

# **Impacts of Advertising on Market Transformation: A Case Study of PG&E's 2007 CFL Marketing Campaign**

*Barbara Wingate, Pacific Gas & Electric Company  
Jennifer E. Canseco, KEMA*

## **ABSTRACT**

Many technology adoption studies have demonstrated that before a technology will be widely adopted by consumers, individuals must first have favorable attitudes toward it. Program implementers expend considerable resources on marketing energy-efficient technologies with the hope that the advertisements will positively impact consumer perceptions, ultimately leading to the consumers' decisions to purchase the technologies.

In July, 2007, Pacific Gas & Electric Company (PG&E) launched a significant advertising campaign designed to influence consumer perceptions of compact fluorescent lamps (CFLs). The campaign was designed to create and reinforce positive impressions of specific CFL attributes with the ultimate goal of changing consumer behavior regarding CFLs – namely, generating increased CFL purchase and installation rates among PG&E customers. PG&E conducted a three-phase research study designed to track changes in consumer perceptions of CFLs and to evaluate the effectiveness of the ad campaign in encouraging consumers to purchase CFLs.

The first (or baseline) phase was conducted prior to PG&E's campaign going "live." The second phase was completed approximately one month after the campaign was launched, and the third at the campaign's conclusion. While it was difficult to attribute changes in consumer perceptions and behavior to specific advertisements, the research has identified positive changes in consumer perceptions of CFL attributes, satisfaction, likelihood of recommending CFLs to friends and family, and stated future purchase intentions. This paper presents key results from all three phases of research and discusses its wider implications for program designers, marketers, and policymakers.

## **Ad campaign background**

Much has been written about the sequential stages of persuasion, or a "hierarchy" of advertising effects. Attitude researchers Lavidge and Steiner (1961) illustrated how communications act to impact consumers, first via a cognitive stage (awareness or knowledge of the advertising and product), then an affective stage (when attitudes are formed and convictions established), then finally a behavioral stage (when action is taken). Pacific Gas & Electric Company (PG&E) conducted research in early 2007 that found a clear need for consumer education around compact fluorescent lamp (CFL) quality (Swirl Integrated Marketing, 2007). The challenge was that consumers perceived CFLs as having poor light quality compared to conventional incandescent bulbs, particularly among consumers who had never purchased CFLs and among infrequent purchasers of CFLs (as these consumers are unaware that CFL quality has improved over time). PG&E identified an opportunity to communicate that product quality has improved appreciably, thus affecting consumer attitudes and driving consumers to purchase PGE-discounted CFLs in retail stores.

The key to reaching PG&E’s goal of increased retail sales of CFLs was *to make CFLs become more “mainstream.”* Thus, a marketing strategy was devised to overcome negative light quality perceptions, as well as underscore the positive financial and environmental benefits of CFLs. In 2007, PG&E launched a four-month marketing campaign to promote CFLs using television, radio, and Internet advertisements. The ultimate goal of the campaign was to educate consumers about the benefits of CFLs and to drive them to purchase CFLs by looking for the PG&E discount sticker on products in retail stores.

The marketing campaign consisted of an integrated media plan (television, radio, online advertising and microsite) as well as a retail approach (collaboration with key CFL retailers) directing consumers to purchase CFLs bearing a PG&E discount sticker. The television and online ads featured a CFL and an incandescent lamp side-by-side talking with one another, and the television ads featured three executions in rotation with messaging concentrated on CFL light quality, environmental benefits, and money savings associated with CFLs. The campaign ran from July through mid-November 2007, with ongoing events throughout October around the national Energy Star® “Change a Light, Change the World” campaign.

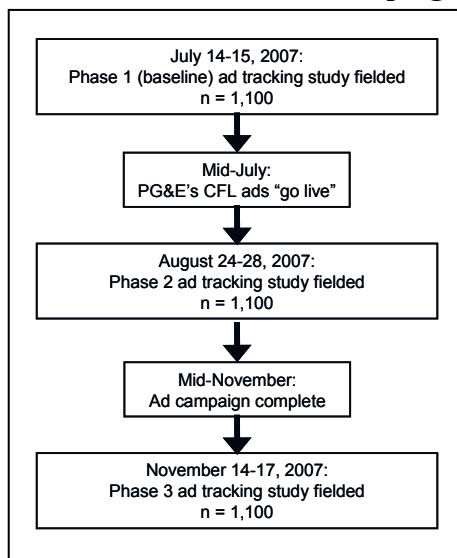
### Study Background

PG&E commissioned a study tracking consumer awareness of the utility’s CFL advertisements with three main objectives:

1. Track awareness of CFL ads over time (focusing primarily on PG&E’s television ads);
2. Provide evidence that the CFL ads changed consumer perceptions of CFLs; and
3. Explore possible links between PG&E’s CFL ads and PGE’s in-store CFL promotions.

The study consisted of three phases. The first was conducted prior to the campaign’s launch, the second approximately one month after the campaign went “live”, and the third immediately following the end of the campaign. Figure 1 provides an overview of the timing for the CFL ad campaign and the three phases of the tracking study.

**Figure 1. Timing of PG&E’s 2007 CFL Ad Campaign and Tracking Study**



## Methods

The market research firm MarketTools fielded a web-based survey to gauge awareness of PG&E's television ads for CFLs. MarketTools has a panel of more than 90,000 customers in PG&E's service territory who are eligible to complete the online study. Each phase of the study was completed with a random selection of 1,100 PG&E customers, and phases 2 and 3 of the study excluded participants from prior phases.

For this study, MarketTools emailed an invitation to participate in the survey to panel members registered in zip codes within PG&E's service territory.<sup>1</sup> The e-mail invitation provided a link to the online study, which presented the respondent with one question at a time. Each question was followed by radio buttons (check boxes) on which respondents could click to indicate their response(s) to each question. Based on a respondent's answer selection for a particular question, the survey program skipped to the next relevant question (with the next question appearing on the screen in place of the previous question).

Web-based research is becoming increasingly popular, as it offers an economical approach for gathering data from a large number of respondents very quickly (Ritter and Sue, 2007). For the purposes of this study, however, the key advantage of web-based surveys over telephone surveys is that survey participants have the ability to view images of the advertisements on screen. For questions of this nature, the web-based method will likely generate more accurate responses than a telephone survey (in which the interviewer would have to describe the advertisement to the survey respondent).

Web-based survey respondent panels tend to be somewhat skewed toward consumers with higher income and higher levels of education than the general population, and panels also tend to over-represent Caucasians while under-representing African Americans and Hispanics (Market Concepts, 2006). Results are thus not entirely representative of PG&E's residential customer base, and caution should thus be taken when interpreting the results. However, because the primary purpose of the research was to track changes over time, and respondents were drawn from the same population group for all three phases of the study, the results are meaningful.

## Challenges

Tracking awareness of PG&E's CFL advertisements over time proved to be somewhat challenging, primarily because another large-scale CFL advertising campaign was active at the same time. Flex Your Power (FYP) ran a campaign that was active from mid-June until the end of September that focused on CFLs and other energy-efficient technologies (McGuire, W., 2008). The campaigns thus overlapped for approximately two and a half months, as PG&E's campaign was active from mid-July through mid-November.<sup>2</sup>

Because of this overlap, it is likely that some study participants confused the two campaigns – in other words, some proportion of the study participants who reported that they had

---

<sup>1</sup> Note that the survey also included a screener question to verify that each respondent was a PG&E electric customer. Surveys were terminated with respondents who could not confirm that their homes received electricity from PG&E.

<sup>2</sup> PG&E and FYP tracked their advertisements differently, so there is no straightforward comparison between the number of ad impressions from each campaign. Additionally, the FYP campaign was active in the four major investor-owned utility service territories, while PG&E's campaign was focused solely on its own service territory in northern California (which represents approximately 40 percent of the state's population).

seen one of PG&E’s CFL advertisements may actually have seen one of FYP’s advertisements. Conversely, it is also possible that some proportion of study participants who reported having seen a “non-PG&E” CFL ad actually saw a PG&E ad. Given these challenges, the researchers focused on tracking changes in awareness of any CFL ads over time (by comparing Phase 2 and 3 results against the baseline results) as well as tracking awareness of PG&E’s ads specifically.

To ascertain whether PG&E’s ads in particular had any effect on consumer perceptions is even more difficult, as there may be multiple influences on consumer perceptions of CFLs (including other advertisements, media attention, word of mouth, and so on). To track evidence of changing perceptions of CFLs, the researchers focused on tracking degrees of agreement with specific positive and negative statements regarding CFL attributes which were directly related to messages in PG&E’s advertising. PG&E’s ad campaign focused on increasing agreement with two positive statements about CFLs:

- CFLs provide good quality light; and
- The quality of CFLs is just as good as regular light bulbs.

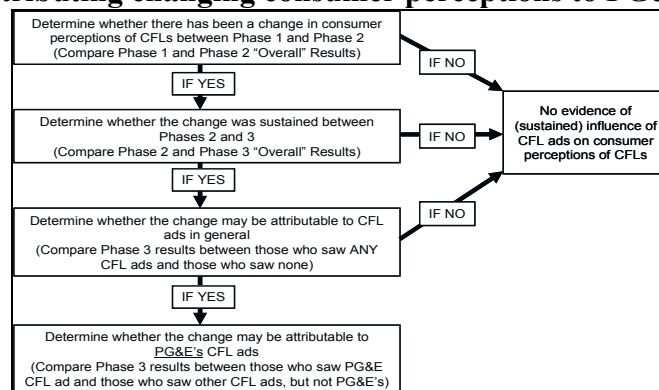
The campaign also focused on decreasing agreement with a negative statement about CFLs:

- CFLs give off a different color light than regular light bulbs.

Figure 2 provides an overview of the steps used by researchers to determine whether PG&E’s ads were likely responsible for changing consumer perceptions of CFLs with regard to the specific attributes describe above (CFL light quality, product quality, and light color). Where statistically significant changes in agreement with positive statements (or disagreement with the negative statement) were apparent between the first and second study phases, the researchers looked for sustained or increased levels of agreement during the third study phase.

If agreement was sustained or increased, researchers compared phase 3 results between respondents who saw any CFL ads and those who saw no CFL ads to determine whether the change might be attributable to CFL ads in general. If the difference between the “any ad” viewers and the “no ad” viewers in Phase 3 was statistically significant, the researchers then compared phase 3 results between those who saw PG&E’s CFL ads specifically and those who reportedly saw CFL ads, but not PG&E’s CFL ads. If the difference in agreement between these two groups was statistically significant, the researchers concluded that PG&E’s ads were likely responsible for the change in consumer perceptions.

**Figure 2. Attributing changing consumer perceptions to PG&E’s CFL ads**



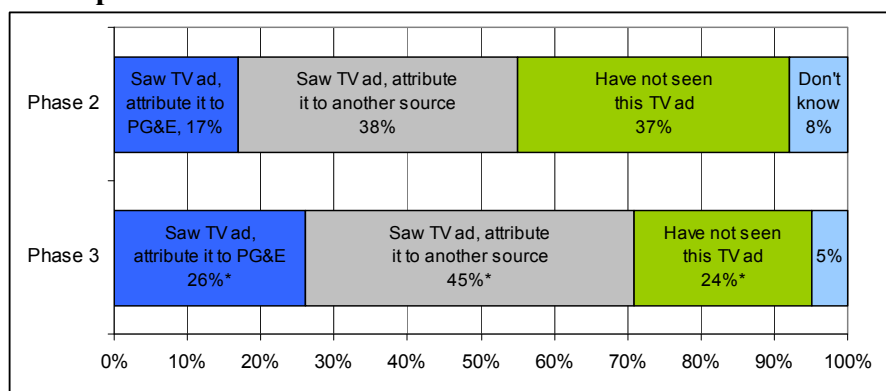
## Key findings

This section presents key findings with regard to awareness of PG&E's CFL ads; changing consumer perceptions regarding CFL light quality, product quality, and light color; satisfaction with CFLs; and possible links between PG&E's ads and their in-store CFL promotions.

### Awareness of PG&E's CFL ads

The web-based surveys showed a still image from one of PG&E's television ads during the second study phase, and based on this, approximately 55 percent of respondents reported having seen the ads. In phase 3, this proportion increased to 71 percent of the study participants (a statistically significant change at the 90 percent level of confidence).<sup>3</sup> The proportion who reported that the ad was sponsored by PG&E (versus some other sponsor) also increased significantly between phases (Figure 3). There were no other significant increases in attribution of CFL ads to other sources, indicating that PG&E ads may be the reason for increased awareness of CFL ads. Additionally, the longer the ads ran, the higher the proportion of respondents who correctly attributed the ads to PG&E.

**Figure 3. Prompted Awareness of PG&E Television CFL Ad and Attribution of Ad**



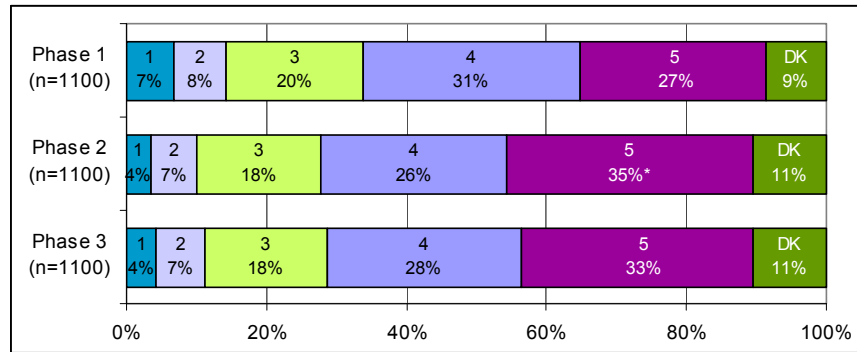
n=1,100. \* Difference from Phase 2 is statistically significant.

### Consumer perceptions of CFLs

**Quality of light from CFLs.** Study results showed a significant increase in the proportion of survey respondents who “strongly agreed” with the positive statement, “CFLs provide good light quality” between study phases 1 and 2. This level of agreement was maintained in phase 3 (see Figures 4).

<sup>3</sup> All statistically significant results are reported at the 90 percent level of confidence.

**Figure 4. Agreement with the Statement,  
“CFLs Provide Good Light Quality” by Study Phase  
(Responses on a 5-point scale where 1 = “Strongly Disagree,” 5 = “Strongly Agree”)**



\* Difference from Phase 1 is statistically significant.

With regard to CFL light quality in particular, results show a significant difference in agreement with the statement “CFLs provide good light quality” among those who have seen CFL ads and those who have not seen any CFL ads (Table 1). As shown in the table, the proportion who of respondents who saw any CFL ad and “strongly agree” with the statement is 35 percent, compared with only 22 percent of respondents who saw reported that they saw no CFL ads (a statistically significant difference).

The table also demonstrates that significantly higher proportion of study participants who reported that they saw PG&E’s television ad strongly agree with the statement than among participants who saw other television ads, but not PG&E’s. These results suggest that the change may be attributable to PG&E’s television ads.

**Table 1. Agreement with the statement, “CFLs Provide Good Light Quality”  
Among Phase 3 Respondent Groups  
(Responses on a 5-point scale where 1 = “Strongly Disagree,” 5 = “Strongly Agree”)**

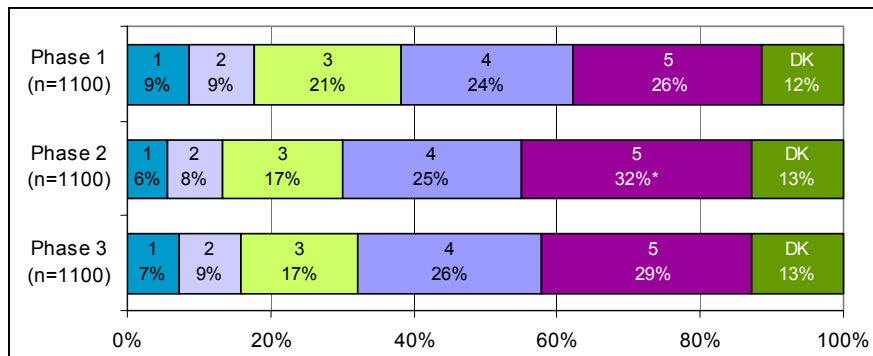
Phase 3 respondent group	% of Phase 3 respondents Who “strongly agree” (rating = 5)	
	%	n
Saw no CFL ads	22%*	140‡
Saw any CFL ad (unaided)	35%*	828
Saw PG&E television ad (aided w/ad image)	37%†	773
Saw television ad, but not PG&E ad	23%†	132

‡ These respondents were not excluded from subsequent aided awareness questions regarding PG&E’s CFL ads; thus, the sum of respondents who have seen PG&E’s ads plus those who have seen other ads is greater than the unprompted total reported ad viewers.

\* † Difference between groups is statistically significant.

**CFL quality.** Study results show a significant increase in the proportion of survey respondents who “strongly agreed” with the positive statement “the quality of CFLs is just as good as regular light bulbs” between study phases 1 and 2. This level of agreement was maintained between phases 2 and 3 (see Figure 5).

**Figure 5. Agreement with the Statement, “the Quality of CFLs is Just as Good as Regular Light Bulbs” by Study Phase (Responses on a 5-point scale where 1 = “Strongly Disagree,” 5 = “Strongly Agree”)**



\* Difference from Phase 1 is statistically significant.

There was less clarity regarding the influence of PG&E’s CFL ads on consumer perceptions of CFL quality than on perceptions of the quality of light from CFLs as described above. Although there is a significant difference in the proportion of respondents who “strongly agree” with the positive statement regarding CFL quality among those who saw no CFL ads (21%) and those who saw any CFL ads (31%), the difference between respondents who reportedly saw PG&E’s ads (32% strongly agree) versus other CFL ads (26% strongly agree) is not statistically significant.

**Table 2. Agreement with “the Quality of CFLs is Just as Good as Regular Light Bulbs” Among Phase 3 Respondent Groups (Responses on a 5-point scale where 1 = “Strongly Disagree,” 5 = “Strongly Agree”)**

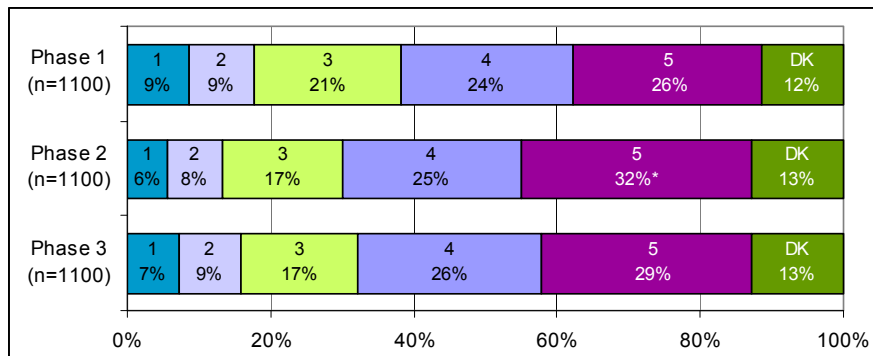
Phase 3 respondent group	% of Phase 3 respondents Who “strongly agree” (rating = 5)	
	%	n
Saw no CFL ads	21%*	140‡
Saw any CFL ad (unaided)	31%*	828
Saw PG&E television ad (aided w/ad image)	32%	773
Saw television ad, but not PG&E ad	26%	132

‡ These respondents were not excluded from subsequent aided awareness questions regarding PG&E’s CFL ads; thus, the sum of respondents who have seen PG&E’s ads plus those who have seen other ads is greater than the unprompted total reported ad viewers.

\* Difference between groups is statistically significant.

**CFLs give off a different color light than regular light bulbs.** Study results show a significant decrease in the proportion of survey respondents who “strongly agreed” with the negative statement, “CFLs give off a different color light than regular light bulbs” between study phases 1 and 2. This level of agreement was maintained between study phases (see Figure 6). However, results show no significant difference in agreement with the statement among those who have seen CFL ads (28%) and those who have not seen any CFL ads (24%), so it is unlikely that PG&E’s ads are responsible for these changes in consumer perceptions of color of light.

**Figure 6. Agreement with “CFLs Give off a Different Color Light than Regular Light Bulbs” by Study Phase**  
**(Responses on a 5-point scale where 1 = “Strongly Disagree,” 5 = “Strongly Agree”)**

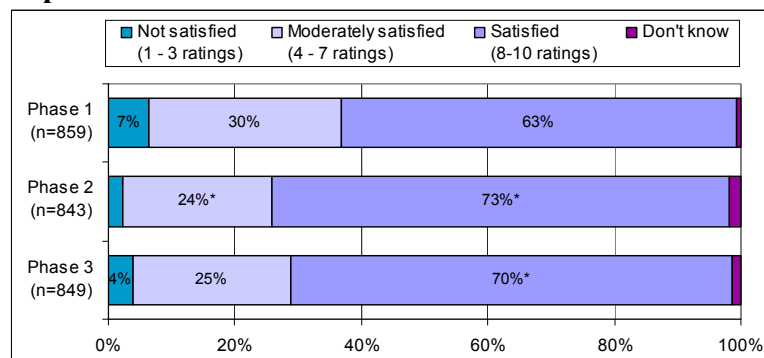


\* Difference from Phase 1 is statistically significant.

### Satisfaction with CFLs

**General Satisfaction.** The web-based surveys asked prior CFL purchasers were asked to rate their general satisfaction with CFLs 10-point scale where 1 means "not at all satisfied" and 10 means "very satisfied" (Figure 7). Between the first and second phases, ratings between 8 and 10 increased from 63 percent to 73 percent (a statistically significant increase) and remained high in phase 3. However, the proportion of phase 3 respondents who are “very satisfied” with CFLs (rating = 10) is not significantly different among those who have seen any CFL ads and those who have not, suggesting the change in satisfaction is not attributable to CFL ads. Some proportion of this change may be attributable to continuing improvements in the CFL products over time rather than to perceptions of higher quality driven by advertising.

**Figure 7. Satisfaction with CFLs Among Prior CFL Purchasers by Study Phase**  
**Ratings on a 10-point scale where 1 = “Not at all satisfied” and 10 = “Very satisfied”**



\* Difference from Phase 1 is statistically significant.

**Likelihood of recommending CFLs to friends and family.** The web-based survey asked study participants to rate their likelihood of recommending CFLs to friends and family on a 5 point scale where 1 means, “very unlikely” and 5 means, “very likely.” The proportion of respondents who reported that they were “very likely” (rating = 5) increased significantly between the baseline (phase 1) and Phase 3 (see Table 3). Phase 3 results show that the proportion of respondents who are “very likely” to recommend CFLs to friends is significantly higher among



those who have seen CFL ads (62%; see Table 4) than among those who have not seen CFL ads (44%), suggesting that the difference may be attributable to CFL ads in general. However, there is no significant difference between respondents who have seen PG&E CFL ads and those who have not seen PG&E ads, indicating that PG&E’s ads are not solely responsible for the shift in likelihood of recommending CFLs to friends and family.

**Table 3. Likelihood of Recommending CFLs to Friends and Family by Study Phase (Among Prior CFL Purchasers)**

Likelihood	Study Phase		
	Phase 1 (n=859)	Phase 2 (n=843)	Phase 3 (n=849)
1 – very unlikely	4%	1%	2%
2	3%	2%	3%
3	15%	11%	12%
4	23%	26%	22%
5 – very likely	52%	57%	60%*
Don’t know	4%	3%	2%
Top-2 box likelihood (rating = 4 or 5)	76%	83%*	82%*

\* Difference from Phase 1 is statistically significant.

**Table 4. Likelihood of Recommending CFLs to Friends and Family Among Phase 3 Respondent Groups (Responses on a 5-point scale where 1 = “Very Unlikely,” 5 = “Very Likely”)**

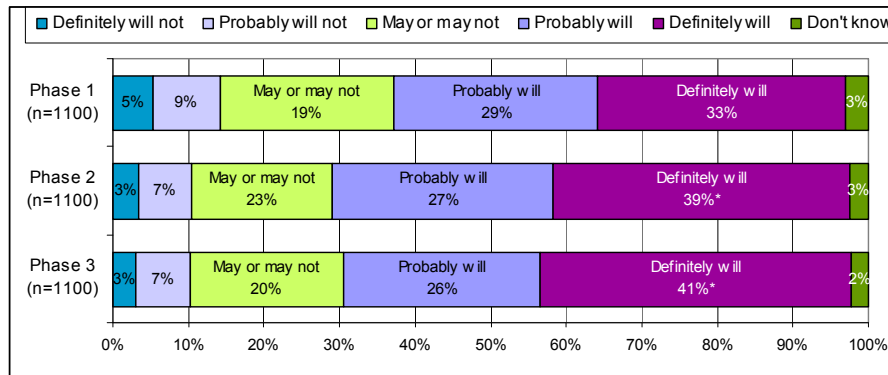
Phase 3 respondent group	% of Phase 3 respondents Who are “very likely” (rating = 5)	
	%	N
Saw no CFL ads	62%*	79‡
Saw any CFL ad (unaided)	44%*	671
Saw PG&E television ad (aided w/ad image)	64%	608
Saw television ad, but not PG&E ad	55%	100

‡ These respondents were included in subsequent aided awareness questions regarding PG&E’s CFL ads; thus, the sum of respondents who have seen PG&E’s ads plus those who have seen other ads is greater than the unprompted total reported ad viewers.

\* Difference between groups is statistically significant.

**Likelihood of purchasing CFLs within the next year.** The proportion of consumers who report that they “definitely will” purchase CFLs within the next year increased significantly between phases 1 and 2 (see Figure 8). This high likelihood was sustained in phase 3, but the proportion of respondents who report that they “definitely will” buy CFLs within the next year is not significantly different among those who have seen (any) CFL ads (46%) and those who have not seen any CFL ads (41%). It is thus unlikely that the change between phases 2 and 3 is attributable to CFL ads alone.

**Figure 8. Likelihood of Purchasing CFLs in the Next Year by Study Phase**

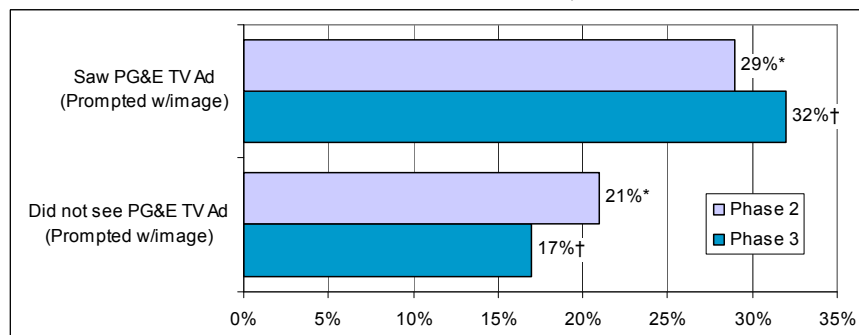


\* Difference from phase 1 is statistically significant.

**Links between PG&E’s CFL ads and PGE’s in-store CFL promotions**

PG&E was interested in exploring whether consumers who viewed their CFL ads on television were more likely to have purchased PG&E-discounted CFLs than consumers who have not seen the ads. Although study results show that the proportion of CFL purchasers who report that they have seen the PG&E stickers on discounted CFLs is significantly greater among respondents who have seen PG&E television ads (32%; see Figure 9) than among those who have not seen the ads (17%), additional research will be required to determine whether the television ads drove consumers to purchase CFLs or other factors are at work. For example, respondents who recall having seen PG&E’s television ads may be more likely to recall having seen the discount stickers than respondents who have not seen the ads.

**Figure 9: CFL Purchasers Who Report Having Seen PG&E Discount Stickers on CFLs in Stores, Phase 2 and 3**



Phase 3: did not see ad (n = 266); saw ad (n = 799). Phase 2: did not see ad (n = 277); saw ad (n = 438).

\* † Difference between results is statistically significant.

**Conclusions**

**Awareness of CFL advertisements**

More than three-quarters of the phase 3 study participants reported having seen one or more CFL ads (from any sponsor). When prompted with an image of PG&E’s CFL ads, 71

percent of respondents reported having seen the ad. This fraction increased significantly between phases 2 (55%) and 3 of the study.

It is likely that some proportion of the consumers who have seen television ads for CFLs recently have seen PG&E's television ads – whether or not they correctly attribute the ads to PG&E. The proportion who report that the TV ad they saw/heard was sponsored by PG&E increased significantly between study phases (unprompted w/ad image), and there were no other significant increases in attribution of CFL ads to other sources. These results indicate that PG&E ads may be the reason for increased awareness of CFL ads between phases 2 and 3 of the study. Additionally, the longer the ads ran, the larger the proportion who correctly attributed PG&E's ads to PG&E.

### **Consumer perceptions of CFLs**

Prior research (e.g., LRC, 2003) has demonstrated that consumers may be unable to distinguish between the light emitted by CFLs and incandescent lamps in controlled environments, but consumers who have not used CFLs may expect that the quality of light from CFLs will be worse or different from that of incandescent lamps. This perception has been cited by consumers as a barrier to first purchase of CFLs (KEMA Inc., 2005), so overcoming this perception may be an important step in increasing consumer adoption of CFLs. Results of this study suggest that CFL ads in general may have contributed to improved consumer perceptions regarding CFL quality, light quality, and color of light, and that PG&E's ads in particular may have positively influenced consumer perceptions of CFL light quality.

### **Consumer satisfaction with CFLs**

It appears unlikely that ads (PG&E's or others) are solely responsible for increased general satisfaction with CFLs or likelihood of purchasing CFLs, as changes are evident both in those who report that they have seen (any) CFL ads and those who have not. It is likely that awareness and purchasing likelihood with the general population have been affected by the high level of media saturation with energy conservation and climate change messages – for example, the 2007 film about global warming presented by former vice-president Al Gore (*An Inconvenient Truth*) and Wal-Mart's much-publicized goal of selling 100 million CFLs before the end of 2007 (Wal-Mart Stores Inc., 2007) – have likely raised the general awareness and purchasing likelihood with the general population. However, study results suggest that CFL ads in general have contributed to an increase in respondents who are “very likely” to recommend CFLs to friends and family.

### **Implications**

While linking changes in consumer perceptions of CFLs to a specific advertising campaign is challenging, results of the study suggest that CFL advertisements that reached PG&E customers in the summer and fall of 2007 had positive effects on their perceptions of CFL product quality, light quality, and light color. It thus appears that television marketing campaigns for CFLs may be an effective means of positively affecting consumer perceptions of CFLs.

However, because there are numerous sources in the market that are currently providing messaging regarding CFLs, establishing a direct connection between a particular brand (e.g.,

PG&E) and CFL advertisements is more challenging. Nonetheless, results of this study are encouraging, as they suggest that some consumers who had seen CFL TV advertising had seen PG&E's even if they did not directly attribute it to PG&E, and recognition of the CFL advertising from PG&E increased over time despite other active CFL campaigns. Results also suggest some synergistic effects between awareness of PG&E's television advertisements for CFLs and its in-store promotional campaign for CFLs.

## References

- KEMA Inc., 2005. Market Progress Evaluation Report (MPER1) for the Northwest Energy Efficiency Alliance's (NEEA) Energy Star® Consumer Products Program. October 21, 2005.
- Lavidge, R.J., and G.A. Steiner, 1961. "A Model of Predictive Measurements of Advertising Effectiveness." *Journal of Marketing*, Vol. 25, #6.
- Lighting Research Center, 2003. Increasing Market Acceptance of Compact Fluorescent Lamps (CFLs): Final Project Report. Prepared for U.S. EPA. September 30, 2003.
- Market Concepts, 2006. How representative is your sample? A MarketTools and Market Concepts White Paper. December 2006.
- McGuire, W. (Flex Your Power), 2008. Personal Communication. January 8, 2008.
- Swirl Integrated Marketing, 2007. PG&E Quantitative Study on CFL Awareness and Perceptions. Prepared for Pacific Gas & Electric Company (PG&E), January 2007.
- Ritter, L.A. and V.M. Sue, 2007. "Using Online Surveys in Evaluation." *New Directions for Evaluation*, a publication of Jossey-Bass and the American Evaluation Association. Number 115, Fall 2007.
- Wal-Mart Stores Inc., 2007. Wal-Mart Surpasses Goal to Sell 100 Million Compact Fluorescent Light Bulbs Three Months Early. Press Release: Bentonville, AK. October 2, 2007.