## Intercepts: "How-to," Lessons Learned, and Potential Application in a Post-CFL World

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## ABSTRACT

Intercepts are a method of identifying and interviewing customers, in-person, at the moment they select a product of interest to the study. This data collection method is being used as one of a number of approaches to impact evaluations in order to measure net-to-gross, leakage, reverse leakage, and residential versus non-residential sales, especially for upstream programs. Challenges with the intercept approach include ensuring representative sampling across multiple program territories and distribution channels; obtaining permission from stores—and often from their corporate headquarters—to conduct the intercepts; training field staff to identify specific products, for example, in an upstream lighting program identifying program bulbs can be challenging (especially when there are multiple bulbs per store and incentive price and bulb-choice vary); and ensuring that correct data are collected to feed into each evaluation input. This paper is based on multiple compact fluorescent lamp (CFL) intercept studies conducted in 2010-2011 in multiple states. The purpose of the paper is to identify lessons learned and offer recommendations for conducting an effective intercept study. Additionally, this paper presents some interesting findings from recent studies, and discusses the potential of applying the intercept approach to the evaluation of measures other than CFLs.

### Introduction

This paper discusses the use of customer intercept surveys (intercepts) as a data collection method for evaluating upstream lighting programs or lighting buy-downs.

While there are a number of data collection methods used for gathering information on program participation, effectiveness, savings, and attribution, no other method is as effective as customer intercepts for capturing influences on customers' decision-making process at the time of the purchase decision. Additionally, other data collection methods—such as phone surveys, in-home audits, mail surveys, and online surveys—require very large sample sizes in order to identify participants in upstream programs, and are typically focused on program sponsored territories. See Table 1 for a list of the benefits of intercepts versus other data collection approaches (Table 2 shows a list of the limitations of the intercept approach in comparison with other data collection approaches). Keep in mind that the overall evaluation objectives and budget, as well as the types of data you want to collect, should be used to determine the best data collection method for each program evaluation.

Table 1. Benefits of Intercepts Compared to Other Data Collection Methods

Intercept Approach Benefits					
Immediacy	Purchase decisions are captured in the moment.				
	Customers have no issue with recalling decision				
	influences.				
	Straightforward process of identifying program				
	participants without depending on program design and				
	sponsors.				
On-site	Ability to capture leakage while operating in the program				
	territory (with other data collection methods, this is often				
	not cost-effective or practical).				
	Allows the evaluator to assess shelf layout, specific retailer				
	program implementation, and in store program delivery.				
	Allows the evaluator to assess the impact of marketing on				
	the in-store purchases.				
	Program measure is still in the packaging, making it easy				
	to identify (other data collection methods rely on self-				
	reported information).				

Because intercept data collection occurs almost simultaneously with the customer's purchase decision, this method provides unique information. Intercepts lend themselves to capturing point-of-purchase customer lighting preferences, factors that influenced their purchase decision, data for calculating the leakage<sup>1</sup> of program bulbs, and data for determining residential versus non-residential market shares. Intercepts can also be an important tool for capturing data that can be used to calculate the price elasticity of demand for CFLs, and consequently for calculating net-to-gross.

CFL intercept surveys, while useful and valuable in identifying factors that influence purchasing decisions, do have some potential drawbacks and challenges, as shown in Table 2. First, a random sample of customers cannot be identified using conventional sampling techniques. Instead, participation is largely dependent on the customers in the lighting aisle of a particular store at the time researchers are conducting interviews. The end result captures a random snapshot of customers shopping at the specified stores on the selected dates, thus researchers should conduct intercepts on different days, in different stores, and at different times. Evaluators typically offer a small financial incentive, such as a store gift card between \$5 and \$10, for participating in intercept surveys. Second, such practices encourage participation, but may also introduce bias into the survey data because participants may feel compelled to provide what they perceive as "preferred responses." A third challenge with intercepts is that retail stores are sometimes reticent to allow them, as many stores prohibit outside solicitation of their customers.

<sup>&</sup>lt;sup>1</sup> Leakage refers to program rebated or otherwise funded measures that leave the territory of the program sponsor. For example, CFLs that are sold at a reduced price because of a buy down program, but that are installed in homes outside of the program territory, are considered leakage.

### Table 2. Limitations of Intercepts Compared to Other Data Collection Methods

Intercept Approach Limitations					
Immediacy	Cannot address satisfaction, retention, and location of				
	installation, as measure has not been used.				
	Cannot measure actual usage (hours-of-use).				
On-site	Participating retail locations are less representative of all				
	retail locations (intercepts require a smaller sample size				
	than some other data collection methods due to intercept				
	cost being more prohibitive than a telephone survey, fo				
	example).				
	Data collected is highly sensitive to the timing and specific				
	store factors such as individual day/week/month,				
	season/signage/store campaigns, etc.				
	Cannot identify a random sample of participants.				
	Data bias with customers providing perceived "preferred				
	responses."				
	Can be difficult to obtain retailer approval.				

While the intercept approach is valid for in-store rebates, mail-in rebates, and buy down programs, it is most useful for buy downs or in-store rebates when customer information is not collected. Intercepts are still a valuable tool for mail-in rebates or in-store rebates when customer information is collected. Even though it is possible to conduct less expensive telephone surveys with those participants after their purchase, there is value in gathering information from purchasers when they are in the act of making the decision and when the researcher can observe the messaging as the customer sees it. This paper outlines how to conduct intercepts of upstream programs, and provides a description of potential challenges and ideas on how to approach these challenges. The paper also presents interesting empirical findings and offers ideas for applications outside of the CFL realm.

# Methodology

### The Intercept Guide

In order to develop an effective intercept guide, it is important to keep in mind that the survey will be conducted in a busy retail environment. In this scenario, the survey should take no longer than five minutes to complete. Within that limited time, key questions should be designed to capture all relevant information about each participant's purchase. For example, to calculate leakage, it is important to capture information on where each bulb will be installed and whether that location is within the program service territory. This requires obtaining the zip code and utility of the installation location, whether a home or business.

In order to achieve the highest participation rate, the authors have found that it is best to intercept customers in the lighting section of each participating retail store. Once a customer has selected a light bulb (whether program or non-program) and placed it in their cart, they become an eligible participant. The benefits of conducting interviews in the lighting section are that the customer can easily remember why they selected a particular product.

While it is also possible to intercept customers post-purchase (as they are leaving the store), this approach poses additional challenges: more time has elapsed since the decision-making process, the

interviewer must determine if each customer purchased bulbs (by looking into their bag or cart as they exit), and the customer is generally less interested in completing a survey while leaving the store. Also, if the evaluator is providing an incentive, the customer cannot use it on that specific occasion unless they return to the line to purchase additional products, making the process more inconvenient for them. Conducting interviews near the store exit can also inhibit traffic. Table 3 provides the pros and cons of pre-purchase and post-purchase intercepts.

Pre-pu	ırchase	Post-purchase		
Pros	Cons	Pros	Cons	
Ability to capture the	Potential difficulty in	Customer has definitely	Most invasive to	
moment of decision.	gaining store	purchased the product.	customers (interviewer	
	agreement.		must look in shopping	
			bag).	
Best visibility of the	Customer may change	May be easier to recruit	May experience more	
inventory and signage.	their mind about	stores since interviews	time pressure as	
	purchasing the product	take place outside.	customer is finished	
	(and not complete the		shopping and ready to	
	purchase).		leave.	
Easiest place to identify	Greatest potential to		Customer cannot use	
participants.	influence purchase		incentive as easily.	
	decision, creating data			
	bias (may purchase a			
	different product			
	because of the study's			
	influence).			
Greater security for				
interviewer and				
interviewee.				

Table 3. Pros and Cons of Pre-purchase Versus Post-purchase Intercepts

Ideally, the interviewer will provide a quick introduction, record the customer's utility and zip code, ask them about products they intend to purchase, record bulbs being purchased as well as the intended installation location (noting the utility and zip code of the installation location), and record the customer's awareness of the program. It is important that the interviewer not influence the customer responses in any way. The interviewer should be trained in proper interviewing techniques and approaches to avoid introducing bias, and should also be familiar with the particular data collection instrument and study they are working with (so they know how to administer it and what would constitute bias).

### The Sampling Plan

Creating an effective intercept sampling plan starts with a list of retailers participating in the program. A participating store is defined as a retailer that is partnering with a utility to promote a specific energy-efficient product. Stores not partnering with a program sponsor are considered nonparticipants, and are also potential intercept candidates. The authors currently interview nonparticipating customers in participating stores (non-program bulb purchasers); however, as even participating retailers are very reluctant to allow intercepts and there would be no incentive for

nonparticipating stores to participate, it may not be practical to conduct intercepts in nonparticipating stores. If nonparticipating stores do agree to have intercepts conducted, the data collected could be valuable for aspects of analysis such as freeridership and spillover; however, we have not attempted this due to the amount of labor involved in gaining approval from the stores.

The sample of stores needs to include a range (and possibly stratification) of various characteristics, such as distribution channel, geographic range, program territory, etc. It is critical to sample a variety of stores across many distribution channels (e.g., home improvement, drugstore, mass merchandise, warehouse, grocery, bargain). Additionally, the sample should include stores with a range of other relevant characteristics: for example, between urban and rural stores, or between stores that are presumed to be vulnerable<sup>2</sup> to leakage and stores that are not. Stores might be identified as vulnerable based on their geographic proximity to other utility areas, or based on the percentage of customers in the neighborhood that are in the service territory of the target program sponsor. Some stores may be targeted for inclusion: for instance, stores identified as high CFL sellers or stores that were identified by the program sponsor as potential sites for in-store demonstrations. Targeting high selling stores provides an opportunity to study their success and make recommendations that will impact the program.

While conducting intercepts, the evaluator will get a better idea of which stores are the most vulnerable to leakage. In one intercept study, we found that four large home improvement retailers initially assumed by the program sponsor to be non-vulnerable were in fact vulnerable.

#### **Store Approval and Other Challenges**

Obtaining store approval can be the greatest challenge to conducting intercepts. Many large chain stores make their purchasing decisions at the corporate level, which often creates a roadblock for obtaining approval at the store level, as the store manager might be unfamiliar with the program and less likely to let the researchers set up interviews. One solution to this challenge is to combine intercepts with another in-store event (e.g., an educational or marketing event). Ideally, the intercepts would be conducted independently of these events, or the event and the research effort would be focused on separate measures so that customer purchasing decisions would not be influenced. Reports have pointed to possible differences between buyers at promotional events and those in stores without promotions, in terms of their decision-making process and their understanding of CFL benefits and drawbacks. Intercepts conducted during promotional events yield 25 percent more completed surveys, on average, but those surveys may not represent everyday CFL purchases (Ledyard et al., 2008).

Another solution to gaining store approval is to engage the implementer or sponsor to require that the retailer participate in evaluation activities as a prerequisite for participating in the program (this is possible with some, but not all, programs). It would also be useful to have an agreement with participating retailers that specifies that intercepts will be allowed as a part of the evaluation activity. Nonparticipating retailers may respond to the same message about the importance of collecting energy savings data. Letting them know you are providing their customers with a gift card might also be a good incentive for them to participate.

Conducting intercepts at participating stores that do not have program bulbs available when the field staff arrive is another challenge and potential roadblock, as customers are often not aware of the program until they see signage in the store. In the absence of program CFLs, there is no reason to conduct surveys; the interviewer will not be able to collect information on program purchases and cannot capture customer buying decisions that result from in-store marketing. To mitigate this

<sup>&</sup>lt;sup>2</sup> Vulnerability is a stores perceived risk to program CFL leakage. Typically, stores near program sponsor territory borders are considered more prone to leakage, since it would be more likely that customers from the non-program utility purchase the discounted program CFLs.

possibility, intercepts should be scheduled in advance so that the store is expecting the field staff and can stock their shelves accordingly.

#### **Field Staff Training**

Training, while crucial for all studies, is especially important for intercepts because field staff may not be knowledgeable or trained in energy studies or the specific type of questions addressed. Also, as this is a newer method for evaluation data collection, energy researchers may not be familiar with intercepts. The key aspects of training discussed in this paper include: the lamps themselves, the intercept guide, and key questions (for example, where the bulb is going to be installed).

In order to effectively conduct intercept surveys, field staff must be able to differentiate program CFLs from non-program CFLs, as well as CFLs from other types of lamps. This aspect of field staff training is most critical because stores sell various styles of CFLs (e.g., twister, globe, spot reflector) and utilities often incent multiple types of CFLs. For example, an A-lamp style CFL can easily be mistaken for an incandescent bulb (as the twisted tube is encased inside the visible housing), thus it is vital that field staff see and learn about different bulb types before conducting intercepts. Field staff should also be briefed on the exact models being discounted by the program so they can recognize and identify the program bulbs.

It is also important to familiarize and train the field staff with using the intercept guide. Many questions depend on customer responses to previous questions. For example, customers who purchase CFLs and non-CFLs may be asked some questions that are not asked of customers who purchase only CFLs. Therefore, field staff need to be aware that they may need to ask different questions based on the customers planned purchase and previous answers. Adequately trained field staff will also ensure that customers are not detained for longer than five minutes; this satisfies both customers and store managers. Lastly, field staff should conduct themselves professionally (e.g., have appropriate attire) and should convey knowledge of both the program and lighting technologies to customers.

In order to determine where a customer plans to install the bulbs, the intercept survey should contain questions regarding customer zip code and utility, as well as the zip code and utility of the intended installation site. In training field staff, it is imperative to reinforce the importance of the zip code data collection. A zip code might seem trivial, but it is critical to determining whether the purchaser and installation site are served by the target utility, and is therefore critical to accurately calculating leakage.

#### **Data Collection**

In order to gain approval to collect data in the retail locations, the intercept field manager, project manager, program sponsor, or implementer should call the stores ahead of time and explain the evaluation, the intercept, and its purpose. It is best to schedule the intercepts a few weeks in advance so that there is time to train the field staff, print and review survey materials, and train back up staff. This also allows for a quality control staff member to make arrangements to also be at the store during the intercepts.

Upon entering the store, the field staff should introduce themselves to the store manager (who should be expecting them). They should purchase the gift cards for that day's intercepts (having determined the denomination and amount in advance). The field staff should then familiarize themselves with the lighting section of the store, and make a list of the program bulbs available (complete with SKU numbers). Identifying the program bulbs is a crucial element of data collection; otherwise, field staff will have no way to compare the price, customer opinions, and overall findings to the non-program bulbs. The field staff should also take pictures of any signage and of the location of the program product

display. After gathering this in-store background information, the field staff are ready to conduct intercepts.

A qualifying participant is defined as someone who is carrying or has a light bulb in their shopping cart. Store customers who are just looking at the lighting section but have not selected a product would not be able to answer any of the decision-based survey questions. It is also important to note that depending on the intercept, not every kind of light bulb purchase may qualify a customer for the study (e.g., fluorescent tube light purchases are often dictated by fixture limitations, not by customer choice).

Once a customer has selected a product, the field staff should introduce themselves, explain the scope of the survey, and offer an incentive to the customer for agreeing to participate. The field staff should then review the items in the customer's shopping cart to determine their planned lighting purchases, and record these on the intercept form. (Since filling out this information on the form can be time-consuming, we recommend taking notes and then recording the details after the customer has completed the survey.) The field staff should then ask the intercept guide questions, record the data accordingly, thank the respondent, and provide them with the gift card or other incentive.

We recommend having a project manager on call during the intercepts for any issues that arise. Issues might include the store having no program signage or bulbs available; the store manager being unaware of the program; the store denying the field staff access even though corporate approval was given; or the store running out of program bulbs while the field staff is conducting intercepts.

#### **Quality Control**

Quality control (QC) is critical for data verification. Typically, a project schedule requires that multiple field staff work simultaneously in participating stores across the client's territory. We recommend that the trainer or another qualified staff person be present at each field staff members' initial intercepts to ensure that the interviewer fills in the data collection forms appropriately, greet the store manager, purchase the gift cards in the correct amount, intercept only qualifying customers, etc. We once encountered an implementer using the incentive to encourage customers to purchase program bulbs; thus, the QC person in the field threw these data out as the customer's decision to purchase the program bulbs had been substantially influenced. Field staff with previous experience conducting intercepts should be monitored during each program study to ensure their mastery of the study particulars—the products, the technical vocabulary, and the specific questions to ask customers.

Additionally, we recommend reviewing the data collected (once back in the office) after every intercept visit throughout the project. The data should be reviewed within one week of data collection (sooner is better). One practical reason that there may be a delay is that field staff often record the data on paper forms and have to mail them in before a review can be conducted. One reviewer should look at all the data to check consistency across field staff and should record inconsistencies, then immediately follow up with the specific field staff who conducted that intercept. For example, if one field staff person misunderstood the survey and entered the number of packages instead of the number of bulbs, those data would be inconsistent and have to be corrected or removed from analysis.

The intercept guide should have a place to record every bulb that the customer is purchasing, thus the reviewer should be able to double check this information against the data field staff collected for that customer. The reviewer should also check for completeness and that all applicable fields are filled out legibly (if not yet entered electronically, data should be spot checked once entered to ensure no entry error exists). Also, a reviewer should write up a QC assessment for each field staff person on their first day conducting intercepts, outlining what went well and giving constructive feedback on potential issues (such as missing data fields, etc.). After their second day in the field, the same QC person should check field staff data to ensure that any initial issues are resolved.

Following the above guidelines determining whether interviewers are correctly following the survey logic and identifying other data anomalies, such as data entry error, missing data, inconsistencies, etc. should be straightforward.

### **Data Analysis**

When conducting or analyzing intercept data tasks with easily underestimated complexities include: determining weighting methods, calculating leakage, calculating reverse leakage, determining residential versus non-residential sales, and determining self-reported attribution.

**Weighting.** After entering the intercept data into an analytics database and completing a quality assurance review, analysts will need to weight the data by variables, such as distribution channel (i.e., store type), rural versus urban location, store sales, and vulnerability status. The appropriate weighting approach should be determined based on the sampling approach, prior to data collection. The specific weights are then calculated after study completion.

**Leakage.** In addition to providing details to estimate overall program leakage, intercepts can provide information on store locations with higher levels of leakage, allowing for program sponsor to optimize their implementation efforts to minimize this loss. In order to ensure these data are as reliable as possible, it is critical to understand where incented measures will be installed.

Some external factors that can have a significant impact on leakage include the presence of implementer demonstrations—which may actively promote and attract customer attention to the program bulbs on sale—and the stores' proximity to other utility territories.

**Reverse Leakage.** In evaluating program savings, the CFL-based energy savings are associated with the installation location, not the location of purchase. Reverse leakage, where program sponsored measures enter the program territory from external sources, can also be measured with intercepts. The determination of whether to use intercepts or another data collection method rests heavily on budget and whether the programs are coordinated (or offered collaboratively with other sponsors). For example, adjacent program sponsors may have agreement and cost sharing initiatives that would make calculating leakage and reverse leakage within each territory a valuable undertaking. A program sponsor whose territory is surrounded by other territories without a program, or without such an agreement, may not benefit from having reverse leakage calculated. For a standalone program sponsor that is interested in calculating reverse leakage, it may be most cost-effective to combine the intercept study leakage information with a phone or other type of survey with the program sponsors' customers.

**Residential Versus Non-Residential Sales.** Intercepts are key to determining a program's customer base and the ways they use those incented measures. The installation location is important for evaluating the program savings, as the customer's home or business may not be within the territory of the sponsor offering the program. This effects the leakage calculation, and should be accounted for with the program design and marketing.

**Self-reported Attribution.** Intercept surveys provide an unparalleled opportunity to understand the influences of program incentives on purchasing decisions, because they happen just after the decision to purchase. The survey allows for gathering information to determine whether customers had already intended to purchase the product without an incentive. Consequently, intercept surveys can be valuable to supporting the estimation of freeridership. This method of data collection addresses one of the common criticisms of self-reported freeridership, specifically that self-reported information collected by

phone or other commonly used data collection approaches often occurs a long time after the purchase event—sometimes even by years, and accurate recall can be an issue (Skumatz, 2009).

Intercepts also provide an opportunity to collect information about the effect of price on a customer's purchases. This information can be used to assess program design and incentive levels, or as an input to a market-based approach to estimating freeridership. For program design purposes, it is critical to understand customers' price sensitivities to maximize participation and cost-effectiveness; more importantly from an evaluator's perspective, obtaining a reliable estimate of freeridership is one of the most critical research objectives. Unlike customer self-report methods of calculating freeridership, market-based approaches rely heavily on understanding a number of market variables—including price elasticity.

Determining the effect of price on the customers purchase can be captured by asking customers hypothetically about whether they would purchase the bulb at half the price (large incentive), double the price (no incentive), etc. to determine the impact of the program on their purchasing decisions. It is important to capture the price range that the customer is willing to pay for a bulb to determine effective incentive levels and whether they would have purchased the bulb in absence of the program, qualifying them as a freerider. To assist in determining the average price of a CFL in the participating retail store, field staff can compare the program bulb prices to non-program bulb equivalents.

#### **Application to Non-CFL Evaluations**

The intercept approach can be a valuable evaluation tool, especially for upstream programs where it is difficult to otherwise identify and interact with participating customers. However, the intercept approach does not necessarily have to be limited to upstream CFL programs. Intercepts are an effective way to collect customer purchasing information for any type of low-cost, high-demand, energy-efficient products. Some prospective applications of intercepts include low-flow showerheads, faucets, LED light bulbs, and different types of energy-efficient light fixtures.

### **Lessons Learned**

After conducting multiple intercept studies across the United States, the following are suggestions for effective and efficient data collection, as well as lessons learned from the field:

- Adequately train field staff to identify specific program bulbs in each store. Ensure that staff are familiar with each type of program bulb, and that they record the bulb SKU numbers from the participating retailers (ahead of time if possible).
- Attempt to conduct intercepts in the section of the store where the program measures are present, rather than post-purchase.
- Provide ample quality control procedures; ensure each field staff is accompanied by a QC staff on their first day of intercepts, review data for inconsistencies within one week of each intercept visit, and follow up with field staff if any inconsistencies are found on their first day or in the data they collect.
- If combining the intercepts with a marketing education event, ensure that potential biases are minimized by having the field staff stand away from the demonstration (so as not to be perceived as being associated with the marketing event) by directing customers with questions about what to purchase to speak to store staff, and by ensuring that the interviewer is clear about their data collection responsibilities and does not provide information to the customer about purchasing options.

- Work with utilities and implementers to determine if they will include allowing intercepts in their retail store agreements. It is important the retailers understand that intercepts are a crucial evaluation activity that will create minimal disturbance to their customers.
- Provide an incentive, preferably a gift card redeemable at the store where the intercepts are being conducted, to encourage participation by the store (due to the potential of increased sales) and by the customer who receives the incentive. Consider also providing an incentive to the retailer that allows the intercepts to be conducted on site.
- Vulnerability assumptions are not always true: intercepts are valuable for determining real vulnerability.
- Obtain bulb sales or bulb distribution data from the utility to inform the sample design, and to allow for sample stratification by sales levels.
- Ensure that program bulbs are actually available in participating stores and that signage is clearly displayed with the bulbs. Also make sure that marketing efforts have been conducted in the store and that staff know about the program; this will help ensure that program bulbs are easily identifiable, staff are able to comment on the bulbs, and bulbs are available for purchase on the day of the intercept.
- Identify the evaluation objectives and budget to determine if intercepts are the best data collection method for the study. Intercepts provide solid information on customer bulb type preferences, as well as on their purchasing decisions and the effectiveness of marketing. Intercepts are valuable in providing guidance to the utility on locations where bulbs are most effectively sold (e.g., bargain stores have less foot traffic than home improvement or mass merchandise retailers).

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