068.98	99.00%	3,693.02	99.81%
LIEE (MTh/yr)	156.51		156.28		156.28	
EE (MTh/yr)	2,618.50		2,912.71		3,536.74	
Annual Net Therm Goal (MTh/yr)	2,700.00		3,100.00		3,700.00	

The TecMarket Works Team's opinions of SDG&E's projections are that they are reasonable given the portfolio being developed and programs being offered. However, we have some concerns about the partnership programs being able to cost-effectively support SDG&E's energy goals and there is limited information on the how the goals will be supported by the third-party providers via the competitively bid programs.

Comparison with Potential

In order to conduct a comparison of SDG&E's portfolio goals with the SDG&E energy potentials, we used KEMA's 100 percent achievable potentials (the potential if the program funding was increased by 100 percent). This allowed for a comparison of an expanded program portfolio that more closely matched the spending levels across the portfolio funding stream. However, it should be noted that the SDG&E programs represent approximately a 141 percent increase from 2004–2005 funding rather than a 100 percent increase, as a result, the potentials estimated in this assessment should be considered conservative for the SDG&E programs when compared to the KEMA potentials estimates. Using this ratio, we would expect the SDG&E portfolio to come in at about 20% more than the KEMA 100% potential estimates.

At this time, there is no published report for industrial potentials, however, there is an industrial potentials study currently being finalized by KEMA. For the SDG&E industrials potential, we

used preliminary estimates from the soon-to-be-published 2005 industrial potentials study being completed by KEMA. The industrial potentials should be considered proxy estimates that will need to be adjusted once the KEMA study is released in 2005. The TecMarket Works Team acknowledges that these potential estimates will change over the course of KEMA's efforts to more fully develop the estimates.

KEMA's published potential reports provide 10-year estimates of sector potentials. In order to adjust the KEMA potentials to the 3-year 2006–2008 program cycle we multiplied the KEMA potentials by .3. We use 3-year potentials in this assessment because the current program planning cycle is three years in length.

We were unable to segregate the programs into residential, non-residential, and industrial sectors using the portfolio data, because several programs crosscut over sector lines. As a result, we summed the SDG&E territory potential estimates for the 100 percent increase in funding levels presented in the KEMA reports, across the residential, non-residential, and industrial sectors and compared these potentials with the SDG&E portfolio estimates.

Natural Gas

As noted in Table 26, the total natural gas potential, as identified by KEMA is 6.73 mega-therms (Mth) for a three-year period. The CPUC's goal for the capture of natural gas by the SDG&E portfolio is 9.5 mega-therms, or about 30 percent higher than the KEMA-identified potential for a 100 percent increase in program funding. A review of the SDG&E portfolio indicates that the IOU will capture 9.07 mega-therms of natural gas over the three-year program period. This is about 5 percent less than the CPUC's goal, but represents a 34 percent increase over the KEMA's 100 percent potential estimate, with a budget increase of about 41 percent beyond the 100 percent increase level used by KEMA to establish the potential. SDG&E is out-performing the potentials estimate for natural gas savings. However, this projection is based on the use of Policy Manual NTG values, which may be significantly different than ex-post evaluation-confirmed impacts. However, we have some concern that the KEMA potentials may not be accurate for the 2006–2008 period in that they do not include all of the adjustments for the new codes and standards that apply to the 2006–2008 period.

Gigawatt Hours

SDG&E's plans indicate that the eighteen programs providing savings that are included in the June 1, 2005 filing will save about 1,003 GWhs annually. However, this projection depends on the partnership and third-party programs to provide savings as projected. This means that the bid and partnership programs will need to get on board producing significant savings in the first year. This may be a challenge for the bid and partnership programs that typically need time to ramp up and move to a steady state, cost-effective mode of operation. At this time, it looks like SDG&E will out-perform both the lower potentials goals and the CPUC's GWh goals through SDG&E programs and the addition of partnership and bid programs. Again, we have some concern about the accuracy of the KEMA potentials estimates.

Megawatts

The SDG&E portfolio projects savings of 210 summer peak mega-watts compared to the CPUC's goal of 263.5 MW and KEMA 100% potentials of 93.27 MW. The CPUC's MW goal is calculated by taking 0.19 times the GWh goal, the KEMA potentials goal uses a summer peak estimation process using a multi-hour-multi-day approach that looks at typical hottest days in

California. We are not sure of the underlying approach used in the calculators provided to the review team. Multiplying the SDG&E GWh projected savings by 0.19 (as established in decision 04-09-060 of September 23, 2004) sets their MW projections at 190 MW, about 27 percent short of the CPUC goal from decision 04-09-060. However, the 210 MW projected is 225 percent over the 100% KEMA potentials.

Table 26 provides a summary overview of the potentials for a 100 percent increase in program spending over KEMA's base year, the CPUC's goals for SDG&E and the projected accomplishments of the SDG&E portfolio.

Table 26. SDG&E – Potential and Portfolio Savings Projections (2006–2008)

Energy	Residential	Non-Residential	Industrial*	All Sectors		
	100% Ach	100% Ach	100% Ach Proxy	100% Ach Proxy	CPUC Goal	Utility Plan
Mth	2.82	2.47	1.44	6.73	9.50	9.07
GWh	209.81	192.68	46.54	449.03	850.00	1,003.00
MW	36.11	35.53	21.63	93.27	263.50	210.00

*Proxy value used because industrial report is unavailable at the time of this report.

Budgets and Services Offering Balance

The budget and service offerings appear to be reasonably in balance at the sector level, and reflects the need to acquire resources from those sectors that can most cost-effectively acquire resources, without underserving residential or hard-to-reach sectors. This is always a balancing act. If programs were required to be most cost-effective, they would target only the industrial and large commercial sectors where energy savings are less expensive. The CPUC will want to keep in mind that the more stringent the energy savings goals, the more likely small commercial, residential, and hard-to-reach sectors will be abandoned in favor of the more cost-effective sectors. The CPUC will want to also keep in mind that different people will have different perspectives on which markets should be served, how the portfolio's balance should be structured, and which measures and initiatives should be incorporated into the portfolio's designs.

The single largest grouping of SDG&E's portfolio funding is going into the "Other" sector. (See Table 27.) This includes services to such sectors as the Navy and to some agricultural markets, but may also reflect the fact that 19 percent of funding is going to third parties and it is premature to calculate which sectors will be targeted by third-party programs. Of the programs that are targeting specific sectors, 42 percent of the savings are expected to be achieved in the non-residential sector, and only 5 percent in the non-residential new construction sector. While 6 percent of the savings are expected in the residential sector, only 1 percent will be achieved in residential new construction. In total, only 3 percent of the savings are coming from residential and non-residential new construction programs, which account for 8 percent of the funding.

Table 27. SDG&E – Projected Funding and Energy Savings by Sector (2006)

Sector	Funding	% of 2006 Total	Savings (Net kWh)	% of 2006 Total
Residential	$ 21,487,200	8%	62,771,872	6%
Residential New Construction	$ 8,334,580	3%	6,853,433	1%
Non-Residential	$ 115,976,066	42%	441,110,531	44%
Non-Residential New Construction	$ 13,599,939	5%	20,660,512	2%
Other	$ 118,746,025	43%	472,475,346	47%
Total Funding	**$ 278,143,810**		**1,003,871,693**	

Energy Savings Issues

To assess if the portfolio energy savings are reasonable for the measures used, we conducted a review of the measures included in the SDG&E portfolio. First we sorted out all the measures that used DEER values to predict energy savings, and reviewed them for accuracy with the DEER database. We then examined the majority of the remaining measures that did not use DEER for estimating impacts.

Table 28. SDG&E – Savings Estimates Developed Using DEER Data

	Number of Measures	Percent of IOU Savings		
		kWh	Therms	kW
No Relationship to DEER	431	49%	93%	55%
Relationship to DEER	148	51%	7%	45%

DEER Measures Estimates

SDG&E used DEER estimates for 51 percent of the kWh savings, 45 percent of the kW impacts and for 7 percent of the natural gas savings included in the portfolio. There were 148 measures in the SDG&E portfolio that were tied to the DEER database.

All of the measures that were estimated using DEER were reviewed for accuracy and consistency with the DEER 2005 Database. The DEER data was downloaded from http://www.rtf.nwppc.org/deer2005/# on May 13, 2005.

In the "measure list" tables of the utility workbooks, the "Measure ID" was typically a match with the "RUNID" field in the DEER data. In some cases averages across the DEER "Measure ID" were used instead of the more specific "RUN ID". Comparisons of the utility estimate and DEER estimate were made based on the information available in the filed workbooks. For example, if the utility noted that they used an average for all DEER refrigerators, the evaluation team attempted to replicate their calculations for a valid comparison.

The majority of SDG&E's kWh savings that were estimated using DEER clearly match the DEER estimates. Many of the estimates that were over were lighting measures in the Express Efficiency program, but it is not clear why a higher per unit estimate was used. For those

estimates that were lower than DEER, most came from broad measure categories (HVAC and Other) in the Standard Performance Contract program.

Table 29. SDG&E – Result of DEER Measure Savings Estimate Review (kWh)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kWh)	% of Portfolio Savings	DEER Estimated Savings (kWh)	% Difference
-	OK	328,022,578	39.3%	328,022,578	0.0%
- Total		328,022,578	39.3%	328,022,578	0.0%
Over	Close Enough	2,244,086	0.3%	2,163,630	3.7%
	Not Clear	62,810,881	7.5%	43,031,769	46.0%
	Not in DEER	96	0.0%	0	100.0%
Over Total		65,055,063	7.8%	45,195,399	43.9%
Under	Not Clear	274,836	0.0%	526,109	-47.8%
	Program Savings Estimate	29,412,654	3.5%	1,740,909,429	-98.3%
	Units	434,845	0.1%	101,122,400	-99.6%
Under Total		30,122,335	3.6%	1,842,557,938	-98.4%
Grand Total		423,199,976	50.7%	2,215,775,915	-80.9%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008

Equal portions of the energy savings matched with the DEER therm estimates as were underestimated. The underestimated savings appeared to be related to a difference in the units being used by SDG&E and DEER (See Table 30). These were whole building measures.

Programmable thermostats in the Express Efficiency and the Small Business Super Saver programs did not make up a large portion of the portfolio savings, but they were extremely overestimated by SDG&E compared to the DEER per unit savings. This may have been an issue of units, or a typographical error.

Table 30. SDG&E – Result of DEER Measure Savings Estimate Review (Therm)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (Therms)	% of Total Portfolio Savings	DEER Estimated Energy Savings (Therms)	% Difference
-	OK	233,707	3.1%	233,707	0.0%
	- Total	233,707	3.1%	233,707	0.0%
Over	Not Clear	50,195	0.7%	25	199500.5%
Over Total		50,195	0.7%	25	199500.5%
Under	Close Enough	540	0.0%	564	-4.3%
	Not Clear	2,146	0.0%	2,327	-7.8%
	Units	231,631	3.1%	27,214,083	-99.1%
Under Total		234,317	3.1%	27,216,974	-99.1%
Grand Total		518,219	7.0%	27,450,706	-98.1%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008

The majority of the demand savings that were estimated using DEER matched closely with the DEER database (See Table 31).

Table 31. SDG&E – Result of DEER Measure Savings Estimate Review (kW)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kW)	% of Total Portfolio Savings	DEER Estimated Energy Savings (kW)	% Difference
-	OK	74,282	41.9%	74,282	0.0%
- Total		74,282	41.9%	74,282	0.0%
Over	Close Enough	429	0.2%	413	3.7%
	Not Clear	776	0.4%	199	289.5%
	Units	7	0.0%	1	616.5%
Over Total		1,211	0.7%	613	97.5%
Under	Close Enough	2	0.0%	2	0.0%
	Not Clear	3,084	1.7%	333,898	-99.1%
	Units	520	0.3%	88,589	-99.4%
Under Total		3,606	2.0%	422,489	-99.1%
Grand Total		79,100	44.7%	497,385	-84.1%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008

Non-DEER Measure Estimates

SDG&E used non-DEER estimation procedures to estimate 46 percent of the projected energy savings (kWh), and 48 percent of the estimated demand impacts. Non-DEER estimation procedures were used for 90 percent of the natural gas saving measures included in the portfolio.

Thirty-eight non-DEER measures were reviewed by the TecMarket Team. These measures represented the majority of the energy savings that were not estimated using DEER data.

Twenty three of the measures presented concern either because of the ambiguity of the documentation or issues with the calculations or a lack of assumptions that were being used. These measures represent 28 percent of SDG&E's kWh projected kWh savings and 56 percent of their projected therm savings. SDG&E will need to provide estimation information for the nine measures that we could not fully review. Table 32 presents the non-DEER measures and the TecMarket Team's assessment of the reasonableness of the estimation approach. For the remaining measures listed here as "reasonable", the documentation clearly explained how the measure savings were estimated, and the methods seemed reasonable to the evaluation team. More detailed information about the specific concerns of the measures listed here, can be found in Appendix A.

Table 32. SDG&E – Non-DEER Measure Energy Savings Assessment

Calculation Approach Provided by IOU	Measure As Described by IOU	% of IOU kWh Savings	% of IOU Therm Savings
Concerns	234067-Refrigeration - Food Service -Auto Closer for Main Cooler Doors	1.2%	0.0%
	234068-Refrigeration - Food Service -Auto Closer for Main Freezer Doors	1.2%	0.0%
	234071-Refrigeration - Glass or Acrylic Doors-Medium Temperature Case	0.9%	0.0%
Concerns Total		**3.19%**	**0.00%**
Reasonable	213104-Water Heating - Pre-rinse Spray Valves	0.0%	1.2%
	213129-Software Plug Load Sensors	0.6%	0.0%
	218014-Gas Wtr Htr and/or Boiler Controller (21 units or more Non-digital)	0.0%	2.1%
	218018-Gas Wtr Htr and/or Boiler Controller (21 units or more - Digital)	0.0%	11.9%
	218027-Gas Wtr Htr and/or Boiler Controller (20 units or less)	0.0%	0.7%
	221001-Whole Bldg - Elec	2.5%	0.0%
	221002-Whole Bldg - Th	0.0%	4.7%
	229013-Attic Insulation	0.0%	2.7%
	229089-Pool Pump TImeclock Reset Agreement	3.2%	0.0%
	234070-Refrigeration - Glass or Acrylic Doors-Low Temperature Case	2.1%	0.0%
	234104-Water Heating - Pre-rinse Spray Valves	0.0%	2.4%
	234105-Heating - Infrared Film for Greenhouse	0.0%	1.5%
	234129-Software Plug Load Sensors	0.5%	0.0%
	234148-Premium T8 with T12 40 Watt Baseline	0.7%	0.0%
Reasonable Total		**9.58%**	**27.28%**
Documentation Provided - Insufficient Time to Review	212003-Lighting	12.4%	0.0%
	212004-Other	4.5%	5.5%
	212005-HVAC	3.4%	2.5%
	213007-Heating - Greenhouse Heat Curtain	0.0%	8.5%
	213119-Lighting - High Output 4 or 6 Lamp T5 or T8 Fixture (High bay applications)	0.5%	0.0%
	232001-Gas	0.0%	6.7%
	232002-Lighting	0.8%	0.0%

	234007-Heating - Greenhouse Heat Curtain	0.0%	9.2%
	234008-Heating - Space Heating Boilers - Hot Water	0.0%	0.7%
	234009-Heating - Space Heating Boilers - Large	0.0%	0.7%
	234010-Heating - Space Heating Boilers - Steam	0.0%	0.7%
	235071-Lighting - Hardwired Fluorescent Lighting Fixtures (ext) 65 watt	1.9%	0.0%
	235086-Lighting - LED Bulbs 3w	1.3%	0.0%
	237004-HVAC	0.9%	0.0%
	237005-Gas Measures	0.0%	5.5%
	238002-Gas Measures	0.0%	5.5%
	238005-HVAC	0.9%	0.0%
Documentation Provided - Insufficient Time to Review	239004-Package 3	0.0%	1.2%
	241004-Package 3	0.0%	1.2%
	242001-Energy Star Clothes Washer - 3.5 cf (Res)	0.0%	7.0%
	242002-Energy Star Clothes Washer - 3.5 cf (Comm'l)	0.0%	0.9%
Documentation Provided - Insufficient Time to Review Total		**26.58%**	**55.92%**

Cost-Effectiveness – SDG&E

SDG&E estimates the TRC cost-effectiveness ratio for their portfolio at 1.94, indicating the portfolio is cost-effective at acquiring energy resources for California. However, several of SDG&E's programs do not show a cost-effectiveness estimate and are excluded from the portfolio cost benefit calculations.

TRC Reported

Eighteen of the SDG&E programs have a cost benefit ratio estimated using the TRC test. Three of these programs are projected not to be cost-effective. The remaining fifteen programs have benefit cost ratios that are positive and when added to the portfolio, bring the cost benefit ratio for the portfolio to 1.94. Table 33 presents the SDG&E portfolio and the results of the TRC tests, where applicable.

Table 33. SDG&E – Program TRC Test Results

Program Name	TRC Test Results
SDG&E Portfolio	1.94
Programs that are not cost-effective*	
City of Chula Vista Partnership	0.89
City of San Diego Partnership	0.83
San Diego County Water Authority Partnership	0.13
Programs that are cost-effective*	
Upstream Lighting Program	5.17
Small Business Super Saver	2.84
Energy Savings Bids	2.82
Department of Corrections Partnership	2.72
Lighting Exchange and Education	2.73
Standard Performance Program	2.45
Community College Partnership	2.37
Savings By Design	2.28
Multi-Family Rebate Program	2.23
Advanced Home Program	2.13
IOU/UC/CSU Partnership	2.03
Sustainable Communities Program	1.78
Express Efficiency Rebate Program	1.67
Limited Income Refrigerator Replacement & Lighting	1.49
Single Family Rebate Program	1.44

*Assumes NTG values used are accurate.

Issues Addressed – SDG&E

Administrative Costs

Using SDG&E's June 1, 2005 SDG&E filing, we exported the administrative costs as a percent of total programs costs. The results from this effort were surprising in that there is a very wide range of administrative cost depending on the program reported. Administrative costs for the portfolio as a whole average 16.5 percent, however the range runs from a high of 100 percent of costs to a low of 0 percent of costs.

One partnership program (County of San Diego) has 100 percent of the costs for the program placed in the administrative line of the worksheet. Likewise, the other partnership programs have administrative costs from 0 to 40 percent; we are not sure why there is such a wide range of administrative costs. We do not think it is possible to have partnership programs with zero or 100 percent administrative costs. However, we are also not sure how SDG&E is allocating administrative costs. Discussions with CPUC staff reflect that there should always be administrative costs, and that they should never be 100 percent of a program's cost. Discussions with SDG&E indicate that they think the administrative costs are applied correctly. The statewide review section of this report presents a table of administrative cost categories. The CPUC should consider requesting that SDG&E confirm that they are using the categories in this table to construct their administrative costs. On-Bill Financing has a high administrative cost (43.8%). We suspect that this is because a large part of this initiative will be structuring, monitoring, and managing the loans and dealing with customer shut-offs and debt collection efforts. Table 34 presents the percent of the budget that is administrative costs for each program.

Table 34. SDG&E – Administrative Costs as a Percentage of Program Budgets

Component of the Portfolio	Administrative Costs*
Portfolio as a whole	**16.5%**
County of San Diego Partnership	100.0%
Codes & Standards Program	45.5%
On-Bill Financing for Energy Efficiency Equipment	43.8%
Third-Party Programs	40.0%
City of Chula Vista Partnership	40.0%
SDREO Energy Resource Center Partnership	39.0%
Emerging Technology	33.3%
City of San Diego Partnership	28.9%
Lighting Exchange and Education	24.4%
Savings By Design	19.5%
Single Family Rebate Program	19.5%
Sustainable Communities Program	18.8%
Advanced Home Program	18.1%
Express Efficiency Rebate Program	14.5%
Standard Performance Program	12.2%
Res Customer Education & Information	12.0%
Multi-Family Rebate Program	11.1%
Small Business Super Saver	8.8%
Upstream Lighting Program	7.1%
Energy Savings Bids	6.5%
Limited Income Refrigerator Replacement & Lighting	5.7%
Community College Partnership	2.8%
Department of Corrections Partnership	1.2%
IOU/UC/CSU Partnership	1.2%
Statewide Marketing and Outreach	0.0%
San Diego County Water Authority Partnership	0.0%

* From SDG&E Revised Workbook of June 1, 2005.

Net to Gross

As instructed by the CPUC, SDG&E used NTG estimates from the Policy Manual. As a result, the NTG numbers used were either .80 or .96, depending on the measure. This may be unrealistic. For example, in the Team's experience, refrigerator pick up programs can have a NTG ranging from .3 to .8, depending on how the participant screening process is structured or how participants are identified and enrolled. The NTG estimates used in the portfolio are significantly high when examined from a perspective of net-realized and evaluation-verified NTG. This also means that the cost benefit estimates across the portfolio are higher than what will be confirmed via the evaluation process and net energy savings will cost more than what is reflected in the portfolio planning documents. While using standard NTG levels makes it easier for planning and analysis, their use significantly increases the risk of not achieving savings goals by overstating them in the portfolio.

Risk Issues

There are a few general risks that apply to the SDG&E portfolio as a whole and some additional program-related risks that are discussed in this section of the report. In addition, the program-specific review tables presented at the end of this chapter provide additional information that applies to specific programs within the SDG&E portfolio.

Oversight Risk

In response to the PRG comments the SDG&E portfolio has changed the level of change authority they would like to have. SDG&E proposes fund shifting guidelines according to the following table:

Table 35. SDG&E – Proposed Fund Shifting Guidelines

Categories	Shifts Within Program	Shifts Among Programs, Within Category	Shifts Among Categories (up to 25%)	Carryover, Carryforward Abilities
Residential	Yes	Yes	Yes	Yes
Non-Residential	Yes	Yes	Yes	Yes
Crosscutting (except Emerging Technologies, Codes & Standards)	Yes	Yes[1]	Yes[1]	Yes
Competitive Bid	Yes	Yes	Yes[2]	Yes
Statewide Marketing & Outreach	Yes	Yes	Yes[1]	Yes
EM&V	Yes	Yes	Yes[1]	Yes

Notes that apply to the above table:

1. For Emerging Technologies, Codes and Standards, Statewide Marketing and Outreach, and EM&V, pre-Commission approval is required before funds are shifted out of these programs.
2. Funds may be shifted among competitive bid programs. Upon approval from the Commission, funds may be shifted out of these non-utility programs into other areas of the program portfolio.

This framework appears to provide sufficient flexibility for the program administrator and does provide sufficient overview for the CPUC for the following cases:

- For fund shifts among categories exceeding the 25% limitation, pre-Commission approval is required before funds are shifted.

In addition, the CPUC has other oversight responsibilities:

- Approval of the addition of new programs that are developed outside of the program administrator's competitive bid process.
- Oversight of program solicitations and selects in the competitive bid process.

This fund shifting approach provides the CPUC with some oversight. However, the CPUC is responsible for the performance of the portfolio and the way in which program funds are spent. The CPUC will want to establish an oversight policy and provide that policy to the IOUs for inclusion in their portfolio plans.

Ramp Up

Much of the SDG&E portfolio is the continuation of programs that have performed well over the past years. The use of proven programs helps lower the risks of programs not performing up to their expectations. However, one risk to the portfolio is associated with the significant increase

in operating budgets and size of the goals compared to previous programs. According to D04-02-059, SDG&E 2004-2005 program budget was $38.8 million per year, according to the data provided by SDG&E for the 2006 program, the IOU will spend $92.7 million in 2006. This represents more than 140 percent increase to the budget in a single year. The SDG&E portfolio will need to be able to increase participation rates and capture the additional installations at a much greater rate than previous programs. While the IOU's ability to capture these additional participants remains to be demonstrated, the program description should state how they plan to accomplish the increased participation and instillations, especially when the projected savings are greater than the potential savings. This explanation should not be a brief indication that the program size will be increased, but should be a strategic presentation of how the program will be increased and what aspects of the program will be adjusted to capture the increased participation.

There will be increased risk in launching on a wide number of programs all ramping up at the same time. This will require significant management and IOU supervision to oversee this ramp up, and to successfully implement larger and more aggressive programs. There is also a risk that as the programs attempt to ramp up, the higher administrative and management costs associated with this ramp up will need to be offset by increased enrollments and installations. SDG&E will need to carefully monitor these programs to see that they are successfully moving in a cost-effective direction.

New Implementers

Strongly associated with ramp up risk is the risk associated with obtaining new implementers to field energy programs that are also effective. Experience in California has shown that not all service providers are up to this difficult task.

Third-Party Bid Programs

SDG&E projects that the third-party programs will achieve 168 GWh and 1.6 million therms. Past experience has shown that there are effective third-party programs as well as programs that need improvements to be cost-effective, thus risk increases. Historically, the third-party programs have been risky. Several of these programs have not developed on projected timelines and have not achieved their goals. Many of these programs requested extensions to operate well into 2005 so that they could capture the energy savings projected for 2004. While many of the third-party programs have performed well, others have been slow to launch and capture savings. Placing so much of the energy savings into these programs represents a risk.

Partnership Programs

SDG&E has a significant number of these types of programs. The success of these programs often hinge on the ability of the partner to acquire cost-effective savings. While partnership programs can look good in the design stage, in practice they often have implementation issues that work to lower the amount of energy that can be acquired through these programs. However, if they are effectively directed, managed and operated, partnership programs can expand the effects of the portfolio. Again, these unknowns increase portfolio risk.

Kilowatts versus Kilowatt Hours

The SDG&E portfolio, as well as the other electric IOU portfolio seem to focus on capturing kWh over kW (see related comments in statewide assessment). An example is the portfolio's reliance on residential CFLs as a measure that captures primarily kWh, but provides very little kW benefits during the day at system peak.

Statewide Marketing and Outreach (FYP) and Other Information Programs
The Flex Your Power Program in particular, and similar programs in general, are a significant risk. Flex Your Power is a high-budget program funded without a solid understanding of what types of messages and promotional events are successful at not just informing, but in causing actions to be taken. Past evaluations have not addressed these issues well. This program is a significant unknown in terms of its ability to increase energy savings directly or indirectly. Funding seems to be based on applied trust that it will directly or indirectly accomplish some level of energy savings across all sectors, without supporting documentation. The CPUC should consider granting approval for one year of funding with the second and third year contingent on the results of an effects evaluation.

Freeriders
Several programs rely on point of purchase approaches. These programs can have significant freeriders that act to erode savings unless there are strong participant filter screens. For these programs especially, the applied NTG ratios may be in error.

On-Bill Financing Initiative
This program component is a significant risk in that we are not sure the market is ready for another financing structure. Past financing programs in other states have not done well, while others have succeeded. SDG&E will need to monitor this effort to determine if it should continue past the first year. If this program overcomes the resource barriers identified in the literature, it can provide a significant level of savings beyond what can be expected without a financing program. However, this program also provides appearance risks. This program appears to be taking ratepayer Public Goods Charge funds and giving it to the IOUs to cover the costs of loaning money to customers at a high rate of return for the utilities.

Program-Specific Risks
The above discussions of risks focus on selected key areas of risk. However, there are also risks associated with each program offered within the SDG&E portfolio. These program-specific risks are presented in the program-specific review tables provided at the end of this chapter. The reader is encouraged to review these program-specific risks in addition to the more general or crosscutting risks discussed above.

Comprehensiveness and Lost Opportunities – SDG&E

This review focuses on the comprehensiveness of the portfolio and lost opportunities that are associated with selected programs.

During the review, the TecMarket Team identified a number of potential lost opportunities associated with the SDG&E portfolio. These include the following.

Lack of Budget to Capture Newly Identified Opportunities
A review of the SDG&E portfolio indicates that the available budget is allocated to planned programs or activities. While this is consistent with CPUC instructions, it also means that there may be no strategic opportunities budget that can be used when one or more of the programs identify a new opportunity or when a market condition makes an opportunity available. (See statewide lost opportunities section of this report for additional information.)

Limited Income Refrigerator Replacement Program
This program does not seem to include lighting measures that if done well, can be as cost-effective as refrigerators.

Cross-Program Referrals
SDG&E's portfolio is structured to be program oriented. This structure requires strong referral mechanisms so that customers who participate in one program are automatically coordinated with all other programs that serve that type of customer. The whole portfolio could be strengthened by creating a strong referral mechanism to other programs so that customers only need to contact one program to understand all services that are available to that customer. Enrollment information from one program should automatically be available to all other programs in the portfolio.

Hard-to-Reach Lighting Turn-In and Education Program
Seems to only focus on one size of bulb, yet other size bulbs offer greater savings and better fit on several fixture types.

Home Energy Consumption Tool / HEES
It does not seem to have a strong referral component to get participants into other programs or to refer participants to people who can get the needed work done. HEES does not seem to refer participants to do-it-yourself instruction guides for recommended work.

Multifamily Rebate Program
MFR does not seem to include CEE Tier II dishwashers and clothes washers.

Advanced Home Program
This creative program seems to only focus on ducts, cooling, water heating and insulation. No advanced lighting or heating described. Yet there are a number of new lighting systems that are showing potential.

Clothes Washer Voucher Incentive Program
Focuses only on one point of purchase (POP) measure when there may be other POP interests by exposed shoppers. Huge lost opportunities are created by allowing vouchers for washers with a water factor of 9.5, when the average water factor for washers qualifying for Oregon tax credits is below 6.0.

Evaluation Considerations

In addition to the general portfolio evaluation issues discussed in this section, we have identified program-specific evaluation issues that need to be considered. These issues are presented in the program-specific review tables provided at the end of this chapter. The reader is encouraged to examine the program-specific evaluation issues in addition to the portfolio issues discussed above.

Partnership Programs
These programs will need early process and impact evaluations to help them get up and running and achieving savings. Programs that are not achieving strong savings in the first year should be reexamined for cost-effectiveness and to determine if the programs are capable of providing cost-effective resources to the portfolio over the following two years.

Third-Party Programs
In the past, the impact evaluations of the third-party programs have not been as rigorous as the evaluations conducted on the IOU programs. The primary reason for this condition is that the third-party programs are often underbudgeted for evaluation efforts, and the program selection approach rewarded administrators that minimized the scope of their evaluations (evaluation dollars were counted against the program in comparing program costs with anticipated benefits). These programs should receive a rigorous impact evaluation that focuses on acquired net effects. Many of the previous third-party evaluations used measure counts times the DEER estimates as the basis for their impact estimates. A more rigorous approach is needed. Likewise, it will be important to conduct process evaluations of these programs early to identify those that are having problems getting started and capturing savings.

Bid Programs
These programs may hold considerable potential for the portfolios and be capable of capturing very cost-effective energy savings. It will be important for the process evaluation to look at the entire bidding, selection process as well as program performance issues. Likewise, these programs should have rigorous impact evaluations as early as possible to determine their impacts and to confirm their potential.

Marketing and Outreach Programs
These programs need to be evaluated to document the effects that they have on the market and to estimate the savings being achieved. We expect that these programs have significant savings, but there is currently little if any documentation that these programs provide the market effects on which they are developed. This should be an early evaluation objective.

Confirm the TRC with Current Evaluation Data
Because the portfolios are based on IOU generated estimates of savings or DEER estimates, there is a need to conduct early impact evaluations on key program and market interventions to confirm the 'as-delivered, as-achieved' net energy impacts. The results from these new evaluations will need to be incorporated into the portfolio estimates of annual impact so that the projections of savings will be updated to be more consistent with achieved savings.

KW versus kWh
The evaluation will want to address the balance of achieved kW and kWh and assess how the programs and the portfolios are impacting the system load factors.

Attribution Issues
With the past and current educational programs and the desire of some of the IOUs to count savings from these programs (e.g. Codes and Standards) the evaluation effort will need to develop an attribution policy and protocol. The policy will need to focus on how evaluations will deal with the issues of attribution across the many different types of programs and cross-program efforts. The protocol will have to focus on what evaluation efforts will be needed across these evaluations. Clearly there will be a need for all impact evaluations to include a knowledge and attribution aspect to how participants heard about the programs and what information they have been exposed to that is portfolio related.

Market Sector Grouping Evaluation Approach
The recent change to have the CPUC conduct the impact evaluations means that these studies can be more easily grouped together rather than conducted as single program studies. The CPUC will want to examine the IOU portfolios and structure the evaluations to deal with technology and market focuses rather than program focuses. This change will improve the evaluation quality, increase evaluation results comparability, and lower the relative cost of the evaluation effort.

Bidding Programs – SDG&E

Little information to assess.

Partnership Programs – SDG&E

Little information to assess.

Policy Issues – SDG&E

Residential New Construction
The four utilities have taken different approaches to Residential New Construction. SDG&E has decided to eliminate its Residential New Construction program – instead, it has its Advanced Home Program, with a budget of $6,639,750.

An alternative to the Advanced Home Program structure is to combine it with related programs that are designed to attack the same market. New Construction or Advanced Homes programs could be integrated with other programs, such as the Emerging Technologies Program, Codes and Standards Program, and Sustainability programs in order to establish a strategic initiative that is specifically designed to provide cost-effective long-term savings through adding innovations to a large dissemination program, and eventually to code changes. In that way, the efforts are strategically designed and would meet the criteria of being run to produce long-term cost-effective savings. In addition, these program all deal with the same market. To show an integrated delivery function for these construction-related programs would send the market a clear signal that the IOUs can work with technologies from inception, to demonstration, to market launch, to increasing saturation, and finally to code inclusion.

Even then the program that helps disseminate the technological improvements may need to be larger than that supportable by the current budget.

Conclusion

In conclusion, the SDG&E portfolio represents a solid mix of programs and measures that together as a portfolio are projected by SDG&E to provide cost-effective energy savings. This review covers several issues pertaining to the programs in this portfolio, but also recognizes the complexity and comprehensiveness of the portfolio. The SDG&E portfolio is projected to meet the goal set out by the CPUC as long as the Policy Manual NTG ratios are applied to the covered measures. Achievements that are estimated from ex-post evaluation-verified capacity might be significantly smaller for some programs once achieved NTG ratios are applied. This may lower the cost-effectiveness of the SDG&E portfolio to be only marginally cost-effective.

Many programs are expansions of successful programs that will need to be ramped up to higher levels than in previous years. This can be a challenge for some programs. The portfolio relies on the bid programs, the third-party programs, and the partnership programs to be cost-effective and to meet the CPUC's energy goals. However, much of these efforts are beyond the direct control of the IOU. It will be critically important for SDG&E to carefully monitor these programs and be ready to move resources away from poor performing programs or programs that are slow to ramp up to other programs that are providing cost-effective programs if the goals are to be achieved.

Program-Level Assessment – SDG&E

This section of the report presents the program-specific assessment information and issue discussions that were identified during the portfolio review effort. The issues reviewed are presented in the left-most column of Table 36 and each subsequent column represents a specific program, allowing the reader to see if the review team determined there to be a issue associated with a specific program, and to understand the review team's perspectives associated with each issue.

Table 36. SDG&E – Program Specific Summaries

SDGE (Assessment Still In progress)	Limited Income Refrigerator Replacement Program	Lighting Exchange and Education	Residential Customer Education and Information
Short Description	Provides no cost refrigerators to customers just above LIEE funding limits	Customers exchange inefficient lights for efficient lights via neighborhood targeted outreach	Home energy audits provided on-line, via U.S. Mail and by telephone.
% of IOU Budget	1.2%	0.6%	0.6%
MWh	6	6,532	-
MW	0.85	1.25	-
Mtherms	-	-	-
TRC	1.49	2.73	-
Assessment of Cost Effectiveness	Is expected to me somwhat cost effedtive	Seems reasonable in that it is focused on getting EE bulbs in use.	No energy savings projected from this effort.
Results Reasonable & Achievable	California has high energy saving for this type of measure, and has data to back it up, but savings seem high	Results depend on getting the bulbs installed and into high use fixtures.	It continues past audit program. Should meet goals if it is well promoted.
Design & Delivery	The LIEE participant is screened based on income, then they examine refrigerator, if it is considered old based on date of manufacturer, they will replace it.	Seems sound, and similar programs have worked. It focuses on neighborhood give-away exchange approach and relies on neighborhood and workplace interactions and motivation.	This program beefs up past audits by providing a benchmark against other homes in the neighborhood.
Markets Targeted	Is a tag-along program to the LIEE program. The actual target is LIEE participants, but many do not qualify. This targets those that do not qualify for LIEE, but are below middle income. This is the near poor. It is possible that the market size is much larger than that being targeted.	Hard to reach neighborhoods.	Residential home owners
Lost Opportunities	Lighting is not included in this program, nor are there options for participant referrals to Energy Star or other programs.	The program includes one size bulb, but offering multiple sizes may provide a better fit in some fixtures and provide more savings. Education focuses on telling about other programs, not on where to use the bulbs. It also does not seem to advise of the audit service available to them.	None noted as long as the audits do a good job of referring people to programs that apply to their home situation.
Risks	This is a single measure program. Freeridership will be low as these are people who are not already looking to buy a refrigerator.	Not sure how the customer is being educated about where to put the bulb. Without good education these can go into low use fixtures or sit on the shelf.	Will the education provided be effective at causing actions to be take, thereby providing some savings? Will the referrals be effective at driving customers to other programs?
Other Issues	Program write-up says it is a cost effective program, but the worksheet says it is not. It is unclear why this program is being offered.	Need to examine placement and use of the bulbs in the evaluation.	This type of program has been shown to produce savings if done well and if customers understand what needs to be done. The program also describes education about time of use as a demand response program strategy.
Past Experience /Evaluations	This is really a new program to get refrigerators into the near poor. Need to confirm savings	Will need to see if bulbs are used in high-use fixtures and what they save.C2	There are not a lot of evaluations of the effects for these types of audit programs. Most studies have focused on on-site audits. Need to evaluate this one.D2

SDGE	Single Family Rebate Program	Multifamily Rebate Program
Short Description	Provides rebates and POP discounts to a limited number of residential equipment.	Provides incentive to get measures installed in both common space and in occupants units.
% of IOU Budget	2.8%	2.4%
MWh	37	14
MW	33.18	3.27
Mtherms	566	1,166
TRC	1.44	2.23
Assessment of Cost Effectiveness	Continuation of an on-going program, which appears to be somewhat cost effective. F19	Appears cost effective with the measure mix and installation assumptions.
Results Reasonable & Achievable	Results appear to be achievable if they can get the customer to install the measures and ramp up. New POP discount can increase freeriders lowering TRC if not well screened.	Relies on savings from both common space and from occupants.
Design & Delivery	Begins an effort to offer discounts at the register (POP)	Expand on multi family designs from previous years by also targeting occupants in addition to common areas. It will also include on-bill financing.
Markets Targeted	All residential customers in homes of less than 4 units.	Continues effort to go after this very large and largely underserved market via owners, associations, property managers, plumbers and linking to education programs efforts.
Lost Opportunities	Seems to focus on the measures that can be the most cost effective. Relies on lighting program to capture lighting savings. The program assumes a 95% furnace which is probably not cost effective.	Tier II dishwashers and tier II clothes washers are not included.
Risks	The dishwashers are only for tier II units and customers may be confused about tier I & II. With POP discounts the program may get an increase in freeridership. There are a lot of savings in pool pumps.	Will need to capture strong participation from both owners and occupants. Success depends on capturing participation from both large and small properties. Small properties my increase costs per property served, but added occupant savings may off-set that cost.
Other Issues	Whole house fans spend $512 to gain 45 kWh. Not sure why this measure is in the program.	The evaluation should address how well occupant savings are being captured. Change in including occupants means that the TRC should be recalculated after first year.
Past Experience /Evaluations	May not be cost effective with net ex-post impacts.	Need to see if split incentives gain savings and participation and over come barriers.

SDGE	Statewide Marketing & Outreach	Express Efficiency Program	Small Business Super Saver
Short Description	General statewide awareness program to stimulate awareness and energy saving actions.	Continues effective past program but removes cap eliminating large businesses. Simple fast rebate program for prescriptive measures.	Rebate program for businesses under 100kW or 20,800 therms.
% of IOU Budget	3.0%	3.6%	11.1%
MWh	-	49,825	157,510
MW	-	7.10	21.75
Mtherms	-	926	1,311
TRC	-	1.67	2.84
Assessment of Cost Effectiveness	No energy savings projected from this effort.	Previously cost-effective. It adds large business and eliminates confusion of dual programs offering the same things based on size of business.	Strong TRC. But there appears to be some weird numbers in the measure level spreadsheet.
Results Reasonable & Achievable	No real effects projected	Looks solid given it is an expansion of a tried and true program.	Seem reasonable for 2006, some issues in 2007 projections.
Design & Delivery	Wide range of marketing and awareness efforts	Long standing program known by larger customers and promoted by vendors. Includes incentive to go to demand response measures. Simple rebate systems.	Uses rebates and direct install to capture savings. Reduces incentives from previous programs. Uses prescribed measures. Uses on-bill financing.
Markets Targeted	All markets	Nonresidential retrofit over 100 kW monthly or 20,800 therms.	Very small and hard to reach businesses with limited capital for EE measures.
Lost Opportunities	Not applicable	Appears solid.	Covers a wide range of measures that provide cost effective savings.
Risks	There is a large risk in the program not providing stimulation in the market to achieve savings through actions taken or program referrals.	Customers can reserve dollars, but may not take actions causing dollars to lapse into next years reducing savings.	The risk is getting the level of participation projected. But services allow direct install and on-bill financing with experienced contractors. This is a significant ramp-up to serve this many customers.
Other Issues	This program needs a rigorous evaluation of effects to determine if resources are being well spent.	It appears that HIDs are not being replaced very much, and we would have thought there was more potential in this high savings measure. Not sure if the install rates take full account of potential now that very large businesses can participate.	NTG for measures 234128, 234129, 234130 may be in error.
Past Experience /Evaluations	Evaluation of the effort did not focus on effects, only on the message delivery and retail participation counts from tracking system.	Several evaluations already conducted.	Will reduced incentives still capture participants and will savings change?

SDGE	Standard Performance Contact (SPC)	Energy Savings Bid Program	Savings By Design
Short Description	Incentive program for non-prescriptive measures.	Large projects or aggregated project to bid on energy efficiency savings provided.	Encourages energy savings in design of non-res buildings.
% of IOU Budget	3.9%	18.3%	4.9%
MWh	36,456	169,459	20,660
MW	4.54	34.90	4.54
Mtherms	501	594	351
TRC	2.45	2.82	2.28
Assessment of Cost Effectiveness	Savings are based on estimates not included in the review documents we have at this time. NTG is lower than the bidding program, but bidding will have high freeridership, so how can this program be lower than bidding on the NTG?	Will depend a great deal of market acceptance and the bids that are provided.	TRC grows each year as projects come on line. Moves to be cost effective as projects are completed.
Results Reasonable & Achievable	The potential results of this program are not clear. There is no real data to show what they expect to accomplish. Need a strong ramp up.	Not a lot of information about how the savings estimate is being made. No measures listed, just large electric and gas savings. The results will depend on the bids.	This program will be competing with the new code changes, so there will be an effect. It is not clear how the results are estimated. There are very gross measure categories and no detail on savings methods.
Design & Delivery	Tries to influence project planning to capture energy savings, requires confirmation of savings estimates.	Not a lot of detail on how this will be structured or how bids will be obtained and evaluated.	Seems to be a continued program with good record.
Markets Targeted	Non-residential customers that need custom applications.	Must be non-res customers or aggregated customers who can save 500,000 kWh annually. However, SDREO is incorporated into the design. Not sure why this is unless they have some large projects to go after, but other cities are not included.	Non-res new construction to build more efficient buildings.
Lost Opportunities	There don't appear to be any HVAC measures targeted based on the available information.	Because anything can be bid, there should be no lost opportunities other than what the bid could get if expanded.	Flexible program so that designers can achieve savings in different ways as long as designs are above T-24
Risks	No justification for how savings are estimated.	It appears that incentives are higher for this program for lighting than for other programs, but no reason is given. Maybe incentives are presented as an average. No mix of measures is assumed. Seems "other" savings are so large it is driving the TRC, but it is not clear what "other" is.	The post 2006 market will be working with the new T-24 code and thus new designs may be harmed. New T-24 may be enough to drive designers to the next level to get incentives, it is not clear which will happen yet. This is a risk.
Other Issues	The administrative costs in the write up are different than the spreadsheet.	The administrative costs in the write up are different than the spreadsheet. The difference between this program and the standard performance program is not clear, particularly if larger projects were allowed in the standard performance program. It is not clear if the project will be assessed equally across all bidders.	Admin costs are different in write-up and spreadsheet. Note there is a difference in Savings-By-Design TRCs across the IOUs and they are using very different costs for natural gas ($1.00 for SDG&E vs $.49 for SCG). It is not clear why there is so wide a cost difference. Also IOU are using different percent improvements above T-24 (5% 10% & 15%).
Past Experience /Evaluations	Measure impact estimates may not be real.	Need to evaluate this to see if they captures large free riders of if new efforts with high savings.	Code changes could significantly eat away savings from this program.

SDGE	Sustainable Communities Program	Advanced Home Program	On-Bill Financing Pilot Program
Short Description	Incentivizes green building designs that save energy in buildings	Provides demonstrations and education on advanced energy savings designs to move the market.	Provides easy access to financing and incorporate payments into energy bills.
% of IOU Budget	0.6%	2.4%	1.4%
MWh	1,699	5,154	-
MW	0.41	5.60	-
Mtherms	44	204	-
TRC	1.78	2.13	-
Assessment of Cost Effectiveness	TRC is positive even during the start-up period. Must have projects ready to go now, but waiting for funds to go forward. No details on how TRC is calculated.	Appears to be cost effective, but these programs are often not.	Not a program, but a financing component of other programs. No energy savings as savings are counted in other programs.
Results Reasonable & Achievable	Not sure, no real data to show what they expect to accomplish. Need a strong ramp up that may take more time than they think..	It seems reasonable if they can get the demonstration project up and going.	Don't know, this is a new program. We will have to see how much demand there is for this. It could be rejected by the market as with past financing programs, or could be in demand if seen as advantageous.
Design & Delivery	Notes that a market push is needed in this sector. Will work with a number of organizations and local governments to enroll people in a green approach. Market appears to be governments and private sector that are green sensitive.	Seems okay. Get demonstrations into the market and count savings from the projects.	Seems okay, linked as an option to other programs.
Markets Targeted	Customers who want green buildings in addition to or with the energy savings.	New building contractors/ builders who can benefit from high efficiency designs.	Residential and multifamily and small commercial participants who need financing.
Lost Opportunities	This will be a balancing act to enable green buildings, but focus on energy so that it is cost effective. They can do a wide number of different things to achieve the green savings.	Write up says a wide range of measures will be addressed, but only lists ducting, cooling, water heating and insulation. No advanced lighting, heating unless this is included in other programs via a coordinated effort.	Not applicable
Risks	The program is considered cost effective in year 1, yet this will require a lot of collaboration in year 1 that will delay energy savings. They may be over-optimistic. They must have some projects ready to go as soon as the funding is ready in order to achieve this. Many builders want green if it does not delay project or increase costs. Risk is high.	Not high with the limited measure focus and the small number of projects.	Higher risk as this program depends on making loans and prompt payments from participants. Can increase installs by people with limited credit access. Danger is that people will not want energy supplies tied to payments.
Other Issues	Need a strong evaluation on energy savings as a component of a green approach. We question how much savings will be achieved by so much focus on non-energy items. Need to watch this.	Flat TRC indicating that they will have demonstration homes up and providing savings during 2006. Must have projects in the wings ready to go forward. The real key to this is do they help spread the innovations in the market. This remains to be proven in an evaluation.	Will need a solid evaluation to see how this effect participation and actions taken. Should this program be incorporated into codes and standards or in emerging technologies. Seems this would be a good link for these other programs to demonstrate what can be done.
Past Experience /Evaluations	Need to see if green building desire produces enough savings to be cost effective. Green does not always mean energy savings.	Evaluation to see if savings are being cost-effectively achieved.	Need to see if this captures new savings net of what they would have done without the zero % fianacing.

SDGE	Codes and Standards Program	Emerging Technologies	Upstream Lighting Program
Short Description	Encourages new codes to improve new construction	Works to move new technologies into the market so they can be used by confirming energy impacts.	Works to expand the availability and use of EE lighting technologies.
% of IOU Budget	0.4%	1.5%	6.1%
MWh	-	-	296,509
MW	-	-	54.49
Mtherms	-	-	-
TRC	-	-	5.17
Assessment of Cost Effectiveness	Not applicable at this time.	Not applicable at this time.	Appears strong, but depends on convincing market actors to use available configurations and to encourage the production of configurations that can be sold in the market and incorporated into program designs.
Results Reasonable & Achievable	Yes, code changes can be expedited.	Yes as long as they can identify new technologies that will save energy and can be verified expedited.	Aggressive goals to expand lighting use, but has cost effectiveness on its side for the customer.
Design & Delivery	Tried and true approach.	Standard approach used in the past for new technologies, but coordinated with CEC, ETCC, PIER and the IOUs.	
Markets Targeted	New construction.	New technology across markets.	
Lost Opportunities	Wide open to considering all new construction techniques, but must be proven in the market, so needs to stay with currently available technologies.	Not applicable because it can focus on new ideas.	
Risks	Risks are that the recommendations will not be incorporated into new codes allowing limited results. Benefits are great if incorporated into code.	Very high risks. Not all technologies developed turn out to be marketable or provide the predicted savings or technology demand relationships in the market.	
Other Issues	This program can have very high impacts, but are not counted at this time because of policy reasons.	The program needs to be able to identify promising new technologies and verify and demonstrate that these technologies can be incorporated into other programs as a standard component. Need a good process and effects evaluation of this one to confirm.	
Past Experience /Evaluations	Studies show very positive impacts, but do not correct for normal adoption. See white paper by Mahone. Need strong evaluation.	Need to see how well this moves technolgies into the adoption cycle, how fast does it speed this?	Impact needs to focus on how the effort changed the market mix and adoption process.

SDGE	Partnership Programs	San Diego Co Water Authority Partnership	Third Party Programs
Short Description	Wide range of partnership programs	POP vouchers for high efficiency cloths washers.	3rd party program to be considered when bid.
% of IOU Budget	9.2%	0.8%	18.5%
MWh	45,526	-	168,300
MW	5.18	-	32.70
Mtherms	1,780	59300.0%	1,620
TRC	about 1.28 on avg	0.1	-
Assessment of Cost Effectiveness	Not enough information to assess	Not expected to be cost effective from an energy perspective.	Not enough information to assess
Results Reasonable & Achievable	Not enough information to assess	Aggressive but reasonable if they can effect the POP decision process for economic minded buyers of residential and commercial units.	Not enough information to assess
Design & Delivery	Not enough information to assess	On-going program that may expand to be a partnership program.	Not enough information to assess
Markets Targeted	Not enough information to assess	Residential and commercial machines.	Not enough information to assess
Lost Opportunities	Not enough information to assess	May be able to effect other appliance purchases for multiple up-grade customers.	Not enough information to assess
Risks	These programs have a high risk of being not cost effective depending on the methods of operation, the commitment of the partners and the technologies targeted.	This program could have very high freeridership if they do not separate those that would have purchased anyway from those who can be convinced to move up to the EE model.	Not enough information to assess
Other Issues	Need to have strong evaluations of the partnership programs including both process and impact.	Need a good freerider evaluation in the impact study.	Not enough information to assess
Past Experience /Evaluations	Do they save energy, are they cost effective, can they be rolled out as planned or will we see delays and low savings in 1st year?	Relies on water savings to be cost effective. See how much the energy impacts are and if they are important in the adoption decision.	Do they save energy, are they cost effective, can they be rolled out as planned or will we see delays and low savings in 1st year?

SCE Portfolio Overview

SCE's proposed portfolio is based on a wide variety of programs for most sectors. Many of the programs are continuations and expansions of well-tested programs with established track records. Some programs will seek out innovative ideas for new opportunities, such as the InDEE and IDEEA, and Emerging Technology initiatives. In addition, SCE has developed three "Flagship" programs that attempt to find efficiencies in implementation by combining multiple previous programs under a few umbrellas. These are the Business Incentive Program, the Residential Energy Efficiency Rebates, and the Comprehensive HVAC program. Among them, these three large programs account for about one-third of the overall annual average budget.

Table 37. SCE – Overview of Programs

Programs with Reported Savings	Budget* ($M)	Percent of Budget
Portfolio Budget	$674.8	100.00%
Appliance Recycling	39.9	5.91%
Residential EE Rebates	67.3	9.97%
Multifamily Rebates	53.2	7.88%
Home Energy Efficiency Surveys	6.0	0.89%
Integrated Schools	5.0	0.74%
CA New Homes	18.3	2.71%
Comprehensive HVAC - Residential	13.4	1.98%
Comprehensive HVAC - Non-Residential	47.2	6.99%
Retrocommissioning	11.8	1.75%
Industrial Processes	40.5	6.00%
Agricultural Energy Efficiency	38.0	5.63%
Small Business Direct Install	48.4	7.17%
Savings By Design	30.9	4.58%
Sustainable Communities	4.4	0.65%
Business Incentive Program	105.9	15.69%
Partnerships	44.5	6.59%
IDEEA	32.7	4.85%
InDEE	5.8	0.86%
Programs without Reported Savings		
Flex Your Power/Marketing Outreach	20.2	2.99%
Education Training and Outreach	24.1	3.57%
Emerging Technologies	11.4	1.68%
Codes and Standards Advocacy	5.9	0.87%

*Does not include EM&V 3-year budget of $54 million.

Goals Attainment – SCE

Southern California Edison will be spending $674.8 million ($750.3 million including costs recovered from others and EM&V) over three years to save an incremental 3,364 GWh and 731

MW. No therms are included in the TRC. The three-year portfolio is forecast to have a TRC benefit/cost ratio of 2.76 and a PAC ratio of 3.58. This is a substantial programmatic effort at an average of $225 million/year, an increase in the annual budget of 246 percent from 2004-2005 ($91.5 million/yr), but is still forecast to be very cost-effective.

Comparison with CPUC Goals

For the three portfolio years, 2006–2008, the planned SCE energy savings can be expressed in two ways: with credit for pre-2006 activity, and without credit. If the pre-2006 is included, SCE is targeting 4,030 GWh (129% of goals), but without the pre-2006 activities, the goal is 3,364 GWh, or about 107 percent of the CPUC energy goals[5]. On the kW side, SCE forecasts 820 MW (120% of goals) with pre-2006 savings and 731 MW, or about 106 percent of the peak savings goals without the pre-2006 savings credit. These numbers reflect the total of the LIEE and EE savings for each year. It is our understanding that pre-2006 savings are not supposed to be used to compare to the goals, but that isn't the understanding of SCE. The MW savings are not the critical summer peak impacts but the cumulative GWh multiplied by the CEC factor of 0.21.

[5] This is further complicated by the fact that the filed Summary Table (Attachment II – Table 2.1) says 3,549 GWh, including Low Income EE.

Table 38. SCE – Energy Goal Accomplishment (2006–2008)

	2006		2007		2008	
	Total	% of 2006 Goal	Total	% of 2007 Goal	Total	% of 2008 Goal
Energy Savings – Electricity						
Annual Net Electricity Savings (GWh/yr)	1,275	138%	1,540	147%	1,215	104%
LIEE (GWh/yr)	24		24		24	
2006–2008 EE (GWh/yr)	1,002		1,121		1,168	
Pre - 2006 EE (GWh/yr)	249		395		22	
Annual Net Electricity Goal (GWh/yr)	922		1,046		1,167	
Lifecycle Net Electricity Savings (GWh)	10,973		12,361		12,955	
LIEE (GWh)	241		244		244	
EE (GWh)	10,731		12,118		12,711	
Cumulative Net Electricity Savings (GWh/yr)	(2,580) 2,828	110%	(3,725) 4,368	121%	(4,917) 5,583	117%
LIEE (GWh/yr)	24		48		73	
EE (GWh/yr)	(2,555) 2,804		(3,676) 4,320		(4,845) 5,510	
Cumulative Net Electricity Goal (GWh/yr)	2,575		3,621		4,788	
Annual Net Peak Demand Savings (MW)	279	135%	282	124%	266	105%
LIEE (MW)	5		5		5	
2006–2008 EE (MW)	218		243		253	
Pre - 2006 EE (MW)	56		33		8	
Annual Net Peak Demand Goal (MW)	207		227		253	
Cumulative Net Peak Savings (MW)	586	108%	874	115%	1,145	114%
LIEE (MW)	5		11		16	
EE (MW)	581		863		1,130	
Cumulative Net Peak Goal (MW)	541		760		1,006	

Source: SCE Workbook: Attachment II -Table 1.1: Projected Program Impacts By Year
** Numbers in parentheses were those filed on 6/1/05, which were changed in the latest Tables provided by SCE on 6/14/05.

Comparison with Potential

As shown in Table 39, the expected savings from this program is forecast to exceed the three-year potential and the CPUC goals. At this time, there is no published report for industrial potentials, however, there is an industrial potentials study currently being finalized by KEMA. For the SCE industrial potential we used preliminary estimates from the soon-to-be-published 2005 industrial potentials study being completed by KEMA. The industrial potentials should be considered proxy estimates that will need to be adjusted once the KEMA study is released in

2005. The TecMarket Works Team acknowledges that these potential estimates will change over the course of KEMA's efforts to more fully develop the estimates.

KEMA's published potential reports provide 10-year estimates of sector potentials. In order to adjust the KEMA potentials to the 3-year 2006–2008 program cycle, we multiplied the KEMA potentials by 0.3. We use 3-year potentials in this assessment because the current program planning cycle is three years in length.

Table 39. SCE – Potential and Portfolio Savings Projections (2006–2008)

Energy	Residential	Non-Residential	Industrial*	All Sectors		
	100% Ach	100% Ach	100% Ach Proxy	100% Ach Proxy	CPUC Goal	Utility Plan
Mth						
GWh	814.62	889.46	424.40	2128.48	3135	3,365

*Preliminary data for industrial, not yet published or finalized

**Comparison to potential studies not applicable as the potential studies use summer coincident peak and the utility and CPUC goals are based on 0.21 times the cumulative GWh achievements.

Budgets and Service Offerings Balance

SCE has a wide variety of program offerings with a reasonable split between residential and all other. There appears to be an effort to serve all customer segments, including manufactured home residents. The two largest three-year budgets are the Business Incentive Program at $106 million and the Residential Energy Efficiency Program with a budget of $67 million, although the multi-family sector will also be well-served with a budget of $53 million.

Table 40. SCE – Projected Funding and Energy Savings by Sector

Sector	Funding*	% of Total	Savings (Net kWh)	% of Total
Residential	$ 179,732,161	27%	1,163,451,673	33%
Residential New Construction	$ 18,886,000	3%	10,603,337	0%
Non-Residential	$ 190,976,354	28%	1,937,804,944	55%
Non-Residential New Construction	$ 30,932,770	5%	119,074,000	3%
Other	$ 254,305,000	38%	285,054,612	8%
Total Funding	**$ 674,832,285**		**3,515,988,566**	

* Does not include three-year EM&V budget of $54 million.

Energy Savings Issues

For all utilities, the TecMarket Works Team attempted to determine how reasonable the savings estimates were for the majority of measures in the overall portfolio. For those with a basis in the DEER database, we compared SCE's estimates to those in the DEER database. For the many measures that are not linked directly to DEER, we examined the workpapers that described how the calculations are done and upon what assumptions the estimates are based. For SCE, the vast majority of kWh and kW in the savings estimates were resulting from measures without a direct link to the DEER database (See Table 41).

Table 41. SCE – Savings Estimates Developed Using DEER Data

	Number of Measures	Percent of IOU Savings		
		kWh	Therms	kW
No Relationship to DEER	1,670	85%		73%
Relationship to DEER	352	15%		27%

DEER Measures Estimates

For SCE, only about 15 percent of the kWh savings and 27 percent of the demand savings of programs could be traced back to a DEER-based energy savings estimate.

All of the measures that were estimated using DEER were reviewed for accuracy and consistency with the DEER 2005 Database. The DEER data was downloaded from http://www.rtf.nwppc.org/deer2005/# on May 13, 2005.

In the "measure list" tables of the utility workbooks, the "Measure ID" was typically a match with the "RUNID" field in the DEER data. In some cases, averages across the DEER "Measure ID" were used instead of the more specific "RUN ID". Comparisons of the utility estimate and DEER estimate were made based on the information available in the filed workbooks. For example, if the utility noted that they used an average for all DEER refrigerators, the evaluation team attempted to replicate their calculations for a valid comparison.

SCE's per unit estimates matched with those in the DEER database for the largest proportion of the kWh savings. For those that were over the DEER value, the main problem was that SCE was using a baseline that was below the current code regulations. DEER provides estimates above code for these measures, and it is not clear why that value was not used in these cases considering that it was used in other cases. Some measures also had differences in the measure units being used in DEER and SCE. Most of these measures were for building shell improvements like insulation, where "square feet" or "whole house" were used as the base unit and causes some comparison problems.

Overall SCE's savings estimate appears to be slightly more optimistic than would have been generated with DEER. Making certain to use above code estimates from DEER would help rectify the discrepancy.

Table 42. SCE – Result of DEER Measure Savings Estimate Review (kWh)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kWh)	% of Portfolio Savings	DEER Estimated Savings (kWh)	% Difference
-	OK	427,621,264	12.3%	427,621,264	0.0%
- Total		427,621,264	12.3%	427,621,264	0.0%
Over	Close Enough	1,457,649	0.0%	1,419,791	2.7%
	Not Above Code	23,983,645	0.7%	4,327,667	454.2%
	Not Clear	6,102,210	0.2%	3,488,666	74.9%
	Not in DEER	560,407	0.0%	0	
	OK	8,915,772	0.3%	8,915,761	0.0%
	Not Above Code and Units*	494,734	0.0%	-5,192,750	-109.5%
Over Total		41,514,418	1.2%	12,959,136	220.3%
Under	Close Enough	35,000	0.0%	35,000	0.0%
	OK	65,003,523	1.9%	65,003,758	0.0%
	Units	452,150	0.0%	9,685,084	-95.3%
Under Total		65,490,673	1.9%	74,723,842	-12.4%
Grand Total		534,626,355	15.4%	515,304,242	3.7%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008
*The savings for one high performance window measure was cited in SCE's workbook as having positive savings, but they did not use the "Above Code" per unit savings estimate provided in DEER, which presented negative savings. There also appeared to be a problem with comparability of the units used by SCE compared to DEER.

The largest proportion of SCE's kW savings was not clearly related to the DEER database. DEER estimates appear to be smaller by a factor of 1000, which suggests there may have been a mistake in the conversion in units from DEER in addition to using a value different from DEER. DEER reports demand savings in watts, not kW. Again, SCE should have used the above code estimates provided in DEER and it is not clear why they did not do this for a select group of measures.

Table 43. SCE – Result of DEER Measure Savings Estimate Review (kW)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kW)	% of Total Portfolio Savings	DEER Estimated Energy Savings (kW)	% Difference
-	OK	34,357	2.3%	34,357	0.0%
- Total		34,357	2.3%	34,357	0.0%
Over	Close Enough	1,219	0.1%	1,215	0.4%
	Not Above Code	8,225	0.5%	1,722	377.5%
	Not Clear	362,598	23.9%	38,659	837.9%
	Not in DEER	5,811	0.4%	0	100.0%
Over Total		377,852	24.9%	41,596	808.4%
Under	Close Enough	1,992	0.1%	1,993	-0.1%
	No Utility Estimate	0	0.0%	2,980	-100.0%
	Not Above Code	275	0.0%	4,709	-94.2%
Under Total		2,267	0.1%	9,681	-76.6%
Grand Total		414,476	27.3%	85,634	384.0%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008

Non-DEER Measure Estimates

SCE provided many workpapers to support their savings estimates. Based on our review of the measures making up the majority of the non-DEER related savings, about 7 percent appeared reasonable based on our review, and 20 percent of the portfolio savings presented specific concerns (See **Error! Reference source not found.**). For more detail about the specific concerns for these measures, see Appendix A. Based on concerns about these measures and lack of documentation for other measures, SCE was asked to provide further documentation of the measure savings estimates. Several of the measures for which additional documentation was provided were those in customized industrial and commercial applications. It appears that the documentation provided will clarify the forecasting assumptions, but there may not be enough information to comment on specific measure savings estimates, but there was insufficient time for complete review. These measures made up nearly 29 percent of the portfolio's savings. Likewise, there were several lighting measures for which additional documentation was provided, and it appears they will clarify the assumptions used in the measure savings estimates, but the evaluation team did not have sufficient time to review each measure. These lighting measures made up about 20 percent of the portfolio savings.

Table 44. SCE – Non-DEER Measure Energy Savings Review

Confidence in Per Unit Estimate	Measure As Described by IOU	% of IOU kWh Savings
Concerns	Exterior Fixture 65 Watt 3,600 to 4,599 Lumens	3.9%
	Auto-closer for Glass Doors for Walk-In Coolers	2.3%
	Main door Cooler Door Gaskets (Walk-in)	1.6%
	Full Service Pump Efficiency Improvement (Receiving Incentives)	1.3%
	Main Door Freezer Door Gaskets(Walk-in)	1.3%

Concerns	Building Retrocomissioning	1.1%
	Attic & Wall Insulation - Quality Installation	1.1%
	Infiltration Barrier for Walk-ins (strip curtains)	0.8%
	Interior Fixture 30 Watt 2,000 to 2,599 Lumens	0.8%
	Insulate Bare Suction Pipes	0.7%
	ES Exterior Fluorescent Fixtures 13 Watt	0.6%
	Variable Frequency Drives for HVAC Fans	0.6%
	Refrigerant charge and airflow	0.5%
	Dimmable Interior Fluorescent Fixtures	0.4%
	Correct refrigerant charge and air flow	0.3%
	Interior Fixture 40 Watt 2,000 to 2,599 Lumens	0.3%
	Strip Curtains	0.3%
	New Refrig Display Case with Doors - Low Temp	0.3%
	Design Assistance	0.2%
	Single Family - 15%, Inland	0.2%
	Air Source Unitary Air Conditioner Split or Packaged ≥135,000 & <240,000 with base efficiency > 9.5 EER, Measure efficiency of 11.5 EER. Tier 2	0.2%
	T-8 or T-5 Lamp and Electronic, 4-foot lamp removed	0.2%
	Air Source Unitary Air Conditioner Split or Packaged ≥240,000 & <760,000 with base efficiency > 10.0 EER, measure efficiency at 12.0 EER. Tier 2	0.2%
	T-8 or T-5 Lamp and Electronic, 8-foot lamp removed	0.2%
	(4) 48" T-12 to (3) 48" T-8 Lamp with Elec. Bal.	0.2%
	Air Source Unitary Air Conditioner (Three Phase) Single Package <65,000 with base efficiency > 9.7 SEER, Measure efficiency at 11.7 SEER. Tier 2	0.2%
Concerns Total		**19.8%**
Reasonable	Overall Building Performance	2.1%
	T-8 or T-5 Lamp and Electronic, 4-foot lamp removed	1.6%
	Overall Systems	1.1%
	Screw-in Compact Fluorescent Lamp, 14-26 watts	0.7%
	System Approach - Cust Process	0.6%
	2nd Gen. (4) 48" T-8 Lamp with (2) Elec. Bal.	0.5%
	T-8 or T-5 Lamp and Electronic, 1-lamp, 4-foot fixture	0.3%
	2nd Gen. (4) 48" T-8 Lamp with Elec. Bal.	0.2%
Reasonable Total		**7.0%**
Documentation Provided - Insufficient Time to Review	Partnership Programs	3.8%
	Com. Customized - Process	3.8%
	Competitively Bid Innovative Programs	3.2%
	Energy Use Audit (On-site) Med	2.7%
	Ind. Customized - Process	2.1%
	Full Service Pump Efficiency Improvement (Not Receiving Incentives)	1.5%
	HVAC Miscellaneous	1.3%
	Com. Indoor Lighting Sys. Repl.	1.1%
	Com. Early Retirement Chillers	1.0%
	Ind. Adj. Speed Drive	0.9%
	Wall or Ceiling Mounted Lighting Sensor	0.8%
	Energy Use Audit (On-site) VSm-Sm	0.6%
	Ind. Motors	0.6%

Documentation Provided - Insufficient Time to Review	Ind. Pump System Controls	0.6%
	Industrial HVAC efficiency	0.6%
	Industrial lighting efficiency	0.6%
	Com. Customized - Refrigeration	0.5%
	Com. Chillers	0.5%
	Com. Customized - Space Conditioning	0.5%
	Com. Early Retirement Chillers, traditional	0.4%
	Com. EMS (Space Conditioning)	0.4%
	Energy Use Audit (On-site) Large	0.3%
	Com. Lighting Controls	0.3%
	Ind Institutionalized Maintenance	0.3%
Documentation Provided - Insufficient Time to Review Total		**28.6%**
Lighting Documentation Provided-Insufficient Time to Review	Interior High Output 4-6 Lamp Fixtures T-8's or T-5's	2.8%
	T-8 or T-5 Lamp and Electronic, 4-foot lamp installed	2.2%
	Screw-in CFL 25 Watt 1,600 to 1,999 Lumens	2.2%
	Screw-in CFL 23 Watt 1,600 to 1,999 Lumens	1.9%
	Screw-in CFL 20 Watt 1,100 to 1,399 Lumens	1.6%
	Screw-in CFL 26 Watt 1,600 to 1,999 Lumens	1.4%
	Screw-in CFL 18 Watt 1,100 to 1,399 Lumens	1.4%
	Screw-in CFL 25 Watt 1,600 to 1,999 Lumens (Nonres.)	0.9%
	Screw-in CFL 23 Watt 1,600 to 1,999 Lumens (Nonres.)	0.8%
	Screw-in CFL 13 Watt 800 to 1,099 Lumens	0.7%
	Screw-in CFL 20 Watt 1,100 to 1,399 Lumens (Nonres.)	0.7%
	Screw-in CFL 14 Watt 800 to 1,099 Lumens	0.7%
	Screw-in Compact Fluorescent Lamp, >27 Watts	0.6%
	Screw-in CFL 26 Watt 1,600 to 1,999 Lumens (Nonres.)	0.6%
	Screw-in CFL 18 Watt 1,100 to 1,399 Lumens (Nonres.)	0.6%
	Screw-in CFL 13 Watt 800 to 1,099 Lumens (Nonres.)	0.3%
	Screw-in CFL 14 Watt 800 to 1,099 Lumens (Nonres.)	0.3%
Lighting Documentation Provided-Insufficient Time to Review Total		**19.6%**

Cost-Effectiveness – SCE

TRC Issues

SCE is forecasting that only three programs will not be cost-effective on a TRC basis. Several have unexpectedly high TRCs that may result in unfulfilled promises.

Table 45. SCE – Program TRC Test Results

Program	TRC
Cost-Effective Programs (TRC ≥1.0)	
Appliance Recycling	6.57
Small Business Direct Install	5.42
IDEEA	4.23
Residential EE Rebates	4.17
InDEE	3.84
Business Incentive Program	3.74
Sustainable Communities	3.68
Partnerships	3.15
Industrial Processes	2.97
Savings By Design	2.67
Multifamily Rebates	2.47
Retrocommissioning	1.72
Agricultural Efficiency	1.51
Integrated Schools	1.32
Comprehensive HVAC - Non-Residential	1.14
CA New Home Program	**0.43***
Programs with a TRC Less than 1.0	
Home Efficiency Surveys	0.93
Comprehensive HVAC - Residential	0.71
CA New Home Program	0.43

*The value filed on June 1, 2005 was 4.13, which was clearly unlikely. Per an E-mail from SCE on 6/13/05, we adjusted this table and others while awaiting a formal *erratum*.

With a TRC of 0.43, the CA New Homes Program appears particularly expensive. We have suggested an approach in our Portfolio Overview and in the policy section of this SCE review that the CA New Homes program could be legitimately combined with Codes and Standards and other programs to create a strategic and cost-effective ensemble. Similarly, the Home Energy Efficiency Survey program is treated in some non-California jurisdictions as part of the marketing effort for very cost-effective Residential Energy Efficiency Programs, with a good combined cost-effectiveness. The savings that come from the rebate programs are seen as a result of the work of all of the elements that combine to bring consumers to make the efficiency transaction, most particularly the information and audit programs. Thus the cost of those programs is included in calculating the cost-effectiveness of the overall rebate program.

TRC Range-of-Estimate Issues

The TRC values range from 0.43 to 6.57. There are at least three TRCs that would appear to be potentially too high, so there is risk of under-achievement. The first is the Home Energy Efficiency Survey that approaches a TRC of 1.0, based on results from the 2002 evaluation of PY 2000 participants in similar programs. Although several national studies have been done that indicate savings can occur from these types of informational audits, the basis for these claimed savings in the HEES program is undermined by the fact that the evaluation did not include a nonparticipants group to control for actions that may have been taken during the start of the energy crisis, which was going on concurrently with the program (Ridge and Associates, 9/2000, Study SCE-116.01). In addition, among the assumptions that were made, the actions taken after the audit were due to the audit, even though 40% of respondents reported having participated in other efficiency programs. Thus, the evaluated TRC may end up disappointing all parties when the results come in from the projected program.

The Appliance Recycling Program (projected TRC of 6.57) is a mature and well-evaluated program that may anticipate actual savings higher than will be achieved. Not only are the number of secondary appliances expected to be picked up increasing over the three years, but the program has been in the market a long time, potentially restricting the amount of net growth that is possible. The expected savings are what would be anticipated from refrigerators that were at least 27 years old according to manufacturers' ratings. While it is true that the seals and fluids of younger refrigerators could result in lower efficiency when tested in the evaluations, they will need to be tested in the next evaluation with actual content-thermal mass to represent actual real world consumption. Just as the actual equipment condition is metered, not just using the test standard, so should the usage with thermal mass be used, since these appliances were supposedly in use in order to be eligible for the program. In addition, the NTG is assumed to be 0.35 across all three years of the program, yet the history of the program has shown a clear downward trajectory of the NTG, which might indicate that the out years could be lower still. Finally, the proposed program design does not require that the refrigerators be manufactured before 1992 in order to be picked up, when this has been the rule for the last two years. This may result in the mix of measures included having a higher starting efficiency than program forecasts.

The other program where the forecast TRC seems to be out of an expected range is the Small Business Direct Install program. It has a TRC forecast of 5.42 for a program delivery approach that has been much less cost-effective in previously evaluated programs. These types of programs are generally very expensive, and the evaluated similar programs in CA cost 100 percent more per first year kWh than is forecast in this program -- the previous evaluations of the third-party small business direct install programs in CA showed that the programs cost $0.22/kWh and $0.25/kWh. This proposal has an expectation of $0.10/kWh. While improved program efficiencies could be expected, doubling the program effectiveness seems to be a risky projection.

Energy Star Refrigerators

There should be serious consideration given to dropping incentives for Energy Star refrigerators, because they already have 42% market share and are expected to continue increasing market share over the three years of the program. The measure saves only 58 kWh a year for a $50 utility rebate; an Energy Star clothes washer above an MEF of 1.80 would save about 70 kWh plus significant water savings, but that measure is not being rebated by the REEP program. It would seem that the $11.5 million planned for refrigerator rebates would better be used for peak saving measures like residential HVAC.

Issues Addressed – SCE

Administrative Costs

At 8.5 percent, the SCE administrative costs are moderate, and probably low for most definitions of administrative costs. If the CPUC-ED staff clarifies the contents and definitions of such costs, a clearer picture will probably emerge when we compare utilities. The administrative costs vary across programs with some of the larger ones, such as the Residential Energy Efficiency Incentives Program having low costs – presumably due to some economies of scale. It is also possible that some programs that are turn-key, such as the Appliance Recycling program, have low internal utility administrative costs, but higher overall societal administrative costs.

Table 46. SCE – Administrative Costs as a Percentage of Program Budgets

Program Name	Percent of Budget
SCE Portfolio Overall	**8.5%**
Codes & Standards Advocacy	25.0%
Partnerships	24.4%
Education, Training and Outreach	18.3%
Emerging Technologies	15.9%
Home Energy Efficiency Surveys	14.1%
Agricultural Energy Efficiency	11.9%
Sustainable Communities	11.0%
Retrocommissioning	9.7%
CA New Homes	9.1%
InDEE	8.6%
Small Business Direct Install	7.4%
IDEEA	7.4%
Business Incentive Program	7.0%
Integrated Schools	6.6%
Residential EE Rebates	6.1%
Flex your power Campaign	6.0%
Savings By Design	5.7%
Comprehensive HVAC - Residential	5.2%
Comprehensive HVAC - Non-Residential	5.2%
Multifamily Rebates	5.2%
Appliance Recycling	4.2%
Industrial Processes	3.3%

Net to Gross

We noted in the overall statewide portfolio that while many of the NTGs found in the Policy Manual are fairly outdated at this time, the utilities did use the values in the Policy Manual as required. The majority of measures appear to have reasonable NTGs. While they are all based on the Policy Manual, there are some measures that probably have incorrectly high expectations for NTG (e.g., premium efficiency motors in industrial rebates, CFLs in residential homes and commercial lighting measures in the Business Incentive Program – all at 0.96). In addition, since the program is being planned for 3 years, the NTG is likely to be different by the third year as the market accepts more and more efficiency measures. Some measures for which trends are developing are appliance recycling, CFLs, Energy Star refrigerators, dishwashers, and air conditioners.

Flagship Programs versus Other Programs

While the BIP and REEP programs are the largest programs, and represent the Flagship Programs for the non-residential and residential programs respectively, there are still many other diverse program offerings that provide services. This diversity lowers the risk associated with concentrating program expectations in a single delivery mechanism.

Energy Accounting Issues

As noted in the Portfolio Overview, sector-specific programs are referring consumers to the Flagship rebate programs, often from more than one sector. At the same time, they are providing audit and custom incentives at the facilities. The accounting for actual achievements and the ability to match up participants in different programs for evaluations will be a chronic problem without some innovative approaches to tracking built-in up front. Double counting is also a potential issue that cannot even be investigated without an appropriate tracking system.

Transparency of Data Issues

Energy Savings

As noted above, we did not have sufficient information to track the bases for the savings for the measures in this portfolio.

Risk Issues

Energy Savings

At the utility level, the risk of not accomplishing the savings that are forecast is always there, but it is a relatively lower risk with a diversified portfolio. At the program level, the expansion of the Residential Rebate program with doubled savings, but tripled costs is one program that is large and could get out of control, and the IDEEA and InDEE programs are forecasting a substantial amount of savings (112GWh at a cost of $39 million) without knowing what new and innovative technologies will be proposed. The optimistic certainty of savings is further emphasized by SCE's forecasting TRCs for the yet-unknown programs of 4.23 and 3.84. Both of these TRCs are higher than just about any other program proposed by the other three California utilities. The other potential risks are noted in the Program Level Summary Table (Table 48).

Oversight Risk

SCE proposes flexibility in shifting funds that allows it to shift both procurement and PGC funds with a great deal of independence. SCE proposes fund shifting guidelines according to the following table.

Table 47. SCE – Proposed Fund Shifting Guidelines

Categories	Shifts Within Program	Shifts Among Programs, Within Category	Shifts Among Categories (up to 25%)	Carryover, Carry Backward Abilities
Residential	Yes	Yes	Yes	Yes
Non-Residential	Yes	Yes	Yes	Yes
Crosscutting (except Emerging Technologies, Codes & Standards)	Yes	Yes[1]	Yes[1]	Yes
Competitive Bid	Yes	Yes	Yes[2]	Yes
Statewide Marketing & Outreach	Yes	Yes	Yes[1]	Yes
EM&V	Yes	Yes	Yes	Yes

Notes:

1. For Emerging Technologies, Codes and Standards, Statewide Marketing and Outreach, pre-Commission approval is required before funds are shifted out of these programs.
2. Funds may be shifted among competitive bid programs. Upon approval from the Commission, funds may be shifted out of these non-utility programs into other areas of the program portfolio.

This proposal provides for flexibility for the program administrator, but only provides after the fact notification to the CPUC for most cases. One clear distinction in the SCE proposal from other utilities is that it allows reductions in the evaluation budget of up to 25% without CPUC approval. Evaluation has often been an area that has suffered from program administrator priorities. This should remain as protected as the Emerging Technologies, Codes and Standards, and marketing and outreach programs.

- For Emerging Technologies, Codes and Standards, Statewide Marketing and Outreach, but not EM&V, pre-Commission approval is required before funds are shifted out of these programs.
- For fund shifts among categories exceeding the 25% limitation, pre-Commission approval is required before funds are shifted.

It is clear that some flexibility is needed to allow utilities to respond swiftly to changes in the markets, but allowing too much flexibility becomes a "faith based" oversight. If the CPUC believes that the 20% is the right amount for bidding, that administrative costs need to be controlled, that programs need to focus on all sectors and provide both kW and kWh benefits, and that sufficient funding is available for evaluations, then some more oversight than "notification" may be required. Otherwise, the current proposals and all of the guidelines behind them become immediately fungible. In fact the Energy Division review of the portfolio balance will have little meaning if it can change dramatically without prior authorization.

We have suggested in other parts of this review that a strategic reserve be accumulated from many programs upfront, which can be used to provide immediate flexibility without having to de-fund programs, take away money from third party implementers, and meet emerging needs. The TecMarket Team believes that flexibility to change incentives when the market moves is very sensible, and shifting uncommitted funds among programs within a sector makes sense, but situations that allow shifting of incentive dollars to increased administration may require prior approval. Not everything is an emergency.

Delivery Risk
Almost all programs will be operated at a much higher level of activity than in the past in order to meet the new goals. The program descriptions often reflect confidence that the proven programs will be improved, but there is little discussion of how the utility will staff up and train all the new actors in the fairly short time needed to ramp to the higher levels, often with new program designs and relationships in the market – such as the Comprehensive HVAC programs. In addition, the large expansion of the retro-commissioning program not only involves the risk of actually getting the same level of savings once the program gets beyond the lower hanging fruit, but entails the added risk that the utility will not be able to get the market penetration among building owners to reach the implied square footage needed to make the targets.

New Implementers
Several programs will have new implementers without a record of working in the program designs in which they are involved. For example, installation contractors with turn-key operations in the Small Business Direct Install Program will work through local governments, Community Based Organizations and Faith Based Organizations. This could be a risk and savings issue if CBOs and FBOs are expected to be re-trained to provide services outside of their areas of experience.

New Program Characteristics
Some programs will have some risks associated with completely new ways to approach the market. This may be a problem for the Comprehensive HVAC programs, for example. In order to achieve the large savings from the programs, solid coordination and new sets of relationships with market channel participants will be needed in a hurry. Further, by providing HVAC incentives upstream, the utilities won't have their usual role in overseeing the installations, and (1) may allow many homes to change their HVAC system without fulfilling the code-requirements to seal ducts at the same time, or (2) may actually end up paying for code-required duct-sealing under another program. This will take some careful oversight.

New means of doing business with the utility will require change on the part of market actors also. New approaches to the market can be effective in the long run, but there are short-term risks for achieving the goals.

Comprehensiveness and Lost Opportunities – SCE

SCE has a very comprehensive and diverse program portfolio. After careful review, we only noted a few areas of potentially lost opportunities. These included the potential for Energy Star Clothes Washers to fall through the cracks if SCE expects SCG to take care of the measure (and they budget for very few rebates), as well as the lack of an efficient manufactured home new construction program. As noted in the statewide summary across all utilities, there is no evidence that the utilities are taking advantage of the large efficiency opportunity to replace high intensity discharge (HID) lighting with high performance T-8s and T-5s in grocery, warehouse, large retail, and other places where a wattage reduction can be almost half of the installed wattage and the related additional benefits of dimming and the ability to work with occupancy sensors open up a lot of other savings opportunities.

Bidding and Third-Party Issues – SCE

There is little information provided, although estimates of the expected savings and aggressive benefit/cost ratios are provided for some programs to fill out the goals and the budgets. Since some of the bid programs are asking for ideas and innovations that haven't already been adopted by the CA utilities over 15 years of programs, the plan that expects very highly cost-effective programs in the next three years seems extremely optimistic.

Partnership Program – SCE

There is approximately $45 million budgeted by SCE over three years for various Partnerships. Although there are descriptions of what each non-utility partner brings to the partnership, the bases for the expected savings and the very strong TRC (3.15) appear to be speculative in many cases, with some optimism based on prior successes with the individual partners, e.g., the California university system.

Policy Issues – SCE

Residential New Construction

SCE is planning a fairly robust new home construction program to follow the Statewide Energy Star New Homes Program. From observing the Public Advisory Group (PAG) process, it appears that there is a strong interest in having Residential New Construction programs at the utilities. Given that the Residential New Construction programs are not easily cost-effective, especially after new code adoption cycles, the Commission should consider providing policy guidance as to the continuation or focus of this effort and the level of funding within the portfolio that is appropriate.

Further, we suggest that these programs could be integrated with other programs, such as the Emerging Technologies Program, Codes and Standards Program, Sustainability programs and the Advanced Building Programs of other utilities, in order to establish a strategic initiative that is specifically designed (a) to provide cost-effective long-term savings through adding innovations (b) through a large building practice dissemination program, and (c) eventually through code changes. In that way the ensemble of programs is strategically designed and would meet the criteria of being operated to produce predictable, long-term, cost-effective savings.

This approach does requires that codes and standards be recognized by the CPUC as being positively influenced by utilities and crediting the utility programs with some part of the resulting large and cost-effective portfolio savings.

Non-Residential New Construction

The natural corollary of this would be to combine the Savings by Design, Emerging Technologies, Sustainable Communities, and Codes and Standards into a non-residential new construction market. (The latter three programs may serve both residential and non-residential portfolios, but it is easier to separate costs in accounting than to divvy up savings among programs in the same market as now occurs). As with the new homes program, there is a need for a "carrier" program in non-residential new construction to disseminate innovations into the market, so that it can be shown to be cost-effective and eventually become improved code. Because all of these programs address the same market actors and are targeted to the same goal of improved building energy efficiency, they should be designed, implemented, evaluated, and

rewarded as a unified program. The policy alternative to develop a unified non-residential new construction market as a sub-portfolio may be an overlooked opportunity.

Evaluation Issues

The CPUC will be responsible for designing and implementing impact evaluations for the 2006–2008 portfolios. Without having direct responsibility for the design of the program and the data tracking, the staff may find that the necessary and useful data may not be accessible due to the design of the Flagship Programs. The REEIP rebate program and the upstream design of the Comprehensive HVAC initiatives are two examples where consumers may be getting services and rebates from more than one program. Knowing who the participant is and being able to follow measures to meters will be important for evaluating the program without double-counting. Examples include HVAC program participation and Business Incentive Program participation. The consumer may not even be aware of the upstream rebate behind measures. Net to gross estimation will be difficult as it is with any upstream program.

In addition, the same consumer gets support from two programs with measures that may interact, as in lighting and HVAC. The HVAC program is designed to work with the CA New Homes Program, but the impact of the measure can be double-counted. The point of purchase rebates are readily available to all consumers and can show up everywhere in the buildings of other programs. This isn't new, but from arm's length, the CPUC staff may find it difficult to sort out the issues that are within the utilities' tracking systems.

The recommendation is that the CPUC staff and the utilities start planning now for how the participants in each program will be tracked and associated with a premise or meter. Develop a process now to ensure that the eventual evaluators will have access to meaningful data needed to do the job, and that responsible parties within each utility are identified.

Finally, the CPUC staff needs to begin now to prioritize the evaluation research that will need to be done, given the large amount of savings that are promised from non-DEER measures and new program designs. Just as the utilities need some flexibility to take advantage of savings opportunities that arise, the CPUC needs to have agreements with the utilities whereby the evaluation results found by the CPUC and its contractors can be used to modify, expand or contract programs that are within what is still a speculative portfolio.

As part of the evaluation effort, we also recommend the following:

1. Development of a data dictionary that all users can access for information on definitions of measures, baselines, energy savings, costs, and references for non-DEER measures, including changes when they are made to the baseline or the measure effectiveness.
2. Periodic updating of the potential studies in all sectors (residential, commercial, industrial, and agricultural).
3. Market-based evaluations to see how specific markets are changing, only some of which may be due to the recorded rebates in the IOU programs. The potential studies should be updated as a large part of market based evaluations.

Conclusion

Our general conclusion is that SCE has a strong and diverse appearing portfolio with only a moderate risk of failing to achieve the projected savings. We also have included some suggestions for improvement in the policies and in the programs. These include:

- Grouping the new residential and non-residential construction programs into market-based packages of programs
- Questioning whether the $11.5 million being spent on refrigerator rebates might better be spent on a more aggressive residential HVAC program
- Adding measures to replace HID lighting with T-8s and T-5s
- Recommending a new manufactured home construction program
- Removing measures that are required by code as listed in the Statewide Portfolio Overview
- Updating gross savings for the Appliance Recycling program when *in situ* test results become available
- Recalculate TRC if necessary to comform to the CPUC Policy Manual, Version 3, as discussed in the Statewide Overview
- Adjust expected TRCs and savings after receiving the bids on the IDEEA and InDEE programs
- Update savings and forecasts against goals to reflect the correct values for CA New Homes, all instances where watts were taken to be kW in estimating savings, the removal of measures that only get to code, and any other *errata* that have become apparent during the review process.

Our general endorsement of what is being proposed is a "faith based assessment" that cannot be validated until we are better able to trace and understand the derivations of the non-DEER savings estimates, and until the programs are actually implemented.

Program-Level Assessment – SCE

This section of the report presents the program-specific assessment information and issue discussions that were identified during the portfolio review effort. The issues reviewed are presented in the left-most column of Table 48, and each subsequent column represents a specific program, allowing the reader to see if the review team determined there to be an issue associated with a specific program, and to understand the review team's perspectives associated with each issue.

Table 48. SCE – Program Specific Summaries

SCE	Appliance Recycling Program	Residential Energy Efficiency Incentive Program	Multifamily Energy Efficiency Rebate Program
Short Description	Continuation and expansion of ARP	Continuation and expansion of statewide (SW) SF rebate program for electric measures.	Continuation and expansion of SW MF rebate program for electric measures.
% of IOU Budget	5.9%	10.0%	7.9%
MWh	177,323	788,040	132,383
Summer Peak MW	30.80	75.50	14.80
Mtherms	-	-	-
TRC	6.57	4.17	2.47
Assessment of Cost Effectiveness	Cost-effective previously and this is an expansion, so it is quite likely to be cost-effective. However, the TRC value seems inflated by leaving out costs that are found in the PAC	Cost-effective previously and this expansion looks likely to be cost-effective.	Cost-effective previously. This expansion still looks quite likely to be cost-effective.
Results Reasonable & Achievable	Most likely given expansion of an old program model by an experienced utility.	Most likely given expansion of tried and true program.	Most likely given expansion of tried and true program.
Design & Delivery	Customers can call for pick-up or schedule via website. Turn-in and pick-up events held with retailers and community groups. Cross promote with appliance efficiency incentive at POS and with MF Incentive effort.	Uses point of sale (POS) rebates (where possible). New on-line ability to apply for rebate.	Indep. Contractors target market this sector for using this program. Property mngr/owner requests have been increasing from program maturation & trade journal mrktg. Info sent to mobile home occupants and mngr--follow-up by 3rd party contractor.
Markets Targeted	Removing older refrigerators, freezers and now room ACs from secondary markets. Added same equipment from commercial.	Residential retrofit. (Central HVAC moved to Comp HVAC program.) Residential new construction. Small commercial as they use these equipment.	Multifamily complexes, rented mobile home parks. Changed definition to include 2+ units to address MF issues in smaller MF bldgs. Includes Comp Mobile Home Program which is continuation of most successful 3rd party program. Added targeted 1-on-1 mrktg for mega-complexes not served by contractor corps.
Lost Opportunities		Tier II clothes washers and Tier II dishwashers are not in this program, because they are cited as having mostly gas savings. At least Tier II clothes washers should be examined for electric savings potential and if there would be missing opportunities beyond the SCG effort (which is only 19,000 units) if not also done by SCE.	Cost-effectiveness of pursuing Tier II clothes washers and Tier II dishwashers for units should be examined and ensure no gaps with the service of this effort by SCG.
Risks	Free-ridership is a perennial risk for this type of program; plus the program's historical penetration may make large new growth difficult.	Continuation makes this relatively low risk with the greatest risk being the significant increase in expenditures over prior efforts. High dependence on ES Refrigerators is a non-lighting measure but it has a high current market penetration of 42%. Therefore, ES Refrig could have a very low NTG and is therefore risky. The $11.5 million being spent here might be better spent elsewhere.	Continuation of successful effort helps to lower risk. Nevertheless, this market is always tough given split incentives. With expansion and incentives at multiple levels, including the expanded residential rebate program, there needs to be monitoring of continued effectiveness and ensure no double-counting of savings.
Other Issues	Evaluation of 2004-05 program with in situ metering may be important to sustain the high estimates of gross savings. Important to ensure that NTG is well studied for the free riders, the remaining life issues and purchase of replacements or different sizes in alternative units.	Tripled budget but doubled savings. Perhaps there are diminishing returns, but it should be monitored.	
Past Experience/ Evaluations			

SCE	Home Energy Efficiency Survey	Integrated School-Based Program	CA New Homes Program
Short Description	Cont. of HEES Mail-In, On-Line In-Home and on phone energy usage surveys. Added install of CFLs w/In-Home audits.	Combines 3 school-based efforts on resid use through child education, and integration of school use and student education at middle/high schools and on college campuses.	Resid new constr. For 15% above Title 24, Includes Advanced Home demonstration program with SCG.
% of IOU Budget	0.9%	0.7%	2.7%
MWh	18,011	10,704	10,603
Summer Pk MW	6.40	25	8.11
Mtherms	-	1,261	-
TRC	0.93	1.32	**0.43**
Assessment of Cost Effectiveness	Previously info-only effort. 1st time post-1998 to claim energy savings.	The 3 programs that were combined have been tested over the last few years.	Getting beyond the new Title 24 standard is difficult and currently res. new construction in CA as a stand-alone is not cost-effective. But investment may be necessary to contribute to market change and future C&S improvements. May need assessment for c/e for all contributors to change in this market sector (program, emerging tech, and C&S).
Results Reasonable & Achievable	Prior 1997 evaluation would suggest the savings estimates are high and these pre CA energy crisis.	Continuing successful efforts. Yet, information only oriented in prior environment so should be monitored & assessed given new role in Portfolio.	Possible but they recognize the current difficulties. Demonstration projects in Advanced Home help complement this.
Design & Delivery	Expansion of current effort. Multilingual surveys. Will follow-up for customer adoptions and track these with savings estimates. Will use participants to market other programs (telemarket & e-mail messages). CBOs help in targeting, particularly hard-to-reach.	Three 3rd party programs that work with the schools and colleges.	Work with builders, contractors, CBIA.
Markets Targeted	Residential, hard-to-reach, and customer usage inquiries and complaints. Coordinated with SCG and water utilities for electric, gas & water savings.	Students, home usage in student homes, and school and college usage.	Residential new construction to include multi-family low and high rise construction.
Lost Opportunities			
Risks	Including savings where not included previously.	New role in providing reliable savings. Verification of these savings should be undertaken.	Earlier comments on cost-effectiveness and difficulty in getting above new Title 24.
Other Issues	Added tracking of customer adoption. Claiming savings that will need to be verified, especially important to avoid double-counting with point of purchase rebates being widely available under REIP.	Why do the therms show up in savings but no therm benefits? Consistency with other programs would have them not reporting therms. (Assuming this is due to teaming with SCG and SCG claims the therms.)	See earlier comments on examining market as a whole.
Past Experience/ Evaluations			

SCE	Business Incentive Program	Comprehensive HVAC Program (Residential)	Comprehensive HVAC Program (Non-Residential)
Short Description	Integrates SW nonresid rebates from Express Efficiency program and calculated and custom rebates from the Standard Performance Contract, SW nonres audits, and is connector program for common nonres rebates in other programs.	One comprehensive HVAC for up/mid/and downstream (but analyzed separately for res & non-res to meeting Portfolio filing req.)	One comprehensive HVAC for up/mid/and downstream (but analyzed separately for res & non-res for meeting Portfolio filing req.)
% of IOU Budget	15.7%	2.0%	7.0%
MWh	1,043,035	24,153	138,357
Summer Pk MW	297.80	13.10	75.10
Mtherms	-	-	-
TRC	3.74	0.71	1.14
Assessment of Cost Effectiveness	Contains programs and program elements from several prior successful efforts. As such, quite likely cost-effective.	Possible but little exp in CA with comp effort.	Possible but little exp in CA with comp effort.
Results Reasonable & Achievable	Components are all tried and successful elements. Budget is in line with savings given prior programs consolidated.	Possible but little exp in CA with comp effort.	Possible but little exp in CA with comp effort.
Design & Delivery	Audits, contractors/vendors, and account reps feed into program, wrk with local govt, besides direct customer. Rebates are based upon 1 of 3 methods: itemized (prescriptive), calculated (N-calc software then prescriptive) and custom (with verification & assistance for this). Besides rebates, also provides energy audits, design assistance, project implementation consulting, and measurement and verification assistance.	3rd party contracts to implement effort.	3rd party contracts to implement effort. May include access to On-Bill Financing Pilot.
Markets Targeted	All sizes of commercial and industrial.	Upstream, mid and down-stream efforts for those with and without HVAC maintenance contractors. Desire to affect mfg, distributors, contractors, and customers.	Upstream, mid and down-stream efforts for those with and without HVAC maintenance contractors. Desire to affect mfg, distributors, contractors, and customers.
Lost Opportunities	Appears to have a large mix of measures (e.g., cool roofs, vending machine controller).		
Risks	Some risks with the integration but should help in coordination but size and other things could cause confusion. Large process evaluation to test interworkings after up and operational would seem reasonable. Investment 3 times that of previous efforts that were combined. Could be a challenge to make that growth and integration, people and data systems. Monitoring to ensure this occurs efficiently could prove beneficial.	Seems quite reasonable and more thorough approach. As not yet tried, need monitoring and may need adjustments/refinements as program progresses. Not sure of exact program until bids come in and are accepted.	Seems quite reasonable and more thorough approach. As not yet tried, need monitoring and may need adjustments/refinements as program progresses. Not sure of exact program until bids come in and are accepted.
Other Issues	The audit is being tracked, actions taken, tracked, and savings claimed. Reviewing work papers and conducting impact evaluation in this area should be considered by CPUC Energy Division given newness of this for claimed savings. All measure previously under Express Efficiency get 0.96 NTG and those from SPC get 0.7011 NTG. The 0.96 seems high, especially given the measures are going to all sectors.	Much is being done via 3rd party bidding. As such, specificity is not complete and some risk involved in how the selection will affect the program design, participation, and cost-effectiveness. Need to ensure that codes are met when the sales are upstream, so that duct sealing isn't paid for downstreanm also.	Much is being done via 3rd party bidding. As such, specificity is not complete and some risk involved in how the selection will affect the program design, participation, and cost-effectiveness.
Past Experience/ Evaluations			

SCE	Retrocommissioning	Industrial Energy Efficiency Program	Agricultural Energy Efficiency Program
Short Description	Full scale commissioning program for existing buildings.	Targeted large industrial effort with focus on process	Targeted effort for agricultural industry, includes prior pump testing and AgTAC
% of IOU Budget	1.8%	6.0%	5.6%
MWh	39,040	194,474	129,368
Summer Pk MW	18.70	37.04	35.10
Mtherms	-	-	-
TRC	1.72	2.97	1.51
Assessment of Cost Effectiveness	1st utility such effort in CA but successful 3rd party efforts and elsewhere.	Possible but much is custom and unknown prior to implementation.	
Results Reasonable & Achievable	1st utility such effort in CA but successful 3rd party efforts and elsewhere.	Possible but much is custom and unknown prior to implementation.	Much educational efforts within this program. Is this optimal method for short-term and long-term savings goal obtainment?
Design & Delivery	Contract with many commissioning providers. Utilize SCE account rep and SCE networks w customers and local govt. Program review candidate bldgs.	Integrated industrial and process-specific effort. Uses Business Incentive Program for standard measure rebates. Uses account reps, 3rd party contracts by geography & industry-specific.	SCE reps primary outreach, supplemented with 3rd party pump repair
Markets Targeted	Large commercial/industrial/gov't market.	Industrial (good to address this part of the market individually to ensure reaching this difficult sector). Specific targets: Oil & gas extraction, food processing, rubber & plastics, elec. Equip., and water and wastewater.	Agriculture and water supply.
Lost Opportunities	Comprehensive and no lost opportunities		Appears comprehensive.
Risks	Large program which means risk. Not only savings may be uncertain, but also penetration into market. Some uncertainty in measurement and measurement life issues. Aggressive market penetration for new effort	Delivery and what will really be done is unknown. Some risk given this. Yet, this risk is common for custom efforts. With other programs providing the same customers prescriptive rebates, it will be a tracking challenge for evaluations.	
Other Issues			Includes pump testing, facility audits, design services, AgTAC, coord with many entities. Are savings being fully captured?
Past Experience/ Evaluations			

SCE	Nonresidential Direct Install	Savings By Design New Construction Program	Sustainable Communities
Short Description	Small bus. Direct install for very small and On-Bill Financing Pilot for small bus.	Based on prior SBD effort, funds electric measures w gas by SCG, whole building approach	Joint effort for more efficient and sustainable communities that include efficiency, transportation, gray water use etc.
% of IOU Budget	7.2%	4.6%	0.7%
MWh	348,848	132,261	8,212
Summer Pk MW	50.40	11.00	4.10
Mtherms	-	-	-
TRC	5.42	2.67	3.68
Assessment of Cost Effectiveness	The TRC is significantly higher than we normally see for a small business direct install effort. The evaluations of the 3rd party small business direct install were $0.22/kWh and $0.25/kWh. This proposal has $0.13/kWh. Further documentation of this level of c/e needed.	Based on tried and true program. But tougher with new Title 24. Should be combined with Emerging Technolofies, Sustainable Communities, and Codes and Standards to be a cohesive approach to the market	
Results Reasonable & Achievable	See last statement.	Tougher with new Title 24 and systems approach moved into Business Incentive Program.	
Design & Delivery	Installation contractors with turn-key through local govt, CBOs and FBOs. (Could be a risk and savings issue if CBOs and FBOs are trained to directly provide services outside of their areas of experience. Problems found elsewhere doing this.) Door-to-door delivery.	Program works early with projects, architect, designers, workshops, education to encourage whole bldg approach.	
Markets Targeted	Very small and small sized businesses.	New Nonresidential Construction	
Lost Opportunities	Comprehensive (and uses HVAC and other programs as appropriate).	Comprehensive whole building approach. Opened up certified designers.	
Risks	Installation contractors with turn-key through local govt, CBOs and FBOs. (Could be a risk and savings issue if CBOs and FBOs are trained to directly provide services outside of their areas of experience.	Claims to obtain savings from design assistance but uncertain how much from this and its evidence (i.e., risk). Custom nature also inherently has risk.	Cost-effectiveness of sustainability efforts in terms of only energy savings could be difficult.
Other Issues	The key question with this program is how much net incremental savings are achieved and is this savings large enough to account for the cost of the on-bill financing component? This is a risk as it depends on how it is structured and placed in the market.		
Past Experience/ Evaluations			

SCE	Education and Training	Statewide Emerging Technologies	Statewide Crosscutting Codes and Standards
Short Description	Info only effort SW includes physical & virtual energy centers	Cont. & expand SW Emerging Tech: Assessment and Information Transfer & the ETCC	Support efforts for increasing Codes & Standards in the future.
% of IOU Budget	3.1%	1.7%	0.8%
MWh			
Summer Pk MW			
Mtherms	-	-	-
TRC			
Assessment of Cost Effectiveness			
Results Reasonable & Achievable			
Design & Delivery	Includes CTAC, mobile energy unit, remote facility audits (mail-in Spanish), CLEO, BOC	Joint effort SW & with CEC PIER to test product, demonstrations, work with EPRI, GRI, CIEE, ARI, ASHRAE and others. 18 new technology assessments to be conducted.	
Markets Targeted	Info & education all markets, added focus on emerging tech, demand response, distributed generation	Energy product, equipment, related advanced R&D and beginning commercialization.	
Lost Opportunities			
Risks	Difficulty in finding right level & type of investment to provide leverage and growth for portfolio while not driving down forecast cost-effectiveness.	Inherent risks in emerging tech just like R&D, but then should assess how commercialized so the "winners" more than cover the "losers".	
Other Issues		A key question is if the program or the ETCC have the ties to the industry that are needed to move technologies into production and distribution. Increased investment, difficult to conduct meaningful evaluation of benefit/cost of investment though this needs to be well examined.	This looks like an important component of the portfolio that builds on past success from utility efforts to change codes in a way that provides significant savings. If savings are to be counted for this program, this may be a program in which more resources are placed.
Past Experience/ Evaluations		NYSERDA recently developed/conducted value/cost methodology for assessing R&D investments.	

SCE	Local Government Partnerships Program	IDEEA	InDEE
Short Description	Leveraging local gvt for green bldg and efficiency efforts.		
% of IOU Budget	6.4%	4.8%	0.8%
MWh	131,961	96,875	14,539
Summer Pk MW	27.00	19.80	2.98
Mtherms	-	-	-
TRC	3.15	4.23	3.84
Assessment of Cost Effectiveness	Not enough information at this time to properly assess.	Can not assess until after 3rd party bids made and accepted.	Can not assess until after 3rd party bids made and accepted.
Results Reasonable & Achievable	Not enough information at this time to properly assess.		
Design & Delivery			
Markets Targeted	Markets together with traditional government entities to use their unique qualities (colleges, prisons, cities, and counties) to penetrate difficult markets.		
Lost Opportunities			
Risks	Significant investment and too little information to fully assess savings estimates and cost-effectiveness.	Risky to assume th ehigh savings and strong TRC when the products and delivery mechanisms are completely new and unknown.	Risky to assume th ehigh savings and strong TRC when the products and delivery mechanisms are completely new and unknown
Other Issues			
Past Experience/ Evaluations			

SCG Portfolio Overview

Southern California Gas's (SCG's) program portfolio is primarily an expansion of previous utility or statewide programs. SCG plans to significantly increase its budget in the next few years, going from $48 million to $61 million in 2007 (a 27 percent increase) and $73 million in 2008 (a 52 percent increase compared to 2006). This is a substantial increase, considering that SCG's budget for 2004 and 2005 program years together was $54 million.[6] Thus, the key difference from the past is the substantial increase in budgets and partnerships, as well as a bidding program. Table 49 presents information on the programs that will be receiving funding for 2006–2008, grouped according to whether they will lead to energy and demand savings or are designed for information purposes only. Approximately 25 percent of the total three-year funding ($182 million) will go into third-party programs and partnership programs, and since they have not been developed, there was little information on these programs in the SCG portfolio to review. An analysis of budget and savings by sector (residential, non-residential, etc.) is described later.

Table 49. SCG – Overview of Programs

Portfolio Component	2006–2008 Budget ($M)	Percent of Budget (%)
SCG Portfolio	**182**	**100**
Programs Reporting Energy and Demand Savings		
Third-Party Programs	33.8	18.5
Local Business Energy Efficiency Program	26.8	14.7
Statewide Non-Residential Express Efficiency Rebate Program	22.1	12.1
Single Family Home Energy Efficiency Retrofit Program	19.5	10.7
Multifamily Home Energy Efficiency Retrofit Program	9.5	5.2
Advanced Home Program	8.8	4.8
SCG/SCE Joint Savings by Design Energy Efficiency Program	7.5	4.1
Energy Efficiency Education and Training Program	6.4	3.5
SCG/Municipal Electric Utility Collaborative Savings by Design Energy Efficiency Program	3.0	1.6
Sustainable Communities Demonstration/City of Santa Monica	0.9	0.5
Programs without Reported Savings		
Evaluation, Measurement and Verification	13.3	7.3
Partnerships	12.0	6.6
Statewide Marketing and Information Program	6.0	3.3
On-Bill Financing	3.8	2.1
Emerging Technologies	3.0	1.6
Energy Efficiency Delivery Channel Innovation Program	3.0	1.6
Home Energy Efficiency Survey	1.9	1.0
Codes and Standards	0.9	0.5

[6] California Public Utilities Commission, Decision 04-02-059 (Feb. 26, 2004), San Francisco, CA.

Goals Attainment – SCG

Comparison with CPUC Goals

According to the information available to the TecMarket Works Team during the review period, SCG projects that their portfolio will meet the natural gas goals provided by the California Public Utilities Commission (CPUC) in each of the program years 2006, 2007 and 2008. They project that SCG's programs will achieve 107 percent of the CPUC's first-year natural gas goals, and they project that by the end of 2008 they will have achieved 106 percent of the natural gas savings goals. Table 50 presents SCG's projections of their portfolio's ability to reach CPUC energy savings goals.

Table 50. SCG – Energy Goal Accomplishment (2006–2008)

	2006		2007		2008	
	Total	% of 2006 Goal	Total	% of 2007 Goal	Total	% of 2008 Goal
Energy Savings – Natural Gas						
Annual Net Therm Savings (MTh/yr)	15,790	107%	20,621	107%	24,285	104%
LIEE (MTh/yr)	946		923		923	
EE (MTh/yr)	14,844.06		19,697.41		23,362.04	
Annual Net Therm Goal (MTh/yr)	14,700		19,300		23,300	
Lifecycle Net Therm Savings (MTh)	195,039		273,332		324,999	
LIEE (MTh)	9,777		9,548		9,548	
EE (MTh)	185,261		263,784		315,451	
Cumulative Net Therm Savings (MTh/yr)	15,790	107%	36,411	107%	60,696	106%
LIEE (MTh/yr)	946		1,869		2,793	
EE (MTh/yr)	14,844		34,541		57,904	
Cumulative Net Therm Goal (MTh/yr)	14,700		34,000		57,300	

Source: SCG Workbook - Attachment II. Tables for Sections 3.2 and 3.3 - Projected Program Impacts By Year

The TecMarket Works Team's opinion of SCG's goal projection is that the goals are reasonable given the portfolio being developed and programs being offered. However, we have some concerns about the partnership programs being able to cost-effectively support SCG's energy goals, and there is limited information on how the goals will be supported by the third-party providers (via the 20 percent of the portfolio that must be competitively bid). We have no information on the expected cost-effectiveness or on the projected savings from the third-party programs as well as the partnership programs being planned by SCG.

Comparison with Potential

In order to conduct the comparison of SCG's portfolio goals with the SCG energy potentials, we used KEMA's "100 percent achievable potentials" (potential amount of energy savings that

could be achieved if the program funding was increased by 100 percent). This allowed for a comparison of an expanded program portfolio that more closely matched the spending levels of the current portfolio. However, the current portfolio budget may be greater than the 100 percent increase reported in KEMA's potential reports for residential and non-residential programs. At this time, there is no published report for industrial potentials, however, there is an industrial potentials study currently being finalized by KEMA. For the SCG industrials potential, we used preliminary estimates from the yet to be published 2005 industrial potentials study being completed by KEMA. The industrial potentials should be considered proxy estimates that will need to be adjusted once the KEMA study is released in 2005.

KEMA's published potential reports provide 10-year estimates of program potential, or the amount of energy impacts that can be achieved over a 10-year period. In order to adjust the KEMA potentials to the 3-year program cycle, we multiplied the KEMA potentials by .3. We use 3-year potentials in this assessment because the current program planning cycle is three years in length.

We were unable to segregate the programs into residential, non-residential and industrial sectors using the portfolio data, as several programs cut across sector lines. As a result, we summed the potential estimates for the 100 percent increase in funding levels across the residential, non-residential and industrial sectors (note: the non-residential sector does not include industrial potentials) and compared these potential estimates with the SCG portfolio estimates. Table 51 provides the results of this comparison.

Table 51. SCG – Potential and Portfolio Savings Projections (2006–2008)

Energy	Residential	Non-Residential	Industrial*	All Sectors		
	100% Ach	100% Ach	100% Ach Proxy	100% Ach Proxy	CPUC Goal	Utility Plan
Mth	15.38	8.88	11.46	35.72	57.30	60.70

*Preliminary data for industrial, not yet published or finalized

As noted in Table 51, the total natural gas potential, as identified by KEMA is 35.7 mega-therms (Mth) for a three-year period (KEMA's 10 year potential x .3). The CPUC's goal for the capture of natural gas by the SCG portfolio is 57.3 mega-therms, or a 160 percent increase above the KEMA-identified potential. A review of the SCG portfolio indicates that SCG will capture 60.70 mega-therms of natural gas over the three-year program period. This is about a 6 percent increase over the CPUC's goal and represents a 170 percent increase over KEMA's 100 percent potential estimate.

This goal seems reasonable and obtainable with the doubling of the portfolio budget each year, and this challenge will require SCG to improve program performance each year of the portfolio. The addition of the bid and partnership programs will significantly help SCG to meet these goals.

Budgets and Service Offerings Balance

SCG's portfolio is distributed among several sectors in terms of funding and expected energy savings (Table 52). Most of the funding is going into the "Other" sector (this may reflect the fact that 23 percent of funding is going to third parties and it is premature to calculate which sectors will be targeted by third-party programs). Of the programs that are targeting specific sectors, 51 percent of the savings is expected to be achieved in the non-residential sector, and another 15 percent in the non-residential new construction sector. While 17 percent of the savings are expected in the residential sector, no savings are to be achieved in residential new construction. This last result is not surprising, since SCG does not have a residential new construction program, they have an Advanced Home Program that will explore new technologies.

Table 52. SCG – Projected Funding and Energy Savings by Sector (2006–2008)

Sector	Funding	% of Total	Savings (MTh)	% of Total	Savings (Net kWh)	% of Total
Residential	$30,900,000	17%	9,717	17%	31,343,032	85%
Residential New Construction	$8,750,000	5%	220	0.4%	5,634,516	15%
Non-Residential	$48,948,177	27%	29,490	51%	0	0%
Non-Residential New Construction	$11,400,000	6%	8,510	15%	7,313	0%
Other	$82,237,187	45%	9,965	17%	0	0%
Total Funding	**$182,235,364**		**57,903**		**36,984,861**	

Over 50 percent of the natural gas savings are in space cooling/heating, 30 percent in the "Other" category (primarily cooking), and 17 percent in water heating. This is quite a contrast to the other utilities where lighting is the predominant end use of savings.

In summary, the budget and service offerings are substantially targeted to certain sectors ("Other" and Non-Residential) and specific end uses (cooking and water heating). Because the focus is on natural gas savings, this strategy may be appropriate.

We expect that the programs that are more closely linked to previous programs run by SCG will accomplish their objectives in an efficient and timely fashion. However, the program descriptions for the bid and partnership programs are not clear in their presentations of what will be accomplished in each of the programs. We suspect that the partnership programs will have some organization and development issues similar to the past performance of these programs. That is, some will go more quickly and more smoothly than others. Likewise, we must assume that the bid programs to be implemented by third-party contractors will also have organizational and development issues consistent with the past performance of these programs. That is, some will be developed and fielded quickly and begin to achieve their energy goals, while others will move more slowly. Nevertheless, bid and partnership programs should be closely monitored and evaluated to ensure that these expectations are met.

Energy Savings Issues

To assess if the portfolio energy savings are reasonable for the measures used, we conducted a two-step review of the measures included in the SCG portfolio. First, we sorted for all the measures that used the energy savings from the DEER database, and compared them to DEER for accuracy. Next, we examined all of the measures that did not use DEER in estimating impacts. The energy impacts for these measures were estimated using non-DEER-associated approaches.

Not many measures in the SCG portfolio were tied to the DEER database (See Table 53). It is interesting to note that they did rely more heavily on DEER for the electric and demand related savings, but not for savings in their primary energy type of natural gas. This could be related to the availability of therm savings data in DEER.

Table 53. SCG – Savings Estimates Developed Using DEER Data

	Number of Measures	Percent of IOU Savings		
		kWh	Therms	kW
No Relationship to DEER	217	15%	88%	32%
Relationship to DEER	16	85%	12%	68%

DEER Measures Estimates

All of the measures that were estimated using DEER were reviewed for accuracy and consistency with the DEER 2005 Database. The DEER data was downloaded format from http://www.rtf.nwppc.org/deer2005/# on May 13, 2005.

In the "measure list" tables of the utility workbooks, the "Measure ID" was typically a match with the "RUNID" field in the DEER data. In some cases averages across the DEER "Measure ID" were used instead of the more specific "RUN ID". Comparisons of the utility estimate and DEER estimate were made based on the information available in the filed workbooks. For example, if the utility noted that they used an average for all DEER refrigerators, the evaluation team attempted to replicate their calculations for a valid comparison.

For a majority of the kWh savings in the portfolio, which are attributable to insulation, SCG seems to have significantly undershot the DEER estimate. However, there appears to be a difference in the units (i.e. square ft) used by SCG and DEER that has caused this discrepancy. We did not have enough information to replicate SCG's calculations.

Table 54. SCG – Result of DEER Measure Savings Estimate Review (kWh)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kWh)	% of Portfolio Savings	DEER Estimated Savings (kWh)	% Difference
-	OK	3,556,000	9.6%	3,556,000	0.0%
- Total		3,556,000	9.6%	3,556,000	0.0%
Under	Units	25,643,032	69.3%	914,661,713	-97.2%
	Not Clear	2,144,000	5.8%	3,380,552	-36.6%
Under Total		27,787,032	75.1%	918,042,265	-97.0%
Grand Total		31,343,032	84.7%	921,598,265	-96.6%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008

These same measures were accountable for the difference in the DEER and utility estimates used for therms.

Table 55. SCG – Result of DEER Measure Savings Estimate Review (Therms)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (Therms)	% of Total Portfolio Savings	DEER Estimated Energy Savings (Therms)	% Difference
-	OK	179,456	0.4%	179,456	0.0%
- Total		179,456	0.4%	179,456	0.0%
Over	Not Clear	1,447,200	3.0%	385,084	275.8%
Over Total		1,447,200	3.0%	385,084	275.8%
Under	Units	4,051,592	8.3%	292,815,451	-98.6%
Under Total		4,051,592	8.3%	292,815,451	-98.6%
Grand Total		5,678,248	11.6%	293,379,991	-98.1%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008

These same measures were accountable for the difference in the DEER and utility estimates used for demand savings in terms of kW.

Table 56. SCG – Result of DEER Measure Savings Estimate Review (kW)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kW)	% of Total Portfolio Savings	DEER Estimated Energy Savings (kW)	% Difference
-	OK	1,127	5.8%	1,127	0.0%
- Total		1,127	5.8%	1,127	0.0%
Under	No Utility Estimate	0	0.0%	1,410	-100.0%
	Units	12,017	62.2%	1,193,224	-99.0%
Under Total		12,017	62.2%	1,194,634	-99.0%
Grand Total		13,144	68.0%	1,195,761	-98.9%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008

Non-DEER Measures Estimates

Based on our review of the measures making up the majority of the non-DEER related savings, about 32 percent of the therm savings appeared reasonable based on our review, and 50 percent still presented some concern. Concern arose either from ambiguity of the documentation, or questions about the assumptions or calculations used. For more detail about the specific concerns for these measures see Appendix A.

We reviewed the energy savings estimates of the non-DEER measures that made up the largest proportion of energy savings, where possible (Table 57). Of the measures analyzed, we found:

- 10 measures had some additional documentation provided to the evaluation team but there was insufficient time for detailed review (representing 43 percent of SCG's therm savings)
- 10 measures had reasonable energy savings based on documentation (representing 32 percent of SCG's therm savings)
- 4 measures had questions regarding energy savings or similar measures not promoted in SCG's portfolio (representing 4 percent of SCG's therm savings)

Details on the concerns about the four measures listed in Table 57 can be found in Appendix A. Further review of the 10 measures that still are unclear should be done before final approval of SCG's portfolio.

Table 57. SCG – Non-DEER Measure Energy Savings Assessment

Confidence in Per Unit Estimate	Measure As Described by IOU	% of IOU kWh Savings	% of IOU Therm Savings
Concerns	316009-Single Family, Maximum Cooling Capacity, CZ 10	3.0%	0.0%
	316012-Single Family, Maximum Cooling Capacity, CZ 15	2.8%	0.0%

	312015-Gas Wtr Htr and/or Boiler Controller Digital Graphing (>= 20 units)	0.0%	2.5%
	312014-Gas Wtr Htr and/or Boiler Controller Non-Digital Graphing (>= 20 units)	0.0%	1.5%
Concerns Total		**5.9%**	**3.9%**
Reasonable	311008-Instantaneous Water Heaters (< 200 MBTUH)	0.0%	0.9%
	311015-Commercial Boiler (Non-Space Heat, Non-Process)	0.0%	2.4%
	311016-Process Boiler - Steam	0.0%	1.5%
	311017-Water Heating -Commercial Pool Heater	0.0%	5.7%
	311029-Pipe Insulation - Low Pressure Steam Applic. (LF) 1 in	0.0%	0.8%
	312009-Central System Gas Boiler: Water Heating Only	0.0%	3.3%
	313005-Misc (per Therm)	0.0%	5.6%
	313010-Whole Bldg (per Therm)	0.0%	5.2%
	317003-Misc (per Therm)	0.0%	4.0%
	317007-Whole Bldg (per Therm)	0.0%	2.2%
Reasonable Total		**0.0%**	**31.5%**
Documentation Provided - Insufficient Time to Review	311002-Greenhouse Heat Curtain	0.0%	6.4%
	311018-Process Boiler - Water	0.0%	1.5%
	314005-Misc. Cooking Equip.	0.0%	2.9%
	314008-NRER Furnace Replacement	0.0%	1.5%
	314010-NRER Oven Replacement	0.0%	1.7%
	314011-NREC Heat Recovery	0.0%	1.8%
	314012-NRER Misc. Process Equip. Replacement	0.0%	7.6%
	314013-NREC Equip. Modernization	0.0%	8.7%
	314042-Grant (SPC Equivalent Measure)	0.0%	8.9%
	318003-Industrial End User Workshops (SPC Equivalent)	0.0%	2.3%
Documentation Provided - Insufficient Time to Review Total		**0.0%**	**43.3%**

Cost-Effectiveness – SCG

SCG estimates the TRC cost-effectiveness ratio for their portfolio at 1.4, indicating the portfolio is cost-effective in acquiring energy resources for California. However, several of SCG's programs do not show a cost-effectiveness estimate and were excluded from the portfolio cost-benefit calculations.

TRC Not Yet Developed

The third-party programs are not yet structured and cannot have a cost benefit ratio until after they are planned in greater detail. In addition, there are several partnership programs, and they also do not have an assigned cost benefit ratio because these programs are not yet formed to the extent that a TRC can be calculated.

TRC Not Applicable

There are four programs for which the TRC test is not applicable. These include the Codes and Standards Program, the Energy Efficiency Delivery Channel Innovation Program, the Emerging

Technologies Program, EM&V, Statewide Marketing and Outreach, the Home Energy Efficiency Survey Program, and the crosscutting On-Bill Financing Initiative.

TRC Reported

The remaining programs in the SCG portfolio have a cost benefit ratio estimated using the TRC test. Most were cost-effective (TRC greater or equal to 1), particularly in the non-residential sector (Table 58). As expected, programs focusing on demonstrations and information and education were not cost-effective. The TRC for the entire SCG portfolio is 1.4.

Table 58. SCG – Program TRC Test Results for 2006–2008

Programs	TRC
SCG Portfolio	**1.4**
Cost-Effective Programs (TRC ≥1.0)	
Local Business Energy Efficiency Program	2.9
SCG/Municipal Electric Utility Collaborative Savings by Design Energy Efficiency Program	2.1
Statewide Non-Residential Express Efficiency Rebate Program	2.0
SCG/SCE Joint Savings by Design Energy Efficiency Program	1.7
Single Family Home Energy Efficiency Retrofit Program	1.4
Residential Multifamily Energy Efficiency Retrofit Program	1.4
Advanced Home Program	1.2
Programs with a TRC of Less than 1.0	
Sustainable Communities Demonstration/City of Santa Monica	0.9
Energy Efficiency Education and Training Program	0.8

TRC and PAC Issues

We did not see any variation in the relative differences between TRC and PAC numbers: the TRC was always less than the PAC, which is what one would expect if one assumes that the only variation between the two indices is cost (the TRC includes all costs, while the PAC excludes customer costs).

Issues Addressed – SCG

Administrative Costs

Administrative costs represent approximately 20 percent of the portfolio budget for 2006–2008: $37.4 million, out of $182 million. This is the highest percentage, when compared to other utilities. However, it is unclear whether all of the utilities are using the same definition and calculation of administrative costs. If the CPUC could clarify the contents and definitions of such costs, a clearer picture will probably emerge when we compare utilities.

Some programs have especially high administration costs, and the percentages ranged from a high of 44 percent (On-Bill Financing) to a low of 0 percent (for the Statewide Marketing and Information Program) (Table 59). The endpoints appear to be reasonable: (1) the On-Bill Financing Program is expected to have high administrative costs, especially in the beginning when designing the program and because there are no incentives and rebates, and (2) the Statewide Marketing and Information Program is expected to be simply a transfer of funds from SCG to the organization implementing this program.

Table 59. SCG – Administrative Costs as a Percentage of Program Budgets (2006–2008)

Program	Percent of Budget
On-Bill Financing	44%
Codes and Standards	40%
Partnership Programs	40%
Third-Party Programs	40%
Emerging Technologies	33%
Sustainable Communities Demonstration/City of Santa Monica	25%
Energy Efficiency Education and Training Program	22%
Home Energy Efficiency Survey	22%
Statewide Non-Residential Express Efficiency Rebate Program	18%
Multifamily Home Energy Efficiency Retrofit Program	15%
Local Business Energy Efficiency Program	14%
SCG/SCE Joint Savings by Design Energy Efficiency Program	14%
Single Family Home Energy Efficiency Retrofit Program	12%
SCG/Municipal Electric Utility Collaborative Savings by Design Energy Efficiency Program	10%
Advanced Home Program	10%
Energy Efficiency Delivery Channel Innovation Program	7%
Statewide Marketing and Information Program	0%

Net to Gross

As mentioned in the overall assessment of the utility portfolios, the spreadsheets for each utility have net to gross (NTG) numbers for each measure. However, the NTG numbers were generally the same across all the measures within a program, or within groups of measures. As instructed, the utilities used default NTG numbers based on the CPUC Policy Manual. However, using these numbers increases the risk of the portfolio not producing the savings indicated by the program and may be inconsistent with some evaluation findings that report different NTG values. As a result, the cost benefit estimates across the portfolio are higher than what will likely be confirmed via the evaluation process. Accordingly, the net energy savings will cost more than what is reflected in the portfolio planning documents. While these standard NTG levels make it easier for planning and analysis, they increase the risk by overstating savings goals from the portfolio.

Risk Issues

Much of SCG's portfolio is the continuation of programs that have performed well over the past years. The use of proven programs helps lower the risks of programs not performing up to their expectations. However, one risk to the portfolio is associated with the significant increase in operating budgets and size of the goals compared to previous programs. There will be an increased risk in launching many programs with large budgets at the same time. SCG's 2005 portfolio budget was about $28 million, the 2006 budget is about $47.8 million, a 71 percent increase in one year. This will require significant management and utility supervision to oversee this ramp up, and to successfully implement larger and more aggressive programs. There is also a risk that as the programs attempt to ramp up, the higher administrative and management costs that will be associated with this ramp up will need to be offset by increased enrollments and installations. SCG will need to carefully monitor these programs to see that they are successfully moving in a cost-effective direction.

We also want to point out several categories of risk associated with SCG's programs:

Oversight Risk
SCG proposes fund shifting guidelines according to the following table:

Table 60. SCG – Proposed Fund Shifting Guidelines

Categories	Shifts Within Program	Shifts Among Programs, Within Category	Shifts Among Categories (up to 25%)	Carryover, Carryforward Abilities
Residential	Yes	Yes	Yes	Yes
Non-Residential	Yes	Yes	Yes	Yes
Crosscutting (except Emerging Technologies, Codes & Standards)	Yes	Yes[1]	Yes[1]	Yes
Competitive Bid	Yes	Yes	Yes[2]	Yes
Statewide Marketing & Outreach	Yes	Yes	Yes[1]	Yes
EM&V	Yes	Yes	Yes[1]	Yes

Notes:
1. For Emerging Technologies, Codes and Standards, Statewide Marketing and Outreach, and EM&V, pre-Commission approval is required before funds are shifted out of these programs.
2. Funds may be shifted among competitive bid programs. Upon approval from the Commission, funds may be shifted out of these non-utility programs into other areas of the program portfolio.

This framework appears to provide sufficient flexibility for the program administrator and provides sufficient overview for the CPUC for the following cases:

- For Emerging Technologies, Codes and Standards, Statewide Marketing and Outreach, and EM&V, pre-Commission approval is required before funds are shifted out of these programs.
- For fund shifts among categories exceeding the 25% limitation, pre-Commission approval is required before funds are shifted.

In addition, the CPUC has other oversight responsibilities:

- Approval of the addition of new programs that are developed outside of the program administrator's competitive bid process.
- Oversight of program solicitations and selects in the competitive bid process.

The California Energy Commission also is provided one oversight responsibility: approval of a proposed measure and corresponding measure assumptions (e.g., energy savings, useful life, etc.).

Ramp Up
Much of the SCG portfolio is the continuation of programs that have performed well over the past years. The use of proven programs helps lower the risks of programs not performing up to their expectations. However, one risk to the portfolio is associated with the significant increase in operating budgets and size of the goals compared to previous programs. The SCG portfolio will need to be able to increase participation rates and capture the additional installations at a

much greater rate than previous programs. While the IOU's ability to capture these additional participants remains to be demonstrated, the program description should state how they plan to accomplish the increased participation and installations, especially when the projected savings are greater than the potential savings. This explanation should not be a brief indication that the program size will be increased, but should be a strategic presentation of how the program will be increased and what aspects of the program will be adjusted to capture the increased participation.

There will be increased risk in launching on a wide number of programs all ramping up at the same time. This will require significant management and IOU supervision to oversee this ramp up, and to successfully implement larger and more aggressive programs. There is also a risk that as the programs attempt to ramp up, the higher administrative and management costs associated with this ramp up will need to be offset by increased enrollments and installations. SCG will need to carefully monitor these programs to see that they are successfully moving in a cost-effective direction.

Short-Term versus Long-Term Savings

SCG's program designs and measures are primarily a continuation and expansion of what has worked in the past: accordingly, they focus on the short-term, in order to reach or exceed the three-year goals set by the CPUC. It is anticipated that the long-term savings will occur through the efforts of the Advanced Home Program and the Emerging Technology Program, although in the opinion of the TecMarket Team, both of these programs are underfunded.

New Program Characteristics

Some programs will have some risks associated with completely new ways to approach the market. For example, the Local Business Energy Efficiency Program contains a "Recognition Program" that provides a non-monetary recognition award to non-residential customers who increase their natural gas efficiency based on energy audit recommendations or knowledge gained through energy efficiency seminars and consultations. Savings are assumed with this effort, and evidence will be needed from monitoring and evaluation. Similarly, the On-Bill Financing Program is innovative and somewhat risky (e.g., defaults), and the costs and benefits need to be monitored, evaluated, and assessed for this program (independently from other programs).

New Technologies

Some programs will be advancing energy efficiency technologies to make them ready for the marketplace (e.g., the Advanced Home Program and the Emerging Technology Program). These programs are inherently risky, since many technologies are unable to cross the chasm from R&D into the marketplace. In recognition of this risk, a small amount of natural gas savings is at risk in these programs.

Barriers

Many of SCG's programs are directed towards addressing key program barriers by offering rebates, information, training, education, etc. These barriers are expected to remain, and therefore present a risk to the achievement of SCG's objectives. One barrier in particular is of concern: the split incentives in the multifamily sector (i.e., owners versus tenants) in investing in energy efficiency. Accordingly, there will be greater risk in the multifamily sector (e.g., the Residential Multifamily Energy Efficiency Retrofit Program), compared to other sectors.

Third-Party Bid Programs
This part of the SCG's portfolio is significantly unknown at this time. Essentially, SCG is placing a larger component of the portfolio into the competitive market without guarantees that it will be able to find service providers that can cost-effectively deliver services. Past experience has shown that there are effective third-party programs as well as programs that need improvements to be cost-effective, thus risk increases.

Partnership Programs
SCG has fewer resources in partnership programs than the other IOUs, however, the success of these programs often hinge on the ability of the partner to acquire cost-effective savings. While partnership programs can look good in the design stage, in practice they often have implementation issues that work to lower the amount of energy that can be acquired through these programs. However, if they are effectively directed, managed and operated, partnership programs can expand the effects of the portfolio. Again, those unknowns increase portfolio risk.

Statewide Marketing and Outreach and Other Information Programs
The Statewide Marketing and Outreach program in particular, and similar programs in general, are a significant risk. It is a high-budget program being funded without a solid understanding of what types of messages and promotional events are successful at not just informing, but in causing action to be taken. Past evaluations have not addressed these issues well. This program is a significant unknown in terms of its ability to increase energy savings directly or indirectly. Funding seems to be based on applied trust that it will directly or indirectly accomplish some level of energy savings across all sectors, without supporting documentation that this relationship is real.

Program-Specific Risks
The above discussions of risks focus on selected key areas of risk. However, there are also risks associated with one or more programs offered within the SCG portfolio. These program-specific risks are presented in the program-specific review tables provided at the end of this chapter. The reader is encouraged to review these program-specific risks in addition to the more general or crosscutting risks discussed above.

Comprehensiveness and Lost Opportunities – SCG

SCG's program portfolio is more limited than other utilities, since SCG's focus is on attaining natural gas savings. After careful review, we only noted a few areas of potentially lost opportunities, mainly related to specific technologies:

1. The Single Family Home Energy Efficiency Retrofit Program does not include motors (since it is a gas program). However, consideration of providing incentives to promote electro-commutated motors (ECM) on furnaces (fans) saves electricity both in the summer and in the winter (for locations with heating). It is possible that a lost opportunity exists in not promoting more efficient ECM furnaces. A cost-effectiveness analysis is recommended for determining if it is cost-effective to include more efficient condensing furnaces (92 percent AFUE and above) in this program.
2. The Residential Multifamily Energy Efficiency Retrofit Program does not include clothes washers. Renters and owners use clothes washers in these buildings (especially if condos and duplexes are included, but also in apartment units and common areas), and studies

have shown this measure to be very cost-effective (and even more cost-effective if one includes water savings and other non-energy benefits).

3. The Residential Multifamily Energy Efficiency Retrofit Program may be missing opportunities in boilers: (a) boiler resets and cutoffs, and (b) new high efficiency modulating boilers for small applications, or chained for larger applications. Although these measures are used throughout the country, a cost-effectiveness analysis is recommended for determining if these measures should be included in this program for this service territory.

Evaluation Considerations

Based on our review of the SCG portfolio, we believe that there is a strong need for a comprehensive and high quality evaluation (both impact and process evaluation) of SCG's programs in the next three years, for the following reasons:

- Natural gas savings have not received as much attention from the evaluation community as electricity savings.
- Many of the proposed programs are new or significant modifications of past programs (especially, the partnership and third-party (bid) programs). Thus, past evaluations of past programs may not be relevant for this new era.
- The documentation for many measures was not available, making the evaluation effort even more important.
- Most of SCG's programs have not undergone an evaluation. As noted in the last row of the table of SCG programs in the following section, ("Past Experience/Evaluations") we could only find the following evaluations that may be relevant for the next three years (based on CALMAC website):
    1. Evaluation of the 2003 Express Efficiency Program
    2. Evaluation of the 2002 Savings by Design Program
    3. Codes and Standards White Paper (2005)
    4. Evaluation of the 2002 Statewide Emerging Technologies Program
- Many of the assumptions used in the calculation of energy savings are based on old data (10-15 years old): e.g., NTG ratio, hours of occupancy, and pre-codes and standards requirements.

As part of the evaluation effort, we also recommend the following:

1. Periodic updating of the potential studies in all sectors (residential, commercial, industrial, and agricultural).
2. Development of a data dictionary that all users can access for information on definitions of measures, baselines, energy savings, costs, and references.
3. Market-based evaluations to see how specific markets are changing, some of which may be due to the IOU programs.

Bidding and Third-Party Issues – SCG

There was not enough information to assess this aspect of the portfolio.

Partnership Program – SCG

There was not enough information to assess this aspect of the portfolio.

Policy Issues – SCG

Residential New Construction

The four utilities have taken different approaches to Residential New Construction. SCG has decided to eliminate its Residential New Construction program – instead, it has its Advanced Home Program, with a budget of $335,000.

> "The Advanced Home Program promotes residential new construction with a crosscutting focus to sustainable design and construction, green building practices and emerging technologies. Additionally, the program supports efficient heating, cooling, water heating system and building envelope design and installation. Through a combination of education, design assistance and financial support, the program works with the building and related industries to exceed compliance with the California Building Energy Efficiency Standards (Standards), to prepare builders for future changes in the Standards and to create future pathways to go far beyond compliance and traditional energy savings objectives. The program will interact on a statewide basis to share best practices but will be implemented locally by the utility."

Given the concerns about cost-effectiveness of residential new construction programs and the need to focus on cost-effective programs, this change might be the preferred method for addressing residential new construction, however, the TecMarket Team suggests that this program be evaluated with attention paid to how well these types of programs help develop a growing market for energy efficient homes.

From observing the Public Advisory Group (PAG) process, it appears that there is a strong interest in having Residential New Construction programs at the utilities. An alternative to constantly scrutinizing this program for cost-effectiveness is to combine it with related programs that are designed to attack the same market. New Construction or Advanced Homes programs could be integrated with other programs, such as the Emerging Technologies Program, Codes and Standards Program, and Sustainability programs in order to establish a strategic initiative that is specifically designed to provide cost-effective long-term savings through adding innovations to a large dissemination program, and eventually to code changes. In that way, the efforts are strategically designed and would meet the criteria of actually being run to produce long-term cost-effective savings. Even then, the program that helps disseminate the technological improvements may need to be larger than that supportable by the current budget..

Conclusion

We offer the following conclusions from our review of the SCG portfolio:

- The SCG portfolio will just meet the goals set out by the CPUC.
- In general, there should be little risk in meeting these savings, since most of the programs will be expansions of previous utility or statewide programs.

- If one significant program is not cost-effective, it is possible that the entire portfolio may not be cost-effective (i.e., TRC < 1).
- The substantial increase in budgets, partnerships, and the use of third parties will present a major challenge that this utility will need to overcome, and that will require comprehensive and high quality monitoring and evaluation.

Program-Level Assessment – SCG

This section of the report presents the program-specific assessment information and issue discussions that were identified during the portfolio review effort. The issues reviewed are presented in the left-most column of Table 61, each subsequent column represents a specific program, allowing the reader to see if the review team determined there to be a issue associated with a specific program, and to understand the review team's perspectives associated with each issue.

Table 61. SCG – Program Specific Summaries

SCG	Single Family Home Energy Efficiency Retrofit Program	Residential Multifamily Energy Efficiency Program	Home Energy Efficiency Survey
Short Description	Continuation & expansion of statewide (SW) SF rebate program for natural gas measures.	Continuation & expansion of SW MF rebate program for natural gas measures.	Continuation of HEES Mail-In, On-Line and In-Home audits. Added install of low-flow showerheads with In-Home audits.
% of IOU Budget	10.7%	5.2%	1.0%
MWh	30,641.75	701.28	-
MW	12.73	0.42	-
Mtherms	5,604.07	4,113.66	-
TRC	1.42	1.37	-
Assessment of Cost Effectiveness	Cost-effective previously and this is expansion and looks likely to be cost-effective (probably beyond conservative TRC provided here).	Cost-effective previously. Yet, this is expansion but still looks likely to be cost-effective (probably beyond conservative TRC provided here).	
Results Reasonable & Achievable	Most likely given expansion of tried and true program.	Most likely given expansion of tried and true program.	Information only program, but some savings are expected.
Design & Delivery	Uses point of sale (POS) rebates (where possible).	Expansion of current effort. Includes outreach and incentives to distributors, contractors, and others for MF installation. Includes utility program staff outreach liaison with large property managers and other actors in this market to expand program effort.	Continuation of current effort. Multilingual surveys marketed for Mail-In. Marketing of On-Line from web site and others, In-Home available upon request.
Markets Targeted	Residential retrofit and rebates also available for residential new construction.	Multifamily retrofit and new construction.	Residential, hard-to-reach, and customer usage inquiries and complaints.
Lost Opportunities	1. Uses 90% and above AFUE furnaces. Like to see consideration & cost effectiveness analysis of 92% AFUE and above (condensing furnace). 2. Though a gas program, consideration for ECM motor on Furnaces would be ideal to see if cost effective given summer peak savings opportunities.	1. Test whether offering clothes washers cost-effective. Many units may have these and have been found to be a significant opportunity in program in other states. 2. Have they tested whether boiler resets and cut-offs are a cost-effective opportunity?	
Risks	Continuation makes this relatively low risk with the greatest risk being the significant increase in expenditures over prior efforts.	Continuation of successful effort helps to lower risk. Nevertheless, this market is always a tough market given split incentives. With expansion and incentives at multiple levels, need to monitor continued effectiveness and ensure no double-counting of savings	
Other Issues	Glad to see Tier II Clothes Washers and Tier II Dishwashers (assumed given description) included.		Added tracking of customer adoption. Could lead to savings claims which would need review and support from evaluation efforts.
Past Experience/ Evaluations	Could not find evaluation study of this program on CALMAC website.	Could not find evaluation study of this program on CALMAC website.	Could not find evaluation study of this program on CALMAC website.

SCG	Statewide Nonresidential Express Efficiency Program	Local Business Energy Efficiency Program (BEEP)	SoCalGas/Edison Joint Savings By Design (SBD) Energy Efficiency Program Plan
Short Description	Continuation & expansion of SW Exp. Eff. Program and collapsed SW Nonres Audit into it.	Additional non-residential rebate effort for measures not covered in Express program.	Based on prior SBD effort, funds gas measures with electric measures by SCE, whole building and systems approach
% of IOU Budget	12.1%	14.7%	4.1%
MWh	-	-	-
MW	-	-	-
Mtherms	11,409.12	18,081.00	5,291.47
TRC	1.96	2.89	1.71
Assessment of Cost Effectiveness	Cost-effective previously. Yet, this is expansion and including audit lowers cost effectiveness, but still looks likely to be cost-effective.	Probable.	Based on tried and true program. But tougher with new Title 24. (Note SCG paying $0.49/therm while SDG&E paying $1/therm but SCG has 1.24 TRC and SDG&E TRC only 0.77.)
Results Reasonable & Achievable	Looks solid given expansion of tried and true program.	Probable. Industrial process is not really known what will be done but reach is conservative in this area.	The evaluation of the SBD program only examined electricity savings. Hopefully, the results will be achievable.
Design & Delivery	Long standing program known by larger customers and promoted by vendors. Outreach for promotion by vendors, contractors, distributors, and mfg. Added more outreach, use of CBOs and FBOs, incentives for bldg owners, ability for On-Bill Financing pilot, and small grass-roots outreach in rural areas. Includes bulk purchase initiative.	Direct promotion by utility reps. Rebate effort based on outreach for promotion by vendors, mfg, distributors, contractors. Includes new Grant effort to encourage innovative projects from largest customers.	Program works early with projects, architect, designers, workshops, education to encourage whole bldg approach.
Markets Targeted	Nonresidential retrofit.	Nonresidential retrofit.	New Nonresidential Construction
Lost Opportunities	Appears solid.		
Risks		Greatest risk is with savings assumed from new award recognition effort. Need evidence for this through monitoring and evaluation.	
Other Issues	Added $25,000 cap for Green House Curtains as this measure has been known to deplete budget previously and savings may still be gained. On-line reservations of rebate funds in multiple languages offered.	Mostly includes gas cooking measures and some industrial (kiln and processing misc). Do not understand that if these are cost-effective, why are they not in the SW Express Efficiency.	
Past Experience/ Evaluations	Evaluation of 2003 Express Efficiency Program available on CALMAC web site. In 2003, SCG achieved a savings of 4,511 Mtherms (209% above CPUC goal). SCG attributed program success to greenhouse curtains and thermostats: 85% of therm savings. Also, boiler sales decreased in 2003, as the market for C/I boilers was saturated and customers went to third parties offering higher rebates.	Could not find evaluation study of this program on CALMAC website.	Could not find evaluation study of this program on CALMAC website. There is an evaluation of the 2002 Savings by Design Program on the CALMAC website. Average NTG is .60 for 1994-2002 period.

SCG	SoCalGas/Municipal Electric Utility Collaborative Savings By Design Energy Efficiency Program Plan	Sustainable Communities-Santa Monica Demonstration Program	Advanced Home Program
Short Description	Based on prior SBD effort, funds gas measures with elect by munis, whole building and systems approach	Joint effort for more efficient and sustainable communities that include efficiency, transportation, gray water use etc.	Demonstration projects of new homes with sustainable design, green building, and emerging technologies.
% of IOU Budget	1.6%	0.5%	4.8%
MWh	-	-	5,634.52
MW	-	-	6.18
Mtherms	3,016.65	-	220.45
TRC	2.10	-	0.70
Assessment of Cost Effectiveness	Based on tried and true program. But tougher with new Title 24.		Demonstration projects - passing TRC not required.
Results Reasonable & Achievable	The evaluation of the SBD program only examined electricity savings. Hopefully, the results will be achievable.		Should be achievable, although the budget is not large.
Design & Delivery	Program works early with projects, architect, designers, workshops, education to encourage whole building approach.	SCG funding includes a 250 kW fuel cell.	Joint effort with SCE, working with builders, mechanical engineers, and other market actors
Markets Targeted	New Nonresidential Construction		Residential new construction and proving alternative systems for future code compliance.
Lost Opportunities			
Risks		Cost-effectiveness of sustainability efforts in terms of only energy savings could be difficult.	Not cost-effective energy gains - but with reasonable investment, a logical part of advancing technologies to make market ready and move market-ready technologies. Could help gain efficiency notice with ability to sell sustainability - need to test cost effectiveness doing so for energy gains.
Other Issues		No savings listed in Portfolio table but Program Concept papers lists 5.5 Mtherm.	
Past Experience/ Evaluations	Could not find evaluation study of this program on CALMAC website.	Could not find evaluation study of this program on CALMAC website.	New program. Could not find evaluation study of this program on CALMAC website.

SCG	Statewide Crosscutting Codes and Standards	Statewide Emerging Technologies	Energy Efficiency Education & Training Program
Short Description	Support efforts for increasing Codes & Standards in the future.	Continuation and expansion of Statewide Emerging Technology: Assessment and Information Transfer & the Emerging Technology Coordinating Committee	Info only effort Statewide - includes physical & virtual energy centers
% of IOU Budget	0.5%	1.6%	1.6%
MWh	-	-	-
MW	-	-	-
Mtherms	-	-	1,145.00
TRC	-	-	0.80
Assessment of Cost Effectiveness			This type of program usually does not result in "credited savings" and are not expected to be cost effective.
Results Reasonable & Achievable			Not sure if savings should be credited in this type of program - CPUC decision needed.
Design & Delivery	Includes development of 12 Case Studies	Joint effort SW & with CEC PIER to test product, demonstrations, work with EPRI, GRI, CIEE, ARI, ASHRAE and others. 18 new technology assessments to be conducted.	Includes: food service kitchen design, mobile industrial education, BOC, NATE cert.
Markets Targeted	New construction, replacement equipment	Energy product, equipment, related advanced R&D and beginning commercialization.	Commercial and industrial, restaurants, bakeries, office bldgs
Lost Opportunities			
Risks		Inherent risks in emerging tech just like R&D, but then should assess how commercialized so the "winners" more than cover the "losers".	Difficulty in finding right level & type of investment to provide leverage and growth for portfolio while not driving down current cost-effectiveness.
Other Issues	This looks like an important component of the portfolio that builds on past success from PG&E efforts to change codes in a way that provides significant savings. If savings are to be counted for this program, this may be a program in which more resources are placed.	A key question is if the program or the ETCC have the ties to the industry that are needed to move technologies into production and distribution. Increased investment, difficult to conduct meaningful evaluation of benefit/cost of investment though this investment though this needs to be well examined.	Savings associated with Industrial User Workshops (represents 2% of portfolio goal). We are unable to verify if savings are reasonable at this time. More information is necessary.
Past Experience/ Evaluations	Codes and Standards White Paper on CALMAC website, showing how savings from Codes & Standards Program could be counted in 2006 and beyond.	NYSERDA recently developed/conducted value/cost methodology for assessing R&D investments. An evaluation of the 2002 Statewide Emerging Technologies Program is on the CALMAC website.	Could not find evaluation study of this program on CALMAC website.

SCG	On-Bill Financing Program	SoCalGas Energy Efficiency Portfolio Marketing & Outreach Program	SoCalGas Energy Efficiency Collaborations
Short Description	Pilot test of on-bill financing for efficiency investments to compliment other programs.	Additional marketing effort but also appears to include program processing costs.	The Collaborations are not yet being defined for SCG. These will be designed and negotiated after the third party competitive bid programs.
% of IOU Budget	2.1%	3.3%	6.6%
MWh	-	-	-
MW	-	-	-
Mtherms	-	-	-
TRC	-	-	-
Assessment of Cost Effectiveness			
Results Reasonable & Achievable	Could assist in greater adoption through other programs. Yet, needs to be monitored, evaluated and assessment separately and with other efforts to ensure proper investment.	Additional marketing is fine as along as proven helpful to Portfolio and doesn't drag down overall TRC too much.	
Design & Delivery		On-Line Outreach, Umbrella Advertising, Grass Roots Outreach. Includes many Peer Review Group (PRG) recommendations for new homebuyer "Welcome" packet, purchasing plan for residential & small businesses, CBO/FBO use, and advertising. The whole is bigger	
Markets Targeted		Residential, small business, rural communities.	
Lost Opportunities			
Risks	The costs and benefits need to be monitored, evaluated and assessed for this program (independently from other programs).		Not enough information to assess until final plans included.
Other Issues		Appears to include program processing costs which may mean program TRCs are inflated but not included these program expenses.	
Past Experience/ Evaluations	New program. Could not find evaluation study of this program on CALMAC website.	Could not find evaluation study of this program on CALMAC website.	Could not find evaluation study of this program on CALMAC website.

SCG	Third Party Programs	Energy Efficiency Delivery Channel Innovation Program
Short Description	14 Topic areas for 3rd party RFPs	
% of IOU Budget	18.5%	1.6%
MWh	-	-
MW	-	-
Mtherms	-	-
TRC	-	-
Assessment of Cost Effectiveness		
Results Reasonable & Achievable		
Design & Delivery	1. Affordable Housing 2. Mfg/Mobile Home 3. Mid & Upstream central furnace & duct test/repair 4. Advanced Home Remodeling 5. Res School-Based Efficiency 6. Foodservice Equip replace for small with older but more effic. 7. Small/med Industrial process	Targets CEOs with information about energy efficiency. Works with California Climate Registry to identify organizations interested in energy efficiency. Works closely with retailers, focusing on instant rebates. Leverages community and faith based organizations to increase energy efficiency. Uses email, direct contact, and other mass market approaches. Takes a customer lifecycle approach.
Markets Targeted	8. Comprehensive Coin-Op Commercial Clothes Washer Replacement 9. Comprehensive up/mid/down water heater replacement 10. Future ee and produc 11. EE Finance Kiosk 12. EE Equipment Exchange 13. EE Ethnic Outreach 14. Natural Gas A/C Replacement	Targets consumers and upstream/midstream actors in the residential, nonresidential, new construction, and partnershiops/collaborations segments.
Lost Opportunities		Not addressed.
Risks	Not enough information to assess until bids are in and accepted.	Not too risky.
Other Issues		
Past Experience/ Evaluations	Could not find evaluation study of this program on CALMAC website.	New program. Could not find evaluation study of this program on CALMAC website.

Appendix A. Review of DEER and Non-DEER Energy Saving Estimates

This appendix is provided as supplementary information on the methodology used to review DEER and Non-DEER energy savings estimates provided by the utilities. In addition, it provides summary findings from the review of those savings estimates across all of the utilities.

Review of DEER Energy Savings Estimates

The information provided in the "measure lists" of the workbooks filed by the utilities on June 1, 2005, were used to identify the source for estimating per unit energy savings. For most of the utilities, only a small portion of their savings, in their primary fuel type, were estimated with reference to DEER (Table 62).

Table 62. Statewide – DEER Energy Savings Estimates

IOU	Number of Measures	% of Measures	Percent of IOU Savings		
			kWh	Therms	kW
PGE	123	22%	43%	12%	35%
SCG	16	7%	85%	12%	68%
SDG&E	148	26%	51%	7%	45%
SCE	352	17%	15%		27%

All of the measures that were estimated using DEER were reviewed for accuracy and consistency with the DEER 2005 Database. The DEER data was downloaded format from http://www.rtf.nwppc.org/deer2005/# on May 13, 2005.

In the "measure list" tables of the utility workbooks, the "Measure ID" was typically a match with the "RUNID" field in the DEER data. In some cases averages across the DEER "Measure ID" were used instead of the more specific "RUN ID". Comparisons of the utility estimate and DEER estimate were made based on the information available in the filed workbooks. For example, if the utility noted that they used an average for all DEER refrigerators, the evaluation team attempted to replicate their calculations for a valid comparison.

The majority of the energy savings that were estimated with DEER, do logically match with the DEER database. Based on the available information, it looks like the utilities as a whole have been more conservative than DEER in estimating their kWh savings, but given the uncertainty in some of the relationships of the utilities' per unit savings estimates with those in DEER it is difficult to say.

Table 63. Statewide – Result of DEER Measure Savings Estimate Review (kWh)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kWh)	% of Portfolio Savings	DEER Estimated Savings (kWh)	% Difference
-	OK	1,540,841,755	21.1%	1,540,841,755	0.0%
- Total		1,540,841,755	21.1%	1,540,841,755	0.0%
Over	Close Enough	385,435,432	5.3%	377,904,504	2.0%
	Not Above Code	23,983,645	0.3%	4,327,667	454.2%
	Not Clear	76,974,172	1.1%	54,272,348	41.8%
	Not in DEER	560,510	0.0%	0	100.0%
	OK	8,915,772	0.1%	8,915,761	0.0%
	Not Above Code and Units*	494,734	0.0%	-5,192,750	-109.5%
Over Total		496,364,265	6.8%	440,227,531	12.8%
Under	Close Enough	22,796,430	0.3%	24,113,291	-5.5%
	Not Clear	79,431,753	1.1%	285,747,945	-72.2%
	OK	65,586,887	0.9%	65,587,275	0.0%
	Program Savings Estimate	29,412,654	0.4%	1,740,909,429	-98.3%
	Units	26,762,872	0.4%	1,129,679,498	-97.6%
Under Total		223,990,597	3.1%	3,246,037,438	-93.1%
Grand Total		2,261,196,618	30.9%	5,227,106,725	-56.7%

% Difference = [Utility - DEER] / DEER Estimate
Net Energy Savings = Utility Estimate * NTG * Number of Units Installed 2006–2008
DEER Estimated Savings = DEER Estimate * NTG * Number of Units Installed 2006–2008
*Three window measures cited by SCE showed negative kWh savings in DEER, there also appeared to be a problem with the comparability of units from SCE's workbook and DEER.

Only 11 percent of the statewide IOU portfolio's therm savings were estimated using DEER. A little over half of them were overestimated and a little under half were underestimated compared to DEER, and had unclear relationships to DEER or the utility and DEER units were not comparable.

Table 64. Statewide – Result of DEER Measure Savings Estimate Review (Therms)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (Therms)	% of Total Portfolio Savings	DEER Estimated Energy Savings (Therms)	% Difference
-	OK	539,878	0.5%	539,878	0.0%
- Total		539,878	0.5%	539,878	0.0%
Over	Not Clear	6,310,023	6.0%	4,678,809	34.9%
	Not in DEER	673,675	0.6%	0	
Over Total		6,983,698	6.6%	4,678,809	49.3%
Under	Close Enough	540	0.0%	564	-4.3%
	No Utility Estimate	0	0.0%	77,744	-100.0%
	Not Clear	147,157	0.1%	78,658,192	-99.8%
	OK	46,716	0.0%	46,770	-0.1%
	Units	4,283,223	4.1%	320,029,534	-98.7%
Under Total		4,477,636	4.2%	398,812,804	-98.9%
Grand Total		12,001,212	11.4%	404,031,491	-97.0%

For the kW savings, about 31 percent of the portfolio's demand savings claimed to be estimated using DEER. Unfortunately, the majority of these demand savings estimates did not have a clear relationship with DEER.

Table 65. Statewide – Result of DEER Measure Savings Estimate Review (kW)

Utility Over/Under Estimated	Reason for Difference with DEER	Net Energy Savings (kW)	% of Total Portfolio Savings	DEER Estimated Energy Savings (kW)	% Difference
-	OK	109,766	4.8%	109,766	0.0%
- Total		109,766	4.8%	109,766	0.0%
Over	Close Enough	1,648	0.1%	1,628	1.2%
	Not Above Code	8,225	0.4%	1,722	377.5%
	Not Clear	531,202	23.5%	176,584	200.8%
	Not in DEER	6,053	0.3%	0	100.0%
	Units	7	0.0%	1	616.5%
Over Total		547,134	24.2%	179,935	204.1%
Under	Close Enough	2,345	0.1%	2,351	-0.2%
	No Utility Estimate	51	0.0%	215,842	-100.0%
	Not Above Code	275	0.0%	4,709	-94.2%
	Not Clear	28,059	1.2%	423,404	-93.4%
	Units	12,537	0.6%	1,281,813	-99.0%
Under Total		43,268	1.9%	1,928,119	-97.8%
Grand Total		700,168	30.9%	2,217,820	-68.4%

Review of Non-DEER Energy Savings Estimates

The information provided in the "measure lists" of the workbooks filed by the utilities on June 1, 2005, were used to identify the source for estimating per unit energy savings. For most of the utilities, the majority of their savings in their primary fuel type were estimated without reference

to DEER (see Table 66). In some cases, independent engineering evaluation or other reference documents were cited. All estimates that were not related to DEER were supposed to be documented in "workpapers" filed by each utility and should have been easily referenced for measure review. Unfortunately, it was these estimates were not clearly linked to documentation, and in reviewing the documentation, the savings calculations and assumptions used for these energy savings estimates were difficult to decipher, even with the provision of additional documentation from the utilities.

Table 66. Statewide – Non-DEER Energy Savings Estimates

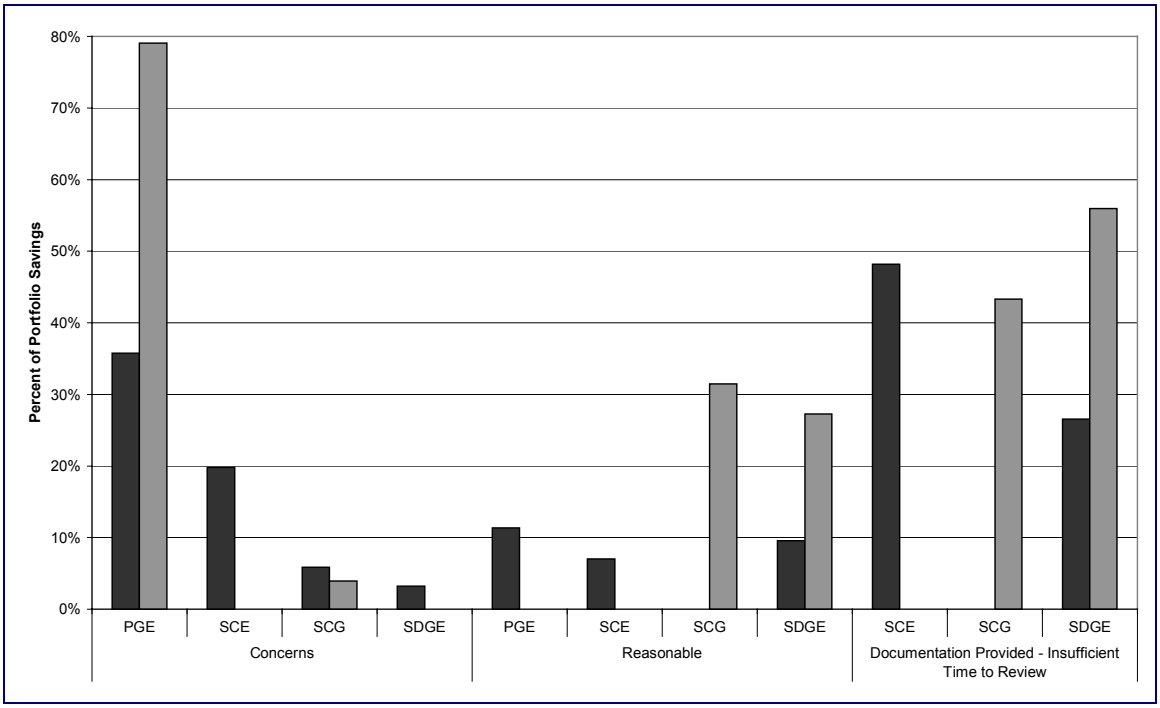
IOU	Number of Measures	% of Measures	Percent of IOU Savings		
			kWh	Therms	kW
PGE	441	78%	57%	88%	65%
SCG	217	93%	15%	88%	32%
SDG&E	431	74%	49%	93%	55%
SCE	1,670	83%	85%		73%

In lieu of reviewing all of the measures that were not DEER related, the team reviewed a portion of measures that made up the bulk of the remaining energy savings not accounted for with DEER. For example, of PGE's total estimated energy savings (based on the measure list data) 43 percent of the kWh savings were based on DEER estimates, while 57 percent of the kWh savings were not related to DEER. For the review of the Non-DEER estimates, we selected measures that represented 47 percent of the total energy savings, adding that to the 43 percent of DEER estimates, we attempted to review 90 percent of the portfolio's energy savings estimates.

Since the measure names are very specific for most of the utilities, this methodology had the effect of identifying multiple measures that individually to not make large contributions to the portfolio, or they cover a wide range of measures in a specific program. For example, "Lighting" or "HVAC" in the Standard Performance Contract program. This presents the additional problem of the difficulty of reviewing a "measure" that actually represents a whole program. Residential measures are also less likely to show up in this list, because of their small individual contributions to the portfolio's savings. Regardless, this review of measures still covers the bulk of the energy savings found in the portfolio.

The measures were organized by measure name and sorted by their percent contribution to the total portfolio, the workpapers were identified, and reviewed. In Figure 1, a high level review of the Non-DEER measure estimates is presented, by utility and general accuracy of the estimate. In cases where the documentation was not available, measure savings were categorized as "No Documentation". Measures savings estimates that appeared "Reasonable" were based on review of the available documentation and the experience of the evaluation team reviewers. Similarly measure savings estimates that caused "Concerns" were based on review of the available documentation and the experience of the evaluation team reviewers.

Figure 1. Statewide – Overview of Non-DEER Energy Savings Estimates



Since therm savings (shown in gray) were most commonly not estimated using DEER, these savings still make up a substantial savings that come under question. Several utilities still present concerns with how they estimated their kWh savings, either because of a lack of documentation or the clarity of the assumptions or calculations used.

Review of the measures that represented specific concerns are noted in Table 67.

Table 67. Statewide – Comments on Measures that Present Concern

Utility	Energy Type	Measure Name	Program	Workpaper Citation	Comments
SCG	kWh	316009-Single Family, Maximum Cooling Capacity, CZ 10	EED4-Advanced Home Program	See "Advanced Home Workpapers.xls" and "Advanced Home Measure Potential Study.doc"	As stated in workpapers, maximum sizing calculation is required by Title 24; how is this measure proposing to do better than what is required and for what amount of savings?
SCG	kWh	316012-Single Family, Maximum Cooling Capacity, CZ 15	EED4-Advanced Home Program	See "Advanced Home Workpapers.xls" and "Advanced Home Measure Potential Study.doc"	As stated in workpapers, sizing, duct sealing required by Title 24; no program reportable savings
SCG	Therm	312015-Gas Wtr Htr and/or Boiler Controller Digital Graphing (>= 20 units)	MFR4-Multi-Family Rebate Program	See Excel workbook "MFRCPNov26.xls".	I reviewed the Excel file and could not find the measure
SCG	Therm	312014-Gas Wtr Htr and/or Boiler Controller Non-Digital Graphing (>= 20 units)	MFR4-Multi-Family Rebate Program	See Excel workbook "MFRCPNov26.xls".	I reviewed the Excel file and could not find the measure
SDGE	kWh	234067-Refrigeration - Food Service -Auto Closer for Main Cooler Doors And 234068-Refrigeration - Food Service -Auto Closer for Main Freezer Doors	SBS-Small Business Super Saver	See "Express and SBS Workpapers.pdf" Page Exp-146	This measure has concerns: 1) The savings calculation for closers uses an ASHRAE base case that is impractically high. 2) Average walk-in may not have sufficient capacity to meet the calculated additional load, thus over-predicting energy use. 3) The door open fraction time was assumed to be 25% of the not-in-use hours, with no study references; this is greater than casual observations and experience would indicate; it is also greater than the 3 hours referred to for the strip curtains measure and extended periods of open door operation would result in a frosted over evaporator coil, resulting in less not greater consumption. Many freezers have door switches which inhibit the refrigeration unit from operating when the door is open, and supermarkets often have temperature alarms that indirectly indicate a door has been left open. M&V is needed to establish actual savings, if any, for this measure.
SDGE	kWh	234071-Refrigeration - Glass or Acrylic Doors-Medium Temperature Case	SBS-Small Business Super Saver	See "Express and SBS Workpapers.pdf" Page Exp-122	This measure has concerns: 1) The assumptions used for the display case load reduction calculations are not referenced. 2) The load used for one display case base is the manufacturers design load value used for selecting compressors; the actual average hourly load seen by the compressors will be less. 3) A 5,700 EFLH assumption is used; this value is not documented with a reference and will vary greatly based upon store location, refrigeration equipment mix and controls. Similarly, the compressor power assumption uses 95 F condensing, whereas this will also very by location, refrigeration equipment and controls. 4) The analysis does not address other equipment changes that may be required to implement this equipment measure to get a resultant compressor power reduction; other system components and controls may have a very large influence on actual savings. M&V is needed to establish actual typical savings.

Utility	Energy Type	Measure Name	Program	Workpaper Citation	Comments
PGE	Therm	Water Ht/Furnace/Boiler-NC-G Process-NC-G HVAC/AC-NC-G	AG & FOOD PROCESS FAB PRO H IND AG & FOOD PROCESS	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: 1) The workpapers state "DOE2 computer simulation if applicable, or project specific engineering analysis is used for New Construction projects." No additional documentation is supplied. 2) It is expected, however, that these measures are part of the statewide Saving By Design (SBD) Program and will follow the same savings calculation requirements as outlined in the other IOU filings. However, none of the IOU filings have specific documentation on a "process" measure for SBD and how savings calculation will be done. 3) More specific documentation is needed on "project specific engineering analysis is used for New Construction projects."
PGE	Therm	Process-RETRO-G HVAC/AC-RETRO-G Water Ht/Furnace/Boiler-RETRO-G Water	AG & FOOD PROCESS FAB PRO H IND AG & FOOD PROCESS	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: The workpapers state "For retrofit projects, PG&E provides estimating software that calculates energy savings based on site-specific information, or, if not applicable, other accepted engineering calculation procedures are used." Review of the SPC estimating software seems to indicate that incentives are calculated based upon modified assumptions and methods from the Express Efficiency workpapers; however, no documentation could be located that explains how the software does its calculations or how the Express Efficiency workpapers' methods may have been enhanced or augmented.
PGE	Therm	Duct Test and Sealing CZs 2, 4, 11, 12 & 13	Mass Market	2006-2008 residential deemed measure workpapers.xls	Use of DEER is reasonable, but assumption to target 150% of DEER savings is not reasonable: DEER assumption is for leakage (36% total leakage to outside - equiv. to about 54% total leakage) more than 150% higher than LBNL reported average leakage in CA homes (Sherman 2001/Jump 1998, 22% total leakage to outside with ~32% total leakage) with leakage reduced by two-thirds by DEER EEM; it is not explained how the program could target homes with 225% of the average leakage and seal 80% of all leaks in those homes - that level of average leakage reduction has not been shown to be possible even if these 225% of average cases could be identified. This issue is common throughout all the IOU filings for duct sealing measures and may overestimate savings by as much as a factor of two. Note that utility programs report total leakage measurements before and after sealing; the important measurement is total leakage to outside which LNBL reports, for CA homes, averages between 66% and 75% of total leakage, thus programs need to begin requiring the measurement of this more meaningful data. It is noted that other similar measures within PG&E and other IOU portfolios use a cooling savings percentage of 18% for this measure, based upon older studies; it should be noted that most of those studies perform duct sealing and insulation and the citations are using the these combined savings reported for short term measurements or are estimated not measured. M&V work is needed to better establish the typical leakage to outside before/after conditions and energy savings for this measure.

Utility	Energy Type	Measure Name	Program	Workpaper Citation	Comments
PGE	Therm	Gas Furnace - 90 AFUE	Mass Market	2006-2008 residential deemed measure workpapers.xls	This measure has the following concerns: 1) For "Energy Star Gas Furnaces with 90 AFUE": source of the assumptions for PG&E's UEC of 388 therms is not documented. 2) DEER is referenced, but this value cannot be duplicated from citation and appears high compared to DEER reference. 3) Calculation is not clearly outlined by formula and seems to contain algebraic errors; unable to duplicate the value. 4) IMC of $716 may be low; $1,000 may be closer for current units and if an acid-proof flue and condensate line installation is needed. 5) "Variable Speed (VS) motor for furnace" studies cited to obtain a differential kW are not for similar units and may not be comparable for variable speed savings calculations. 6) The calculation uses the peak watts differential as the basis of savings. This peak wattage differential may be a by-product of the SEER 14 vs. SEER 16 rating of the different units, not the use of a VS motor and does not capture any effect of the VS operation of the motor in the calculation. 7) The hours of cooling operation and hours of heating operation are not documented and will vary by climate. 8) IMC of $120 may not reflect current unit pricing differential; $1,000 may be a more appropriate value.
PGE	Therm	Process Boiler - Steam	Mass Market	Non-Residential Workpapers.doc	No documentation on savings calculation methods; GAS WP.doc states " Measure data for cost effectiveness modeling have been developed based on average characteristics among customer participants in the SoCalGas Process Energy Consumption boiler measure (those units with efficiencies of 82+%) during PY 2001." No further documentation, references, calculation methods or data are provided.
PGE	kWh	Process-RETRO-E	AG & FOOD PROCESS FAB PRO H IND HI-TECH F	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: The workpapers state "For retrofit projects, PG&E provides estimating software that calculates energy savings based on site-specific information, or, if not applicable, other accepted engineering calculational procedures are used." Review of the SPC estimating software seems to indicate that incentives are calculated based upon modified assumptions and methods from the Express Efficiency workpapers; however, no documentation could be located that explains how the software does its calculations or how the express efficiency workpapers' methods may have been enhanced or augmented.
PGE	kWh	VSDs for HVAC Fans - 100 hp maximum	Mass Market	Non-Residential Workpapers.doc	This measure has the following concerns: 1) the calculation approach does not account for a wide range of building load profiles and their climate specific variation; 2) average fan power used may not represent current typical case; 3) average flow used may not represent current typical case; 4) factors used in the calculation, from 1991 study that is not supplied, may not be appropriate for current application; and 5) a more rigorous analysis should be performed using more current data, software and techniques.

Utility	Energy Type	Measure Name	Program	Workpaper Citation	Comments
PGE	kWh	Lighting-NC-E Lighting Controls-NC-E HVAC/AC-NC-E Refrigeration/ Appliances-NC-E Bldg Envelope-NC-E	AG & FOOD PROCESS FAB PRO H IND HI-TECH F LODGING F MEDICAL F OFFICE B RETAIL ST SCH & COLL	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: 1) The workpapers state “DOE2 computer simulation if applicable, or project specific engineering analysis is used for New Construction projects.” No additional documentation is supplied. 2) It is expected, however, that these measures are part of the statewide Saving By Design Program and will follow the same savings calculation requirements as outlined in the other IOU filings; if that is the case than there are no concerns on these measures; if that is not the case, further review may be needed.

Utility	Energy Type	Measure Name	Program	Workpaper Citation	Comments
PGE	kWh	HVAC/AC-RETRO-E	AG & FOOD PROCESS FAB PRO H IND HI-TECH F LODGING F MEDICAL F OFFICE B RETAIL ST SCH & COLL	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: 1) The workpapers state "For retrofit projects, PG&E provides estimating software that calculates energy savings based on site-specific information, or, if not applicable, other accepted engineering calculation procedures are used." Review of the SPC estimating software seems to indicate that incentives are calculated based upon modified assumptions and methods from the Express efficiency workpapers; however, no documentation could be located that explains how the software does its calculations or how the express efficiency workpapers methods may have been enhanced or augmented. 2) The specific concerns outlined below are an example of the problems seen with the Express Efficiency methods used; an initial review of other HVAC EEMs raises similar concerns not listed here. 3) The assumptions for the base and retrofit HVAC system (such as DX AC units and chillers) kW used to calculate the reduction in HVAC system demand, the operating hours used to estimate kWh reduction, and the coincident adjustment factors may not be appropriate. 4) The kW reduction calculation is of the form (kWr-kWb)* CDF, where: kWb and kWr are the base and retrofit system kW, and CDF is a coincident diversity factor. The energy savings calculation takes the form of (kW1-kW2)*EFLCH, where: kW1 and kW2 are as just mentioned and EFLCH is an equivalent full load cooling hours. The base system kWb and kWr used to calculate the reduction in HVAC system kW are based upon a ARI rated performance and do not take into account the wide variation in peak demand conditions in different climate zones. 5) The CDF alone is not a sufficient multiplier to adjust the rated kW for peak conditions at the selected location. 6) The coincident factors are also based upon old data that may not be representative of current building load profiles; the coincident factors are based on pre-1990 survey, not measurement with minor adjustments from very small sample telephone interviews. 7) If CDF in the SPC software are being modified by location, as they should, there is no documentation on how this was done and the source of the data. The equivalent full load cooling hours assumptions used do not seem to take into account climate variation. The EFLCH, instead, are based upon older data from the 1990's that may over- or under-estimate hours of use depending on the building type. If EFLCH in the SPC software are being modified by location and using the users specified operating hours, as they should, there is no documentation on how this was done and the source of the data. 8) A more rigorous analysis should be undertaken, based on current/future field monitoring M&V work, to update these values or base the SPC and express efficiency savings on a more accepted approach to calculations for the measures.
PGE	kWh	Process-NC-E	AG & FOOD PROCESS FAB PRO H IND HI-TECH F	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: 1) The workpapers state "DOE2 computer simulation if applicable, or project specific engineering analysis is used for New Construction projects." No additional documentation is supplied. 2) It is expected, however, that these measures are part of the statewide Saving By Design (SBD) Program and will follow the same savings calculation requirements as outlined in the other IOU filings. However, none of the IOU filings have specific documentation on a "process" measure for SBD and how savings calculation will be done. 3) More specific documentation is needed on "project specific engineering analysis is used for New Construction projects."

Utility	Energy Type	Measure Name	Program	Workpaper Citation	Comments
PGE	kWh	Lighting-RETRO-E	AG & FOOD PROCESS FAB PRO H IND HI-TECH F LODGING F MEDICAL F OFFICE B RETAIL ST SCH & COLL	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: 1) The workpapers state "For retrofit projects, PG&E provides estimating software that calculates energy savings based on site-specific information, or, if not applicable, other accepted engineering calculational procedures are used." Review of the SPC estimating software seems to indicate that incentives are calculated based upon assumptions and methods from the Express Efficiency workpapers. The assumptions for the base lighting system used to calculate the reduction in lighting system power, the operating hours used to estimate kWh reduction, and the coincident and interactive adjustment factors may not be appropriate as they are based on out-of-date data. 2) The kW reduction calculation is of the form (kWr-kWb)*DIE*CDF, where: kWb and kWr are the base and retrofit fixture powers, DIE is a demand interactive effects factor and CDF is a coincident diversity factor. The energy savings calculation takes the form of (kW1-kW2)*EIE*AOH, where: kW1 and kW2 are as just mentioned, EIE is a energy interactive effects factor and AOH is an annual operating hours. 3) The base system kWb used to calculate the reduction in lighting system power do not seem to take into account T24 requirements. For example, incandescent lamps and T12 fluorescent lamps with magnetic ballasts are often referred to as the base systems in the workpapers; these base case systems may not correctly account for the Title 24 requirements, that include minimum lamp efficacy and maximum watts/sqft requirements. 4) Title 24 efficacy requirements take effect upon replacement of fixture indoors or outdoors while the more restrictive watts/sqft requirements are triggered upon replacement of 60% or more of the fixtures in a space. It is likely that a significant fraction of all lighting retrofit projects should be using a Title 24 minimum efficacy or watts/sqft as the base rather than the existing customer system or other workpapers noted base systems. 5) The annual hours of operation (AOH) assumptions used do not seem to take into account recent M&V studies results (that were used to update similar calculations for these measures in DEER). The AOH, instead, are based upon older data from the 1990's that may over- or under-estimate hours of use depending on the building type. Additionally, identical AOH assumptions for CFL and non-CFL lighting are used; this is known to be significantly high for occupancy types that are major participants in the program; for example recent CFL studies for hotel rooms, offices and industrial buildings AOL for CFLs are significantly lower than those workpaper values. 6) The coincident and interactive factors are also based upon old data that may not be representative of current building load profiles and HVAC efficiencies; the coincident factors are based on pre-1990 survey, not measurement, data, and the interactive factors are based mostly upon pre-1995 small sample modeling data with minor adjustments from very small sample telephone interviews. 7) All these factors can be strongly dependent on climate; that effect is ignored in the analysis. 8) A more rigorous analysis should be undertaken, based on current/future field monitoring M&V work, to update these values.

Utility	Energy Type	Measure Name	Program	Workpaper Citation	Comments
PGE	kWh	Refrigeration/ Appliances-RETRO-E	AG & FOOD PROCESS FAB PRO H IND RETAIL ST	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: 1) The workpapers state "For retrofit projects, PG&E provides estimating software that calculates energy savings based on site-specific information, or, if not applicable, other accepted engineering calculational procedures are used." Review of the SPC estimating software seems to indicate that incentives are calculated based upon modified assumptions and methods from the Express Efficiency workpapers; however, no documentation could be located that explains how the software does its calculations or how the Express Efficiency workpapers' methods may have been enhanced or augmented. 2) For specific concerns on a subset of the refrigeration measure calculations used for Express Efficiency and the basis of the SPC software, see comments in this table on: "Strip Curtains for Walk-ins", "Main door Cooler Door Gaskets", "New Refrig Display Case with Doors - Low Temp", "" and "Insulate Bare Suction Pipes."
PGE	kWh	Lighting Controls-RETRO-E	AG & FOOD PROCESS FAB PRO H IND HI-TECH F LODGING F MEDICAL F OFFICE B RETAIL ST SCH & COLL	2006-2008 Calculated Workpapers.xls	This measure has the following concerns: The workpapers state "For retrofit projects, PG&E provides estimating software that calculates energy savings based on site-specific information, or, if not applicable, other accepted engineering calculational procedures are used." Review of the SPC estimating software seems to indicate that incentives are calculated based upon modified assumptions and methods from the Express Efficiency workpapers; however, no documentation could be located that explains how the software does its calculations or how the express efficiency workpapers methods may have been enhanced or augmented.
PGE	kWh	Bldg Envelope-RETRO-E	AG & FOOD PROCESS FAB PRO H IND HI-TECH F LODGING F MEDICAL F OFFICE B RETAIL ST SCH & COLL	2006-2008 Calculated Workpapers.xls	This measure has the following concerns. The workpapers state "For retrofit projects, PG&E provides estimating software that calculates energy savings based on site-specific information, or, if not applicable, other accepted engineering calculational procedures are used." Review of the SPC estimating software seems to indicate that incentives are calculated based upon modified assumptions and methods from the Express Efficiency workpapers; however, no documentation could be located that explains how the software does its calculations or how the express efficiency workpapers methods may have been enhanced or augmented.

Utility	Energy Type	Measure Name	Program	Workpaper Citation	Comments
PGE	kWh	Strip Curtains for Walk-ins	Mass Market	Non-Residential Workpapers.doc	This measure has concerns: 1) The savings calculations for strip curtains uses an ASHRAE base case known to be impractically high; the methodology is appropriate for an open door with fully developed flow, however, the resulting baseline load is several times larger than any supermarket freezer's design capacity, thus cannot reflect power use. Similarly, the calculated freezer savings is greater than the actual connected compressor kW for an "average" freezer. (Comments are for a typical chain supermarket.) 2) The door open fraction time was assumed to be 3 hours per day, with no study references; this time is greater than experience would indicate and moreover (for freezers in particular) extended periods of open door operation would result in a frosted over evaporator coil, resulting in less, not greater consumption. Many freezers have door switches which inhibit the refrigeration unit from operating when the door is open, and supermarkets often have temperature alarms that indirectly indicate a door has been left open. 3) The number of doors to be retrofitted with strip curtains appears to be several thousand across the IOUs whereas most chains and warehouses have specified strip curtains for many years, the number of doors available for retrofit may be lower. 4) This measure could often be used inappropriately to fund normal maintenance replacements due to wear and tear or intentional damage; the program materials don't preclude replacement of a previously installed, but removed, strip curtain. M&V is needed to establish actual savings and use patterns as well as free-ridership.

Utility	Energy Type	Measure Name	Program	Comments
SCE	kWh	Main door Cooler Door Gaskets (Walk-in) And Main Door Freezer Door Gaskets(Walk-in)	Non-Residential Business Installation And Business Incentive Program	This measure has concerns: 1) The savings calculations for gaskets uses an ASHRAE base case that is impractically high; while the calculation method appears valid for a fully open door, the key assumption for this measure – 3% of open door losses – is not referenced and requires further justification. 2) This measure proposes to provide a rebate for a "standard practice" maintenance item; door gaskets have a long life and often air leakage may result from misalignment or door damage caused by material handling equipment. Due to the frost and condensation that results from leaking doors, repairs are often made as part of routine maintenance or for safety reasons, resulting in a very high free rider faction or abuse of this measure. 2) The incremental cost does not appear to include the labor necessary to identify the select leaking doors, procure appropriate gaskets on a door-by-door basis, and install correctly – which often requires other repairs and alignment. M&V is needed to establish free-ridership, fraction of replacements that actually reduce consumption, and actual savings.
SCE	kWh	Exterior Fixture 65 Watt 3,600 to 4,599 Lumens Interior Fixture 30 Watt 2,000 to 2,599 Lumens	Residential EE Rebates	This measure has the following concerns: 1) No documentation on calculation of specific savings listed for this measure - just a narrative without formulas or calculation sequence used to produce this specific savings value. We cannot reproduce the number. 2) Replacement and new fixture is subject to new Title 24 minimum requirements for certain locations inside/outside the home. It does not appear this measure takes into account those minimums. Statement that “Those applications that require a building permit would not qualify as a retrofit under this program.” Is not reasonable, since all lighting retrofits, other than lamp replacement/de-lamping, require a permit.
SCE	kWh	ES Exterior Fluorescent Fixtures 13 Watt	Multifamily EE Rebates	This measure has the following concerns: replacement and new fixture is subject to new Title 24 minimum requirements for certain locations inside/outside the home. It does not appear this measure takes into account those minimums. Statement that “Those applications that require a building permit would not qualify as a retrofit under this program.” Is not reasonable, since all lighting retrofits, other than lamp replacement/de-lamping, require a permit.
SCE	kWh	Dimmable Interior Fluorescent Fixtures And Interior Fixture 40 Watt 2,000 to 2,599 Lumens	Residential EE Rebates	This measure has the following concerns: replacement and new fixture is subject to new Title 24 minimum requirements for certain locations inside/outside the home. It does not appear this measure takes into account those minimums. Statement that “Those applications that require a building permit would not qualify as a retrofit under this program.” Is not reasonable, since all lighting retrofits, other than lamp replacement/de-lamping, require a permit.

Utility	Energy Type	Measure Name	Program	Comments
SCE	kWh	Correct refrigerant charge and air flow (appears as several measures)	Comprehensive HVAC	This measure has the following concerns:: 1) refrigerant charge or TXVs are required by Title 24 in some CTZ's upon AC installation; this EEM should not be available for homes when required by Title 24. 2) Approach is reasonable but we have concerns about assumptions. This measure appears in many IOU filings and as multiple measures within each IOU filing, using different assumptions and calculation approaches. 3) Some cite Mowris & Associates older studies or other studies, which reported up to 18% EER improvements and 12.7% kW reductions, but recent studies show these values may overstate annual energy (due to short-term monitoring) and peak demand savings; current values of 7%, as used by PG&E for this measure, are more in agreement with current M&V work (but values will vary greatly by site.) Thus PG&E's kWh values for the RC measures look reasonable, but the other utility values may need to be reduced by 45%. 4) For residential kW savings, PG&E (and other IOUs) did not apply a "coincident diversity factor" to the peak unit kW/ton values or adjust the kW reduction to account for location having different peak conditions that the unit rated kW. The diversity factor accounts for the fraction of residential units that are not on during the IOU peak demand period and should additionally be adjusted (for this measure) to include climate effects; this factor could be set to between 50-80%, depending upon the climate zone for both climate and occupancy. Thus ,kW impacts should be reduced. SCE responded for residential programs: "RASS thermostats "off" percentages … during the daytime hours for the combined CZ 14 and 15 is only 14%. Thus, the number of AC units that would be "on" during the on-peak would be closer to 86% and not 50%." Response to SCE comment: The RASS data provides "typical" behavioural data but cannot account for that fraction of empty houses due to alternate behaviour (vacations, shopping, events, etc.) or "off" AC due to other reasons (such as financial).This is why models using the RASS data need to be "calibrated" to billing data with the typical multiplier of 0.5. SCE responded for commercial programs:" Field measurement data from PECI was used to estimate this measure." Response to SCE comment: The document provided does not contain any references to published studies or reports; the northwest "technician" results from "field measurements" are not provided in any detail so as to allow the analysis of the data to determine if it was appropriate to use for the estimation of savings for this measure (by itself) in CA.

Utility	Energy Type	Measure Name	Program	Comments
SCE	kWh	Single Family - 15%, Inland	CA New Homes	This measure has the following concerns: 1) No adequate documentation. 2) This programs savings analysis, including this measure, was based upon a study that appears to not have taken 2005 Title 24 requirements into account. This appears to have produced savings estimates for items that are required by Title 24. 3) The program proposal is not kWh savings but rather "TDV" savings; this is not directly related to energy but rather an hourly multiplier on energy. SCE responded: "Energy features were added to the base case home to meet ComfortWise standards and exceed 2005 Title 24 by 15%. These above code upgrades included mechanically designed HVAC system per ACCA Manuals J, D and S and stamped by a licensed CA mechanical engineer, tight HVAC ducts as defined by the CEC, 11.0 EER air conditioner, tight air infiltration, quality installation of insulation, and all upgraded features inspected by a HERS certified 3rd party inspector. These features saved 546 source kWh and 0.36 kW per home." Response to SCE comments: correctly sized (ACCA Manuals) HVAC and tight ducts are code requirements; SEER 13 requirement provides a market EER range of 10.75 to 12.50, so perhaps an EER of 12.1 (upper 25%) might be able to be justified as "above code" but not the value proposed; difficult to see much savings, relative to estimate, from the remaining items. TDV savings should not be used.
SCE	kWh	Air Source Unitary Air Conditioner Split or Packaged (10 variations of this measure appear for different size single/three phase units and levels of efficiency improvement)	Comprehensive HVAC	This measure has the following concerns about assumptions: 1) This measure references DEER as a base value, then applies an adjustment value, but it is not documented how the adjustment value was calculated. 2) Similar measures for the upstream HVAC for all the IOUs use a different calculation methodology that also has assumptions that concerns us: those assumptions seem to have high full load equivalent hours of operation values and diversity factors that are based upon old data and may substantially over estimate energy and demand impacts. SCE responded: "Once DEER values are available for this category, they will be used." Response to SCE comment: This value seems to be an acceptable "place holder" until the DEER values is available in August '05.
SCE	kWh	Auto-closer for Glass Doors for Walk-In Coolers	Non-Residential Business Installation	This measure has concerns: 1) The savings calculations for closers starts an ASHRAE base case that is impractically high. 2) Average walk-in may not have sufficient capacity to meet the calculated additional load, thus over-predicting energy use. 3) The door open fraction time was assumed to be 25% of the not-in-use hours, with no study references; this is greater than casual observations and experience would indicate; it is also greater than the 3 hours referred to for the strip curtains measure and extended periods of open door operation would result in a frosted over evaporator coil, resulting in less not greater consumption. Many freezers have door switches which inhibit the refrigeration unit from operating when the door is open, and supermarkets often have temperature alarms that indirectly indicate a door has been left open. M&V is needed to establish actual savings, if any, for this measure.

Utility	Energy Type	Measure Name	Program	Comments
SCE	kWh	Infiltration Barrier for Walk-ins (strip curtains) And Strip Curtains	Non-Residential Business Installation And Business Incentive Program	This measure has concerns: 1) The savings calculations for strip curtains uses an ASHRAE base case known to be impractically high; the methodology is appropriate for an open door with fully developed flow, however, the resulting baseline load is several times larger than any supermarket freezer's design capacity, thus cannot reflect power use. Similarly, the calculated freezer savings is greater than the actual connected compressor kW for an "average" freezer. (Comments are for a typical chain supermarket.) 2) The door open fraction time was assumed to be 3 hours per day, with no study references; this time is greater than experience would indicate and moreover (for freezers in particular) extended periods of open door operation would result in a frosted over evaporator coil, resulting in less, not greater consumption. Many freezers have door switches which inhibit the refrigeration unit from operating when the door is open, and supermarkets often have temperature alarms that indirectly indicate a door has been left open. 3) The number of doors to be retrofitted with strip curtains appears to be several thousand across the IOUs whereas most chains and warehouses have specified strip curtains for many years, the number of doors available for retrofit may be lower. 4) This measure could often be used inappropriately to fund normal maintenance replacements due to wear and tear or intentional damage; the program materials don't preclude replacement of a previously installed, but removed, strip curtain. M&V is needed to establish actual savings and use patterns as well as free-ridership.
SCE	kWh	Variable Frequency Drives for HVAC Fans	Business Incentive Program	This measure has the following concerns: 1) the calculation approach does not account for a wide range of building load profiles and their climate specific variation; 2) average fan power used may not represent current typical case; 3) average flow used may not represent current typical case; 4) factors used in calculation, from 1991 study that is not supplied, may not be appropriate for current application; 5) a more rigorous analysis should be performed using more current data, software and techniques.
SCE	kWh	Attic & Wall Insulation - Quality Installation (appears several times)	CA New Homes	This measure has the following concerns: 1) not clear how this exceeds Title 24, or 2) how estimation of savings is for above the code requirements. SCE responded: "As described in the Program Implementation Plan, the application of this measure is not designed to exceed T-24. It is designed to improve the rate of compliance with the requirements of the code through a quality control inspection. Improved compliance will produce a greater number of quality installations and thus increased savings." SCE's response confirms that there is not "above code" savings; this appears to be a "code enforcement" program.
SCE	kWh	New Refrig Display Case with Doors - Low Temp	Business Incentive Program	This measure has concerns: 1) The assumptions used for the display case load reduction calculations are not referenced. 2) The load used for one display case base is the manufacturers design load value used for selecting compressors; the actual average hourly load seen by the compressors will be less. 3) A 5,700 EFLH assumption is used; this value is not documented with a reference and will vary greatly based upon store location, refrigeration equipment mix and controls. Similarly, the compressor power assumption uses 95 F condensing, whereas this will also very by location, refrigeration equipment and controls. 4) The analysis does not address other equipment changes that may be required to implement this equipment measure to get a resultant compressor power reduction; other system components and controls may have a very large influence on actual savings. M&V is needed to establish actual typical savings.

Utility	Energy Type	Measure Name	Program	Comments
SCE	kWh	Design Assistance	Sustainable Communities	This measure has the following concerns: 1) Documentation is not clear: documentation references the Savings By Design, but it is not clear how this programs savings is calculated or how specific project savings will be calculated and attributed to the actions of this program. SCE responded: "This program offering is a non-traditional approach to the infrastructure opportunities for the new construction of communities. SCE expects that customized calculations will be submitted to the program by participants/consultants over time. The estimated forecast is based on SCE's experience and judgement to establish an initial savings placeholder for future studies and project proposals within this program." SCE's response does not provide any additional information on how this activity will directly result in attributable energy savings and how those savings will be calculated for each project. SCE responded: "This program offering is a non-traditional approach to the infrastruture opportunities for the new construction of communities. SCE expects that customized calculations will be submitted to the program by participants/consultants over time. The estimated forecast is based on SCE's experience and judgement to establish an initial savings placeholder for future studies and project proposals within this program." Comment to SCE response: this still does not offer a explanation of the methods or calculation that will be used to attribute project or activity specific savings for this measure. The methods that will be used to claim specific project savings need to be identified.
SCE	kWh	T-8 or T-5 Lamp and Electronic, 4-foot lamp removed	Multifamily EE Rebates	This measure has the following concerns: No documentation on calculation of specific savings listed for this measure, just a narrative without formulas or calculation sequence used to produce this specific savings value. We cannot reproduce the number. SCE responded: "This measure explicitly targets underground parking garages that require around the clock lighting." SCE's response does not provide a method to verify the savings estimates. SCE response: "This measure explicitly targets underground parking garages that require around the clock lighting." Response to SCE comment: Okay, but the program cannot allow this measure to be used for non-24-hour lighting.
SCE	kWh	T-8 or T-5 Lamp and Electronic, 8-foot lamp removed	Business Incentive Program	This measure has the following concerns: Annual hours of operation for major program participant appears high - offices are 25-30% percent above recent EM&V, and retail are 10-20% above recent EM&V
SCE	kWh	(4) 48" T-12 to (3) 48" T-8 Lamp with Elec. Bal.	Non-Residential Business Installation	This measure has the following concerns: No specific documentation on calculation of specific savings listed for this measure. We cannot reproduce the number - savings is above the range for all building types listed in documentation. SCE responded: "The demand savings (Watts) were obtained from the 1999 Small Business SPC Lighting Tables (Appendix E - Minimum Efficiency Standards). The base fixture was assumed to demand 44 Watts and the new fixture 76 Watts." SCE's response may provide the answer, but the documentation was not provided. Since the Express Efficiency lighting documents are referenced, the concerns outlined in "Lighting-RETRO-E" for PGE (on hours of operation, lighting base case, and other factors) may apply here.

Utility	Energy Type	Measure Name	Program	Comments
SCE	kWh	Insulate Bare Suction Pipes	Business Incentive Program	This measure has concerns. The method for calculation of heat gain to uninsulated suction lines appears valid, however, the analysis ignores important factors that may invalidate the conclusions on energy savings: 1) If the lines are outside the refrigerated area the suction line heat gain does not change the refrigerant properties or mass flow requirements at the refrigerated space; the effect is not as direct as are gains to a chilled water line. Refrigeration compressor rating conditions are based on a fixed 65 F return gas temperature and neither of the major compressor manufacturers has explicit information on compressor pumping capacity and power as a function of return gas temperature, thus the effect on compressor energy for these suction line gains is not explicitly known. 2) Even with insulation, there is still heat gain, and with long suction lines, the return gas temperature at the compressor may approach the same temperature as an uninsulated line, resulting in the same impact on the compressor; since the suction lines tend to be very long in most commercial refrigeration applications, it is unlikely that there will be very many instances where this measure will produce significant savings. 3) For lines within a conditioned space, the base case assumption of no insulation is a very unlikely case, since suction lines normally have enough insulation to avoid condensation and dripping, both to avoid damage to the structure and for safety reasons. Lines located on roofs that are not insulated were probably originally insulated, but not jacketed, and the rubber insulation deteriorated rapidly with exposure to sunlight; this, then, is a maintenance item. M&V is needed to establish free-ridership, fraction of replacements that actually reduce consumption, and actual savings.