

**California's Market Effects Studies:  
Key Findings, Lessons Learned, and Future Directions**

**Prepared by:  
Edward Vine  
California Institute for Energy and Environment**

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## Executive Summary

In the last three years, the California Institute for Energy and Environment (CIEE), along with the California Public Utilities Commission (CPUC), managed three market effects studies that were funded by the CPUC. This report summarizes the key findings from these studies that focused on CFLs, residential new construction (RNC), and high bay lighting (HBL). This report also summarizes the key results from a survey that was conducted by CIEE in February 2011 to assess the value of these papers, see how these papers have been used and are planning to be used, and determine what additional studies should be conducted in the evaluation of market effects.

The Market Effects studies had three primary objectives:

- Understand the cumulative effects of California's energy-efficiency programs on the target market.
- Quantify 2006–2008 kilowatt-hour and kilowatt savings (if any) caused by the above potential market effects and not claimed as direct or participant spillover savings.
- Support the CPUC's strategic planning efforts by clarifying whether savings from potential market effects can be quantified with sufficient reliability to be treated as a resource.

As shown in Table ES-1, each of the studies addressed these objectives with evaluation methodologies relying on a diverse set of data collection methods and sources of data, including the review of program material and related literature, review of investor-owned utility (IOU) program data, telephone surveys, in-person interviews, in-depth interviews (in person or by phone), in-home audits, onsite visits, and stocking inventories. Most of the analyses relied on descriptive statistics, but multivariate regression modeling was used in one study (CFLs), and compliance modeling and Delphi (expert) panels were used in another study (RNC). Comparison states were used in two studies (CFLs and HBL) to serve as a baseline. While energy savings were calculated for all three studies, two studies (HBL and RNC) claimed that the energy savings could be quantified with sufficient reliability to be claimed as a resource, while the third study (CFLs) could estimate savings but the savings could not be claimed as a resource for the 2006-2008 program cycle. Finally, all three studies recommended changes to California's evaluation protocols, including allowing for the estimation of total net effects (includes free ridership, participant spillover and nonparticipant spillover), and the use of Delphi panels as part of the Basic level of rigor.

Many lessons were learned in the evaluation of market effects, and some of the most important were the following:

- Market effects need to be estimated throughout a program's life cycle
- Baseline data need to be collected throughout a program's lifecycle – ideally, before program implementation

- Because non-program (comparison areas) are becoming harder to find, timing is crucial and other methods will need to be used (e.g., qualitative hypothesis testing and Delphi (expert) panels).
- Require hypothesis testing as part of the evaluation
- Include elements of market effects evaluation in other program evaluations

In order to determine what further research should be done in the future in the area of market effects, CIEE conducted a survey in February 2011 to assess the value of the market effects reports, see how these reports have been used and are planning to be used, and determine what additional activities should be conducted in the area of market effects. Many of the respondents believed that the studies were very beneficial and useful. For these people, the studies represented an extraordinary, authoritative resource and reference that could be accessed over time for guidance in designing, implementing, and evaluating policies and programs. In fact, many of the respondents had already made use (or were planning to make use) of these studies for improving the planning, design, implementation and evaluation of programs. Not surprisingly, many respondents would like to see additional market effects studies, and they also recommended several specific market effects studies.

**Table ES-1. Summary of Market Effects Evaluations**

| <b>Market Effect Study</b> | <b>Data Collection</b>   | <b>Data Analysis</b>   | <b>Comparison States</b>  | <b>Energy Savings</b>  | <b>Claim savings as a resource?</b>   | <b>Changes to Protocol?</b>   |
|----------------------------|--|--|---|--|---|---|
| <b>CFL</b>                 | <ul style="list-style-type: none"> <li>• Review of program material &amp; related literature</li> <li>• Review of IOU program data</li> <li>• Telephone surveys with customers, retailers, manufacturers</li> <li>• In-person interviews with program managers &amp; evaluators</li> <li>• In-home audits</li> <li>• Stocking inventories</li> </ul> | <ul style="list-style-type: none"> <li>• Descriptive Statistics</li> <li>• Multivariate Regression Modeling</li> </ul> | <ul style="list-style-type: none"> <li>• Georgia</li> <li>• Kansas</li> <li>• Pennsylvania</li> </ul>                           | <ul style="list-style-type: none"> <li>• Total net impacts for 2008 were 23% of IOU's claimed gross savings</li> </ul>           | <ul style="list-style-type: none"> <li>• Not for the 2006-2008 program cycle</li> </ul> | <ul style="list-style-type: none"> <li>• Change scoping study section of Protocol</li> <li>• Allow for the estimation of total net effects (inclusive of free ridership, participant spillover and nonparticipant spillover)</li> </ul> |
| <b>High Bay Lighting</b>   | <ul style="list-style-type: none"> <li>• Review of program material &amp; related literature</li> <li>• Review of IOU program data</li> <li>• Telephone surveys with program managers,</li> </ul>  | <ul style="list-style-type: none"> <li>• Descriptive Statistics</li> </ul>   | <ul style="list-style-type: none"> <li>• Mississippi</li> <li>• Georgia</li> <li>• Alabama</li> <li>• South Carolina</li> </ul> | <ul style="list-style-type: none"> <li>• 15.1 to 27.2 GWh per year in savings due to the net out-of-program adoptions</li> </ul> | <ul style="list-style-type: none"> <li>• Yes for the 2006-2008 program cycle</li> </ul> | <ul style="list-style-type: none"> <li>• Include the documentation of anticipated market effects</li> <li>• Include the discovery of unanticipated market</li> </ul>  |

|                                     |  |   |  |  |   |  |
|-------------------------------------|--|---|--|--|---|--|
|                                     | <p>implementation contractors, lighting contractors, lighting distributors, and end users</p> <ul style="list-style-type: none"> <li>• In-depth interviews with manufacturers, distributors and installation contractors</li> </ul>  |   |  | of HBL technologies  |   | effects  |
| <b>Residential New Construction</b> | <ul style="list-style-type: none"> <li>• Review of program material &amp; related literature</li> <li>• Review of IOU program data</li> <li>• Telephone surveys with homebuyers, builders, contractors, Title 24 consultants, HERS raters, window distributors, lighting fixture and control distributors</li> </ul> | <ul style="list-style-type: none"> <li>• Descriptive Statistics</li> <li>• Compliance modeling</li> <li>• Delphi (expert) panels</li> </ul> | <ul style="list-style-type: none"> <li>• None</li> </ul> | <ul style="list-style-type: none"> <li>• Average new home built used 7.6% less energy than permitted to use under state building code</li> </ul> | <ul style="list-style-type: none"> <li>• Yes for the 2006-2008 program cycle (and already covered in the Codes &amp; Standards Program evaluation)</li> </ul> | <ul style="list-style-type: none"> <li>• Add Delphi (expert) panels</li> </ul> |

|  |   |  |  |  |  |  |
|--|---|--|--|--|--|--|
|  | <ul style="list-style-type: none"><li>• Onsite visits and audits of non-program homes</li><li>• In-depth interviews with program managers, building code officials/inspectors</li></ul> |  |  |  |  |  |
|--|---|--|--|--|--|--|

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## 1. Introduction

In an October 2007 decision (D.07-10-032), the California Public Utilities Commission (CPUC) directed its staff to explore (during 2008–2009) the ability to credibly quantify and credit “nonparticipant spillover” market effects, and to report on the ability of current protocols to measure nonparticipant spillover savings for the 2006-2008 program cycle. The Market Effects Evaluation Protocol provides the following definition of market effects:

“A change in the structure of a market or the behavior of participants in a market that is reflective of an increase in the adoption of energy-efficient products, services, or practices and is causally related to market interventions...” where a “market” is defined as “the commercial activity (manufacturing, distributing, buying and selling) associated with products and services that affect energy usage.”<sup>1</sup>

The Market Effects Evaluation Protocol acknowledges that two types of market effects are recognized in the energy-efficiency industry:

- Those that occur while the program is running and are a result of how the program is changing markets.
- Those that are forecasted to occur after the program has ended and are due to the changes established or put into motion by the program.<sup>2</sup>

The protocol clearly states, however, that it was designed to measure only the first of these two categories – that is, concurrent market effects.<sup>3</sup>

In the October 2007 decision, the CPUC directed its staff to report its findings following the process evaluation and market impact studies of the 2006–2008 program cycle on the ability of current protocols to measure such “nonparticipant spillover” savings and to propose possible revisions to market effects protocols, utility savings goals, or performance incentive mechanisms for subsequent action by the CPUC. Consequently, the CPUC decided to examine possible market effects in compact fluorescent lamps (CFLs), residential new construction, and high-bay lighting (referred to as the “Market Effects studies”). Working with the CPUC, the California Institute for Energy and Environment (CIEE) developed study plans for, and assisted in overseeing, each of these market effect studies.<sup>4</sup>

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<sup>1</sup> California Evaluation Protocols, pp. 143-145.

<sup>2</sup> Ibid.

<sup>3</sup> Note that because this analysis will not include market effects forecasted to occur later, total market effects may be greater than those estimated here.

<sup>4</sup> The CIEE market effects study plans are available at <http://uc-ciee.org/planning-evaluation/7/lbrsearch>.

The Market Effects studies had three primary objectives:<sup>5</sup>

- Understand the cumulative effects of California’s energy-efficiency programs on the target market.
- Quantify 2006–2008 kilowatt-hour and kilowatt savings (if any) caused by the above potential market effects and not claimed as direct or participant spillover savings.
- Support the CPUC’s strategic planning efforts by clarifying whether savings from potential market effects can be quantified with sufficient reliability to be treated as a resource.<sup>6</sup>

The three market effect studies have been completed, and all of the reports (Appendix A) are available in the database of evaluation reports on the CALMAC website ([www.calmac.org](http://www.calmac.org)), on the CPUC website ([www.cpuc.ca.gov](http://www.cpuc.ca.gov)) and on CIEE’s website ([www.uc-ciee.org](http://www.uc-ciee.org)). In addition to the preparation of the reports, each author presented their findings at a public workshop that was held at the CPUC or via a webinar.

This report briefly reviews the methodology, selected key findings, and lessons learned from each of the market effects studies, highlighting the results as they pertain to the three objectives described above (more details can be found in the voluminous reports listed in Appendix A). While this review discusses possible revisions to market effects protocols, this review does *not* discuss possible changes to utility savings goals or performance incentive mechanisms, changes in program design, or other non-methodology policy recommendations – these topics are best left to the CPUC report that will be prepared by Energy Division staff.

In order to determine what further research should be done in the future in the area of market effects, CIEE conducted a survey in February 2011 to assess the value of the market effects reports, see how these reports have been used and are planning to be used, and determine what additional activities should be conducted in the area of market effects. The results of this survey are presented in Section 5.

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<sup>5</sup> The Residential New Construction Market Effects Study included a fourth objective: Assess the effects of pre-2006 IOU programs on the adoption of more efficient technologies and practices in the 2005 Title 24 code.

<sup>6</sup> The market effects studies focused on methodological issues. The authors of the report were neutral going into the studies on whether there were market effects. And the CPUC was not planning on using the results for determining utility performance on meeting their energy savings goals and its impact on shareholder incentives.

## 2. CFL Market Effects Study

### 2.1. Methodology

The CFL Market Effects study reviewed previous program evaluation, market research, and market effects studies of California's investor-owned utilities (IOUs)' programs and other relevant studies outside of California. The study included telephone surveys with approximately 2,500 end-use customers, telephone interviews with about 600 CFL retailers and manufacturers (representing the vast majority of market-level CFL sales in California), in-home audits of 269 homes, comprehensive retailer lighting shelf stocking inventories in 185 stores (representing over one million stocked bulbs), and interviews with 17 residential lighting program managers, policymakers, and evaluation consultants familiar with historic California or other residential lighting programs across the U.S.

The analysis included qualitative and quantitative data approaches, including descriptive statistics and multivariate regression modeling techniques. Primary research was conducted in California and in three comparison states (Georgia, Kansas and Pennsylvania) selected to serve as a baseline for California. The customer survey and in-home audit data were combined with primary data from 11 additional states (in a collaborative effort conducted with other program states, and analyzed in a single set of models) as part of the analysis.

The study was guided by the development of a logic model and researchable questions that were developed as part of the CFL Market Effects Scoping Study. These research questions addressed leading market indicators including CFL awareness, availability, pricing, and satisfaction, as well as coincident and lagging market indicators such as CFL sales and saturation, respectively.<sup>7</sup>

### 2.2. Key findings on market effects

In their final report, the authors presented numerous findings on leading and lagging indicators with respect to the statewide Upstream Lighting Program (the focus of this market effects study). While the interviews provided fairly strong qualitative evidence and some quantitative evidence that there were effects from the Upstream Lighting Program (ULP) at one time (e.g., changes in awareness of CFLs, attitudes and acceptance of CFLs, CFL availability, and declines in CFL prices), most of the analyses of current market conditions yielded no quantitative evidence of market effects at the end of the 2006 to 2008 program cycle. Though they may initially seem contradictory, the authors believed that these findings actually told a consistent story. The upstream market

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<sup>7</sup> Leading indicators are early indications of changes in the level of CFL market activity. They may be used to predict a forthcoming change in CFL market activity. Coincident indicators are signs that the level of CFL market activity is changing that occur concurrently with the altered level of activity. Lagging indicators are indications of changes in the level of CFL market activity that occur after the level has changed.

actor interviews asked respondents about their perceptions of the ULP in 2006 through 2008 (and some questions included earlier time periods). Data for other, more quantitative analyses (i.e., CFL User Survey, In-Home Survey, Shelf Stocking Surveys, pricing analysis, and regression analysis), however, were collected in 2008 and 2009. Thus, the authors noted that while the upstream interviews provided evidence that California's programs may have caused market effects in both California and nationally in the past, the quantitative analyses provided evidence that these effects had largely eroded over the past two years.

### **2.3. Energy savings**

Through a regression approach, the study estimated that cumulative 2008 total net impacts, inclusive of both free ridership and spillover, were 23% of the IOU's claimed gross savings. This estimate, although inclusive of market effects, was lower than the estimated NTG ratio in the Residential Retrofit Upstream Lighting Program (ULP) Report, which recommended a NTG of 0.54 (instead of 0.23) across the three IOUs. The authors explained that the differences between the two studies were due to two key factors. First, the net effects estimate for the CFL Market Effects study was only based on a 2008 model, whereas the ULP report estimated the NTG ratio for the entire 2006-2008 period. Second, the net effects estimate for the CFL Market Effects study was based on a model of cumulative net effects *realized in 2008*, whereas the ULP report estimated the NTG *caused* in 2006-2008. In other words, impacts from previous program cycles were included in the market effects approach (e.g., higher saturation will reduce total sales estimates), whereas the ULP report attempted to isolate impacts from the 2006-2008 cycle. The authors concluded that, taken together, the findings did not provide evidence that market effects in the form of energy/demand savings (nonparticipant spillover) could be unequivocally claimed or quantified as a result of the California IOU programs for the 2006-2008 time period.

### **2.4. Assessment of whether savings can be claimed as a resource**

The authors noted that market effects from upstream CFL programs had been claimed as savings throughout the United States. Recent evaluations in Massachusetts (2006), Vermont (2005), and New York (2005), in fact, had identified NTG ratios (inclusive of free ridership and spillover) that exceeded 100%. In other words, in the relatively recent past, the programs found total CFL sales in the respective utility service territories were far greater than they would have been in absence of the program, so the utilities could claim savings from more CFLs than they incented. Given the intensive marketing and outreach nature of these programs, the substantial price buy-downs they offered, and the nascent CFL market a few years ago, the authors concluded that these findings did not appear unreasonable.

However, the CFL market has changed substantially in more recent years, and the authors noted that the findings from the CFL Market Effects report indicated that the baseline for CFL sales had risen throughout the U.S., including regions with no utility efforts to promote CFLs. Because the CFL Market Effects study did not find evidence that market effects energy/demand savings attributable to the 2006-2008 ULP could be

unequivocally quantified, they concluded that market effects savings from the CFL programs *could not* be claimed as a resource for the 2006-2008 program cycle. They also noted that this was not to say that CFL market effects could not be reliably estimated — rather, that they were not observed in 2008.

## **2.5. Suggestions for changes to Market Effects Evaluation Protocol**

One of the greatest challenges the CFL Market Effects Team faced in trying to quantify the energy/demand savings from market effects of the 2006-2008 ULP was the lack of earlier market effects data—both to establish a (pre-2006) baseline, and to understand the market effects for the first portion of the program period. While the Market Effects Evaluation Protocol states, “a baseline study must be conducted as early as possible,” they recommended some subtle but important changes to the scoping study section of the Protocol. Specifically, they recommended that through the scoping study the evaluation contractor be required not only to conduct a thorough review of relevant past studies, but also to explicitly delineate the quality and usefulness of any extant baseline data. They recommended that the CPUC should use this assessment of baseline data availability to define the timing and scope of the subsequent market effects study. In addition, the authors recommended that the scoping study be required to include a description of the market’s evolution over time. Documentation of the market history provides a context for the market effects assessment. An understanding of this context may be of critical importance if, for example, significant program impacts occurred prior to the timeframe under evaluation (as the evaluators believed it did in this evaluation).

Once a market effects study has been authorized, the Market Effects Evaluation Protocol recognizes two approaches for estimating causal attribution: preponderance of evidence and modeling. The authors tried to assess the markets effects attributable to California’s 2006-2008 ULP using the preponderance of evidence approach for some metrics (e.g., CFL awareness, availability, and the program’s effect on CFL pricing) and modeling for others (e.g., energy and demand savings). They found the preponderance of evidence approach—in this case employing customer surveys, in-home lighting audits, retail shelf stocking surveys, and trade ally surveys—worked well for qualitatively assessing the market effects attributable to California’s ULP. However, modeling the nonparticipant spillover effect of an upstream program on the market as a whole—without the benefit of adequate annual sales data or being able to readily identify end use customer participants—posed unique challenges. In light of the challenges inherent in modeling the market effects attributable to upstream energy-efficiency programs, the authors suggested that the Protocol allow for the estimation of total net effects (i.e., a net-to-gross ratio that is inclusive of free ridership, participant spillover, and nonparticipant spillover) for upstream programs rather than focusing solely on nonparticipant spillover.

## **2.6. Lessons Learned**

In the endeavor to accurately estimate the magnitude of CFL market effects, the authors concluded that market effects needed to be estimated throughout a program’s life cycle. In other words, a rigorous assessment of program versus estimated baseline sales conducted earlier in the life cycle of the California IOU CFL programs *might* have

identified quantifiable market effects that occurred earlier in the program's life. The lack of such baseline data, coupled with the rapid increase in CFL sales throughout the U.S. during the first part of the 2006-2008 program cycle and the more recent national downturn in sales, makes it extremely difficult for any program state, including California, to now claim or quantify savings from cumulative market effects induced by their programs alone. The authors highly recommended that future market effects studies gather baseline data before program implementation as well as throughout a program's lifecycle. These studies do not need to be more costly; in fact, they may be less costly by using longitudinal analytic approaches that implement ongoing data collection activities.

In addition to establishing baseline and ongoing, more regular data collection, the authors made other methodological recommendations for CFL or other market effects studies, including:

- The multistate regression approach improves on the simple difference of means (i.e., delta sales) approach by controlling for other factors that impact sales of energy-efficient measures, including income, education, housing characteristics, and utility rates.
- The key to successful implementation of the multistate approach is collecting good estimates of sales, which, for lack of reliable secondary data, requires consistent approaches across states in terms of primary data collection activities (survey questions, time horizons, etc.).
- Shelf-stocking surveys are less useful as a proxy for sales since they cannot fully capture sell-through rates (i.e., lowest cost products may have sold quickly and not be available during the stocking survey), but they are valuable for understanding availability and pricing characteristics.
- Future studies should also consider examining a diffusion of technology curve to understand how efficiency gains in California might impact standard practices in other areas of the country.

Market effects studies also provide important market characterization findings that can inform both impact evaluations and program planning efforts. For example, the primary data collection activities taken for this study produced estimates for a number of important parameters (e.g., sales and prices of CFLs), and included the following activities:

- Upstream interviews: A qualitative estimate of historic and current market effects.
- CFL user survey and in-home lighting audits: Saturation, penetration, and current buying patterns.
- Shelf stocking surveys: Current offerings (model types, features), stocking patterns, and program pricing effects (e.g., pricing multiplier effects) across all retailer channels and differences by retail channel.

### 3. High-Bay Lighting Market Effects Study

#### 3.1. Methodology

The High-Bay Lighting<sup>8</sup> (HBL) Market Effects study was guided by the development of a logic model and researchable questions that were developed as part of the HBL Market Effects Scoping Study. The authors of the HBL Market Effects study reviewed previous program evaluation, market research, and market effects studies of California IOUs' programs and other relevant studies outside of California.<sup>9</sup> The authors also reviewed California IOU program data for HBL measures on the Energy Efficiency Groupware Application (EEGA) website, as well as incremental cost and other HBL measure data in the Database of Energy Efficiency Resources (DEER). Intensive secondary research was performed to document the evolution of HBL technologies with their intrinsic advantages, disadvantages, and costs. The study included telephone interviews with 14 program managers or implementation contractors of the California IOUs' programs claiming savings from HBL measures.

The authors conducted in-depth interviews (nationally and California) with representatives of 11 manufacturers, 15 distributors, and 16 installation contractors active in the commercial and industrial HBL market. Primary research was also conducted in California and a comparison area (Mississippi, Georgia, Alabama and South Carolina) selected to serve as a baseline for California. Telephone interviews were conducted with lighting contractors (150 in California and 100 in the comparison area), lighting distributors (142 in California and 77 in the comparison area), and end-users of HBL technologies (124 in California and 80 in the comparison area).

One of the critical methodological challenges in this study was the assessment of what portion of the savings "outside the program" could plausibly be attributed to the effects of the program. Because the program was driven primarily by contractors, very few customers were able to recall any interaction with the program, thereby making customer surveys an ineffective method. Therefore, the authors assessed the likely level of spillover based on judgments informed by formal testing of four hypotheses concerning alternative influences on promotion and adoption of efficient HBL technologies: (1) spillover; (2) influence of codes and standards; (3) cumulative effects of previous California energy efficiency and information programs on customers' purchase decision criteria and processes; and (4) targeting of the California market by manufacturers and large distributors.

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<sup>8</sup> High bay lighting refers to a diverse group of technologies that are used to light spaces in commercial and industrial facilities with ceiling heights 15 feet and above.

<sup>9</sup> During the 2006-2008 program period, the three California IOUs operated 12 programs that offered incentives for efficient high bay lighting. Most of these incentives were issued through prescriptive rebate programs.

### **3.2. Key findings on market effects**

The authors concluded that there was reasonably strong evidence to demonstrate significant energy and demand savings and market effects from the California IOU programs' support of energy-efficient retrofit HBL technologies. All of the survey and market results showed a consistent story. The IOU program promoted the T5 High Output (T5HO) technology which commanded a steep price premium compared to other "efficient" HBL technologies: 22 to 65 percent higher prices compared to equivalent pulse start metal halide (PSMH) technologies and 300 to 400 percent higher prices compared to T-8 fluorescents. Because of lower operating costs, higher compatibility with controls, and superior lumen maintenance, the IOU programs focused heavily on T5HOs, which accounted for 93% of all fixtures rebated and incentives paid. Despite their high incremental costs, sales of T5HO fixtures outside the program in California exceeded in-program sales by over 3:1, and out-of-program sales of T5HOs alone in California accounted for 51 percent of total HBL sales. The market share of T5HOs in the comparison area, as reported by contractors, however, was only 29 percent. The high level of out-of-program sales strongly suggested that program area contractors took a much more aggressive approach to promoting and selling T5HOs than did their counterparts in the comparison area. This finding was supported by other contractor survey results.

### **3.3. Energy savings**

The authors calculated that the net difference in energy savings due to the higher efficiency of HBL lighting purchased in California from 2006 to 2008 versus the baseline, as represented by technology shares in the comparison area, was 97.2 GWh per year. After adjusting gross savings less free ridership, the net energy savings generated by energy efficiency programs that promoted efficient HBL lighting during the period 2006 – 2008 (as calculated by evaluations of California's utility programs) totaled 67.0 GWh per year. And the difference in the estimate of net energy consumption reductions generated by the two methods is 30.2 GWh (reflecting purchases made outside of the program that exceed baseline levels – nonparticipant spillover). Based on their analysis, the authors concluded that the IOU programs were responsible for most of the difference between actual and baseline adoption of efficient HBL technologies in California during the period 2006 – 2008. Compliance with Title 24 lighting power density requirements by contractors and the designers with whom they work also accounted for some of the difference, but the authors believed that the channel of influence on projects in existing facilities (as opposed to new facilities) was relatively weak compared to the programs. They were not able to apportion quantitatively the percentage of net adoptions attributable to the programs versus Title 24.

Based on additional analyses, the authors concluded that at least 50 percent of the HBL adoptions were attributable to the effect of the program. They also believed that 90 percent was a plausible estimate for the top end of the range, given the relative weakness of the other potential influences in regard to the replacement (as opposed to new construction) market. Applying these percentages to the estimate of 30.2 GWh per year in savings from net out-of program adoptions developed above, they arrived at a range of



15.1 to 27.2 GWh per year in savings attributable to the net out-of-program adoptions. Combining the results of the above analysis with the estimate of net energy savings from the 2006-2008 impact evaluations generated estimates of net program savings (that include out-of-program adoptions) of 82.1 to 94.2 GWh per year.

#### **3.4. Assessment of whether savings can be claimed as a resource**

The authors concluded that the 2006-2008 HBL programs caused significant market effects and could be claimed as a resource. In particular, they found the following activities to be critically important:

- Strong promotion of energy-efficient T-5 technologies by California contractors, when compared to their counterparts in non-program areas.
- Strong promotion of T-5 technologies to all customers and projects, with and without program incentives.
- Large volume of T-5 fixture sales “outside the program”, which led to spillover in the range of 23 to 27 percent of net savings, as estimated by evaluations that did not account for spillover.

#### **3.5. Suggestions for changes to Market Effects Evaluation Protocol**

The authors recommended that the protocol for market effects studies should include the documentation of unanticipated market effects—or program effects that are not characterized in the program logic model—as a “key aspect” of the report. Similarly, they recommended that researchers should include the discovery of unanticipated market effects, if any, as another objective of a market effects study. Finally, they recommended that the market effects evaluation protocol should be revised to contain guidelines on the appropriate conditions under which to deploy available approaches for quantifying adoptions of targeted measures outside the program and for assessing the attribution of observed market changes to program activities (e.g., hypothesis testing).

#### **3.6. Lessons learned**

From a methodological point of view, the authors concluded that it was feasible to conduct a cross-sectional, market-level net savings analysis, including estimation of market size and technology shares, without actual data. However, they warned analysts interested in conducting similar studies of the following potential complications:

- Previous studies relying on cross-sectional methods involving comparison of program areas to non-program areas show that timing is crucial. Once national markets for efficient technologies begin to take off, differences in technology shares between program and non-program areas quickly become insignificant.
- Non-program areas are becoming increasingly difficult to find (e.g., commercial lighting programs are active in nearly every state).
- Comparability of the program and non-program areas will always be an

issue. Therefore, the kinds of qualitative hypothesis testing used to isolate spillover effects will be required in these kinds of studies.

The authors provided suggestions for future HBL market effects evaluation work. First, they recommended that a white paper be prepared on using comparison areas in the nonresidential sector. They also recommended three related market effects studies to improve the understanding of the HBL market: one on HBL controls and changes in hours of use, another on end users using HBL technologies, and a third on HBL usage in new construction.

## 4. Residential New Construction Market Effects Study

The Residential New Construction Market Effects study was guided by the development of a logic model and researchable questions that were developed as part of the Residential New Construction Market Effects Scoping Study. The Residential New Construction Market Effects study was performed in two phases. The first phase covered the market and attribution analysis of the California IOU's residential new construction (RNC) programs<sup>10</sup>. Phase I, using primarily qualitative methods, was designed to provide qualitative evidence of market effects that may reasonably be attributed to the IOU's RNC programs, and Phase II was designed to quantify the energy savings caused by the market effects.

### 4.1. Methodology

Phase I aimed to establish whether or not there was substantial evidence of increases in the efficiency of the RNC market—beyond the direct effects of the IOUs programs—that may reasonably be attributed to those programs. In addition, Phase I was designed to assess the historical context of RNC design and construction practices in California, and to analyze the cumulative impact of the 1998-2005 IOU programs on the 2005 code change. The primary research activities conducted in Phase I were an analysis of historical trends, an analysis of expected outcomes, and an analysis of the effects of IOU programs on changes in the efficiency requirements of the Title 24 code. The primary data collection methods used to collect data were telephone interviews with 976 buyers of new non-program single-family homes in the IOU territories, 32 builders of non-program homes, 9 HVAC contractors, 45 Title 24 consultants, 29 Home Energy Rating System (HERS) raters, 17 window distributors, 16 lighting fixture and control distributors, on-site visits to 267 non-program homes, in-depth interviews with 8 managers of other voluntary programs aimed at increasing the efficiency of RNC in California, 14 building code officials/inspectors, and web-based estimates of naturally occurring market adoption (NOMAD) trends by 10 residential building experts, with re-estimation of indirect effects of prior IOU programs on NOMAD by 6 experts. Phase 1 concluded that there was sufficient evidence of large potential market effects to justify a Phase 2 to attempt to quantify those savings.

Phase II focused on two of the three ways that the IOU programs can lead to reduced energy use: (1) by improving compliance with existing code; and (2) by facilitating construction that is more efficient than required by the current code. The authors estimated code compliance and gross energy savings using the Residential New Construction Baseline Study (RNC Baseline) conducted as part of the 2006-08 California Residential New Construction Program Evaluation and the Codes and Standards (C & S)

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<sup>10</sup> The IOU's RNC programs included Southern California Gas's Advanced Home Program, San Diego Gas and Electric's Advanced Home Program, Southern California Edison's California New Homes Program, Pacific Gas and Electric's (PG&E) Residential New Construction Program and PG&E's Duct & Cover Program.

Program evaluation. For the 194 homes included in both the baseline and the C & S evaluation, the team conducted a full site audit at each home, and built a compliance model from the field-observed building characteristics. In order to convert the gross savings estimates into net savings estimates, the evaluation team employed two Delphi panels, consisting of 24 Title 24 consultants and seven building industry experts.

#### **4.2. Key findings on market effects**

In Phase I, the authors concluded that there was sufficient evidence for discernible non-participant spillover from the 2006-2008 IOU RNC programs, primarily through the training of builders and other market actors, which helped bring about improved code compliance, increased above-code practices, and market readiness for a code upgrade. Further, there was strong evidence that sizeable numbers of non-program homes built in the 2006-2008 period used above-code practices and technologies, that the level of efficiency increased during this period, and that the IOU programs had an observable effect on the increased use of above-code practices and technology.

On the other hand, demand-side effects, such as increasing home buyer awareness and increasing consumer demand/willingness to pay for efficient homes, largely did not occur, owing at least in part to the low volume of IOU program participation. In sum, the authors concluded that Phase I provided qualitative evidence of increases in the efficiency of the RNC market—beyond the direct effects of the IOUs' 2006-2008 programs—that may reasonably be attributed to those programs.

The Phase II work confirmed the Phase I findings. Code compliance under the 2005 building standards supported the findings from the Phase I report pertaining to code compliance and above-code building practices. And the Delphi panels (Title 24 consultants and building industry experts) identified the various elements of training (builders, subcontractors, Title 24 and code officials) as the most important elements of the IOU's RNC programs.

#### **4.3. Energy savings**

In Phase II, the authors found that energy savings associated with the observed market effects in non-participant homes were large and quantifiable, but also found that the gross savings overlapped with the gross savings from the Codes and Standards evaluation. This latter finding provided valuable corroboration of the scope and size of the impact of the IOU's RNC programs on non-participants. In addition, the RNC market effects study provided valuable insights as to how the IOU's RNC programs made a difference above and beyond naturally occurring market adoption of improved efficiency, to better understand why the non-participant spillover occurred and why the average non-participant home built during the 2006 to 2008 time period was built to exceed the requirements of Title 24.

Some detailed findings:

- Statewide, the average compliance margin was 7.4% above-code. In other words, the average new home built during the 2006 to 2008 time period

used 7.4% **less** energy than it was permitted to use under the California State Building Code (i.e. Title 24).

- The average above-code home resulted in 17% savings in electricity usage and 11% savings in natural gas usage over the average code-compliant home.
- The average code-compliant home resulted in 27% savings in electricity usage and 5% savings in natural gas usage over the average below-code home.
- Based on the unweighted Title 24 consultant responses, the Delphi panel estimated that the 2006-2008 IOU's RNC programs were responsible for 25% (9,970 MWh) of the gross electricity savings and 26% (187.8 MDth) of the gross natural gas savings due to above-code homes compared to code-compliant homes. In addition, the Delphi panel estimated that 21% (8,172 MWh) of the gross electricity savings and 20% (144.3 MDth) of the gross natural gas savings were due to the pre-2006 IOU programs. Thus, the 2006-2008 and pre-2006 IOU programs taken together accounted for nearly half of gross electricity and natural gas savings in above-code non-program homes.
- Based on the unweighted Title 24 consultant responses, the Delphi panel estimated that the 2006-2008 IOU'S RNC programs were responsible for 23% (1,282 MWh) of the gross electricity savings and 23% (18.2 MDth) of the gross natural gas savings in code-compliant homes compared to below-code homes (Figure E.2-7). In addition, the Delphi panel estimated that 23% (1,284 MWh) of the gross electricity savings and 24% (18.6 MDth) of the gross natural gas savings were due to the pre-2006 IOU programs. Thus, the 2006-2008 and pre-2006 IOU programs taken together accounted for nearly half of gross electricity and natural gas savings from achieving code compliance in non-program homes.

#### **4.4. Assessment of whether savings can be claimed as a resource**

The authors concluded that it was possible to claim the energy savings as a resource. However, an important factor bearing on the reliability of the non-participant spillover savings estimate was determining the extent to which the savings were counted in other utility program evaluations, in particular, the Codes and Standards Program evaluation, in order to avoid double-counting of savings. The evaluation team found that all of the energy savings from non-participant spillover had been counted in the Codes and Standards evaluation. Specifically, the evaluation of the Codes and Standards Program captured all spillover savings in non-program (baseline) homes (i.e., improved compliance with code and facilitating the construction of above-code homes) from 2006-2008 utility programs, because such savings contribute to compliance with Title 24. The RNC market effects study measured savings in homes exceeding the 2005 code relative to homes just meeting the code, and in homes just meeting the 2005 code relative to homes not meeting the code. The Codes and Standards Program evaluation measured savings in all homes using the 2001 code as baseline. Therefore, all gross savings in the

RNC ME study were a strict subset of and should have been counted in the Codes and Standards Program evaluation's gross standard savings. The finding that the spillover savings overlap with savings counted in the Codes and Standards evaluation provides valuable corroboration of the scope and size of the impact of the IOUs' programs on non-participants.

It is important to point out that while it is likely that there was overlap in savings with the Codes and Standards Program, the market effects research helps program administrators understand how and why the savings were achieved and where they should consider concentrating their efforts in future program cycles. While the gross savings overlap, the RNC ME study was important because it provided an example of how market effects could be measured and how the scoping study, logic model and the results of a market effects pilot evaluation could identify the mechanisms behind program effects.

#### **4.5. Suggestions for changes to Market Effects Evaluation Protocol**

The authors suggested that the Market Effects Evaluation Protocol could be modified for estimating the net impacts of RNC programs. In the California RNC market, distinctive and continually changing state building codes, multiple and varied climates, and the prevalence of local market actors preclude a cross-sectional inter-state modeling approach for causation; new construction in California simply is not comparable enough to new construction in any other area—or even a combination of areas—to allow valid comparisons. In addition, the diversity and complexity of the end-uses and practices involved in new construction make a modeling approach problematic. This is in contrast to other types of markets that are relatively similar across areas, with relatively uniform technologies, in which quasi-experimental designs taking into account differences over time and across areas are more feasible.

Hence, the authors suggested that the Market Effects Evaluation Protocol could be modified to provide the following requirement for estimating the net impacts of new construction programs for the Basic level of rigor:

“A Delphi or expert panel approach, in which gross savings and penetration of technologies and practices are estimated and presented to panel members, who are then asked to attribute savings to energy efficiency programs and other factors; it is essential that there be at least two rounds of Delphi surveys, with the first round results summarized and presented in the second round survey so panel members can understand and learn from each other in developing the final attribution estimates.”

#### **4.6. Lessons learned**

Based on their research, the authors noted several lessons learned with respect to program evaluation:

- Because market transformation is a program goal, market effects research should occur on a regular basis; otherwise, program planners cannot know if

the goal is being achieved.

- Baseline studies should continue in the future on a regular basis to allow continued examination of efficiency trends over time.
- As IOU-sponsored training programs were consistently identified as being critical to the observed market effects, coordinate the evaluation of education and training programs to include elements of market effects evaluations to better understand what building techniques and technologies are being applied to non-program homes.
- Because of difficulties in identifying and recruiting building industry experts for Delphi panels, identify and recruit building industry experts who could serve on a similar Delphi panel at the conclusion of the program cycle. Panelists would be asked to follow the programs during the program cycle, paying particular attention to non-participant spillover.

## 5. Market Effects Survey Results

In order to determine what further research should be done in the future in the area of market effects, CIEE conducted a survey in February 2011 to assess the value of these studies, see how these reports have been used and are planning to be used, and determine what additional activities should be conducted in the area of market effects.<sup>11</sup>

Forty (40) individuals responded to the survey. Since we do not know the size of the population of people who are interested in this topic, we were unable to determine a response rate or assess the representativeness of the sample. Nevertheless, we believe that the responses provide some useful information for determining the next steps in the evaluation of market effects.

### 5.1. Respondent Characteristics

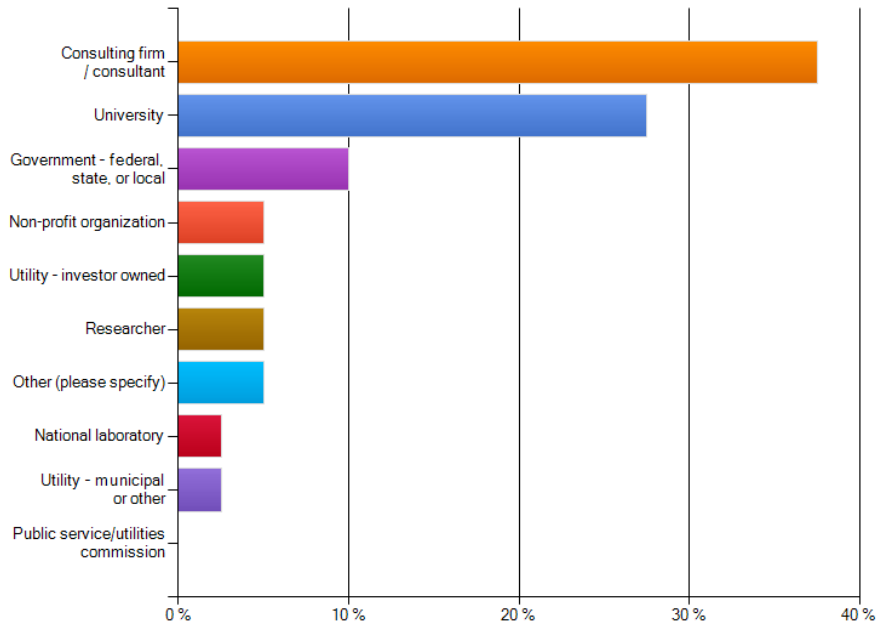
As shown in Figure 1, the respondents reflected a diverse group of respondents in terms of their affiliation. Due to the research focus of the papers, it is not surprising to see that most of the respondents were consultants (38%) or from academia (28%). Only a few utility people responded to the survey; this was surprising and disappointing since we know that many utility personnel participated (in person or by phone) at the public workshops and webinars and provided review comments to the draft reports, and we also know that many utilities are interested in the evaluation of market effects.

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<sup>11</sup> The survey questionnaire is in Appendix B. A notice of the survey was sent to the CPUC Service List and the CIEE Listserv.

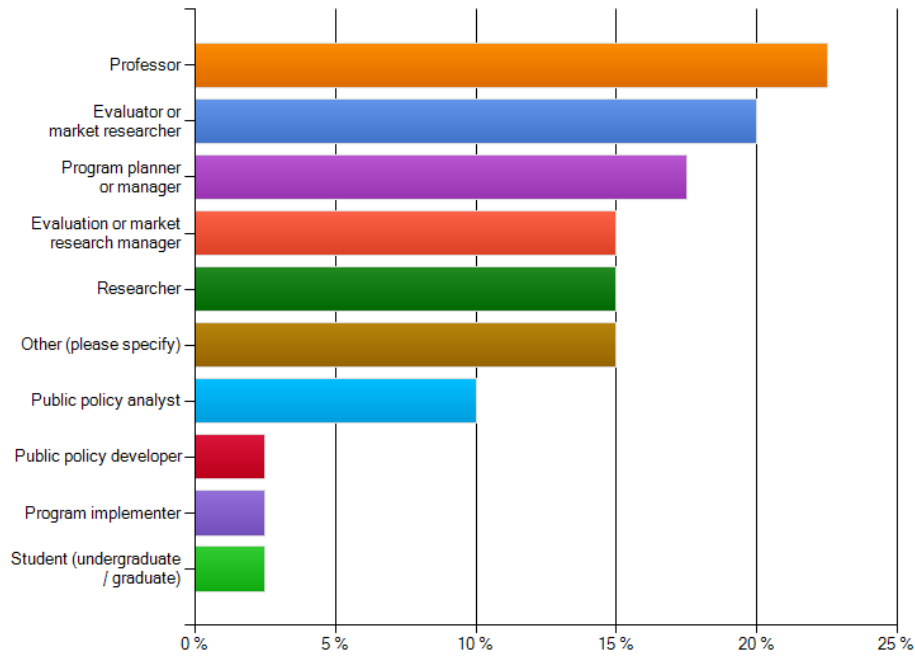


Figure 1. Which of the following best describes your affiliation?



As shown in Figure 2, the respondents reflected a diverse group of respondents in terms of their position: due to the research and policy focus of the papers, most of the respondents were professors (23%), evaluators or market researchers (20%), program planners or managers (18%), or evaluation or market research managers (15%). Representatives from the public policy and implementation professions also responded.

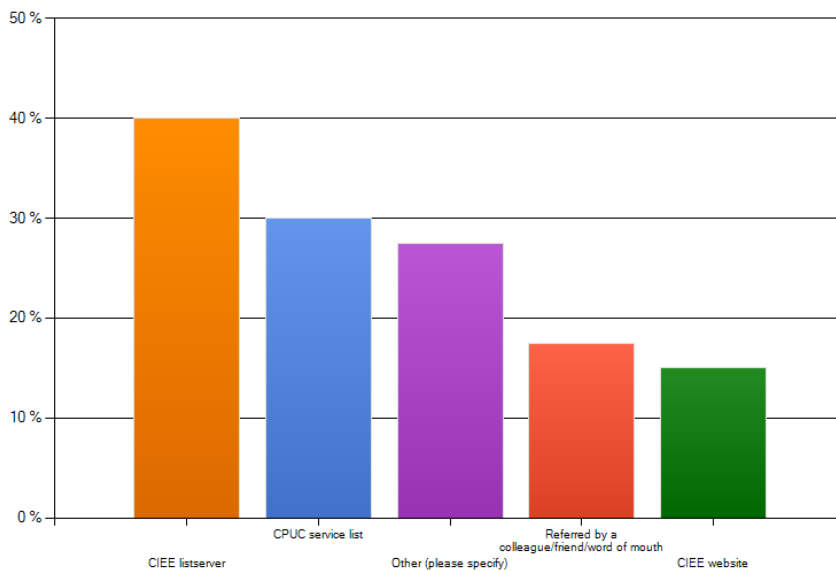
**Figure 2. Which of the following best describes your job?**



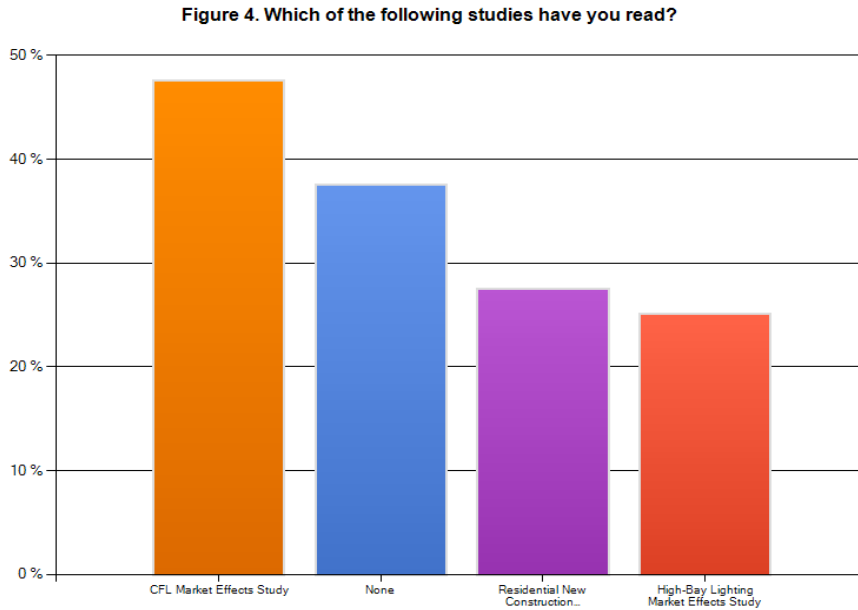
## 5.2. Marketing and Examination of Studies

The primary method for notifying people about the market effects studies was sending announcements to CIEE’s list server and the CPUC’s service list. As shown in Figure 3, these were the primary ways that the respondents learned about the market effects studies. A few respondents heard about the studies from CIEE’s website or from a colleague or friend.

**Figure 3. From which of the following sources did you hear about the market effects studies?**



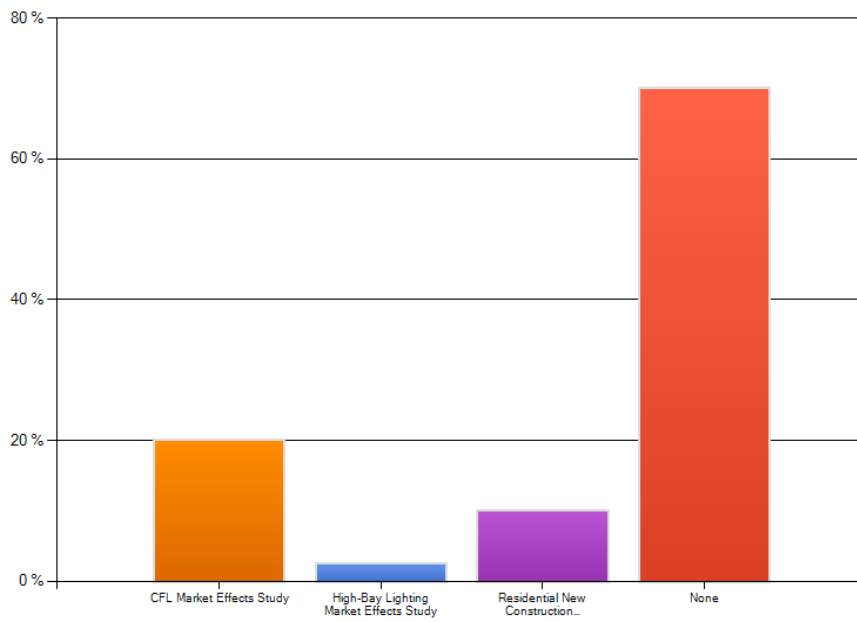
As seen in Figure 4, two-thirds of the respondents had read at least one of the market effects studies (this is a self-selected motivated group!). Because people could read some or all of the report at their own leisure, it was not surprising to find less people able to listen to the workshops and webinars, which typically lasted two hours (Figure 5).<sup>12</sup>



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<sup>12</sup> Although not evident from the survey response, there were over 100 participants listening to the CFL Market Effects Study presentation on the webinar.

Figure 5. Which of the following studies have you heard the presentation?



### **5.3. Benefits and Usefulness of Studies**

Many of the respondents believed that the studies were very beneficial and useful (and would be useful in the future, as described in the section below). For these people, the studies represented an extraordinary, authoritative resource and reference that could be accessed over time for guidance in designing, implementing, and evaluating policies and programs.

Five types of benefits stood out. First, these studies were able to show that market transformation exists: they were able to quantify savings that could not otherwise be captured, and they were able to identify the source of the savings. Second, the testing of methods for evaluating market effects was of value in and of itself, and respondents appreciated that the methods and their testing was made transparent and publicly available.

Third, the scholarly and objective high quality syntheses and analyses provided systematic and valuable reviews of markets and market effects research; for example, they provided (and helped to understand) information on how a particular market (e.g., CFLs) has evolved over time and where it is now (with detailed, up-to-date market information). In addition, many felt that the papers were very educational in explaining market complexities to a broader audience and variety of groups involved in policy, programs, and research.

Fourth, respondents were able to learn about new technologies, the breadth of adoption of technologies and where the remaining opportunities lie, so that they can apply them to new projects. And fifth, the respondents valued the analysis and review of other documents and studies, as well as the provision of data on California and comparison areas that could be transferrable to other regions and used in other market effects studies outside of California.

### **5.4. Methodology Improvements**

While several respondents noted that no changes were needed, most respondents did not have any suggestions for how the methodologies of the market effects studies could be improved. A few respondents provided three recommendations for conducting market effects studies. First, data collection needs to begin early, since market effects (baseline) studies require measurements before the program. One respondent suggested that market effects studies be required every 2-5 years, and include this requirement in the CPUC's EM&V Plan. Second, industry data are needed to allow better modeling (e.g., for CFLs, sales by state by year going back historically), and this might have to be mandated by the CPUC. Third, larger sample sizes and more robust monitoring data are needed.

### **5.5. Present and Future Use of Studies**

Several of the respondents had not made use of the studies (other than for personal use as a general source of knowledge) but were planning to use them in the

future. In contrast, many respondents had already made use of the studies for generally improving the planning, design, implementation, and evaluation of programs. More specifically, respondents used the information in these studies for informing or validating assumptions in cost-effectiveness models and planning needs, for recognizing problems with methods and simulation tools, and for understanding market size and penetration leading to estimates of overall effects. Others used this information for consulting, research, teaching, class work, writing papers and reports on market effects and providing comments to the CPUC on program effectiveness and policy strategies for future lighting and residential new construction programs. And a few used the California information for projects outside California, for comparison work in other states with the findings in California.

While some respondents were unsure of how they were going to use these studies, and some had no plans, many respondents were planning to use these studies in their planning, design, implementation, and evaluation of programs. More specifically, respondents were planning to use the information in these studies for cost-effectiveness assessments, incorporating lessons learned to avoid repeating errors and to build on what seems to be effective, benchmarking, and examining trends in market penetration of specific energy-efficient goods in the market. Some respondents will use this information to help customers make decisions, and others will provide this information to their product managers and for assessing market size and penetration of specific technologies. Others were planning to continue to use this information for consulting, research, teaching, class work, writing papers and reports on market effects. One respondent was planning to replicate the high bay lighting study in their service territory, using some of the California comparison data, while another was planning to use this type of analysis for water planning. Finally, one person indicated that they would be using this information to continue their work on codes and standards program activities.

## **5.6. Dissemination of Studies**

Several respondents have forwarded these reports to others in California and in other states (spillover effect), such as: program administrators and managers, program designers and marketers, planners and evaluators, reporters, consultants, supervisors, colleagues, product managers, manufacturers and retailers, and utility clients.

## **5.7. Additional Market Effects Studies**

Many respondents would like to see additional market effects studies. Some had specific studies in mind (see below), while others provided general reasons for more studies. Some respondents thought these studies were very important for assessing market transformation and carrying momentum forward, others were interested in the market penetration of other energy-efficient products and services, and others wanted to quantify savings from market effects and identify the program components that were most responsible for the savings (for program design). They also want to increase their understanding of new technologies and indirect program impacts, and how future market effects studies would compare with the ones recently conducted. Respondents felt that market effects evaluation was practically and conceptually difficult but crucial.

Moreover, as California continues to emphasize the importance of market indicators, respondents thought that market effects studies would be important for more measures, and particularly for the statewide programs. However, some respondents only wanted market effects studies if the evaluation results were going to be used by the CPUC.

Specific market effects studies were suggested:

- Residential sector:
  - HVAC
  - Whole house home performance
  - Audits
  - Weatherization
  - Smart meters
  - Appliances
  - LEDs
  - Lighting and HVAC control technologies
  - Electronic loads
  - Large screen televisions
- Non-residential sector:
  - New construction
  - Retrofit
  - HVAC
  - High performance T-8 lighting
  - LEDs
  - Lighting and HVAC control technologies
  - Building commissioning
  - Smart meters
  - Energy storage
- Industrial programs
- Agricultural programs
- Local government programs
- Renewables (in buildings)

Some recommended studies were more generally stated: e.g., conduct market effects studies for all energy saving technologies for which saving are counted, but as market studies not technology studies.

## 6. Conclusions on Measuring Market Effects Studies

Three market effects studies were conducted to address the following objectives:

- Understand the cumulative effects of California’s energy efficiency programs on the target market.
- Quantify 2006–2008 kilowatt-hour and kilowatt savings (if any) caused by the above potential market effects and not claimed as direct or participant spillover savings.
- Support the CPUC’s strategic planning efforts by clarifying whether savings from potential market effects can be quantified with sufficient reliability to be treated as a resource.

These studies were successful in collecting and analyzing a variety of data to understand the cumulative effects of California’s energy efficiency programs in three markets (CFLs, HBLs, and RNC), and they were able to quantify the savings caused by the above potential market effects for the 2006-2008 time period. Two studies (HBL and RNC) claimed that the energy savings could be quantified with sufficient reliability to be claimed as a resource, while the third study (CFLs) could estimate savings but the savings could not be claimed as a resource for the 2006-2008 program cycle.

These studies affirm that measurement of program effects and market transformation is possible even in a market crowded with stimuli. But it is important to note that, as with other evaluation efforts, there is often a great deal of uncertainty when evaluating market effects. This uncertainty reflects the reliance of the evaluator on self-reports (of manufacturers, retailers, participating consumers and nonparticipants) for assessing changes in the marketplace as well as program attribution. In addition, the uncertainty also stems from the increasing “clutter” of other (nationwide, local, regional) campaigns, incentives and messages affecting behavior that makes it very difficult to assign attribution to the effects from one particular program. Nevertheless, the use of multiple methods (surveys, quasi-experimental design, econometric modeling, etc.) and obtaining information from a range of actors leads to relatively robust measurements of market effects. And this approach will become even more robust if the following lessons are incorporated in future studies of market effects:

1. Collect baseline data as early as possible
2. Estimate market effects throughout a program’s lifecycle
3. Require hypothesis testing as part of the evaluation
4. Include elements of market effects evaluation in other program evaluations



## 7. Acknowledgements

This paper reflects the work of many people conducted over several years. First, I would like to thank CIEE's administrative staff for getting many of the contracts in place and for their administrative assistance over time (in particular, Jeanette Gorsira and Ken Krich). Second, I would like to thank the three advisors that helped CIEE in managing these contracts (Stephen Meyers, Ralph Prah, and Isaac Turiel) and Ken Keating for providing evaluation oversight as an advisor to the CPUC. Third, the CPUC's Energy Division staff were very valuable in managing the work of the contractors and providing insights, particularly Mikhail Haramati and Ayat Osman. Fourth, the consultants themselves spent a great deal of time in conducting this work – while there are too many people to list, I would like to acknowledge the efforts of leading members of these teams: Lynn Hoefgen and Greg Clendenning on the RNC market effects study, Ellen Rubinstein and Scott Dimetrosky on the CFL market effects study, and Mitchell Rosenberg and Tim Pettit on the HBL market effects study. Finally, I would like to thank the reviewers of an earlier draft of this paper: Mikhail Haramati, Ken Keating, Ayat Osman, and Ralph Prah.

## APPENDIX A

### Market Effects Studies

#### **Compact Fluorescent Lamps Market Effects Final Report**

*Author(s):* The Cadmus Group, Inc.: Energy Services Group (formerly Quantec, LLC), KEMA, Itron, Inc., Nexus Market Research, A. Goett Consulting Year: 2010

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#### **Compact Fluorescent Lamps Market Effects Final Report. Appendix A: In-Home Audit Findings**

*Author(s):* The Cadmus Group, Inc.: Energy Services Group (formerly Quantec, LLC), KEMA, Itron, Inc., Nexus Market Research, A. Goett Consulting Year: 2010

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#### **Compact Fluorescent Lamps Market Effects: Final Interim Report**

*Author(s):* The Cadmus Group, Inc.: Energy Services Group (formerly Quantec, LLC), KEMA, Itron, Inc., Nexus Market Research, A. Goett Consulting Year: 2009

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#### **High Bay Lighting Market Effects Study: Final Report**

*Author(s):* KEMA, Inc. Kema, Inc. and Itron, Inc. Year: 2010

[Download](#)

#### **Phase II Report: Residential New Construction (Single-Family Home) Market Effects Study**

*Author(s):* KEMA (formerly RLW Analytics), NMR Group (formerly Nexus Market Research), Itron Inc., The Cadmus Group Inc. Year: 2010

[Download](#)

#### **Phase I Report: Residential New Construction (Single Family Home) Market Effects Study (Final)**

*Author(s):* KEMA, Inc. KEMA, Inc. (formerly RLW Analytics), Nexus Market Research, Inc., Summit Blue Consulting, Itron, Inc., and The Cadmus Group, Inc. Year: 2009

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## APPENDIX B

### Market Effects Studies Survey

In the last few years, the California Institute for Energy and Environment (CIEE) and the California Public Utilities Commission (CPUC) sponsored a series of studies on market effects on three topics: residential new construction, CFLs, and high-bay lighting. These studies have been completed and presented at public workshops held by the CPUC (the papers and presentations can be found at the following website: <http://uc-ciee.org>).

CIEE and CPUC are interested in how these studies have been used by the readers of the reports and/or participants at the workshops. In addition, CIEE and CPUC are interested in recommendations for additional market effects studies that should be pursued in the coming years. Thus, we would appreciate if you could respond to this brief survey and send this file back to Ed Vine at CIEE ([Edward.Vine@uc-ciee.org](mailto:Edward.Vine@uc-ciee.org)) by February 10, 2011. All responses will be kept anonymous and confidential.

**1. Which of the following *best* describes your affiliation? (Check *one* response)**

|                          |                                       |                          |                              |
|--------------------------|---------------------------------------|--------------------------|------------------------------|
| <input type="checkbox"/> | Consulting firm / consultant          | <input type="checkbox"/> | University                   |
| <input type="checkbox"/> | Government – federal, state, or local | <input type="checkbox"/> | Utility – investor owned     |
| <input type="checkbox"/> | National laboratory                   | <input type="checkbox"/> | Utility – municipal or other |
| <input type="checkbox"/> | Non-profit organization               | <input type="checkbox"/> | Researcher                   |
| <input type="checkbox"/> | Public service/utilities commission   | <input type="checkbox"/> | Other (specify: _____)       |

**2. Which of the following *best* describes your job? (Check *one* response)**

|                          |                                       |                          |                                    |
|--------------------------|---------------------------------------|--------------------------|------------------------------------|
| <input type="checkbox"/> | Evaluator or market researcher        | <input type="checkbox"/> | Program planner or manager         |
| <input type="checkbox"/> | Evaluation or market research manager | <input type="checkbox"/> | Student (undergraduate / graduate) |
| <input type="checkbox"/> | Public policy analyst                 | <input type="checkbox"/> | Professor                          |
| <input type="checkbox"/> | Public policy developer               | <input type="checkbox"/> | Researcher                         |
| <input type="checkbox"/> | Program implementer                   | <input type="checkbox"/> | Other (specify: _____)             |

3. In which State do you presently reside? \_\_\_\_\_

4. From which of the following sources did you hear about the market effects studies? (Check *all* that apply)

|                          |                   |                          |  |
|--------------------------|-------------------|--------------------------|--|
| <input type="checkbox"/> | CPUC service list | <input type="checkbox"/> | Referred by a colleague/friend/word of mouth |
| <input type="checkbox"/> | CIEE listserver   | <input type="checkbox"/> | Other (specify: _____)                       |
| <input type="checkbox"/> | CIEE website      | <input type="checkbox"/> | _____ )                                      |

5. Which of the following studies have you read and/or heard the presentation? (Check *all* that apply)

| White paper                                       | Read?                    | Heard presentation?      |
|---|--------------------------|--------------------------|
| CFL Market Effects Study                          | <input type="checkbox"/> | <input type="checkbox"/> |
| High-Bay Lighting Market Effects Study            | <input type="checkbox"/> | <input type="checkbox"/> |
| Residential New Construction Market Effects Study | <input type="checkbox"/> | <input type="checkbox"/> |

6. What do you consider to be the benefits and usefulness of these studies?

7. Could the methodologies of the market effects studies or the manner in which they present results be improved? If so, how?

8. How have you used these studies in your work? Please be specific.

[It could be in the areas of policy development, program design, program implementation, program evaluation, marketing, education, information transfer, etc.]

9. Are you planning to use these studies in your work? If so, how?

10. Have you forwarded any of the papers to others or referred others to the papers in some way (e.g., mentioned in a conversation)? Please be specific.

**11. Would you like to see another set of market effects studies? And for what purpose?**

**12. What additional market effects studies should be prepared?**

**13. Do you have any other comments related to market effects evaluation?**

**THANK YOU VERY MUCH FOR RESPONDING TO THIS SURVEY.**

**PLEASE EMAIL YOUR RESPONSES TO ED VINE – [EDWARD.VINE@UC-CIEE.ORG](mailto:EDWARD.VINE@UC-CIEE.ORG)**

**BY FEBRUARY 10, 2011**