

Net-to-Gross Evaluation Methodology

EFFICIENCY NOVA SCOTIA CORPORATION

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ECONOLER

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INTRODUCTION

On May 19, 2010, a workshop was held by Nova Scotia Power's Demand Side Management team and a group of evaluation experts¹ to discuss a Nova-Scotia-based protocol for the assessment of free ridership, spillover and net-to-gross (NTG) calculations. The results of this discussion were a series of suggestions regarding appropriate methods for assessing free-ridership and spillover in Nova Scotia, including the following:

- the use of research in determining NTG;
- the application of NTG to additional Demand Side Management (DSM) programs than those for which it had previously been used;
- the timing of evaluation surveys to accurately assess participant responses;
- verification methods such as billing analysis for programs such as Low-Income Housing; and
- the need for a document of NTG calculations that could be applied to programs annually instead of measuring NTG every year.

On June 30, 2011 Nova Scotia's Utility and Review Board ordered that Efficiency Nova Scotia Corporation (ENSC) submit a document by December 15, 2011 that outlines its approach to the calculation of free ridership and spillover for the energy efficiency programs it administers. This document addresses that Order and also outlines the methodology used for assessing market effects. For this reason, the report is titled *Net-to-Gross Evaluation Methodology*. The report highlights how ENSC's selected methodology aligns with the workshop discussion and how it differs.

The general methodology included here was also presented to ENSC's Program Development Working Group (PDWG) in September 2011 (see Appendix A).

Selected Approach

The methodology selected for assessing net-to-gross ratios (NTGRs) for Efficiency Nova Scotia's programs relies on the self-report approach (SRA). The SRA involves the analysis of responses to survey questions that are designed to measure 1) the influence of a program on participants' decisions to implement eligible energy efficiency measures and 2) an estimate of the potential differences in energy savings in the absence of the program. Based on these responses, a NTGR is derived.

The SRA is one of several approaches to estimating net energy and demand impacts that were discussed at the 2010 workshop. In addition to the SRA, other approaches discussed included econometric methods, cross-sectional methods, structured expert judgment, and enhanced SRA. SRA has been selected because it provides a feasible and cost-effective way of estimating NTGRs in a

¹ The group included representatives of ScanAmerica, NMR Group, Research Into Action, Vermont Energy Investment Corporation, Navigant Consulting and the Energy Trust of Oregon.

timely manner and at a level of validity and reliability that is acceptable to key stakeholders in Nova Scotia. In particular, it provides a balance between five factors: cost, time required to conduct the analysis, the credibility of the results, feasibility of the research design and the various sources of error and uncertainty.

While the SRA methodology being used in Efficiency Nova Scotia's 2011 evaluation preserves the most important elements of approaches used to estimate previous NTGRs, it also incorporates two enhancements designed to improve upon the past approaches:

- The current method introduces a 0 to 10 scoring system for key questions that is used to estimate the NTGR, rather than using fixed categories with assigned weights (as was done previously). This provides a highly structured response-based scoring system instead of applying subjective weights to qualitative answers that can vary from one evaluator to another.
- The current method asks respondents to jointly consider and rate the importance of the many likely events or factors that may have influenced their energy efficiency decision-making rather than only focusing on their rating of the program's importance. This question structure more accurately reflects the complex nature of real-world decision making and should help to ensure that non-program influences, in addition to program influences, are reflected in the NTGR assessment.

The SRA used in these evaluations is also consistent with SRA methods used in other jurisdictions such as California, New York, Oregon, and Pennsylvania.

The 2010 workshop participants suggested that NTGRs need not be calculated every year; rather, once an acceptable NTGR for a program was calculated, it could be applied for several years before being recalculated. However, it should be noted that using the SRA to calculate free-ridership means that as long as a participant survey is used during a program evaluation, questions on free-ridership can easily be included. Once the algorithm is developed, it is a low-cost approach and it can provide ENSC with feedback relevant to the design of a program and its necessity in the market.

NTG methodology

The SRA methodology chosen for the evaluation of ENSC's programs includes the assessment of three distortion effects:

- Free-ridership;
- Internal spillover; and
- Market effects.

Free-ridership occurs when participants would still have purchased the efficient product or implemented the energy efficiency measure in the absence of the program. In order to gain an accurate assessment of free-ridership levels, the workshop group noted that the timing for conducting surveys is an important issue. Assessing the program's influence on participants shortly after

participation prevents the repercussion of memory loss and needs to be considered for each program. Although not implemented for 2011, ENSC is working towards administering surveys throughout the full evaluation cycle rather than towards the end of each year.

Internal spillover occurs when participants purchase eligible efficient products or implement eligible energy efficiency measures following their previous participation in the program. For a few programs, internal spillover is assumed to be insignificant and is therefore not measured. This decision is based on past evaluations, program logic models and the reasons identified in the relevant program sections.

Market effects can be caused by a program intervention on a specific product. It occurs in several forms, such as increased sales, growth in the variety of products and a better distribution network. Two programs have been identified that could potentially generate market effects: the Retail Markdown and Performance Plus programs. In these cases, market effects are measured through interviews with retailers and builders.

Once each effect has been quantified for a program, the net-to-gross ratio is calculated as follows:

$$\text{Net-to-gross ratio} = (1 - \% \text{ free-ridership} + \% \text{ internal spillover} + \% \text{ market effects})$$

The following table summarizes the approach used to assess these effects for each program.

Table 1: Summary of the Distortion Effects
Evaluated for Each Program

Program Names	Field Activities			Distortion Effects		
	P Survey	N-P Survey	Retailer/ Builder Interviews	FR	SO	Market Effects
Efficient Products – Appliance Retirement	90	0	0	⊙	⊙	
Efficient Products – Appliance Replacement	0	0	1			
Efficient Products – Retail Markdown	70	70	5	⊙ & Δ		Δ & □
Efficient Products – LED Holiday Light Exchange	0	0	0			
Efficient Products – Low-Income Direct Install	70	0	0			
Efficient Products – Multi-Unit Residential Renter	70	0	0	⊙	⊙	
EnerGuide for Existing Houses	70	0	0	⊙	⊙	
Existing Houses – Fuel Substitution	70	0	0	⊙	⊙	
Low-Income Homeowner	70	0	0			
New Houses – Performance Plus	70	0	10	⊙	⊙	Δ
Efficient Products – Commercial Direct Install	70	0	0	⊙	⊙	
Prescriptive – Business Energy Rebate (BER)	55	0	0	⊙	⊙	
Prescriptive – Smart Lighting Choices (SLC)	0	0	10	Δ		
Custom	46	0	0	⊙	⊙	
Small Business Energy Solutions (Direct Install)	61	0	0	⊙	⊙	

Legend:

⊙ Measured through participant surveys

□ Measured through non-participant surveys

Δ Measured through retailer or builder interviews

1 RESIDENTIAL PROGRAMS

1.1 Efficient Products – Appliance Retirement

The Appliance Retirement program offers an incentive to owners for removing their old refrigerator, freezer, dehumidifier or air conditioner. The program's partners pick up old appliances from the participants' premises and ship them to a recycling facility where over 95 percent of the unit components are environmentally recycled.

Free-Ridership

The evaluation of free-ridership is based on responses from participant surveys. For each appliance retired, participants are asked a series of questions to determine what they would have done if the program had not been in place. Participants are considered to be free-riders if they declare that they would still have acted the same without the program. The actual level of free-ridership is then established by asking if any of the following occurred:

- Before learning about the Appliance Retirement program, they had intended to dispose of their appliance in a manner that it would not be used by someone else;
- They would have kept the unit unplugged in the absence of the program;
- They would have removed the appliance within one year after program participation.

A specific level of free-ridership is assigned to each participant, depending on the responses given for each question. The average level of free-ridership is then calculated for each appliance.

Internal Spillover

Internal spillover effect is expected to be insignificant. However, questions are included in the survey to validate this hypothesis. Respondents are asked whether they retired other appliances following their previous participation in the program without receiving any rebate. Additional questions are used to quantify the level of spillover by validating the following: the type of appliance, date and type of disposal, and the influence of the program on the participant's action(s).

1.2 Efficient Products – Appliance Replacement

The Appliance Replacement program offers an incentive to multi-unit residential building owners for replacing old refrigerators with new ENERGY STAR qualified units. For the 2011 evaluation year, the number of participants is not sufficient to launch a telephone survey and evaluate a representative level of free-ridership and internal spillover. Therefore, no distortion effects will be measured for this program.

1.3 Efficient Products – Retail Markdown

The Retail Markdown program provides retailer-level discounts to offset the cost of purchasing energy efficient products. CFLs, ENERGY STAR refrigerators and ENERGY STAR clothes washers provide a large portion of the program total savings. For these three products, the free-ridership level is measured using two different approaches.

Free-Ridership

For CFLs, a telephone survey with the general population is being used to measure the level of free-ridership of each participant. Participants are considered to be free-riders when they declare they would still have bought the product without the program rebate. The actual level of free-ridership is then established by asking whether:

- They would have purchased CFLs without the program rebate;
- They would have bought the same quantity of CFLs without the program rebate;
- They would have bought the CFLs at the same time without the program rebate;
- The discount offered by the ENSC program influenced their decision.

For refrigerators and clothes washers, the approach is somewhat different. As the number of buyers of these products is relatively small, reaching an acceptable number by conducting a telephone survey with the general population is not possible. Therefore, the free-ridership level is being measured through in-depth interviews with retailers. Retailers are asked to estimate the number of refrigerators and clothes washers that would have been sold in the absence of the discount offered through the program. Free-ridership is obtained by dividing the retailer estimates by the total number of products sold during the same period. Validation is provided by comparing results with the level of influence that retailers associate with the program incentive.

Market Effects

Retail Markdown program discounts are offered during two distinct periods: in the spring and in the fall. Between these periods, eligible product sales may take place due to the program's intervention. The general population survey and retailer interviews are used to estimate the market effects attributable to the program. More specifically, questions are asked to understand the market penetration of three eligible products (CFLs, ENERGY STAR refrigerators and ENERGY STAR clothes washers) to see whether the program has any effect on the market over its lifetime.

1.4 Efficient Products – Low-Income Renter

The Low-Income Renter program was implemented in 2011. This program works with Community Services, local housing authorities, and landlords of low-income housing to offer free energy efficient upgrades to low-income tenants. Due to the nature of the projects and the target customers, the

distortion effects of the program are assumed to be insignificant. Consequently, the net-to-gross ratio for this program is assumed to be 100%.

1.5 Efficient Products – Multi-Unit Residential Renter

The Multi-Unit Residential Renter program aims to educate and engage multi-unit property owners and tenants through events held in the lobby areas of selected multi-unit properties. The measures promoted include the retirement of old appliances as well as complementary installations of CFLs, power bars with timers, low-flow showerheads and faucet aerators.

Free-Ridership

Free-ridership is not being calculated for individual measures; rather, one overall level of free-ridership is being estimated for the program. Participants are considered to be free-riders when they declare they would still have implemented the energy efficient measures if the program had not been in place. The actual level of free-ridership is then established by asking whether:

- They would have implemented the measures anyway;
- They had planned to implement the measures before learning about the discount;
- They would have implemented the same number of measures;
- They would have implemented the measures at the same time;
- The discount offered by the program influenced their decision.

Internal Spillover

The participant survey is used to assess spillover. Participants are considered as contributing to spillover when they declare that they implemented eligible energy efficient measures on their own following their previous participation in the program. If this is the case, additional questions are asked to quantify the level of spillover by identifying the measure, the date of implementation and the influence of the program on their decision.

1.6 Efficient Products – LED Holiday Light Exchange Program

Each fall since 2005, the LED Holiday Light Exchange program has given the opportunity for Nova Scotians to exchange two sets of old holiday lights for one new set of LED holiday lights. Since this program is quite small and since there is no way of tracking participants for questioning, no distortion effects will be measured for this program.

1.7 Existing Houses – EnerGuide for Existing Houses

The EnerGuide for Existing Houses program fosters energy efficiency improvements in existing houses. A certified energy advisor performs a comprehensive examination of the house and provides

the owner with a list of possible efficiency upgrades. After upgrades are implemented, a final EnerGuide rating is established by a follow up audit. The homeowner is eligible for program rebates based on the increase in the EnerGuide rating and the eligible prescriptive measures implemented.

Free-Ridership

The free-ridership level for this program is measured through questions included in a participant survey. Participants are considered to be free-riders when they declare they would have implemented the energy efficiency upgrades anyway. The actual level of free-ridership is then established by asking whether:

- They had planned the energy efficiency upgrades before learning about the discount;
- They would have implemented the same number of energy efficiency upgrades without the program;
- They would have implemented the energy efficiency upgrades within the same year;
- The program influenced their decision to implement the energy efficiency upgrades.

Internal Spillover

A participant survey is used to assess spillover. Internal spillover occurs when participants declare that, following their participation in the program, they implemented additional energy efficiency upgrades of the type that had been recommended in their energy audit. If this is the case, additional questions are used to quantify the level of spillover by identifying the upgrades implemented, the date of implementation and the influence of the program on their decision.

1.8 Existing Houses – Fuel Substitution

The Fuel Substitution pilot program encourages homeowners to reduce their electricity consumption for home heating and/or domestic water heating by substituting or replacing their electric system for one using another energy source such as wood, wood pellets or natural gas.

Free-Ridership

The free-ridership level for this program is measured through questions included in a participant survey. Participants are considered to be free-riders when they declare they would have replaced their heating equipment if the program hadn't been in place. The actual level of free-ridership is then established by asking whether:

- They had planned the replacement before learning about the rebate;
- They had contacted a contractor concerning the electric space or water heating equipment, which they later replaced as part of the program;
- They would have made the replacement within the same year if the program had not been in place;

- The program influenced their decision to proceed with the replacement.

Internal Spillover

The participant survey is also used to assess spillover. In the case of the Fuel Substitution program, internal spillover occurs when participants who converted their heating system to natural gas declare that they also converted their kitchen ranges or laundry equipment. If this is the case, additional questions are used to quantify the level of spillover by identifying the equipment converted, the date of conversion and the influence of the program on their decision.

1.9 Low-Income Homeowner

The Low-Income Homeowner program offers various energy efficiency measures to low-income homeowners. The measures targeted are building envelope upgrades as well as the installation of programmable thermostats, CFLs, tank insulation, faucet aerators and low-flow shower heads. Due to the nature of the projects and the target customers, the distortion effects of the program are assumed to be insignificant. Therefore, the net-to-gross ratio for this program is assumed to be 100%.

1.10 New Houses – Performance Plus

The Performance Plus program encourages builders and homeowners to make better energy efficiency choices for their new house. Rebates are based on the final EnerGuide rating of the house and on energy efficient product installations.

Free-Ridership

The free-ridership level for this program is measured through questions included in a participant survey and in-depth builder interviews. A question is included in the participant survey that determines whether the decision maker was the homeowner or the builder.

In the event that the decision maker is the homeowner, the free-ridership level is evaluated through questions included in a telephone survey. Participant homeowners are considered to be free-riders when they declare they would have built their house with the same level of energy efficiency if the program had not been in place. Subsequently, the level of free-ridership is established by asking whether:

- They would have built their house within the same year without the program;
- They would have achieved a similar or higher level of energy efficiency for their new home without the program;
- The program influenced their decision to build their house to a given level of energy efficiency.

In the event that the decision maker is the builder, a general free-ridership level is determined for all builders through questions included in the in-depth interviews conducted with a sample of participant builders. Questions similar to those used in the participant survey are asked to builders.

The final free-ridership level is calculated using the ratio of homeowner decision makers to builder decision makers established during the participant survey.

Internal Spillover

As is the case with the EnerGuide for Existing Houses program, the internal spillover associated with the Performance Plus program is assessed through a participant survey. Participants are considered as contributing to spillover when they declare that, after their initial participation in the program, they implemented additional energy efficiency measures of the type that had been recommended in their energy audit. If this is the case, additional questions are used to quantify the level of spillover by identifying the measures implemented, the date of implementation, and the influence of the program on their decision.

Market Effects

The marketing of the Performance Plus program is designed so that builders receive promotion and awareness documents on various energy efficiency measures. Consequently, market effects can occur when a builder decides to install high-efficiency equipment in new home construction projects without participating in the program.

In-depth builder interviews are conducted in order to measure market effects. Questions are asked to understand how the program's promotion affected builders' design decisions.

2 COMMERCIAL & INDUSTRIAL PROGRAMS

2.1 Efficient Products – Commercial Direct Install

The Direct Install program manages the installation of efficient products such as CFLs, LED exit signs and programmable thermostats in Nova Scotia businesses.

Free-Ridership

The free-ridership level for this program is measured through questions included in a participant survey. Participants are considered to be free-riders when they declare that their company would still have installed the efficient measures if the program had not been in place. The actual level of free-ridership is then established by asking whether:

- Their company would have installed the efficient products anyway;

- Their company had planned to install the products before talking with anyone about the program;
- Their company would have installed the products within the same year;
- Their company would have installed the same number of products;
- Their company was influenced by the program before making any decision to install the products.

These questions are asked for the respondent's overall participation in the program rather than for individual measures. The results allow a level of free-ridership to be determined and the average level of free-ridership associated with the program to be calculated.

Internal Spillover

As the program promotes prescriptive measures associated with specific products including CFLs, LED exit signs and programmable thermostats, the spillover level of the program is assessed through a telephone survey. Participants are considered as contributing to spillover when they declare they installed eligible energy efficient products on their own, following their previous participation in the program. If this is the case, additional questions are used to quantify the level of spillover by identifying the product type, the date of purchase and the influence of the program on their purchase.

2.2 Prescriptive Retrofit – Business Energy Rebates

The Business Energy Rebates program offers incentives and financing for energy efficient equipment, including lighting, refrigeration, compressed air, HVAC, high efficiency motors and variable speed drives.

Free-Ridership

Free-ridership is measured through a telephone survey. Participants are considered to be free-riders when they declare they would have bought the efficient equipment without the rebate offered through the program. The actual level of free-ridership is then determined by asking whether:

- They would have bought equipment with the same efficiency;
- They would have bought the equipment at the same time;
- They were influenced by the program rebate, marketing initiatives or a representative when making the decision.

Internal Spillover

Following their participation in the program, some participants may have installed additional energy efficient products. If the program taught them about energy efficiency in general or raised their awareness about efficient products they were not aware of before, additional savings are attributed to the program.

Spillover is measured through participant surveys. Participants are considered to be contributing to spillover when they declare they purchased efficient equipment after participating in the program. Additional questions are used to quantify the level of spillover by validating the equipment, the date of purchase and the influence of the program on their purchase.

Subsequently, follow-up calls are made to participants flagged for spillover. These calls are used to confirm participants' declarations and to collect equipment specifications.

2.3 Prescriptive Retrofit – Smart Lighting Choices

The Smart Lighting Choices program offers rebates on T8 lamps and electronic ballasts at the distributor level. Participating distributors submit their sales data by month and receive a rebate based on the number of units sold during each period.

Free-Ridership

For this program, only free-ridership is taken into account. As all buyers are participants, free-ridership is determined by calculating the difference between actual sales and estimates of what sales would have been in the absence of the program.

Questions are included in vendor interviews to estimate how the market would have reacted without the program. Using vendor sales data as a starting point, the market proportion attributable to the program is measured.

2.4 Custom – Retrofit and New Construction

The Custom program offers incentives and financing for energy efficient equipment including compressed air, industrial processes, refrigeration, motors, lighting and other electrical end-uses. The participation process requires the submission of a feasibility study and a measurement and verification (M&V) plan. Free-ridership for this program is expected to be low, considering the process requirement.

Free-Ridership

A telephone survey is used to evaluate the potential free-ridership level. Participants are considered to be free-riders when they declare they would have implemented the efficiency measures without the incentive offered through the program. The actual level of free-ridership is then determined by asking whether:

- They would have implemented the same energy efficiency measures without the program;
- They would have implemented the energy efficiency measures at the same time without the program;

- They were influenced by the program incentive, marketing or representative when making their decision.

Internal Spillover

As mentioned during the May 2010 workshop, spillover can be measured for this program. Following their participation in the program, some participants may have implemented additional energy efficiency measures of the type identified in their feasibility study. Some may have installed measures without going through the process of developing a feasibility study and an M&V plan. If their decision was influenced by the program raising their awareness about new energy efficiency measures and their projected savings, a portion of these savings will be attributed to the program.

During telephone interviews, participants are asked whether they implemented additional energy efficiency measures after participating in the program. Additional questions are used to quantify the level of spillover by validating the measures identified in the feasibility study, the date of installation and the influence of the program on their purchase.

Subsequently, follow-up calls are made to participants flagged for spillover. These calls are used to confirm participants' declarations and to collect equipment specifications.

2.5 Small Business Energy Solutions

The Small Business Energy Solutions program offers installation services, incentives and financing for businesses to install various energy efficient products.

Free-Ridership

A telephone survey is used to gather participant responses related to free-ridership. Participants are considered to be free-riders when they declare they would have installed the efficient products without the incentives and services offered by the program. The actual level of free-ridership is then determined by asking whether:

- They would have bought the same number of energy efficient products without the program;
- They would have bought energy efficient products with the same efficiency without the program;
- They would have bought the energy efficient products at the same time without the program;
- They were influenced by the program incentives and assistance, marketing or representative when making their decision.

Internal Spillover

Following their participation, some participants may have bought and installed other energy efficient products promoted by the program. If their decision was influenced by the program raising their awareness of the advantages of such products, a portion of these savings is attributed to the program.

During the telephone survey, participants are asked if they bought and installed additional energy efficient products following their previous participation in the program. Additional questions are used to quantify the level of spillover by identifying the product type, the date of purchase and the influence of the program on their purchase.

Subsequently, follow-up calls are made to participants flagged for spillover. These calls are used to confirm participants' declarations and to collect product specifications.



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Net-to-Gross Evaluation Methodology

Efficiency Nova Scotia Corporation

September 14, 2011

SUMMARY OF THE PRESENTATION

Overview

- › Objectives of the presentation
- › Summary of the NTGR evaluation

Residential Programs

- › Efficient Products – Appliance Retirement & Replacement
- › Efficient Products – Retail Markdown
- › Efficient Products – Low-Income Direct Install
- › Efficient Products – Multi-Unit Residential Renter
- › Efficient Products – Direct Install (“Part of the Solution”)
- › Existing Houses – EnerGuide
- › Existing Houses – Fuel Substitution
- › Low-Income Households
- › New Houses – Performance Plus

Commercial & Industrial Programs

- › Prescriptive – Business Energy Rebates
- › Prescriptive – Smart Lighting Choices
- › Custom
- › Small Business Energy Solutions

OBJECTIVES OF THE PRESENTATION

- › Present the net-to-gross ratio methodology used in the 2011 evaluation of ENSC DSM programs.
- › Includes the assessment of three distortion effects:
 - Free-Ridership (FR)
 - Internal Spillover (SO)
 - Market Effects (ME)
- › Once each effect has been quantified for a program, the net-to-gross ratio will be calculated based on this equation:

$$\text{NTGR} = (1 - \% \text{ FR} + \% \text{ SO} + \% \text{ ME})$$

SUMMARY OF THE NTGR EVALUATION

EP – Appliance Retirement	90	0	0	⊙	⊙	
EP – Appliance Replacement	0	0	1			
EP – Retail Markdown	70	70	5	⊙ & Δ		Δ & □
LED Holiday Light Exchange	0	0	0			
EP – Low-Income Direct Install	70	0	0			
EP – Multi-Unit Residential Renter	70	0	0	⊙	⊙	
EP – Direct Install	70	0	0	⊙	⊙	
Existing Houses – EnerGuide	70	0	0	⊙	⊙	
Existing Houses – Fuel Substitution	70	0	0	⊙	⊙	
Low-Income Households	70	0	0			
New Houses – Performance Plus	70	0	10	⊙	⊙	Δ
Prescriptive – Business Energy Rebate	55	0	0	⊙	⊙	
Prescriptive – Smart Lighting Choices	0	0	10	Δ		
Custom	46	0	0	⊙	⊙	
Extra Large Industrial	0	0	0			
Small Business Energy Solutions	61	0	0	⊙	⊙	

Measured through: ⊙ Participant surveys □ Non-participant surveys Δ Retailer, vendor or builder interviews

RESIDENTIAL PROGRAMS



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EP – APPLIANCE RETIREMENT

- › **Free-ridership** will be measured through participant surveys for each appliance.
- › Participants will be considered as FR when they declare that they would still have acted the same without the program.
- › The level of FR will be determined by asking whether:
 - Before learning about the program, they already intended to dispose of their appliance in a manner that would not have led it to be used by someone else;
 - They would have kept the unit unplugged in the absence of the program;
 - They would have removed the appliance within one year after program participation.

EP – APPLIANCE RETIREMENT

- › **Spillover** will be measured through participant surveys for each appliance.
- › Although SO is expected to be insignificant, participants will be asked whether they retired other appliances following their previous participation in the program.
- › Additional questions will be used to quantify the level of SO by validating the type of appliance, the date and the type of disposal and the influence of the program on their action.

EP – APPLIANCE REPLACEMENT

- › No **free-ridership** or **spillover** effects will be measured for this program in 2011.
- › The number of participants is insufficient to launch a telephone survey and evaluate a representative level of such effects.
- › Thus, the net-to-gross ratio for this program is assumed to be 100%.

EP – RETAIL MARKDOWN

- › **Free-ridership** will be measured for three products using two different approaches.
- › **For CFLs**, FR will be measured through participant surveys.
- › Participants will be considered as FR when they declare that they would still have bought the product without the program rebate.
- › The level of FR will be determined by asking whether:
 - They would have purchased CFLs without the program rebate;
 - They would have bought the same quantity of CFLs without the program rebate;
 - They would have bought the CFLs at the same time without the program rebate;
 - The discount offered by the program had highly influenced their decision.

EP – RETAIL MARKDOWN

- › **For refrigerators and clothes washers, FR will be measured through retailer interviews.**
- › Retailers will be asked to estimate the portion of refrigerators and clothes washers that would have been sold without the program discount.
- › The results will also be confirmed by comparing them with the level of influence that the retailers associate with the discount offered by the program.

EP – RETAIL MARKDOWN

- › **Market effects** will be measured for this program.
- › Between the discount periods, eligible product sales may take place due to the program's intervention and will be considered as market effects.
- › The general population survey and the retailer interviews will be used to estimate the market effects attributable to the program.

EP – LOW-INCOME DIRECT INSTALL

- › No **free-ridership** or **spillover** effects will be measured for this program in 2011.
- › This program offers free energy-efficient upgrades to low-income households.
- › Due to the nature of the projects and the target customers, the distortion effects of the program are assumed to be insignificant.
- › The net-to-gross ratio for this program will be 100%.

EP – MULTI-UNIT RESIDENTIAL RENTER

- › **Free-ridership** will be measured through participant surveys.
- › Participants will be considered as FR when they declare that they would still have implemented the energy-efficient measures if the program had not been in place.
- › The level of FR will be determined by asking whether:
 - They had already planned to implement the measures before learning about the discount;
 - They would have implemented the same number of measures;
 - They would have installed the measures at the same time;
 - The discount offered by the program had highly influenced their decision.

EP – MULTI-UNIT RESIDENTIAL RENTER

- › **Spillover** will be measured through participant surveys.
- › Participants will be considered as SO when they declare that they implemented eligible energy-efficient measures on their own, following their previous participation in the program.
- › If such is the case, additional questions will be used to quantify the level of SO by identifying the measure, the date of purchase and the influence of the program on their decision.

EP – DIRECT INSTALL (“PART OF THE SOLUTION”)

- › **Free-ridership** will be measured through participant surveys.
- › Participants will be considered as FR when they declare that their company would still have installed the products if the program hadn't been in place.
- › The level of FR will be determined by asking whether:
 - Their company had already planned to install the products before talking with anyone about the program;
 - Their company would have installed the products within the same year;
 - Their company would have installed the same number of products;
 - Their company had been influenced by the program before making any decision to install the products.

EP – DIRECT INSTALL (PART OF THE SOLUTION)

- › **Spillover** will be measured through participant surveys.
- › Participants will be considered as SO when they declare that their company installed eligible products on their own, following their previous participation in the program.
- › If such is the case, additional questions will be used to quantify the level of SO by identifying the product type, the date of purchase and the influence of the program on their purchase.

EXISTING HOUSES – ENERGUIDE

- › **Free-ridership** will be measured through participant surveys.
- › Participants will be considered as FR when they declare that they would have implemented the energy efficiency upgrades anyway.
- › The level of FR will be determined by asking whether:
 - They had already planned the energy efficiency upgrades before learning about the discount;
 - They would have implemented the same number of energy efficiency upgrades without the program;
 - They would have implemented the energy efficiency upgrades within the same year;
 - The program had influenced their decision to implement the energy efficiency upgrades in their house.

EXISTING HOUSES – ENERGUIDE

- › **Spillover** will be measured through participant surveys.
- › SO will occur when participants decide to implement additional energy efficiency upgrades recommended in their energy audit following their participation in the program.
- › Questions will be included in the questionnaire to identify potential SO.
- › If such is the case, additional questions will be used to quantify the level of SO by identifying the upgrades implemented, the date of implementation and the influence of the program on their decision.

EXISTING HOUSES – FUEL SUBSTITUTION

- › **Free-ridership** will be measured through participant surveys.
- › Participants will be considered as FR when they declare that they would still have replaced their heating equipment if the program had not been in place.
- › The level of FR will be determined by asking whether:
 - They had already planned the replacement before learning about the rebate;
 - They had already contacted a contractor concerning their heating equipment, which they later replaced as part of the program.
 - They would have implemented the replacement within the same year if the program had not been in place.
 - The program had influenced their decision to proceed with the replacement.

EXISTING HOUSES – FUEL SUBSTITUTION

- › **Spillover** will be measured through participant surveys.
- › SO will occur when participants who have converted their system to gas declare that they also converted their kitchen ranges or their laundry equipment.
- › Questions will be included in the questionnaire to identify potential SO.
- › If such is the case, additional questions will be used to quantify the level of SO by identifying the converted equipment, the date of conversion and the influence of the program on their decision.

LOW-INCOME HOUSEHOLDS

- › No **free-ridership** or **spillover** effects will be measured for this program in 2011.
- › This program offers financial incentives for building envelope upgrades as well as for the installation of programmable thermostats, CFLs, tank insulation and low-flow shower heads for low-income homeowners.
- › Due to the nature of the projects and the target customers, the distortion effects of the program are assumed to be insignificant.
- › The net-to-gross ratio for this program will be 100%.

NEW HOUSES – PERFORMANCE PLUS

- › A question will be included in the participant survey to determine who was the decision maker between the homeowner and the builder:
 - In the event that it is the homeowner, **free-ridership** will be evaluated through participant surveys. A specific level of FR will be assigned to each participant depending on the responses given for each question. Then, an average level of FR will be calculated for all participant homeowners.
 - In the event that it is the builder, a general **free-ridership** level will be evaluated for all builders through in-depth interviews conducted with 10 participant builders.
- › The final **free-ridership** level will be calculated using the ratio of decision makers between homeowners and builders established during the participant survey.

NEW HOUSES – PERFORMANCE PLUS

- › Homeowner participants will be considered as FR when they declare that they would have built their house with the same level of energy efficiency without the program.
- › The level of FR will be determined by asking whether:
 - They would have built their house within the same year;
 - They would have achieved a similar or higher level of energy efficiency for their new home;
 - The program had influenced their decision to build their house with the same level of energy efficiency.
- › Questions similar to those used in the participant survey will be asked to builders during the in-depth interviews.

NEW HOUSES – PERFORMANCE PLUS

- › **Spillover** will be measured through participant surveys.
- › Participants will be considered as SO when they declare that, after their initial participation in the program, they implemented additional energy efficiency measures that had been recommended in their energy audit.
- › If such is the case, these participants will be considered as SO.
- › Additional questions will be used to quantify the level of SO by identifying the measures implemented, the date of implementation and the influence of the program on their decision.

NEW HOUSES – PERFORMANCE PLUS

- › **Market effects** will be measured for this program.
- › Being promoted through the builder association, market effects can occur if builders decide to install high-efficiency equipment in new constructions without participating in the program.
- › In-depth builder interviews will be conducted to measure market effects.
- › Questions will be asked to understand how the program's promotion affected builder's design decision.

C&I PROGRAMS



BUSINESS ENERGY REBATE

- › **Free-ridership** will be measured through participant surveys.
- › Participants will be considered as FR when they declare that they would have bought the efficient equipment without the rebate offered through the program.
- › The level of FR will be determined by asking whether:
 - They would have bought equipment with the same efficiency;
 - They would have bought the equipment at the same time;
 - They were influenced by the program rebate, marketing or representative when making the decision.

BUSINESS ENERGY REBATE

- › **Spillover** will be measured through participant surveys.
- › Participants will be considered as SO when they declare that they purchased efficient equipment after participating in the program.
- › Additional questions will be used to quantify the level of SO by validating the equipment, the date of purchase and the influence of the program on their purchase.
- › Follow-up calls will be made to participants flagged for SO to confirm their declaration and collect equipment specifications.

SMART LIGHTING CHOICES

- › **Free-ridership** will be measured through vendor interviews.
- › As this program offers rebates at the retail level, only FR will be taken into account as distortion effect.
- › In this case, FR corresponds to what would have been the market sales for T8 lamps and electronic ballasts without program implementation.

CUSTOM

- › **Free-ridership** will be measured through participant surveys.
- › FR for this program is expected to be low, considering the process requirement.
- › Participants will be considered as FR when they declare that they would have implemented the energy efficiency measures without the rebate offered through the program.
- › The level of FR will be determined by asking whether:
 - They would have implemented the same energy efficiency measures without the program;
 - They would have implemented the energy efficiency upgrades at the same time;
 - They were highly influenced by the program rebate, marketing or representative when making their decision.

CUSTOM

- › **Spillover** will be measured through participant surveys.
- › Participants will be considered as SO when they declare that they implemented additional energy efficiency measures identified in their feasibility study after participating in the program.
- › Additional questions will be used to quantify the level of SO by validating the measures identified in the feasibility study, the date of installation and the influence of the program on their action.
- › Follow-up calls will be made to participants flagged for SO to confirm their declaration and collect equipment specifications.

SMALL BUSINESS ENERGY SOLUTIONS

- › **Free-ridership** will be measured through participant surveys.
- › Participants will be considered as FR when they declare that they would have bought the efficient lighting products without the financial incentive and the free installation.
- › The level of FR will be determined by asking whether:
 - They would have bought the same number of products without the program;
 - They would have bought products with the same efficiency;
 - They would have bought the products at the same time;
 - They were highly influenced by the program incentive, marketing or representative when making their decision.

SMALL BUSINESS ENERGY SOLUTIONS

- › **Spillover** will be measured through participant surveys.
- › Participants will be considered as SO when they declare that they bought and installed additional efficient lighting products following their participation in the program.
- › Additional questions will be used to quantify the level of SO by identifying the product type, the date of purchase and the influence of the program on their purchase.
- › Follow-up calls will be made to participants flagged for SO to confirm their declaration and collect product specifications.