Appendix I:

San Diego Gas & Electric Company

Spillover Estimates for Selected 2013-2014 Programs

SPILLOVER ESTIMATES FOR SELECTED 2013-2014 ENERGY EFFICIENCY IOU PROGRAMS

PACIFIC GAS AND ELECTRIC COMPANY
SOUTHERN CALIFORNIA EDISON COMPANY
SOUTHERN CALIFORNIA GAS COMPANY
SAN DIEGO GAS & ELECTRIC COMPANY

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TABLE OF CONTENTS

A. Introduction

In party comments on the proposed Decision Providing Guidance on 2013-2014 Energy Efficiency Portfolios and 2012 Marketing, Education, and Outreach (Guidance Decision or Decision), many echoed their support for inclusion of "spillover effects" in Energy Efficiency (EE) portfolio cost effectiveness calculations. In response to these comments, the California Public Utilities Commission (CPUC or Commission) noted in its final Decision 12-05-015 that it agrees with the parties to include these effects to the extent these are quantified so that the benefits of the program reflect the broader impact of programs. More specifically, the Decision stated, ". . . for their 2013-2014 portfolio applications, the utilities may present estimates of spillover that may result from the proposed programmatic activities, and may propose the inclusion of spillover effects in their cost effectiveness analyses and results. This may be provided at either the program or portfolio level." (Decision, p. 363.)

The Guidance Decision also noted that future Evaluation, Measurement and Verification (EM&V) may further allow measurement activities to quantify these effects.

This report documents the joint investor-owned utility (IOU)[1] efforts to propose spillover estimates for their 2013-2014 EE applications. It describes the details of the approach, resources, and research used to propose and document the rationale for the spillover estimates for a select group of programs that demonstrate strong program logic for such benefits not directly counted by the programs.

1. Spillover Definition

Since the EM&V Protocol from early 1990s, the 2006 EM&V Protocols and the EE Policy Manual Version 4, spillover has been defined as: reductions in energy consumption and/or demand in a utility's service area caused by the presence of the Demand-Side Management (DSM) Program, beyond program-related gross or net savings of participants. These effects could result from:

(a) Additional energy efficiency actions that program participants take outside the program as a result of having participated.

(b) Changes in the array of energy-using equipment that manufacturers, dealers and contractors offer all customers as a result of program availability.

(c) Changes in the energy use of non-participants as a result of utility programs, whether direct (e.g., utility program advertising) or indirect (e.g., stocking practices such as (b) above or changes in consumer buying habits).

In contrast to "free ridership" that excludes savings from the gross savings that are not attributable to the program, the spillover effects add back the extra benefits not accounted for by the program but directly or indirectly attributable to the program. Equation 1 is what most evaluators use to calculate the spillover-adjusted net-to-gross ratio ($NTGR_{SA}$):

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[1] Joint IOUs are Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas and Electric Company (SDG&E) and Southern California Gas Company (SCG).

$$NTGR_{SA} = (1 - \text{Free Rider Rate}) + \text{Spillover Rate} \quad \text{Equation 1}$$

Net savings are calculated using Equation 2, which is used in the IOU approach to proposing spillover-adjusted net-to-gross ratios:

$$\text{Net Savings} = \text{Gross Savings} \times NTGR_{SA} \quad \text{Equation 2}$$

It is important to note that while the addition of spillover benefits is critically important, the IOUs are not yet allowed to fully capture all relevant environmental benefits and are not allowed to capture any other non-energy benefits such as improved health and reduction in water use and macroeconomic benefits.

2. Spillover Effects Practices in California and Other States

Since 2006-2008 program cycle, the impact evaluations in California (CA) have paid little attention to estimating participant and non-participant spillover primarily because the IOUs, per CPUC policy, were not allowed to count such savings toward program and administrator goals and performance. This has been the direction despite the fact that spillover has been long-acknowledged as a possible benefit of energy efficiency programs. The EM&V protocols have an entire chapter devoted to ways in which market effects, including non-participant spillover can be measured. The recent prohibition on counting spillover savings made it impossible to conduct a comprehensive evaluation of the benefits of the energy efficiency programs. Over the last seven years, only three comprehensive market effects studies[2] have been completed. These studies for the most part were designed to assess the methodologies for quantifying market effects and could only provide directional value for actual spillover and market effects estimates.

Table 1 is based on data from a recent American Council for an Energy Efficient Economy (ACEEE) study that surveys the 50 states and District of Columbia regulators on various aspects of the rate-payer funded energy efficiency programs. For select "Top-10" Energy Efficiency States, Table 1 shows, whether or not net savings includes spillover savings.

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2 Available at www.calmac.org

High-Bay Lighting market effects Study Final Report – ID CPU0034.01 June 2011 by KEMA.

Compact Fluorescent Lamps (CFL) market effects Final Report – ID CPU0032.01 April 2010 by The Cadmus Group.

Phase II Report Residential New Construction (Single-Family Home) Market Effects Study – ID CPU0051.01 December 2010 by KEMA.

TABLE 1
ACEEE NATIONAL SURVEY 2012
"A NATIONAL SURVEY OF STATE POLICIES AND PRACTICES FOR THE EVALUATION OF RATEPAYER-FUNDED ENERGY EFFICIENCY PROGRAMS"

ACEEE Top-10 Energy Efficiency States	Include Spillover in Net Savings Calculation?
Massachusetts	Yes
New York	Yes
Oregon	Yes
Vermont	Yes
Rhode Island	Yes
Connecticut	Yes
Washington	Gross (NTG=1)
Minnesota	Gross (NTG=1)
Maryland	Gross (NTG=1)
California	No

Source: http://www.aceee.org/research-report/u122.

Interestingly, the three states, Washington, Minnesota, and Maryland, have concluded that effects such as spillover more than offsets the free ridership savings, resulting in a NTGR equal to 1.0. The report also notes that there is a wide variation across states in treatment of net versus gross savings and the inclusion of free ridership and spillover in the definition of net. Their national survey shows that 53 percent of the states that report net savings, 26 percent report only gross savings, and 21 percent report both. Of the states that report net savings, one-third do not report spillover. The report underscores this fundamental imbalance:

> We [ACEEE] would argue that these [free ridership and spillover] are two sides of the same "net" coin, and that it is fundamentally imbalanced to adjust for one of these factors and not the other. Therefore, we recommend that if a state wants to estimate "net savings," their methodology should incorporate both free riders and free drivers/spillover.

3. Using Spillover in Current E3 Total Resource Cost and Program Administrator Cost Calculations

The IOUs agreed that the $NTGR_{SA}$ can be directly used in the E3 Calculator as illustrated in Equations 3 and 4 for the Total Resource Cost (TRC) and the Program Administrator Cost (PAC), respectively:

$$TRC = \frac{NTGR_{SA} \times Benefits}{Admin\ Cost + (NTGR_{SA} \times Measure\ Cost) + (1 - NTGR_{SA}) \times Incentive} \quad \text{Equation 3}$$

$$PAC = \frac{NTGR_{SA} \times Benefits}{Admin\ Cost + Incentive} \quad \text{Equation 4}$$

Note that for simplicity sake, we assume that the spillover measure savings and costs are the same as the program measure savings and costs even though the spillover measure may or may not be the same as the program eligible measure. More rigorous methods can be used in the future to obtain more accurate spillover savings and cost data.

4. The Use of Spillover Adders

There are at least two ways to calculate the NTGR that is adjusted for spillover. The standard formulation of an NTGR that is in Equation 5:

$$NTGR = (1 - Free\ Ridership) + Spillover \quad \text{Equation 5}$$

For this to work, the spillover rate must be calculated as follows:

$$Spillover\ Rate_G = \frac{Net\ ISO + Net\ OSO + Net\ NPSO}{\textit{Ex Post}\ Gross\ Program\ Impacts} \quad \text{Equation 6}$$

Where

Net ISO = Net Inside Participant Spillover

Net OSO = Net Outside Participant Spillover

Net NPSO = Net Non-Participant Spillover

Equation 6 is what many evaluators use to calculate reported spillover. This is referred to as the additive version.

However, depending on the situation, the calculation can be done differently[3]. For example, Saxonis (2007) reports spillover-adjusted NTGRs that are calculated in a slightly different manner. In Table 1 of this paper, he reports the following for a motors program:

Free Ridership: 67%

Spillover: 168%

NTGR (Adjusted): 88%

Equation 7 is used:

$$\text{NTGR} = (1 - \text{Free Ridership}) \times (1 + \text{Spillover}) \qquad \text{Equation 7}$$

This is referred to as the multiplicative version. Another example is that the calculations in New York State Energy Research and Development Authority's (NYSERDA) *New York's System Benefits Charge Programs Evaluation and Status Report (March 2012)* (New York Status Report) are also produced using Equation 7. For this multiplicative version of the spillover-adjusted NTGR to work, the spillover rate was calculated using Equation 8:

$$\text{Spillover Rate}_N = \frac{\text{Net ISO + Net OSO + Net NPSO}}{\textit{Ex Post} \text{ Net Program Impacts}} \qquad \text{Equation 8}$$

The only difference between Equations 6 and 8 is that in the former the denominator is *ex post* **gross** savings while in the latter the denominator is *ex post* **net** savings. The numbers in the Saxonis paper and in the New York Status Report might have been created for a particular reason (e.g., for use in a benefit-cost calculator). However, the spillover rates contained in the NYSERDA evaluation reports were done using Equation 6.

When spillover estimates were obtained from Saxonis (2007) or from the Status Report, the spillover rates were converted from multiplicative to additive. Multiplicative rates were converted into additive rates by simply subtracting the initial NTGR from the spillover-adjusted NTGR. Using the Saxonis numbers as an example, the conversion is done as follows:

Additive Spillover Rate = 0.88 – 0.67 or 0.21

Of course, adding 0.21 and 0.67 yields 0.88.

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3 Some evaluators estimate spillover in terms of net energy and demand but they do not report spillover rates (e.g., Duke Energy).

Whether one uses the additive or the multiplicative version doesn't matter since one will get the same answer. However, it is critical that one is consistent in the use of the chosen calculation. For example, adding an initial NTGR to a multiplicative spillover rate would result in an inflated estimate of the spillover-adjusted NTGR.

Another question is whether evaluators are reporting *ex post* or *ex ante* gross savings in the denominator. Sometimes, due to time constraints the *ex ante* gross savings are used because the team assigned the task of estimating *ex post* gross savings has not complete its work. Using *ex ante* gross in the denominator will almost always result in a lower estimate of a spillover rate. Which one is used in a given report is not always clear.

Recognizing that evaluators and organizations report spillover rates using various calculations, the IOUs were as careful as possible given the time constraints to make sure that the spillover rates were calculated and modified, when necessary, in a manner that allowed them to be added to the initial NTGR.

B. The Joint-IOU Approach to Proposed-Spillover Estimates

The joint IOU approach to the proposed spillover estimates involved five steps:

(1) Program Identification – Identify a select group of programs in 2013-2014 portfolio that are expected to generate participant and non-participant spillover.

(2) Literature Review – Research available studies within and outside of California.

(3) IOU Review of Initial Proposal – Joint IOU review of literature review and development of joint IOU proposed spillover estimates for 2013-2014 programs.

(4) Stakeholder Review – Provide a draft report to PAG and ED before end of May.

(5) Final Proposed Spillover Rates – Incorporate additional feedback from the IOUs and the ED and include the final proposed spillover rates in the 2013-2014 application to be filed July 2.

1. Program Selection

After reviewing the logic and underlying theory and direction of programs in the 2013-2014 cycle, the list of programs in Table 2 was identified as good candidates for developing program spillover estimates for the 2013-2014 application. Programs that are expected to generate deep savings and/or significant spillover due to multiple touch points in the market through upstream or midstream market strategies, such as new construction programs, advanced lighting programs, and residential and commercial comprehensive retrofit programs, etc., were deemed to be good candidates.

TABLE 2
SELECTED LIST OF PROGRAMS BY PROGRAM AREA

Program Area	Program
HVAC	HVAC Upstream Equipment
	HVAC QI
	HVAC QM
Residential Lighting	Upstream Lighting (Spiral CFLs 30 Watts or less)
	Upstream Lighting (All else)
C/I Lighting	Lighting (Deemed and calculated)
New Construction	Savings by Design
	Res New Construction
Calculated	Industrial
	Agriculture
	Commercial
Deemed	Industrial
	Agriculture
	Commercial
Plug Load	BCE
	HEER
Whole House - Advanced	Residential

2. Literature Review

As noted above, that there has not been much EM&V effort in CA since the 2004-2005 program cycle to estimate spillover savings. The limited availability of the data from California caused the IOUs to rely more on out-of-state research, especially those states that continue to focus a significant amount of attention to measure spillover effects over time. However, when applying other states spillover results to California, one need to recognize the fact that the magnitude of any participant and non-participant spillover is a function of a number of factors including at a minimum, the following seven:

(1) Type of Intervention Strategy – The type of intervention strategy is critical since a program must involve those activities that are expected to produce non-participant spillover.

(2) Length of Time a Program Has Been Running – The longer a program has existed the greater the likelihood that the program will generate non-participant spillover.

(3) Level of Effort (i.e., Program Budget) – All things being equal, properly designed programs with larger budgets can be expected to have greater non-participant spillover.

(4) Technology – A variety of factors might affect the adoption of a particular technology among non-participants such as incremental costs, level of innovation, and the perceived competitive advantage of the technology.

(5) Market Characteristics/Dynamics – Factors such as the size of the market, the number of market actors and their relationships, and communication paths, distribution.

(6) Regional Economy – There are regional economic factors that might affect non-participant adoption rates such as levels of unemployment, household income, levels of educational attainment, financing opportunities, and interest rates.

(7) Target Audience – For example, low income and small commercial customers might be expected to be less likely to adopt the efficient measures outside the program due to budget constraints.

Unfortunately, the extent to which a given IOU program and the region in which it is to be implemented were consistent with a given program with reported spillover could not be rigorously examined. Instead, the IOUs relied on matching by the: (1) sector; (2) strategy (upstream or downstream); and (3) customer segment. Given this, the mapping of spillover results into IOU proposed programs is only an approximation. Using the three factors, the relevant reports were identified for each IOU program. This task was further complicated by fact that evaluators and organizations in the referenced studies sometimes reported spillover estimates based on different calculations. The IOU researchers made a special note of these differences when applying the numbers. For each program, the final proposed spillover estimate was one that was in the range of reported spillover estimates and plausible given the program theory and logic.

All identified studies and their links are presented in Appendix B along with the associated spillover rates.

3. IOU Review of Initial Proposal

The IOUs reviewed the results of the literature review and the mapping of spillover rates to the identified IOU 2013-2014 programs. Based on this review, the IOUs submitted a draft spillover proposal to the ED and key stakeholders on May 29. The IOUs made a formal presentation at the 2013-2014 EE Planning Statewide Stakeholder Meeting at the Pacific Energy Center on May 29, 2012.

4. ED and Stakeholder Review

The ED and various stakeholders were asked to comment on the proposed spillover rates. Written comments were received from the ED and NRDC. While the NRDC comments were minor, the ED comments were more extensive. As a result, each ED comment along with the IOU response is provided below.

ED Comment: Res QI – This needs both a better logic and better support for the applicability of the study—the default is higher than 50 percent of the NYSERDA study.

IOU Response: First, the mean of all NYSERDA programs (minus new construction) is 47 percent. Twenty percent is only 43 percent of 47 percent. Nevertheless, upon review and ED feedback, the spillover rate has been lowered to 15 percent due to the fact that the program is new and that no evaluations of similar programs could be identified. A more complete program theory and logic model will be included in the forthcoming Program Implementation Plan (PIP).

ED Comment: Res QM – The logic doesn't support any short-term spillover as written—where is the impact on the non-participants?

IOU Response: The program also provides tools that help contractors do their work better, both in terms of selling quality maintenance and in performing quality maintenance. This is likely to cause spillover to non-participants through contractors implementing these practices on other projects and at lower cost. It may also demonstrate a value proposition from quality installation that leads other firms to adopt these practices. That is, there are expected to be effects on the supply side that boost non-program adoption of quality maintenance due to the effects of the program. These effects may be quite significant relative to the size of the program because the current incidence of quality maintenance is roughly zero outside the program and the program has worked through industry channels to educate both participating and non-participating contractors about these practices. A more complete program theory and logic model will be included in the forthcoming Program Implementation Plan (PIP).

ED Comment: Res CFL – Methods from other parts of the country vary by so much that the applicability is questionable, and the presentation ignores CA study which showed no SO. Logic may work for some lamp shapes/types of the Advanced share of the program; however there is no discussion on how the scope/size of the California programs may impact the opportunity for concurrent spillover. The literature review does not directly address the fact that there has been a strong tendency for upstream lighting programs to show decreasing NTGRs in recent years, a trend that may help to limit the magnitude of spillover for this program over the near-term. Finally, the discussion does not address the potential effects of the onset of EISA on program impacts.

IOU Response: The IOUs have decided not to propose spillover savings for Upstream Lighting (Spiral CFLs 30 watts or less).

ED Comment: Non-Res Lighting – Applicability to 2013 codes environment needs to be shown. Right now, it assumes the past situations are the same as the future. Needs more back-up to show how all future non-res lighting markets reflect the market for High-Bay lighting. A key issue that should be kept in mind in applying the results of the High-Bay Lighting study is that High-Bay lighting was specifically selected for a pilot market effects study because multiple observers thought that this was a commercial and industrial (C&I) lighting market that had an unusually high potential for market effects. The results of the study are therefore probably better interpreted as an upper bound rather than a point estimate for spillover effects for non-res lighting in general. Additionally, past free rider and market effects studies in California have not included standard practice and estimates of the market activities of lighting contractors absent the programs but rather relied heavily upon customer survey data. Additionally, with 2014 Title 24 impacting the lamp and ballast replacements in the same manner as past fixture replacements, overlap with C&S claims in addition to lighting contractor standard practice needs to be factored into the market effects justification.

IOU Response: Evaluations of past programs are routinely used to inform future planning whenever the use of best available information is sought. In addition, the evaluation of High-Bay lighting was only one of three studies examined.

For programs that promote measures for which there is an applicable code, things are no different. All programs are designed with applicable codes in mind. For example, new construction programs incentive buildings that are 15 to 20 percent above Title 24. When the new code comes into effect, the program will incent buildings that are 15 to 20 percent above the new code. Expected spillover rates for programs operating under the new code can be informed by spillover rates observed for programs that operated under the old code. We understand that code will be triggered when more than 10 percent of the lights are changed rather than 50 percent prior to 2013. While this will impact gross savings, the spillover rate should not be affected, since both the net spillover (denominator) and the gross savings (the numerator) are both affected by this change in code.

ED Comment: RNC – MF SO needs a logical basis that is independent of the affordable housing criteria, and some data that is applicable to 2013 Title 24 levels of baseline. SF res spillover is not going to be incremental—if it doesn't show up in the sample of nonparticipant homes, it isn't there, and if it does, it is included in the code compliance savings claims (see additional discussion of this issue under the Double Counting heading below).

IOU Response: The IOUs have decided not to propose spillover for the Residential New Construction (RNC) Program.

ED Comment: Industrial, Agricultural (AG) – Calculated – If this is to be given any positive consideration, the logic of how spillover occurs outside the program when the account reps are constantly in contact with the firms has to be explained. In addition, the issue of how much new concurrent SO will occur in markets known for long time frames must be addressed. Numbers derived from only two very different markets such as High-Bay lighting and VFDs (where there are significant benefits beyond the energy savings are not always available for other measures and market sectors) need to be shown to be applicable to all custom measures. (Note that no basis is given in the write-up tables for the numbers chosen for C&I and agricultural calculated or deemed.)

IOU Response: First, not all agricultural and industrial customers have an account representative. Regardless of size, customers can install both deemed and calculated measures. The evaluations of programs, upon which the IOUs relied for proposed spillover rates, included a mix of large, medium, and small customers. While one could hypothesize that participants and non-participants who have an assigned account representative are less likely to have any type participant spillover, this has yet to be demonstrated empirically. The program logic model and theory will reflect the fact that large customers can be influenced by account representatives on a regular basis.

The IOUs urge the ED to reconsider the policy that only concurrent spillover (spillover occurring within the funding cycle) can be claimed by the IOUs. For this 2013-2014 cycle, the IOUs should be able to claim cumulative spillover (spillover measured during this cycle but due to IOU influence prior to this cycle). Beginning with the next cycle (2015-2017), only concurrent spillover will be counted which will

be incremental to what was counted in the 2013-2014 cycle. This does mean that the estimation of spillover must be a permanent component of all future evaluations of programs expected to have substantial spillover. If the CPUC rejects this proposal, concurrent spillover should still be measured in the 2013-2014 cycle for selected programs since it could be substantial, although to obtain reliable estimates will be methodologically challenging.

Finally, the spillover estimates are based on evaluations of programs that cover a wide range of measures as well as programs that focus more narrowly on specific measure groups such as heating, ventilation and air conditioning (HVAC) and lighting. As a result, the average spillover for all commercial and industrial programs (minus new construction) was used as the expected value. In this calculation, the spillover rates for NYSERDA programs were reduced by half as an explicit recognition of the ED's concerns about the uncertainty surrounding these spillover estimates. The Industrial Deemed Program was increased by 5 percentage points beyond the expected value to account for expected high spillover rates for motors.

Both the Deemed and Calculated Agricultural Sub-Programs were also increased by 5 percentage points beyond the expected value to account for high expected spillover.

ED Comment: Deemed Commercial – The applicability of the High-Bay lighting study is questionably applicable to all deemed measures. Check the 06-08 SO results for most measures in the message from C. Best on May 31, 2012. High-Bay lighting also stands as the only reference for deemed Ag and Industrial SO. (See table above. Multiple studies formed the range within which a spillover rate was selected. The removal of High-Bay lighting would not affect the range.) It doesn't fit all measures in the market.

IOU Response: The High-Bay lighting (ID 28) was not the source relied upon for the spillover estimate the Agricultural Program. Instead, the IOUs relied upon the Process Evaluation Report for the 2006-2008 SCE Agricultural Energy Efficiency Program (ID 15). In this report, the evaluators noted that, while free ridership is high, spillover among rebate recipients and pump testers appears to be very high. A strong possibility is that both the many years that this program has been offered along with the high levels of pumps being re-tested over the years has directly led to the high levels of energy efficiency awareness for pumps among the program participants. The current high free ridership along with high spillover may be the direct consequence of these many years of program operation and participation.

ED Comment: BCE/Plug Loads/HEER – Just like the program, the logic provided makes it difficult to distinguish between what is the changing market baseline absent the program and what are the SO effects of the program. Also, if they are adjusting the NYSERDA numbers by 50 percent, the mid-point of the range is 12.5 percent (2.5 percent to 22.5 percent). It is also difficult to assess the proposed spillover assumptions for these programs given the likelihood that the programs will be revamped going forward. Additionally, the scope/size of the California programs (providing incentive for close to 1 million high-definition televisions (HDTV) in 2010) needs to be considered in evaluating the opportunity for additional market effects.

IOU Response: A multiplicative spillover rate was inadvertently used for two studies. These were converted to an additive rate and reduced by 50 percent. These results were combined with a third study, the average of which was 10 percent which now serves as our best estimate. The justification for this new estimate is further strengthened based on the more complete program theory and logic model include in the PIP. The Program proposes and incents new models (e.g., ES 5.0 +35 percent specification for TVs) on a frequent and regular basis because the new models diffuse through the market very fast relative to other measures. Thus, the impact of the program must be based on its ability to accelerate the diffusion of each new technology relative to a baseline that is itself rapidly changing. The methodological challenges while daunting are not impossible. On a forward going basis, this program will be combined into one single Plug Load and Appliance program. Generally speaking, this program will have the effect of increasing EE shelf space, improving stocking practice, improving the awareness/knowledge of retailers, contractors/market actors and consumers.

ED Comment: EUC – Under-subscription of available EUC funds, given the high visibility and marketing behind that program, would seem to run counter to a claim of high levels of either participant or non-participant market effects; this needs to be addressed in any justification. Also, the recent D.12-05-015 elevated to EUC NTG from 0.55 to 0.85, which likely already captures most possible market effect into the newly authorized values.

IOU Response: The spillover rate has been reduced from 25 percent to 20 percent. The IOUs note that the D.12-05-015 specified that IOUs should be allowed to include spillover effects (net of free riders) in their alternative portfolio. This decision did not say that the change in the Whole House Program NTGR from 0.55 to 0.85 included an adjustment for spillover effects.

However, the market characterization studies and macroeconomic analysis suggest that EUC funds will have a greater likelihood of being fully expended. The justification for this estimate is further strengthened by a more complete program theory and logic model include in the PIP.

ED Comment: Several of the proposed values, combined with the supporting logic and citations, raise apparent issues regarding double-counting of savings. Two examples are upstream residential lighting and RNC (although the same issue may also apply in a different manner to other programs).

IOU Response: In any attempt to estimate program-level spillover, there is the possibility of double counting since most portfolios contain more than one program within a given sector targeting some of the same measures. One could adjust each program-level estimate of spillover for double counting or one could adjust for double counting at the portfolio level. Given the time constraints, the IOUs were not able to determine whether the spillover estimates reviewed had been adjusted for double counting at the program or portfolio. This is one of the reasons why the IOUs have generally been conservative in their spillover estimates.

ED Comment: RNC – As noted in the IOUs' discussion of this program, the RNC market effects study found that, while there was substantial spillover, much if not all of this overlapped with savings claimed under the Codes and Standards program.

The discussion acknowledges this but does not seem to fully grapple with the implications. Given these findings, it is not clear to us that there should be any additional spillover credit within the RNC Program. If there is any, it should probably be small.

IOU Response: The IOUs have decided not to claim any spillover benefits for the RNC. However, to exclude spillover will misrepresent the efficacy of the RNC. Therefore, the IOUs request that both participant and non-participant spillover be investigated as part of the planned impact evaluation for 2010-2012. Because the Codes and Standards Program claims credit for the RNC spillover benefits, the RNC will not also attempt to claim these savings.

ED Comment: Upstream Lighting – The issue here is that we believe that some of the NTG methods used in California in the 2006-2008 study already include spillover to some extent. Indeed, with this kind of program it is difficult to make a clear distinction between direct impacts and spillover. We recognize that spillover was not intended to be included in the 2006-2008 cycle, but we believe this proved unavoidable given the methods available. For example, the multi-state modeling study, which was considered in the final NTG analysis, by its nature produces an estimate of total net impacts at the market level. Upstream interviews incorporate spillover effects among participating vendors to some extent. For these reasons it is unclear to us whether there should be an additional spillover credit for upstream lighting. If there is it should probably be relatively small, and/or limited to specific program components.

IOU Response: The 2006-2008 market effect study is a snapshot of the market rather than an attempt to measure cumulative effects. If 2006-2008 NTGR method (three-state comparison) included spillover already, the market effects study for the same period would not have come up with "0 or negative" market effects.

We had a discussion with KEMA on June 7, 2012. Kema confirmed that the 2006-2008 study did not attempt to capture cumulative spillover effect which was not possible to discern years after the fact. The IOUs and the ED were encouraged to conduct ongoing periodic market effects studies so these important effects can be captured properly and timely.

Finally, the IOUs have chosen to not to claim spillover for the Upstream Lighting (Spiral CFLs 30 watts or less).

ED Comment: Following Through on Global Drivers of Spillover Magnitude – Page 6 of the Microsoft® Word file lists seven likely factors helping to predict the magnitude of spillover in individual programs. For the most part we agree with this list. However, the factors presented here do not seem to be referenced with any consistency in the individual program discussions, particularly in cases where items on the list would tend to argue for lower spillover credit. An example would be Res QI/QM and the principle that older programs are more likely to produce significant spillover. We agree with this principle, and would point out that the fact that Residential QI/QM are effectively new programs would seem to limit their likely initial spillover effects. (We do agree that these programs have greater spillover potential over the longer term, but this exercise is focused primarily on producing spillover estimates for the 2013-2014 cycle.)

IOU Response: The reviewers should recognize that quantifying the individual contribution of all these factors is an exercise not plausible given the lack of data needed and the level at which it is needed. Again, this was not at exercise to strive for accuracy but rather one to obtain reasonable estimates grounded in plausible ranges and supported by the underlying program logic and theory. The alternative was to abandon this level of investigation and select the lowest possible estimate and apply it across the entire portfolio. In order to arrive even at such a number, the IOUs chose a bottom up approach. The IOUs will incorporate to the extent possible these factors in justifying the expected spillover. The IOUs note that estimates of expected spillover might decrease to the point where it they longer have a meaningful impact on the TRC of the portfolio or key programs and are, therefore, not worth pursuing.

ED Comment: Concurrent Versus Cumulative Spillover – As we discussed in the question and answer session on May 24, given the current regulatory framework, we believe it will be important to attempt to isolate spillover that is *caused* to occur within the 2013-2014 program cycle, a focus that might be called concurrent spillover. Concurrent spillover is generally likely to be lower than cumulative spillover. We believe the current discussion generally does not grapple with this issue.

IOU Response: We would urge the Commission to address this policy issue, especially in this first round of a concerted effort to estimate spillover from of California efficiency programs in the 2013-2014 cycle. Any such effort will need to grapple with this issue of concurrent and cumulative effects; otherwise it will have a fate that of the CFL Market Effects study which came close to finding and quantify CFL market effects right up to the point of 2008 when those effects just vanished due to a "concurrent" measurement problem that is hard to handle without a good understanding of the cumulative effects.

ED Comment: Handling of Costs in the TRC – There has been a lot of effort to make the E3 calculator rigorous and consistent. While it would simplify the filing for the 2013-2014 transition cycle, it isn't accurate to off-set free-ridership TRC costs with Spillover costs. (This is the impact of using the NTGR –spillover adjusted in the formulae). Because of the way that free-ridership costs are handled in the Standard Practice Manual (with addendum), they do not include the cost incurred by the free-riding consumer, only the incentive costs, which is generally a fraction of the incremental costs. On the other hand the spillover TRC costs include the whole incremental measure cost, even if it is paid by the consumer, not the utility. The smaller the fraction of the incremental cost met by the incentive the less equivalent the FR and SO costs are. It would be best that the submitted calculation reflect this, but, if not, the submission should indicate that what is submitted is just intended to meet the needs of the transition period, and that the SO cost issue would be addressed in the next revisions of the E3.

The utilities should address the issues of cost versus energy adjustments for market effects and show discuss how adjustment to energy savings should be applied to costs to ensure capture into the TRC of the probable higher measure costs paid when program support is not involved in the market effect measure installation. Additionally, there

was no discussion by the utilities of the differential energy savings and costs of market effect installed measures compared to program measures.

IOU Response: The process for deciding how to incorporate spillover into the TRC is just the most recent example of a disturbing practice on the part of the CPUC. The development and maintenance of the Standard Practice Manual (SPM) has a long history that has traditionally involved various stakeholders. Recently, however, changes in the E3 Calculator have been made by the ED with little or no documentation. Examples include: (1) the adjustment for rebates paid to free riders; (2) the dual baseline; and, most recently, (3) the inclusion of spillover, and 4) the proposed changes to the E3 calculator that would re-characterize "excess incentives" as administrative costs.

The issue of adjusting costs to account for incentives paid to free riders at least was addressed in the 2007 SPM Clarification Memo (D.07-09-043, Mimeo pp. 154-158). However, with respect to the dual baseline, while the August 2008 of the Energy Efficiency Policy Manual makes it clear that cases of early replacement must be addressed using a dual baseline approach, there is as yet no mention of this in SPM, the California Protocols or E3 documentation. IOUs and other stakeholders have never even been asked to participate in these discussions and have never even been asked to comment on this issue. The exploration of how spillover can be included in the benefit-cost calculations also had no involvement of these stakeholders. Finally, with respect to the issue of excess incentives, these changes seem to be based on an interpretation of a cost-effectiveness rule that is not well understood by stakeholders. The IOU teams who are closest to this issue are concerned that this may negatively impact the cost-effectiveness for emerging technologies programs just at the time when those programs are being called upon to take a larger role in the portfolio.

For now, the IOUs are requesting that the spillover-adjusted NTGR be used to adjust both the incremental costs and incentives paid to free riders (see Equation 3 in Report). This adjustment is intended for use during the transition period, 2013-2014. Regarding the excess incentives issue, the IOUs propose not to make this adjustment in 2013-2014 transition period until it can be addressed in a more collaborative way involving all relevant stakeholders and in time for the 2015-2017 cycle. The eventual resolution of all these issues listed above should be reflected in revised and thoroughly documented versions of the Energy Efficiency Policy Manual, the SPM and the California Protocols.

Regarding the issue raised of differential energy savings and costs of installed spillover measures compared to program measures, the IOUs have made it clear that, given the serious time constraints, they are assuming that the spillover measure savings and costs are the same as the program measure savings and costs even though the spillover measures may or may not be the same as the program eligible measure. More rigorous methods can be used in the future to obtain more accurate spillover savings and cost data.

ED Comment: Handling of Market Effects Adjustment to Currently Adopted NTG Values – The utilities need to discuss the applicability of a market effects "adder" versus "multiplier" on existing NTG (net-of-free rider) values. They proposed

NTGnew = NTGfr + NTGme rather than NTGnew = NTGfr × (1 + NTGme) or other possible formulations. In other words, are any adopted market effects to be applied as a upwards adjustment to the *ex ante* or evaluated net or net versus gross savings?

IOU Response: The adjustments are made only to the net-to-gross ratio (NTGR) and include only inside participant spillover (ISO), outside participant spillover (OSO) and non-participant spillover (NPSO). Other effects in the market are not considered. The IOUs have chosen a spillover *adder* rather than a *multiplier*. The explanation is provided in the report.

ED Comment: Are the proposed market effects adjustment weighted to properly account for free-riders among the participants from whom the effects were developed? Similarly, are the non-participant effects proposed (especially those derived from other jurisdictions) properly adjusted to account for free riders in the California environment considering the larger scope/size of California programs?

IOU Response: In the studies reviewed, the market effects, both participant and non-participant, were net (i.e., they had been adjusted using a separate spillover NTGR).

5. Final Proposed Spillover Rates

Table 3 presents those programs for which the initial spillover rates have been lowered based on based on additional IOU analyses and ED feedback. In addition, the IOUs continue to be sensitive to concerns shared by both the IOUs and the ED about the accuracy of spillover estimates reported by NYSERDA. As a result, while the IOUs relied on a number of NYSERDA studies, they continued to assign them a lower weight. Table 4 presents the final proposed spillover rates for each selected program. Note that while the spillover rates for both the Upstream Lighting Program (Spiral CFLs 3 watts or less) and the Residential New Construction Program have been reduced to zero, the IOUs believe that the spillover rates of 25 percent and 30 percent, respectively, are not implausible and that the expected TRCs for these two programs absent these spillover impacts will be substantially underestimated.

TABLE 3
ORIGINAL AND REVISED SPILLOVER RATES, BY PROGRAM

Program	Original Spillover Rate	Revised Spillover Rate
HVAC Q/I	20%	15%
HVAC Q/M	20%	15%
Upstream Lighting (Spiral CFLs 30 Watts or less)	25%	0%
Residential New Construction	30%	0%
Plug Load (BCE) – Upstream and Midstream	25%	10%
Plug Load (HEER) – Downstream	25%	10%
Whole House – Advanced	25%	20%

Note that the justifications for spillover for the programs presented in Appendix A are brief and that more complete justifications are provided in the program logic models and theories included in Appendix C – Program Implementation Plans (PIP).

TABLE 4
PROPOSED SPILLOVER RATES, BY PROGRAM

Program Area	Program	Working Team		Basis for Hypothesized Spillover (program logic, research-supported)	Spillover Estimates - Range and/or estimates	Applicable References with Page Numbers	DEER/ Workpaper NTG	Proposed Spillover Estimate	Spillover-Adjusted NTGR=(1-FR)+SO
HVAC	HVAC Upstream Equipment (Electric & Gas)	Brett Close 626-302-0620	Derek Jones 415-973-9048	PTLM/Research	13% to 21%	IDs: 14, 39	0.85	0.10	0.95
	HVAC QI (Electric & Gas)	Brett Close 626-302-0620	Derek Jones 415-973-9048	PTLM	None Available	n/a	0.6	0.15	0.75
	HVAC QM (Electric & Gas)	Brett Close 626-302-0620	Derek Jones 415-973-9048	PTLM	None Available	n/a	0.85	0.15	1.00

TABLE 4
PROPOSED SPILLOVER RATES, BY PROGRAM
(CONTINUED)

Program Area	Program	Working Team		Basis for Hypothesized Spillover (program logic, research-supported)	Spillover Estimates - Range and/or estimates	Applicable References with Page Numbers	DEER/ Workpaper NTG	Proposed Spillover Estimate	Spillover-Adjusted NTGR=(1-FR)+SO
Residential Lighting	Upstream Lighting (Spiral CFLs 30 Watts or less) (Electric)	Caroline Chen 619-423-1512	Brian Smith 415-973-1180	PTLM/Research	0% to 79%	IDs: 46, 47, 48, 50, 51, 52, 53, 55	0.54	0%	0.54
	Upstream Lighting (All else) (Electric)	Caroline Chen 619-423-1512	Brian Smith 415-973-1180	PTLM/Research	0% to 79%	IDs: 46, 47, 48, 50, 51, 52, 53, 55	0.85	0.25	1.10
C/I Lighting	Lighting (Deemed and calculated) (Electric)	Caroline Chen 619-423-1512	Brian Smith 415-973-1180	PTLM/Research	23% to 49%	IDs: 28, 29, 30	0.70	0.35	1.05
New Construction	Savings by Design (Electric & Gas)	Dan Hopper 626-302-0626	Rob Kasman 415-973-4094	PTLM/Research	6% to 43%	IDs: 1, 22, 23, 24, 37	0.60	0.10	0.70
	Res New Construction (Electric & Gas)	Dan Hopper 626-302-0626	Rob Kasman 415-973-4094	PTLM/Research	6% to 51%	IDs: 41, 45, 56	0.55	0%	0.55

TABLE 4
PROPOSED SPILLOVER RATES, BY PROGRAM
(CONTINUED)

Program Area	Program	Working Team		Basis for Hypothesized Spillover (program logic, research-supported)	Spillover Estimates - Range and/or estimates	Applicable References with Page Numbers	DEER/ Workpaper NTG	Proposed Spillover Estimate	Spillover-Adjusted NTGR=(1-FR)+ SO
Calculated	Industrial (Electric)	Reggie Wilkins 626-302-0640	Rob Kasman 415-973-4094 Rafael Friedman 415-972-5799	PTLM/Research	0% to 39%	IDs: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38	0.60	0.20	0.80
	Industrial (Gas)	Reggie Wilkins 626-302-0640	Rob Kasman 415-973-4094 Rafael Friedman 415-972-5799	PTLM/Research	0% to 39%	IDs: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38	0.50	0.20	0.70
	Agriculture (Electric & Gas)	Reggie Wilkins 626-302-0640	Rob Kasman 415-973-4094 Rafael Friedman 415-972-5799	PTLM/Research	30%	IDs: 15	0.60	0.25	0.85
	Commercial (Electric)	Reggie Wilkins 626-302-0640	Rob Kasman 415-973-4094 Rafael Friedman 415-972-5799	PTLM/Research	0% to 39%	IDs: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38	0.60	0.10	0.70
	Commercial (Gas)	Reggie Wilkins 626-302-0640	Rob Kasman 415-973-4094 Rafael Friedman 415-972-5799	PTLM/Research	0% to 39%	IDs: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38	0.50	0.10	0.60
Deemed	Industrial (Electric & Gas)	Reggie Wilkins 626-302-0640	Rob Kasman 415-973-4094 Rafael Friedman 415-972-5799	PTLM/Research	0% to 39%	IDs: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38	0.60	0.25	0.85
	Agriculture (Electric & Gas)	Reggie Wilkins 626-302-0640	Rob Kasman 415-973-4094 Rafael Friedman 415-972-5799	PTLM/Research	High	IDs: 15	0.60	0.25	0.85
	Commercial (Electric & Gas)	Reggie Wilkins 626-302-0640	Rob Kasman 415-973-4094 Rafael Friedman 415-972-5799	PTLM/Research	0% to 39%	IDs: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38	0.60	0.05	0.65

TABLE 4
PROPOSED SPILLOVER RATES, BY PROGRAM
(CONTINUED)

Program Area	Program	Working Team		Basis for Hypothesized Spillover (program logic, research-supported)	Spillover Estimates - Range and/or estimates	Applicable References with Page Numbers	DEER/ Workpaper NTG	Proposed Spillover Estimate	Spillover-Adjusted NTGR=(1-FR)+SO
Plug Load	BCE (Electric)	Caroline Chen 619-423-1512	Andy Fessel 415-973-6236	PTLM/Research	2.5% to 24%	IDs: 57, 58, 59	0.60	0.10	0.70
	HEER (Electric & Gas)	Caroline Chen 619-423-1512	Andy Fessel 415-973-6236	PTLM/Research	2.5% to 24%	IDs: 57, 58, 59	0.55	0.10	0.65
Whole House - Advanced	Residential (Electric & Gas)	Caroline Chen 619-423-1512	Andy Fessel 415-973-6236	PTLM	19%	IDs: 49	0.85	0.20	1.05

C. Why Non-Resource Programs Spillover Matters

Non-resource programs are those that, while not claiming energy and demand impacts, nevertheless achieve them. A key example is the Workforce Education and Training (WE&T) Program. While Table 2 only lists a selection of resource acquisition programs for proposed spillover estimates, non-resource programs could not be included given available limited time and that no prior savings and NTGR estimates are available for the IOU non-resource programs. However, the IOUs believe that participant and non-participant spillover can and should be attributed to non-resource programs.

This Program can potentially have substantial spillover. For example, workforce education programs prepare professionals to better incorporate energy efficiency options into the design, construction and/or operation of buildings, production systems and facilities. The knowledge gained through training can also affect not only the building in which a trainee works but other buildings owned by the company. In addition, this knowledge and these practices can spread to other customers through word-of-mouth or other means such as conferences and newsletters. As a result of this training, a company might decide to participate in a utility-sponsored rebate program, the savings from which are credited to the rebate program. However, the customer might choose to install these measures in one or more of the company's buildings outside the program. Once exposed through the same channels mentioned above, non-participants might also install these measures outside the program. Eventually, the entire market will adjust to offer more services and products given the heightened market pull for these. Thus, both participant and non-participant spillover can be significant in non-resource programs.

While the IOUs have not proposed a specific spillover rate for such non-resource programs, they urge the ED to allocate a reasonable amount of impact evaluation resources to estimating their spillover impacts.

D. Conclusions

The IOUs understand that this is just the starting point and look forward to working with the ED to improve programs designed to produce spillover, market effects and eventually transformed markets as well as effective methods for estimating these impacts.

Going forward, more work could be done by the impact evaluation teams to empirically estimate *ex post* spillover impacts. To help assess whether the estimated *ex post* estimates are in the plausible range, it might be useful for the impact team to conduct a more rigorous mapping of identified studies to the California *ex post* estimates. It would also help if there were CPUC-approved methods for estimating spillover. Unfortunately, while California EM&V Protocols contain methods for estimating market effects at the market level, there are no CPUC-adopted protocols for estimating participant and non-participant spillover. Such a protocol should be prepared, reviewed and eventually incorporated into the existing California EM&V Protocols. These protocols should specify the various levels of rigor and clearly describe what would constitute credible evidence for spillover impacts.

Appendix A: Summary Justifications for Proposed Spillover Rates

In this Appendix, basic information about each program as well as the logic and justification for spillover are presented. For each program, a more detailed and comprehensive explanation of the program logic and underlying theory supporting spillover is presented in the IOU program implementation plans (PIPs) for the 2013-2014 cycle.

Program Name:	HVAC Upstream Equipment
Program Sector:	Commercial (i.e., Residential, Commercial, Industrial, Agriculture, etc.)
Description of the Program	The program provides incentives to HVAC distributors to stock efficient equipment so that it is available when customers need it, rather than forcing them to wait for a unit to be ordered. This is meant to overcome the standard practice among HVAC distributors of not stocking high-efficiency HVAC equipment because it does not tend to sell as quickly. Thus, the program effectively pays the carrying cost for distributors of keeping the equipment on hand.
Logic for this Spillover Effect	This program is likely to have spillover due to market effects relating to the stocking practices of HVAC equipment distributors, and possibly HVAC manufacturers. By increasing the availability of high-efficiency HVAC equipment, sales of these types of units increase. This in turn is likely to have positive effects on the availability and pricing of high-efficiency units. This effect has not been quantified. Another effect is the spillover effect due to the experience of end-users. A PG&E study from 1997 estimated between 13% and 21% spillover from an HVAC equipment program due to increased uptake outside the program. This is the source of our estimate.
Justification for Spillover Claim	PG&E found a 13% spillover in an HVAC equipment program from the 1990s based on self-report, and found 21% in the same program using a discrete choice methodology. A program in Vermont found evidence of significant spillover in their HVAC equipment program, but did not quantify this level. Based on this evidence, we suggest a 10% ex-ante spillover estimate.
Attached other support material	See Appendix B.

Program Name:	Residential ENERGY STAR HVAC Quality Installation
Program Sector:	Residential
Description of the Program	This program provides incentives for homeowners to engage well-qualified contractors to perform high-quality installation of new energy-efficient air conditioners. Through that process, it provides ongoing training for HVAC technicians in doing high quality work that meets industry standards.
Logic for this Spillover Effect	This program is likely to have spillover primarily from the improved capabilities of contracting firms that participate in the program. The program provides initial training in meeting industry standards for quality installation as well as ongoing training in the field to deal with real-world challenges of quality installation. This is likely to improve the quality of work done by these firms outside the program, as well as reduce their costs. It may also demonstrate a value proposition from quality installation that leads other firms to adopt these practices. Additionally, this program may have participant spillover effects in providing evidence of the value of energy efficiency that leads customers to undertake other efficiency improvements outside of energy efficiency programs.
Justification for Spillover Claim	We found no estimate of the effects of spillover in such programs, and so recommend using a default assumption of 20%. NYSERDA found in their Home Performance with Energy Star program, which takes a whole house view, but uses a very different delivery mechanism, that spillover was approximately 30%.
Attached other support material	See Appendix B.

Program Name:	Residential and Commercial HVAC Quality Maintenance
Program Sector:	Both
Description of the Program	The program provides tools and incentives to contractors and customers to engage in quality maintenance practices to ensure HVAC systems meet customer goals for energy efficiency, indoor air quality, and thermal comfort. There is an incentive for signing a maintenance agreement that encourages a long-term viable business relationship between the contractor and the customer. There are also incentives for conducting maintenance activities to meet the performance criteria set out in the maintenance agreement. The program has also taken industry maintenance standards and operationalized them in tools that contractors can use to guide them in performing quality maintenance.
Logic for this Spillover Effect	The predominant practice for residential and small commercial maintenance is addressing acute system failures through short-term business relationships. The program tries to change that both by encouraging a longer-term business relationship between the contractor and the customer and providing the basis for a value proposition around which quality work can be done, rather than a focus on lowest price. The program also provides tools that help contractors do their work better, both in terms of selling quality maintenance and in performing quality maintenance. This is likely to cause spillover to non-participants through contractors implementing these practices on other projects and at lower cost. It may also demonstrate a value proposition from quality installation that leads other firms to adopt these practices.
Justification for Spillover Claim	We do not currently have a quantitative estimate of the amount of spillover. But due to the mechanism of the programs, especially with respect to the standard practice, are confident that there is substantial spillover from these programs. We recommend using a default value of 20%.
Attached other support material	See Appendix B.

Program Name:	Residential Lighting (Primary Lighting Incentive Program)
Program Sector:	R/C/I/A & Outdoor
Description of the Program	The Primary Incentive Lighting Program is a combination of residential upstream lighting and all other lighting measures from the down-stream and non-residential portfolio. This program is now cross-cutting and may include up-stream, mid-stream and down-stream program elements for implementation. For 2013-2014, this program will work in conjunction with Lighting ETP activities, Lighting Market Transformation sub-program and Lighting Innovation sub-program. The Primary Lighting Incentive Sub-program is the only resource element of the lighting programs.
Logic for this Spillover Effect	For the purpose of this spillover analysis, the IOUs reviewed a range of studies from California and non-California jurisdictions. This work was not exhaustive but it serves the purpose to show a range of spillover effects from various states and programs. To focus, we organized our analysis in two categories: 1) Residential CFL lighting and advanced lighting (i.e., non-CFLs), 2) Non-residential lighting. Generally speaking, the California residential lighting program has been dominated by the upstream lighting program design. In such program design, the entire lighting distribution chain is involved to deliver products/measures to the consumers: • Manufacturers – participating in the buy-down program, making product affordable, available, and effective, • Retailers/distributors – participating in the program to provide shelf space, marketing signage and store detailing, sales staff training • The consumers – receiving mass marketing messaging from program such as Marketing education and outreach (MEO) and other program specific marketing initiatives. By the virtual of involving every element of manufacturing and distribution chain, the upstream lighting program is designed to have spillover effects. These market actors and participants would build the factory capacity and retail channels to produce and distribute products to serve program participants' and non-participants' needs. For the non-residential lighting, a number of market actors would be involved, depending on the size of renovation project. For a small scale renovation project, only the distributor and contractor may be involved. For a large-scale renovation project, the manufacturer, distributor, contractor, electrical engineer, and architect may all be involved. As part of this process, all the market actors will learn about the new non-residential products/services to meet the needs of the program participants and non-participants.
Justification for Spillover Claim	<u>Residential Lighting:</u> For residential lighting, we focused on CFL vs. advanced (i.e., all else) lighting types. We have reviewed studies from NYSERDA, Massachusetts, Vermont, Maine, and California.

	• The range of spillover effect: 0% to 79%. In this range, NYSERDA is the highest at 79% and California is the lowest with 0%. For the other three states, the spillover effect ranges from 23% to 46%. **Non-Residential Lighting:** For Non-residential lighting, the IOUs reviewed two study sources: NYSERDA and California's High-Bay Lighting Study. • The range of spillover effect: 15% to 49%.
Attached other support material	See Appendix B.

Program Name:	Non-Residential New Construction (Savings By Design)
Program Sector:	Non-Residential
Description of the Program	The Nonresidential new construction program is designed to reduce the electric and therm needs of new and expanding commercial, industrial, and agricultural facilities in the IOU service territory. It offers a full spectrum of support to building owners, architects, engineers, and other specialized consultants by providing the tools and information necessary to achieve optimum energy and resource efficiency in their projects.
Logic for this Spillover Effect	By providing multi- level design, technical, and financial assistance to influence the basic design of a customer's project, the program focused intervention minimizes lost opportunities that may result when a building's performance is not a primary consideration in the design of a project. The program design applies incentives to offset increased design costs rather than increased construction costs. The program logic anticipates that the training/certification component of the program prepares design professionals to lead and facilitate an integrated design process with the goal of enhanced energy and resource efficiency into the majority of their projects. Its Design Assistance (DA) services have proven successful over the past many years in providing energy calculations, design facilitation, and energy recommendations that provide the guidance and information building owners need to make well-informed design and construction decisions for their facilities. In many cases building owners find that design assistance services is the main influencer in their including energy efficient options in their building, even more influential than a direct incentive. These assistance services make the program have potentially wider program impacts on other building projects than just the participating projects.
Justification for Spillover Claim	Since there were no recent CA studies for this program that estimated spillover, we explored pre-2004-05 impact studies and NYSERDA New Construction studies from 2005 through 2008 that estimated spillover. According to the most recent California study – the 2003 BEA conducted by RLW in 2005 http://www.calmac.org/publications/BEA_2003_Final_Report__080105_.pdf, On Page 2 Table 1, 11 % of the gross savings were due to participant spillover savings. Page 6 reports that the non-participant spillover savings are added to the net participant savings and are used to calculate the comprehensive net-to-gross ratio. Table 4 in the report provides the non-participant spillover estimated to be 96MWh, which the report notes to be much lower than the 6,401 MWh reported in the 2002 program year. Taking this lower non-participant spillover savings and adding to the participant net savings then provides what the report calls a comprehensive NTG in Table 31 on page 37 for 76.2% for commercial projects and 59.0% for industrial projects. This spillover is inclusive of the participant inside spillover, which is 11 % of the gross savings. Hence with the small 1% NP spillover and the 11 percent participant spillover, the total spillover can be calculated to be 12%. Using similar approach in 2002 RLW study http://www.calmac.org/publications/BEA_2002_Final_Report.pdf

	Page 1 provides participant spillover to be 13% of the gross savings and on page 5 table 5 data, 6,401 MWh of energy savings was estimated for the NP spillover, which is 5 % of the gross savings. Since participant spillover was in each study included the gross savings during each year the spillover we will only be considering the non-participant spillover in our prosed spillover for the Savings By Design program. The non-participant spillover for the Savings By Design program from the BEA studies and the 2008 NYSERDA New Construction Program we reviewed were as follows: 1999-2001 : 23% 2002 : 6% 2003 : 1% NYSERDA : 85% Given that these are older studies, we propose using 50% of the California Spillover estimates, and 30% of the NYSERDA estimates (also since NYSERDA is both out of state and may not closely reflect the current program offerings or new construction market characteristics of California), and taking a simple average of these to determine proposed spillover rate for the 2013-14 Savings by Design Program. This estimation process results in a Non-participant spillover rate of 0.1 for the SBD program.
Attached other support material	See Appendix B.

Program Name:	Residential New Construction
Program Sector:	Residential
Description of the Program	Residential New Construction program is an award-winning performance-based program that encourages and assists builders to incorporate energy efficient technologies and design in the homes they construct to exceed the California Title 24 Energy Efficiency Standards by a minimum of 15%. The program provides financial incentives, education, and marketing assistance to California builders who construct new residences that exceed the state's mandatory minimum energy efficiency standards. The program targets single family production builders and multifamily developers.
Logic for this Spillover Effect	The RNC Program relies on direct and induced indirect effects on the participant builders and other market actors through participating projects and beyond those projects, nonparticipant projects including changes in energy efficiency of non-participating new homes, changes in education and actions of non-participant builders, etc. The program would be expected to indirectly influence non-participant builders to upgrade their energy practices because of the influence of the program on the market. The program's logic would postulate that through the knowledge of this program even non-participant builders could be encouraged to incorporate more efficient practices into their projects because of the combined forces of competition with other builders, demand for efficiency in the market, indirect education on the benefits and costs, and on efficient design practices, etc.
Justification for Spillover Claim	Two CA studies are directly relevant to this program. A more recent RNC Market Effects study http://www.calmac.org/publications/RNC_mkt_effects_Phase_2_report_final_120610-ID.pdf (Page xx-xxi) that concluded that nonparticipant spillover savings are large and quantifiable, but they overlap with the gross standard savings from the Codes and Standards evaluation. A Delphi panel estimated that the 2006-2008 and pre-2006 IOU programs taken together account for nearly half of gross electricity and natural gas savings in above-code non-program homes. This large non-participant spillover impact matches with another CA study on new homes that specifically calculated this estimate. On Pg. 15 of http://www.calmac.org/publications/Final_Version_of_04-05_CAESNH_report.pdf, the report says that if spillover and market effects could be fully accounted for, which would constitutes savings net of the combined effects of free ridership and indirect spillover effects, we might expect the NTG ratio to be as high as 0.63 (between 0.55 to 0.71) for MF. For SF, the calculations are not provided explicitly but can be deduced from various pieces of information and data in the report. On Page 73, the report says that if the program represents 5% of the market for new homes, then the NP spillover factor to be applied to the program would be a multiplier of 0.06 or if 10% of the market, the multiplier would be 0.12(see Table 31 for correct correspondence as there is error in the text). According to a 2011 EPA news release http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/03b5c89a8f316a8d852579110055ebef%21OpenDocument the Energy Star Homes reached a share of 25 percent. Using this correspondence

	data, we then estimate a NP spillover multiplier would be 0.30 (i.e., 1.2=x/0.25 where 1.2 is factor derived from reported correspondence between market share and NP spillover factor 0.06/0.05=1.2=0.12/0.10). The report in Table 31 seems to add this NP spillover factor to (1+ S+NPSO). While the study used data from builder's interviews, another approach used by RLW for the same program assessed the nonparticipant spillover estimates and hence net savings of the RNC program. The RLW memo on RNC spillover (see in the supporting material below) on Page 5 estimated a nonparticipant inclusive NTG of 0.85 (Table 6 on Page 7). Given the current DEER net of free-ridership estimate of 0.55, this can imply a spillover of 0.30. Hence we propose a spillover of 30% for RNC, with the caveat as noted by the ME study that we need to explore how much of this spillover is already counted in the C&S program. Even if this spillover is already counted in the C&S program, it's worth noting that this improves the RNC cost effectiveness. This 30% spillover estimate is a 23% smaller than the NYSERDA estimate of 39%.
Attached other support material	See Appendix B.

Program Name:	Calculated Programs
Program Sector:	Industrial Sector
Description of the Program	The purpose of the Statewide Industrial Calculated Energy Efficiency Program is to provide services to improve the energy efficiency of industrial facilities in California, including financial incentives based on calculated energy savings. The energy savings are calculated for measures installed as recommended by comprehensive technical and design assistance for customized projects. Integrated projects are encouraged to combine energy efficiency and demand response. Eligible projects include new construction, retrofit, and retrocommissioning. The Calculated Energy Efficiency Program is part of a suite of programs within the Statewide Industrial Energy Efficiency Program. The Calculated Energy Efficiency Program is utilized for projects where: 1. A rebate is not available through the statewide Deemed Energy Savings Program, 2. Customized calculations provide the most accurate savings estimates, 3. Customized interactive effects between measures are best captured through whole building or whole system modeling. Because it presents a calculation method that can consider system and resource interactions, the program will become the preferred approach for supporting the integrated, whole system, and multi-resource management strategies of the California Long Term Energy Efficiency Strategic Plan (Strategic Plan). Key features in the process include: Energy audits of facilities and processes with recommendations for energy efficiency, demand response and greenhouse gas reductions Calculations of energy savings for exceeding Title 24 code or industry standard practice baselines Technical assistance from SCE in energy audits and calculated savings Submission of project proposal for SCE review and approval Pre-inspection by SCE for approved retrofit projects Post-inspections on approved and completed projects to verify performance Payment of incentives from SCE.
Logic for this Spillover Effect	C&I customers who participate in customized programs are subject to repeated messaging from utility representatives on the benefits of energy efficiency programs and how EE should be a normal part of business operations. Utilities position themselves as being “Trusted Energy Advisors”. This value proposition, in combination with utility core programs that feature rebates, technical assistance and cost benefit

	calculations, inspires customers to take action within, across and outside of programs and across program cycles.
Justification for Spillover Claim	A major customized offering for nonresidential customers are variable frequency drives. Programs that feature this technology have been demonstrated to provide significant and lasting savings for nonresidential customers by increasing efficient motor market share. *Commercial and Industrial Market Effects Evaluation (Summit Blue, Quantec, October 2007).* Lighting programs have also increased the share of efficient nonresidential lighting technologies. In 2006-2008, IOU programs drove combined T5 and T8 share within program areas to nearly 80% as compared with out of program areas with a share of 45%. *High Bay Lighting Market Effects Study Final Report (KEMA, Itron, June 2010) p. 14.*
Attached other support material	See Appendix B.

Program Name:	Calculated Programs
Program Sector:	Agricultural Sector
Description of the Program	The purpose of the Statewide Agriculture Calculated Energy Efficiency Program is to provide services to improve the energy efficiency of agriculture facilities in California, including financial incentives based on calculated energy savings. The energy savings are calculated for measures installed as recommended by comprehensive technical and design assistance for customized projects. Integrated projects are encouraged to combine energy efficiency and demand response. Eligible projects include new construction, retrofit, and retrocommissioning. The Calculated Energy Efficiency Program is part of a suite of programs within the Statewide Agriculture Energy Efficiency Program. The Calculated Energy Efficiency Program is utilized for projects where: a rebate is not available through the statewide Deemed Energy Savings Program, customized calculations provide the most accurate savings estimates, or interactive effects between measures are best captured through whole building or whole system modeling. Because it presents a calculation method that can consider system and resource interactions, the program will become the preferred approach for supporting the integrated, whole system, and multi-resource management strategies of the Strategic Plan. Key features in the process include: • Energy audits of facilities and processes which recommend efficient design alternatives and detailing energy savings and CO2 reductions • Calculations of energy savings for exceeding Title 24 code or industry standard practice baselines • Technical assistance from SCE in energy audits and calculated savings • Submission of project proposals for SCE review and approval • Pre-inspection by SCE for approved retrofit projects • Post-inspections on approved and completed projects to verify performance • Payment of incentives from SCE.
Logic for this Spillover Effect	Agricultural customers who participate in customized programs are subject to repeated messaging from utility representatives on the benefits of energy efficiency programs and how EE should be a normal part of business operations. Utilities position themselves as being "Trusted Energy Advisors". This value proposition, in combination with utility core programs that feature rebates, technical assistance and cost benefit calculations, inspires customers to take action within, across and outside of programs and across program cycles.
Justification for Spillover Claim	A major customized offering for nonresidential customers are variable frequency drives. Programs that feature this technology have been demonstrated to provide significant and lasting savings for nonresidential customers by increasing efficient motor market share.

	Commercial and Industrial Market Effects Evaluation (Summit Blue, Quantec, October 2007). Lighting programs have also increased the share of efficient nonresidential lighting technologies. In 2006-2008, IOU programs drove combined T5 and T8 share within program areas to nearly 80% as compared with out of program areas with a share of 45%. *High Bay Lighting Market Effects Study Final Report (KEMA, Itron, June 2010*) p. 14.
Attached other support material	See Appendix B.

Program Name:	Calculated Programs
Program Sector:	Commercial Sector
Description of the Program	The Statewide Commercial Calculated Incentives sub-program provides customers technical and calculation assistance, as well as incentives based on calculated savings, to influence the design and installation of energy efficient equipment and systems in both retrofit and added load applications. The Calculated Incentives sub-program is utilized for projects where a rebate is not available through the Statewide Deemed program, where project conditions require customized calculations to provide the most accurate savings estimates, or where a project has interactive effects that are best captured through whole building or whole system modeling. Because calculated savings estimates are based on actual customer operating conditions, pre-inspections (for retrofit projects) and post-inspections are typically required as part of each utility's project documentation. An important element of the Calculated Incentives sub-program is the design assistance and calculation assistance provided by the IOUs to influence customers to select the most efficient design and equipment options. For both retrofit and added load projects, IOUs work with the customer and their project team to evaluate their proposed projects and provide a report recommending efficient design alternatives and detailing energy savings, CO2 reductions, and calculated incentives available for exceeding Title 24 code or industry standard practice baselines as appropriate. The combination of technical support and the availability and commitment of approved utility incentive funds is an essential driver to overcome key customer barriers, including lack of technical resources and lack of capital for energy efficiency projects.
Logic for this Spillover Effect	C&I customers who participate in customized programs are subject to repeated messaging from utility representatives on the benefits of energy efficiency programs and how EE should be a normal part of business operations. Utilities position themselves as being "Trusted Energy Advisors". This value proposition, in combination with utility core programs that feature rebates, technical assistance and cost benefit calculations, inspires customers to take action within, across and outside of programs and across program cycles.
Justification for Spillover Claim	A major customized offering for nonresidential customers are variable frequency drives. Programs that feature this technology have been demonstrated to provide significant and lasting savings for nonresidential customers by increasing efficient motor market share. *Commercial and Industrial Market Effects Evaluation (Summit Blue, Quantec, October 2007).* Lighting programs have also increased the share of efficient nonresidential lighting technologies. In 2006-2008, IOU programs drove combined T5 and T8 share within program areas to nearly 80% as compared with out of program areas with a share of 45%. *High Bay*

	Lighting Market Effects Study Final Report (KEMA, Itron, June 2010) p. 14.
Attached other support material	See Appendix B.

Program Name:	Deemed Programs
Program Sector:	Industrial Sector
Description of the Program	The purpose of the Statewide Industrial Deemed Energy Efficiency Program is to provide services to improve the energy efficiency of industrial facilities in California, including financial incentives based on deemed energy savings. The energy savings are deemed for measures installed. Integrated projects are encouraged to combine energy efficiency and demand response. The Industrial Deemed Energy Efficiency Program is part of a suite of programs within the Statewide Industrial Energy Efficiency Program. Key features of the program include: • Information and technical assistance from SCE on energy efficiency measures and savings potential • Application via mail, fax, internet and phone by customer for eligible measures • Reservation of financial incentives by SCE, if requested by customer • Pre- and post-installation inspection by SCE, as determined by SCE based on prior participation and other factors • Payment of incentives from SCE.
Logic for this Spillover Effect	Lighting programs have increased the share of efficient nonresidential lighting technologies. In 2006-2008, IOU programs drove combined T5 and T8 share within program areas to nearly 80% as compared with out of program areas with a share of 45%. High Bay Lighting Market Effects Study Final Report (KEMA, Itron, June 2010) p. 14. Deemed programs delivery considerable lighting projects to all customer segments and therefore contribute to substantial market transformation.
Justification for Spillover Claim	High Bay Lighting Market Effects Study Final Report (KEMA, Itron, June 2010).See Appendix B.

Program Name:	Deemed Programs
Program Sector:	Agricultural Sector
Description of the Program	The purpose of the Statewide Agriculture Deemed Energy Efficiency Program is to provide services to improve the energy efficiency of agriculture facilities in California, including financial incentives based on deemed energy savings. The energy savings are deemed for installed measures. Integrated projects are encouraged to combine energy efficiency and demand response. The Agriculture Deemed Energy Efficiency Program is part of a suite of programs within the Statewide Agriculture Energy Efficiency Program. Key features of the program include: • Information and technical assistance from SCE on energy efficiency measures and savings potential • Application via mail, fax, internet and phone by customer for eligible measures • Reservation of financial incentives by SCE, if requested by customer • Pre- and post-installation inspection by SCE, as determined by SCE based on prior participation and other factors • Payment of incentives from SCE.
Logic for this Spillover Effect	Lighting programs have increased the share of efficient nonresidential lighting technologies. In 2006-2008, IOU programs drove combined T5 and T8 share within program areas to nearly 80% as compared with out of program areas with a share of 45%. High Bay Lighting Market Effects Study Final Report (KEMA, Itron, June 2010) p. 14. Deemed programs deliver considerable lighting projects to all customer segments and therefore contribute to substantial market transformation.
Justification for Spillover Claim	High Bay Lighting Market Effects Study Final Report (KEMA, Itron, June 2010). See Appendix B.

Program Name:	Deemed Programs
Program Sector:	Commercial Sector
Description of the Program	The Statewide Commercial Deemed Incentives sub-program provides rebates for the installation of new energy efficient equipment. Deemed retrofit measures have prescribed energy savings and incentive amounts and are generally intended for projects that have well defined energy and demand savings estimates (i.e., T12 to T8 replacements). The Deemed Incentive mechanism is designed to help influence the installation of energy efficient equipment and systems in both retrofit and added load applications by: • Reducing the initial purchase costs of such equipment, and • Reducing the inconvenience of participating in utility rebate programs by offering a simple application process. The Deemed Incentives sub-program directly addresses key market factors that lead to higher energy costs for California businesses. Providing a menu of prescribed common measures simplifies the process of reviewing project proposals and provides a "per-widget" rebate that reduces the cost of retrofitting outdated and inefficient equipment. This sub-program makes it attractive for customers to spend money in the short-run in order to achieve lower energy costs in the long run.
Logic for this Spillover Effect	Lighting programs have increased the share of efficient nonresidential lighting technologies. In 2006-2008, IOU programs drove combined T5 and T8 share within program areas to nearly 80% as compared with out of program areas with a share of 45%. High Bay Lighting Market Effects Study Final Report (KEMA, Itron, June 2010) p. 14. Deemed programs deliver considerable lighting projects to all customer segments and therefore contribute to substantial market transformation.
Justification for Spillover Claim	High Bay Lighting Market Effects Study Final Report (KEMA, Itron, June 2010) See Appendix B.

Program Name:	Plug Load & Appliances (formally known as Business Consumer Electronics (BCE) & Home Energy Efficiency Rebate Programs (HEER))
Program Sector:	Residential
Description of the Program	Both BCE and HEER programs leverage Energy Star label and standards heavily. These programs are designed to pursue energy savings that is above and beyond the Energy Star standards (i.e., 20% above Energy Star refrigerators). BCE is designed as a mid-stream incentive program where the retailers would receive the incentive for the qualifying products and will have the motivation to change their stocking practice to make these highly efficient products/measures more readily available. In this program design, the incentive is not pass-through to the purchasers. HEER program is designed to offer end-users incentives to motivate the above code energy efficiency purchases of major appliances for the household. In this program design, additional market actors may be involved, depending on if adoption of these measures would require installation efforts. For example, a variable-speed pool pump may require a pool contractor to perform the installation as well as the necessary programming. Together, these two programs address all enduse-specific and miscellaneous plug load measures within the households.
Logic for this Spillover Effect	Please include a short description of the logic links for spillover effects Both of these program shares the following touch points: • DOE Energy Star, • Manufacturers, • Retailers/Distributors, and some value-added resellers • Contractors • End-users For the BCE program, the retailers are typically staffed with national buyers; the program impact on retailers' stocking behavior is often national rather than just limited to the state of California. For the HEER program, the program influences both the retailers and contractors' stocking behaviors and selling practices. Likewise, the manufacturers are influenced by utility's incentive program design thus making above and beyond Energy Star qualified appliances a design and manufacturing priority. In summary, both BCE and HEER programs are designed to influence manufacture and retailers' build-plan and stocking behavior for program participants and non-participants. In addition, the programs influence contractor and other intermediaries that may assist

	purchasers with installation services for program participants and non-participants.
Justification for Spillover Claim	Little specific spillover estimate exist for similar Energy Star product programs. This spillover analysis is based on the results of the NYSERDA spillover study for Energy Star Products and Energy Star Bulk Purchase Program. Spillover ranges = 5% to .45% The recommended spillover effect for the plug load program is 10%.
Attached other support material	See Appendix B.

Program Name:	Whole House
Program Sector:	Residential
Description of the Program	The statewide Energy California Upgrade Whole House program offers two program tracks: (1) Basic path, with a package of deemed measures, and (2) Performance path, with the goal to meet and exceed 20% energy usage reduction in the household. Since program inception, well over 90% of program activities are in the advanced path. To participate in the advanced path, the contractor must have at least one member of his/her team qualified as BPI analyst.
Logic for this Spillover Effect	The California statewide Whole House Program was modeled after the New York's Home Performance with Energy Star Program. The California program is designed with extensive contractor support components: (1) BPI certification contractor training for contractors who wish to become BPI certified; (2) program contractor recruiting and mentoring activities. These support activities are to ensure all participating contractors meet the necessary job proficiency level to meet homeowners and IOUs program quality needs. As indicated by the 2010-2012 Whole House Process Evaluation, the number of individuals with active BPI certifications, in California, grew dramatically between January 1, 2010 and November 1, 2011. Total active certified individuals grew from 65 to 1,596. The number of certifications (individuals may have more than one type of BPI certification) grew from 88 to 2,349, in California. For SCE, the number of program participating contractor grew to over 150 in early 2012. However, majority of these contractors do not have any program jobs. In Q1/2012, the SCE program team opted to remove participating contractors with no-jobs for more than 6 months or longer. With this action, the participating program contractor dropped to about 100 contractors. When looking at the SCE program results, nearly 90% of all program jobs are completed by 8-10 contractors only.
Justification for Spillover Claim	(1) The EUC-Whole House program by design can generate spillover effects through its network of participating contractors. (2) Since the program also supports BPI certification training, the numbers of qualified contractors have grown in California as a result of its support and program availability. Range of spillover effects: 37%, based on NYSERDA We reduce the NYSERDA value by 50%. Recommend adoption of 20% for spillover effects.

Attached other support material	See Appendix B.

Appendix B: Spillover References

Nonresidential Spillover Studies and Rates

ID	Non-Residential Spillover Studies	Link to full report	Inside Spillover Rate	Outside Spillover Rate	Nonparticipant Spillover Rate	Total
1	2007 Evaluation, Measurement, and Verification Report for the Nonresidential Fenestration Certification Initiative (NFCI) #1227-04, #1496-04, #1497-04, #1498-04 Study ID: CRF0001.01	http://www.calmac.org/publications/EM&V_Final_Report_2004-05_CSUCRF_NFCI_1227-04_1496-04_1497-04_1498-04ES.pdf			37%	37%
	National Grid 2001 Commercial and Industrial Free-ridership and Spillover Study: July 2002	http://www.cee1.org/eval/db_pdf/259.pdf				
2	MA: Energy Initiative Program Participant Spillover Rates	http://www.neep.org/uploads/EMV%20Forum/EMV%20Products/Net%20Savings%20Webinar%20Presentation%2007-28-11.pdf	11.10%			11.10%
3	MA: Design 2000plus Program Participant Spillover Rates	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/109_PA_2007%20C&I%20FR%20SO.pdf	18.80%			18.80%
4	MA: Small C&I Program Participant Spillover Rates	http://www.neep.org/uploads/EMV%20Forum/EMV%20Products/Net%20Savings%20Webinar%20Presentation%2007-28-11.pdf	2.60%			2.60%
5	MA: Accelerated Application Process and Comprehensive Project Participant Rates Spillover	http://www.cee1.org/eval/db_pdf/259.pdf	10.90%			10.90%
6	MA. Nonparticipant spillover	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/109_PA_2007%20C&I%20FR%20SO.pdf			9.20%	9.20%
7	NH: Energy Initiative Program Participant Spillover Rates	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/109_PA_2007%20C&I%20FR%20SO.pdf	16.80%			16.80%
8	New Hampshire: Design 2000plus Program Participant Spillover Rates	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/109_PA_2007%20C&I%20FR%20SO.pdf	34.50%			34.50%
9	New Hampshire: : Small C&I Program Participant Spillover Rates	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/109_PA_2007%20C&I%20FR%20SO.pdf	24.50%			24.50%
	2009 Energy Efficiency Annual Report: Massachusetts Electric Company/Nantucket Electric Company: d/b/a/ National Grid. August 2010: Volume 1	http://www.nationalgridus.com/non_html/eer/ma/MECO%202009%20Annual%20Report_Vol1.pdf				
10	C/I Design 2000plus	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/109_PA_2007%20C&I%20FR%20SO.pdf				6.00%
11	C/I Energy Initiative	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/109_PA_2007%20C&I%20FR%20SO.pdf				9.00%

Nonresidential Spillover Studies and Rates (Cont.)

ID	Non-Residential Spillover Studies	Link to full report	Inside Spillover Rate	Outside Spillover Rate	Non-Participant Spillover Rate	Total
12	C/I Small Business Services	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/109_PA_2007%20C&I%20FR%20SO.pdf				2.00%
13	EVALUATION OF PACIFIC GAS & ELECTRIC COMPANY'S 1997 COMMERCIAL ENERGY EFFICIENCY INCENTIVES PROGRAM: LIGHTING TECHNOLOGIES. PG&E Study ID *number: 333A. March 1, 1999*	http://www.calmac.org/publications/19990301PGE0007LI.PDF	2.93%		7%	9.93%
14	EVALUATION OF PACIFIC GAS & ELECTRIC COMPANY'S 1997 COMMERCIAL ENERGY EFFICIENCYINCENTIVES PROGRAM: HVAC Technologies PG&E Study ID number: 333B	http://www.calmac.org/publications/19990301PGE0008LI.PDF			13.17%	13.17%
15	PROCESS EVALUATION REPORT for the 2006-08 SCE Argicultural Energy Efficiency Program. CALMAC Study ID SCE0287.01	http://www.calmac.org/results.asp?t=2				High
16	MAJOR COMMERCIAL CONTRACT GROUP VOLUME I FINAL IMPACT EVALUATION REPORT 2006-2008 PROGRAM YEARS: CPU0021.01	http://www.calmac.org/publications/Major_Commercial_2006-08_EM&V_Report_FINAL_-_VOL_1.pdf				Vey Little
17	Evaluation of the 2004-2005 Nonresidential Audit and PG&E Local Program CPUC Study IDs, 1122-04, 1248-04, 1358-04, 1465-04 CALMAC Study ID: PGE0216.01: Final	http://www.calmac.org/publications/04-05_NRA_Final_10-22-08.pdf	0%	0%	0%	0%
18	BetterBricks Building Operations Initiative Market Progress Evaluation Report #2. Prepared by TecMarket Works, Report #E08-187, 2008	http://neea.org/research/reports/E08-186.pdf				No Estimate
19	Final Report 2010 BetterBricks Market Progress Evaluation Report Funded By: NEEA. Prepared by research/into/action,	http://neea.org/research/reports/E11-222_Combined.Apdf.pdf				No Estimate
20	Light Commercial HVAC Market Assessment. Prepared for NEEA by Energy and Environmental Analysis, Inc., 2005.	http://neea.org/research/reports/143.pdf				No Estimate
21	REGIONAL BUILDING OPERATOR CERTIFICATION VENTURE; FINAL MARKET PROGRESS EVALUATION REPORT. Funded by NEEA and prepared by research/into/action, 2001	http://neea.org/research/reports/88.pdf				No Estimate
22	1999-2001 Building Efficiency Assessment Study: An Evaluation of the Savings By Design Program. Prepared for PG&E, SDG&E, and SCE. (Commercial buildings)	http://www.calmac.org/publications/BEA%20Final%20Report%20(071603).pdf			22.00%	22.00%
23	2002 Building Efficiency Assessment Study: An Evaluation of the Savings By Design Program. Prepared for PG&E, SDG&E, and SCE. (Commercial buildings)	http://www.calmac.org/publications/BEA%20Final%20Report%20(071603).pdf			6%	6.00%
24	2003 Building Efficiency Assessment Study: An Evaluation of the Savings By Design Program. Prepared for PG&E, SDG&E, and SCE. (Commercial buildings)	http://www.calmac.org/publications/BEA%20Final%20Report%20(071603).pdf	13%		5%	18.00%
25	2006-2008 Evaluation Report for PG&E Fabrication, Process and Manufacturing Contract Group CALMAC Study ID: CPU0017.01. Prepared by Itron, 2010.	http://www.calmac.org/publications/PG&E_Fab_06-08_Eval_Final_Report.pdf				0%
26	State of Wisconsin Department of Administration Division of Energy Focus on Energy Statewide Evaluation Business Programs: Participant Spillover Savings Study Final: December 22, 2005. Evaluation Contractor: PA Government Services Inc. Prepared by: Miriam L. Goldberg, Christopher Dyson, and Valy T. Goepfrich, KEMA Inc.	http://www.cee1.org/eval/db_pdf/1183.pdf		0.41%		0.41%
27	State of Wisconsin Public Service Commission of Wisconsin Business Programs Impact Evaluation Focus on Energy Evaluation Report: Last Quarter of Calendar Year 2009 and First Two Quarters of Calendar Year 2010. Prepared	http://www.focusonenergy.com/files/Document_Management_System/Evaluation/cy10bpimpactreport_evaluationreport.pdf				8% for kWH 11% for kW .002% for therms
28	(Commercial) HighBay Lighting Market Effect Study, for 2006-2008 program cycle, by KEMA, June 18, 2010, page 7. (Non-Res Lighting)	http://uc-ciee.org/downloads/High_Bay_Lighting_Market_Effects_Study.pdf				23% to 41%

Nonresidential Spillover Studies and Rates (Cont.)

ID	Non-Residential Spillover Studies	Link to full report	Inside Spillover Rate	Outside Spillover Rate	Nonparticipant Spillover Rate	Total
29	New York Energy $martSM Program Cost-Effectiveness Assessment June 2005. Prepared for the New York State Energy Research and Development Authority (NYSERDA) by Heschong Mahone Group, Inc., Ridge & Associates, and Energy and Environmental (Table 3-6, p. 22, Small Commercial Lighting Program)	http://www.nyserda.ny.gov/en/Page-Sections/Business-Partners/Commercial-Lighting/~/media/Files/EIBD/Business%20Development/Commercial%20Lighting/sclp-tech-guide.ashx				24%
30	(Commercial) New York Energy $mart" Business Partners Cumulative Annual Energy and Peak Demand Savings, NYSERDA System Benefits, 2009, page 3-7, Table 3-7.	http://www.nyserda.ny.gov/en/Programs/Program-Evaluation/~/media/Files/Publications/NYES%20Program/2010/2010q1_nyes_sbcreport.ashx				25%
31	NYSERDA (2012) *Impact Evaluation NYSERDA 2007-2009 FlexTech Program, Final Report*. March. Submitted by Megdal & Associates, LLC and ERS.	http://www.nyserda.ny.gov/Page-Sections/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2012-Reports/Impact-Evaluation.aspx	4%	30%	15%	25%
32	NYSERDA (2007) *Commercial and Industrial Market Effects Evaluation, Final Report*. October. Submitted by Summit Blue Consulting LLC and Quantec.	http://www.nyserda.ny.gov/en/Page-Sections/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2007-Reports/~/media/Files/EDPPP/Program%20Evaluation/2007ContractorReports/2007%20MCA%20Commercial%20and%20Industrial.ashx	4%	40%	14%	29%
33	NYSERDA (2005) *Commercial and Industrial Performance Program: Market Characterization, Market Assessment and Causality Evaluation: Final Report.* Submitted by Summit Blue Consulting LLC, Skumatz Economic Research Associates, Inc., and Quantec.	http://www.nyserda.ny.gov/en/Page-Sections/Program-Evaluation/NYE$-Evaluation-and-Status-Reports/~/media/Files/Publications/NYES%20Program/2004/2004final_nyes_sbcsummary.ashx	6%	19%	14%	39%
34	NYSERDA (2007) *FlexTech Market Characterization, Assessment and Causality, Final Report*. October. Submitted by Summit Blue Consulting LLC and Quantec.	http://www.nyserda.ny.gov/en/Page-Sections/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2007-Reports/~/media/Files/EDPPP/Program%20Evaluation/2007ContractorReports/2007%20MCA%20Technical%20Assistance.ashx	11%	19%	14%	22%
35	NYSERDA (2005) *FlexTech Market Characterization, Assessment and Causality, Final Report*. October. Submitted by Summit Blue Consulting LLC and Quantec.	C:\Users\Richard Ridge\Documents\Business\RGRF	7%	28%	14%	25%
36	NYSERDA (2005) *Smart Equipment Choice Market Characterization, Assessment and Causality, Final Report*. Submitted by Summit Blue Consulting LLC and Quantec.	http://s3.amazonaws.com/zanran_storage/www.summitblue.com/ContentPages/44075069.pdf	9%	22%	14%	23%
37	NYSERDA (2007) NEW CONSTRUCTION PROGRAM (NCP) MARKET CHARACTERIZATION, MARKET ASSESSMENT AND CAUSALITY EVALUATION. Subitted by Summit Blue Consulting, LLC (Project number: 7721)	http://www.nyserda.ny.gov/en/Page-Sections/Program-Evaluation/NYE$-Evaluation-Contractor-Reports/2008-Reports/~/media/Files/EDPPP/Program%20Evaluation/2008ContractorReports/2008%20MCA%20New%20Construction.ashx	0%			43%
38	FINAL REPORT: PHASE 2 EVALUATION OF THE EFFICIENCY VERMONT BUSINESS PROGRAMS (RLW 2006, p E-11)	http://publicservice.vermont.gov/energy/ee_files/efficiency/eval/2005%20eval_of_vt_business_prog.pdf				No Estimate

Residential Spillover Studies and Rates

ID	Residential Spillover Studies		Inside Spillover Rate	Outside Spillover Rate	Non-participant Spillover Rate	Total
41	Phases I and II Report Residential New Construction (Single-Family Home) Market Effects Study	http://www.calmac.org/publications/RNC_Market_Effects_Phase_I_Report_report_May_21_final_v3.pdf			0	0
42	2009 Energy Efficiency Annual Report: Massachusetts Electric Company/Nantucket Electric Company: d/b/a/ National Grid. August 2010: Volume 1	http://www.nationalgridus.com/non_html/eer/ma/MECO%202009%20Annual%20Report_Vol1.pdf				
43	Residential Conservation Services: Refirgerators	http://uc-ciee.org/downloads/Market%20Effects%20Summary%20Paper%20Final.pdf				36.00%
44	Residential Energy Star HVAC	http://uc-ciee.org/downloads/Market%20Effects%20Summary%20Paper%20Final.pdf				0.00%
45	Residential New Construction 	http://uc-ciee.org/downloads/Market%20Effects%20Summary%20Paper%20Final.pdf				0.00%
46	Whitepaper by William P. Saxonis, 2007 Energy Program Evaluation Conference, Chicago, page 539. (Energy Star Program)	http://uc-ciee.org/downloads/Market%20Effects%20Summary%20Paper%20Final.pdf				22.5%
47	The Cadmus Group, Inc.: Energy Services (formerly Quantec, LLC) April 2010 (CFL), page	http://uc-ciee.org/downloads/Market%20Effects%20Summary%20Paper%20Final.pdf				0%
48	California's Market Effects Studies:Key Findings, Lessons Learned, and Future Directions, by Ed Vine, CIEE, August 9, 2011, page-5, Table-ES-1 (CFL)	http://uc-ciee.org/downloads/Market%20Effects%20Summary%20Paper%20Final.pdf				N/A
49	New York Energy $mart^{SM} Program Cost-Effectiveness Assessment June 2005. Prepared for the New York State Energy Research and Development Authority (NYSERDA) by Heschong Mahone Group, Inc., Ridge & Associates, and Energy and Environmental (Table 3-6, p. 22, Home Performance with Energy Star)					19%
50	Massachusetts Program Administrators, Cross-Cutting Net to Gross Methodology Study for Residential Programs – Suggested Approaches (Final), July 20, 2011, prepared by NMR Group, Inc. with contributions by Tetra Tech and KEMA	http://www.ma-eeac.org/docs/2011%20EM&V%20Studies/Residential%20MA%20NTG%20Methods%20Final%20072011.pdf				No Estimate

Residential Spillover Studies and Rates (Cont.)

ID	Residential Spillover Studies		Inside Spillover Rate	Outside Spillover Rate	Non-participant Spillover Rate	Total
51	Market Progress and Evaluation Report (MPER) For the 2007, Massachusetts ENERGY STAR® Lighting Program, page 72	http://www.cee1.org/eval/db_pdf/474.pdf				No Estimate
52	Technical Reference User Manual (TRM) No. 2010-1	http://www.cee1.org/eval/db_pdf/474.pdf				25%
53	Process and Impact Evaluation of the Efficiency Maine Lighting Program, Ap	http://www.efficiencymaine.com/docs/emresidentiallightingevaluation.pdf				23% to 46%
54	Getting MIF'ed: Accounting for Market Effects in Residential New Construction Programs. Marshall Keneipp et al., 2010. (Table 2)					39%
55	Table 1-3, 1996 CFL Study for PG&E and SDG&E, by Hagler Baily, February 1998, SDG&E, Study ID#983.	http://www.calmac.org/publications/983.pdf				25%
56	NYSERDA New Construction	http://www.cee1.org/eval/db_pdf/1150.pdf				51%
57	New York Energy $mart[SM] Program Cost-Effectiveness Assessment June 2005. Prepared for the New York State Energy Research and Development Authority (NYSERDA) by Heschong Mahone Group, Inc., Ridge & Associates, and Energy and Environmental (Table 3-6, p. 22, ENERGY STAR® Products)					4.0%
58	New York Energy $mart[SM] Program Cost-Effectiveness Assessment June 2005. Prepared for the New York State Energy Research and Development Authority (NYSERDA) by Heschong Mahone Group, Inc., Ridge & Associates, and Energy and Environmental (Table 3-6, p. 22, ENERGY STAR® Bulk Purchase)					2.5%
59	Whitepaper by William P. Saxonis, 2007 Energy Program Evaluation Conference, Chicago, page 539. (Energy Star Products Program)	http://www.iepec.org/2007PapersTOC/papers/62_1064_ab_585.pdf?q=spillover				24.0%