



BPA Grocer Market Opportunity Assessment

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Prepared for
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Prepared by
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Executive Summary

In 2007, the Bonneville Power Administration (BPA) launched the EnergySmart Grocer (ESG) Program. For grocers and other businesses with large refrigeration systems, the program provides energy audits, technical advice, and financial incentives to install energy-efficient equipment. BPA and its third-party implementation contractor (PECI) have serviced more than 3,000 grocery stores. Since the program's inception, more than 90 utilities in the Northwest have offered the program, saving more than 10.7 aMW of electricity through refrigeration measures.

This study's focus is refrigeration in Northwest grocery stores. Specifically, this research quantifies the energy-savings opportunities in grocery refrigeration, and describes what measures contain those opportunities. This study did not include convenience stores or other businesses with commercial refrigeration, though these stores are served by the program.

Cadmus developed estimates of comprehensive saving opportunities within BPA's territory using ESG Program audit and rebate data. The ESG program compiled extensive data on recommended measures, quantities, and savings estimates during on-site audits using GrocerSmart, an energy-savings calculation software. In addition to program data, Cadmus also used secondary sources to develop savings estimates for new construction and measures not currently offered by the program.

To better understand the market opportunities, Cadmus conducted 128 interviews and surveys with BPA's wholesale customers, PECI, program trade allies, independent grocery stores in the Northwest, and national grocery store chains doing business in the Northwest. The study's main findings and recommendations follow.

Significant savings opportunities remain for grocery store refrigeration equipment.

Cadmus estimates approximately 40 aMW of programmatic saving opportunities and 105 aMW of comprehensive saving opportunities remain for refrigeration upgrades, new construction efficiency improvements, and other measures currently not offered by the program in the grocery market. Remaining opportunities, by category, can be found in the report's Conclusions and Recommendations section.

Current program measures represent approximately 50% (20.1 aMW) of the remaining programmatic saving opportunities, with 50% of those savings derived from medium- and low-temperature cases, doors, floating head and suction control strategies, condensers and compressors. New measures, such as existing building commissioning (EBCx) and new construction, represent approximately 50% of the remaining opportunities.

Recommendations:

- Consider increasing incentives for medium- and low-temperature cases, doors, and condensers and compressors, which represent the bulk of all energy-saving opportunities from current measure offerings.

- Consider lowering incentives for measure groups such as controls and motors that have approached market saturation.
- Evaluate the procedures for approving new construction and EBCx projects to help streamline the process and increase uptake.
- Consider offering additional incentives for undertaking more comprehensive projects with deeper savings (for example, projects that bundle four or more measures).

Demand for energy-efficiency among grocery stores remains high, and more outreach and education may help accomplish energy savings from refrigeration technologies.

Most grocery stores planning energy-efficiency upgrades in the near term intend to take advantage of incentives available through the ESG Program, and consider the program influential in their decision making. Stores most commonly cited a perception of limited opportunities as a reason for not making upgrades. The audit data for these respondents, however, showed considerable opportunities remain at their stores.

Recommendation:

Explore opportunities for raising awareness and for additionally educating store owners regarding their specific options to upgrade refrigeration. This will help overcome knowledge barriers among store owners who believe little opportunity remains. Such outreach should include information on measures the program currently offers incentives for and new measures, as they are added.

The barriers to making upgrades reported by independent and national grocery stores appear to be unrelated to the program's delivery challenges.

The program implementer reported that regional geographic gaps in program offerings across BPA's territory impact the financial viability of conducting large-scale projects at multiple locations for national grocery store companies. These gaps stem from variations in utility participation in ESG, which became an issue in 2011 when the region shifted to local control of utility budgets. The result was ESG participation by northwest utilities resembled a patch-work quilt across the region.

A comparison of market barriers reported by various stakeholder groups revealed that independent grocers' faced the following primary barriers to upgrading their energy efficiency:

- Cost, structural, and space constraints; and
- Inconvenience.

National store accounts reported the following barriers:

- Coordinating corporate remodeling and expansion schedules;
- Impacts of low Northwest electricity prices on the return-on-investment; and
- Costs and corporate reluctance to fund projects (to a lesser degree).

Recommendation:

Certain factors may fall outside of the program's control, such as the way energy-efficiency incentive (EEI) funds are allocated and used. Yet options may exist to mitigate these barriers' impacts. For example, a financial bonus could be offered to national store accounts for conducting simultaneous upgrades in multiple locations within the region. Such actions could increase the return-on-investment due to economies of scale, and help counteract the effect of gaps in regional offerings. A tiered structure, with bonuses, could also be used to influence small stores and national chains. Stores installing more than a predetermined number of measures could qualify for additional incentives.

Though most utilities expressed realistic expectations regarding the remaining opportunities for energy savings in grocery store refrigeration within their territories, they could benefit from a better understanding of what savings are attainable.

As reported by BPA program staff, the program's turn-key design results in varying degrees of utility involvement in program administration, where little to no involvement may be typical. Cadmus' survey findings confirmed knowledge gaps occurred regarding the number of stores reached by the ESG Program within utilities' territories as well the remaining saving opportunities.

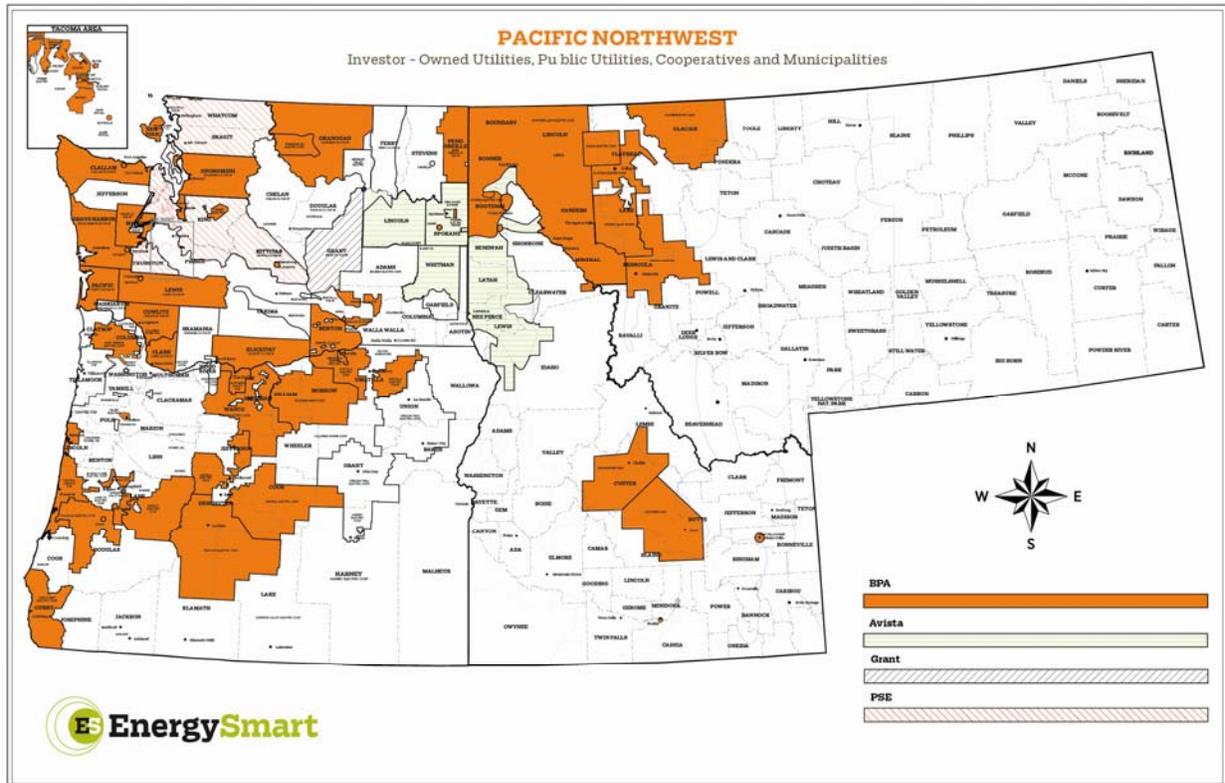
Recommendation:

Many utilities would benefit from a better understanding of the remaining opportunities within their territories. BPA should consider developing a strategy, drawn from this study's findings, for informing utilities of such remaining savings, and then should work with utilities and stakeholders to identify market barriers to realizing these savings, and to generate solutions specific to their territories. This would allow BPA to collaborate with utilities to capture unrealized energy-savings opportunities from grocery store refrigeration, and possibly could help utilities determine future EEI funding allocations.

Introduction

The EnergySmart Grocer (ESG) Program helps groceries, convenience stores, restaurants, and other facilities with commercial refrigeration reduce operating costs through energy-efficient upgrades and retrofits. Launched in 2007, the program currently operates within most of the Bonneville Power Administration's (BPA) territory. Figure 1 shows the ESG Program's wide coverage.

Figure 1. EnergySmart Grocer Territory*



* http://www.energysmartonline.org/documents/EnergySmart_PNWTerritory_Maps.pdf

The ESG Program provides a comprehensive suite of services to guide utility customers through the process of upgrading their store's refrigeration equipment. This approach is called Inform-to-Invest. The ESG Program's Field Energy Analysts provide a core service through on-the-ground technical assistance. The Field Energy Analysts conduct no-cost audits and provide recommendations specific to a store, with all audit recommendations backed by utility-funded incentives.

The ESG Program includes a National Accounts team, which works at the corporate level of large chains to promote the ESG program, and also delivers savings to convenience stores through "contractor-play" whereby no audits are conducted, but rather the contractor prospects jobs independently and then works the deemed list of measures.

Over the past six years the ESG Program has conducted hundreds of audits, which have contributed to a large database of store-specific recommendations. Over 80% of eligible grocery stores have received at

least one audit. The program also has maintained detailed records of measures installed (tracked through incentive applications).

Report Scope

In 2012, BPA hired Cadmus to investigate BPA’s grocery store segment, seeking to gain insights into the market’s energy-efficiency saturation and to assess remaining opportunities. Because the core segment in EnergySmart Grocer is the grocer market, the research focused directly on grocery refrigeration equipment. This research did not assess opportunities in convenience stores or other businesses with commercial refrigeration. Table 1 provides details regarding what was and was not included in this analysis.

Table 1. Scope of ESG Opportunity Assessment

Opportunity Segment	Included in Report?
Refrigeration Savings from National Stores	Yes
Refrigeration Savings from Independent Stores	Yes
Refrigeration Savings from Convenience Stores and other similar businesses	No
Saving Opportunities from Lighting or Heating, Ventilation, and Air Conditioning, Cooking Equipment, or other measure end-uses	No
Projected refrigeration savings outside of the current ESG program offerings (including new measures and new grocery store construction)	Yes

Cadmus assessment opportunity analysis drew heavily upon the ESG Program’s audit recommendations and the installed measure database. By using recommended measures, quantities, and savings estimates, Cadmus could assess remaining program opportunities. Cadmus also used secondary sources to develop savings estimates for new construction and for measures the program currently does not offer.

To better understand the market opportunities, Cadmus conducted interviews and surveys with: BPA’s wholesale customers; the ESG Program implementer; program trade allies; independent grocery stores in the Northwest; and national grocery store chains doing business in the Northwest.

Report Organization

This report presents the methodology, findings, conclusions, and recommendations from Cadmus’ research, with the sections following this introduction organized as follows:

- **Program Opportunity Assessment:** This section outlines the data used, and explains the opportunity assessment’s methodology and associated key findings.
- **Market Research:** This section outlines the methodology and key findings from various stakeholder interviews and surveys.
- **Conclusions and Recommendations:** This section provides conclusions and recommendations drawn from Cadmus’ research.

Program Opportunity Assessment

In the past six years, the ESG Program has provided energy audits and rebates on efficiency measures for most grocery stores in BPA's service territory. Cadmus used these program data, adjusted for measure competition and measures already rebated, to estimate the remaining energy-savings opportunities within grocery refrigeration. Cadmus also estimated energy-savings opportunities associated with new construction and new measures anticipated to be included to some degree in the program in the future. No time horizon was included in this analysis except for calculating new construction and programmatic saving opportunities. This section outlines the methods used and findings in detail.

Methodology

This study quantifies two types of savings opportunities, as defined below:

- **Remaining Comprehensive Saving Opportunities** assume all remaining resource opportunities may be captured (determined through existing site audits, new measures, EBCx, and new construction), regardless of their costs or market barriers.
- **Remaining Programmatic Savings Opportunities** are the portion of remaining comprehensive opportunities that the program could likely achieve, based on maintaining similar program structure and incentive levels. Such opportunities have been determined based on current market barriers and implementation challenges facing the program.

To estimate comprehensive saving opportunities, this study relied on actual, site-specific data on a near census of facilities, using all measure recommendations and savings estimates unique to individual sites.

Estimating Comprehensive Savings Opportunities

Cadmus received ESG Program data for audit recommendations and rebated measures. These data, which were categorized by store type (distinguishing specifically between national chain and independent stores), consisted of the following:

- Store information
- Store type (national chain or independent)
- Measure specifications (name, category)
- Per-unit savings (kWh)
- Units of savings (for example, per linear foot, per lamp, per ton)
- Quantity of measures recommended and installed

The audit dataset, which listed a wide range of measure recommendations specific to each store, included assumptions about baseline conditions. Savings estimates used in this study were based on per-unit savings estimates found in ESG Program audit data.

The ESG Program offers three types of measures: custom, standard protocol (calculated savings), and unit energy savings (UES) (deemed savings). For non-UES measures, simulation modeling or engineering calculations were used to determine savings estimates per measure, both of which the Regional Technical Forum (RTF) reviewed. These estimates were tailored to individual sites and, in some instances, accounted for interactions between site-specific equipment and represent savings based on existing equipment. In general, energy-savings estimates were standalone, and did not account for interactivity between measures not included in ESG Program modeling or already-installed measures. The rebate database listed all measures installed through the program, including their quantities, estimated savings, and incentive amounts. In some cases, participants received rebates, but did not receive an audit.

ESG Program audit database recommendations address all applicable measures, many of which involve competing technologies that provide participants with different opportunities for installing energy-efficient measures in a single application. For example, both ECM and permanently split-capacitor motor (PSC) replacements can be recommended for installation; in assuming a single application, however, ECMs represent the highest savings opportunity. Thus, as savings opportunities can be captured through multiple, competing measures, to avoid double-counting savings, the study assumed installation of the highest-saving measures.

Cadmus used ESG Program audit data to develop bundles of non-competing measures, and then removed any installations tracked through ESG Program rebate data to calculate the remaining comprehensive saving opportunities. Cadmus considered bundles of similarly competing technologies, and developed competition rules to reduce the number of recommended measures per site only to those representing energy-savings opportunities that could be installed concurrently.

Table 2 lists refrigeration measures by category.

Table 2. Grocery Refrigeration Measure List

Measure Categories	Measure Names
Auto Closers	Auto-Closers
Case Lighting	Delamp Inefficient Lighting*
	T12 Lamp with Electronic Ballast**
	T12 Lamp to T8 Lamp**
Cases	Doors to Low-Heat Doors
	High-Efficiency Low-Temperature Case
	High-Efficiency Medium-Temperature Case
	No Door to Door Cases
	No Door to Door Walk-In
	Open to Reach-In (Low-Temperature Case)
	Open to Reach-In (Medium-Temperature Case)

Measure Categories	Measure Names
Condensers, Floating Head Pressure Controls (FHPC), and Compressors	Evaporative Condenser
	Floating Head Pressure Control with Multiplex
	Floating Head Pressure Control with Multiplex and Variable Frequency Drive
	Floating Head Pressure Control for Single Compressor Systems
	Floating Suction Pressure Control for Multiplex
	Multiplex Compressor System with High-Efficiency Condenser
	High-Efficiency Low-Temperature Compressor
	High-Efficiency Multiplex Compressor
Controls	Oversized Condenser
	Anti-Sweat Controls for Low-Temperature Case
	Anti-Sweat Controls for Medium-Temperature Case
Gaskets	Evaporator Fan Controls
Light-emitting Diodes (LED) for Open Cases	Gaskets
	LEDs Open Case (High Power)
LEDs for Reach-In Cases	LEDs Open (Low Power)
	LEDs with Occupancy Sensor
	LEDs Reach-In Case (High Power)
Motors	LEDs Reach-In Case (Low Power)
	ECM for Cases
	ECM for Compressor Fan
	ECM for Walk-In
	PSC for Cases
	PSC for Walk-In
Night Covers	Variable-frequency Drive (VFD) for Condenser Fan
Other	Night Covers*
	Refrigerant Piping Insulation*
Strip Curtains	Walk-In Lighting*
Vending Machine Controls	Strip Curtains
	Vending Machine Controls

* Based on conversations with ESG Program staff, the program no longer offers incentives on these measures and no remaining comprehensive saving opportunities have been estimated for these measures.

** All energy-savings opportunities associated with these Case Lighting measure recommendations have been reported under the LED measure categories.

In 2010 and 2011, the program added several new technologies (e.g., strip curtains, occupancy sensors, and walk-in evaporator fan controls). These were included as recommendations for stores already receiving audits and meeting any additional criteria. For such stores, Cadmus assumed measures quantities and savings values, based either on other measures recommended for a site or on averages across other sites.

There were 170 stores that did not receive audits. Of these, 58 received a rebate but no audit, and 112 did not have an audit or receive a rebate. To estimate the energy savings available in these stores,

Cadmus applied the average, remaining energy-savings opportunities calculated for the 646 stores with audit data.¹

Table 3 lists all grocery stores by store type and category.²

Table 3. Unique Grocer Stores by Type and Category

Store Category	Number and Type of Store		
	National	Independent	Overall
Stores with audit and rebate data used in analysis	263	383	646
Rebate-only Stores	43	15	58
Stores with neither audit nor rebates	NA	NA	112
TOTAL	306	398	816

Other Saving Opportunities

Cadmus estimated saving opportunities for other resources, including new construction, existing building commissioning (EBCx), and new measures not currently offered through the program.

New Construction

For estimating new construction energy-savings opportunities, Cadmus relied on data from three years of ETO evaluations and the 6th Plan’s forecast of grocery store square footage. The ETO program provides a comprehensive effort to assist owners of newly constructed or substantially renovated commercial and industrial buildings to achieve energy savings through differing tracks. For this program, Cadmus completed impact evaluations during program years 2008 through 2010.

To estimate opportunities in new construction, Cadmus completed the following:

- Removed non-refrigeration measure savings and adjusted savings to reflect changes in code (such as the Energy Independence and Securities Act (EISA) of 2007).³
- Averaged savings per store kWh for refrigeration measures, resulting in 201,170 kWh (n=22).

¹ Average saving opportunities for the 646 stores with audit data reflect stores receiving some rebates through the ESG Program; however, 12% of these stores did not. Additionally, of 170 stores without audit data, 58 stores received some rebates; it is not known whether any energy-efficiency retrofits were completed for the additional 112 stores. Therefore, the average energy-savings opportunity applied to the 170 stores provides a reasonable assumption.

² Cadmus conducted additional research to confirm how close the total ESG Program participating store count aligned with actual grocery stores within the participating region and the number of stores within nonparticipating utility territories. Exploration of available data sources (including a request of purchased Dunn and Bradstreet, Inc., grocery store data) found these sources unreliable, and ESG Program data provided the best source for this information.

³ EISA and state codes were used to identify measures, previously rebated in programs, that have become code requirements, and, therefore, should not be included in the new construction energy savings estimates. For example, several older ETO projects received rebates for installing an electronically commutated motor (ECM) in walk-ins or strip curtains, which EISA now requires. In its analysis, Cadmus removed these EISA and code-required measures from the new construction savings estimates.

- Averaged total square footage for new construction grocery stores, resulting in 75,011 square feet (n=22).
- Calculated kWh per square foot as the ratio of the average kWh per store, divided by average store square footage.
- Using the 6th Plan forecast and assumptions from an ETO study, applied average energy-savings per square foot to calculate savings for the overall opportunity within new construction,⁴ adding 4.2 million additional square feet in grocery stores.

New Measures

Cadmus also considered a number of measures not included in ESG Program audit data. The ESG Program implementation contractor provided a list of measures to add in future years, along with its estimated savings and the approach used to calculate these estimates. Cadmus reviewed these savings algorithms to confirm their accuracy before incorporating savings into the comprehensive saving estimates.

In general, measure-savings estimates proved reasonable, after applying two adjustments. First, Cadmus did not include savings for two measures (ECMs on condenser fans; and high-efficiency, low-temperature compressors) as these competed with existing measures already in the ESG Program and were included in the analysis of comprehensive saving opportunities. Second, Cadmus adjusted measure applicability in a few instances, based on average estimated store sizes, and the presence of an energy management system (EMS) and typical existing equipment.⁵ Measures in the analysis include:

- **Enhanced floating head pressure (FHP) and floating suction pressure (FSP) controls:** Both of these measures provide incremental savings to FHP controls and FSP controls measures available through the program. Additional savings are achieved by further optimizing control setpoints. It was assumed this measure could be applied to 55% of existing stores—the estimated number of stores with an EMS (which is required for this measure). This percentage estimate was based on the audit data store type (national versus independent) and store size.
- **Adaptive controls—refrigeration:** This measure is a standalone controller that optimizes setpoints and controls defrost cycles for refrigerated cases and walk-ins. Savings result from: a reduction in evaporator fan run-times, a reduction in defrost cycling, and reduced compressor run times. This measure applies only to smaller stores without an existing EMS—an estimated 45% of existing stores, based on the assumptions noted above.
- **Variable capacity modulation for refrigeration compressors:** This measure requires either the replacement of existing compressors with variable-speed compressors or the installation of

⁴ While this opportunity assessment does not include a general time horizon to calculate energy-saving opportunities, the exception is the estimation of new construction opportunities. For this analysis, Cadmus relied on the 6th Plan forecast from the current year to the end of their planning horizon. This assumes the 6th Plan forecast from 2013 to the end of the time horizon (2030).

⁵ These measures were not reviewed for cost-effectiveness.

unloaders or a variable-speed drive on existing compressors, if available. Variable-speed controls allow the compressor to operate more efficiently at part-loads, thereby reducing compressor energy consumption. This measure applies to grocery stores with multiplex systems. It was assumed this measure would apply to 55% of existing stores, the portion assumed to have the type of EMS typically used to control multiplex compressor systems.

- ECMs on condenser fans:** This measure involves replacing existing condenser fan motors (typically PSC or shaded pole types) with ECMs. While feasible, this measure competes with the oversized condenser, VFD on condenser fan, and FHP control with VFD measures that already exist in the savings analysis (as these require a VFD on the condenser fan motor). As VFD produce higher savings and were included in the analysis for 589 sites, savings opportunities for ECMs on condenser fans were included only for the remaining 227 stores. Even if a customer chose to replace the existing fan motors with ECMs and removed the already rebated VFDs, incremental savings would not occur between the VFD measure and ECM, as both achieve savings by varying the same fan motor speed.
- Efficient display case evaporator coils:** This measure requires the installation of more efficient evaporator coils in cases and walk-in applications. The coils are designed with a larger surface area, which achieves energy savings by increasing the amount of heat transfer across the coil, which in turn decreases the load on the compressor. As any coil could technically be replaced, it was assumed this measure could apply to all existing stores.

Existing Building Commissioning

To estimate EBCx savings opportunities, Cadmus assumed savings from commissioning refrigeration equipment would be 5% of whole-building refrigeration energy consumption.⁶

Table 4 provides these estimates.

Table 4. Comprehensive Savings Opportunities Percentages by Account—EBCx

Account Type	Refrigeration EUI (kWh/sq. ft./yr.)	Percent Savings from EBCx	Average Store Area (sq. ft.)	Estimated Savings per Store (kWh) **	Number of Stores*
National Account	36.6	5%	60,799	111,339	355
Independent Account	36.6	5%	20,979	38,417	461

* Stores with unidentified account types (n=112) allocated here, based on the percent distribution of stores by store type (national verses independent).

** This analysis only looked at refrigeration savings, and did not include overhead lighting or HVAC measures.

⁶ Two studies on commercial buildings found 12.5%, savings, on average, from retrocommissioning. Due to a range of savings by building type, Cadmus assumed 5%, as this study is specific to refrigeration savings. Sources include:

(1) E. Mills, N. Bourassa, M. Piette. 2005. "The Cost-Effectiveness of Commissioning New and Existing Commercial Buildings: Lessons from 224 Buildings," National Conference on Building Commissioning.

(2) E. Mills, P. Mathew. 2009. *Monitoring-Based Commissioning: Benchmarking Analysis of 24 UC/CSU/IOU Projects*, Lawrence Berkeley National Laboratory. June.

Inputs used in calculating EBCx, comprehensive energy-savings opportunities include the following:

- **Refrigeration Energy Use Intensity (EUI):** Cadmus assumed refrigeration energy consumption for a store makes up 50% of its total energy use (based on data from the U.S. Department of Energy [US DOE]) for Pacific Northwest climate zones. Average EUI data drew upon the following sources:
 - 2009 CBSA
 - 2003 CBECS
 - ESG program implementer EUI estimates
 - NREL Grocery Store 50% Energy Savings: Technical Support Document, 2009⁷
- **Average store square feet:** Derived from audit data for national and independent accounts.
- **Estimated savings per store:** Calculated by multiplying EUI x square feet x 5% savings.
- **Number of stores:** From ESG Program data.
- **Comprehensive energy-savings opportunities:** Estimated savings per store (kWh), multiplied by the number of stores.

Estimating Remaining Programmatic Opportunities

For estimating the remaining programmatic savings opportunities for current ESG Program measures, Cadmus considered what savings the program can realize for various measures with similar cost characteristics (i.e., cost bundles). Cadmus used current measure data, solicited feedback from BPA staff, and consulted other regional sources to estimate what savings the ESG Program could reasonably accomplish.⁸ Considering differences across measures regarding costs, types of opportunity, market acceptance, and other market barriers, Cadmus estimates the remaining, programmatic, energy-savings opportunities at approximately 27% of the remaining, comprehensive saving opportunities for the entire program.

Table 5 presents attainable opportunity percentages, by measure category and bundle. Of remaining opportunities, 27% can be accomplished compared to overall saving opportunities. A discussion follows regarding opportunities to be realized by cost bundle.

⁷ NREL Grocery Store 50% Energy Savings: Technical Support Document, 2009.
<http://www.nrel.gov/docs/fy09osti/46101.pdf>

⁸ The Northwest Power and Conservation Council, in its assessments of regional conservation potential, traditionally has assumed 85% of the electric economic technical potential can be achieved (as assumed in the 6th Plan).

Table 5. Remaining Programmatic Opportunity Percentages by Measure Category

Measure Categories	Cost Bundle	Percent That Can Be Realized
Auto Closers	1	85%
Gaskets	1	85%
Strip Curtains	1	85%
Vending Machine Controls	1	85%
Controls	2	85%
LEDs for Open Cases	2	85%
LEDs for Reach-In Cases	2	85%
Motors	2	85%
Cases	3	16%
Condensers and Compressors	3	16%
TOTAL		27%

Cost Bundle 1

Cost bundle 1 represents low-cost, relatively easy-to-install measures. Assuming funding proves available to pay for the full incremental cost, customer willingness to adopt these measures will likely encounter only limited barriers. Therefore, measures characterized within this cost bundle have been assigned an attainable factor of 85%.

Cost Bundle 2

Cost bundle 2 represents measures of moderate costs, with a payback within a one to three years. Such measures require installation by a highly skilled technical contractor, but are not considered lost-opportunity resources. To date, the program has successfully reached high adoption rates for many of these measure categories: controls and motors have realized more than 75% of total comprehensive saving opportunities through program activity.

Program staff indicated these successes stemmed not only from program intervention, but from increased incentive levels for some measures within this cost bundle. Consequently, measures characterized within this cost bundle have been assigned an attainable factor of 85%.

Cost Bundle 3

Cost bundle 3 contains measures more appropriately characterized as lost opportunity resources. Complex measures such as replacing cases, compressors, and condensers align with store remodels than with one-off retrofits. To date, the program has seen modest adoptions of these measures (3% to 7% of the total comprehensive saving opportunities). Implementing measures from this cost bundle depends on overcoming a variety of barriers, such as costs and timing of remodels. For these measures, Cadmus calculated an average 4.9% attainment factor, based on the installation rate over the first six years of program delivery. Extrapolating this percentage to a 20-year horizon results in a 16% attainment factor.

Realizable Estimates for Other Resources

For new construction, EBCx, and most new measures considered for the analysis, Cadmus determined 85% of comprehensive saving opportunities can be realized. One exception was variable-capacity modulation for refrigeration compressors. As this measure operates more similarly to a lost opportunity

resource (indicative of cost bundle 3 measures), Cadmus applied a 16% factor, consistent with the approach used for cost bundle 3.

Findings

Overall Findings

Cadmus estimates approximately 40 aMW of programmatic saving opportunities and 105 aMW of comprehensive saving opportunities remain for refrigeration upgrades, new construction efficiency improvements, and other measures currently not offered by the program in the grocery market (Table 6). Comprehensive savings opportunities represent the difference between total saving opportunities and total rebated savings already achieved through the program.

Table 6. BPA Grocery Opportunity Assessment

Resource Type	Program Achieved Savings (aMW)	Comprehensive Savings Opportunities		Programmatic Saving Opportunities	
		aMW	Pct. of Total	aMW	Pct. of Total
Current Program Measures	10.7	75.8	72%	20.1	50%
EBCx	0	6.5	6%	5.6	14%
New Construction	0	1.3	1%	1.1	3%
New Measures	0	21.8	20%	13.4	33%
TOTAL	10.7	105.4	100%	40.1	100%

Table 7 presents estimates from the remaining savings opportunities with current measures (those considered in the analysis of audit data) offered through the ESG Program. Cadmus derived the analysis sample from participants with available audit data, and this table illustrates extrapolations of average savings to other accounts missing audit data, thus reflecting energy-savings opportunities for the entire grocer population.

Table 7. Savings Opportunities—Current Program Measures

Account Category	Number of Stores	Previous Program Achievements (aMW)	Comprehensive Saving Opportunities	Programmatic Saving Opportunities
			aMW	aMW
Accounts with audit data, used in analysis	646	10.3	59.2	15.7
Rebate-only accounts **	58	0.4	6.4	1.7
Stores without audits or rebates ***	112	0.0	10.3	2.7
TOTAL	816	10.7	75.8	20.1

** Accounts without audit data that received a rebate through the ESG Program.

*** Accounts not receiving an audit or rebate through the ESG Program.

Separate from the analysis of ESG Program participant audit data (primarily retrofit measures), Cadmus calculated savings estimates associated with other resources: EBCx, new construction, and refrigeration measures not currently part of the program. Table 8 presents these savings estimates.

Table 8. Savings Opportunities—New Construction and New Measures

Resource Type	Number of Accounts	Comprehensive Saving Opportunities (aMW)	Programmatic Saving Opportunities (aMW)
EBCx	All Stores	6.5	5.6
New Construction	56*	1.3	1.1
New Measures**	% of Stores	21.8	13.4
TOTAL		29.6	20.0

* Store count extrapolated based on forecasted square feet, assuming an average of 75,011 square feet per store.

** See Appendix C for a detailed breakout of measure assumptions

Detailed Findings

The analysis using ESG Program audit data allowed detailed summaries of remaining energy-savings opportunities; however, these results were limited to the analysis sample of 646 participating accounts with audit data. Table 9 provides estimates of remaining energy-savings opportunities and savings achieved, by program and measure category.

Table 9. Rebated and Saving Opportunities by Measure Category, for audited stores

Measure Categories	Total Audit Recommendations (aMW)	Total Rebated Savings (aMW)	Program Achieved Savings as Pct. of Total Audit Recommendations	Remaining Comprehensive Saving Opportunities (aMW)	Remaining Saving Opportunity as Pct. of Total	Remaining Programmatic Saving Opportunity (aMW)*
Case Lighting	0.01	0.01	NA	0	0%	0.00
Other	0.11	0.11	NA	0	0%	0.00
Vending Machine Controls	0.19	0.02	11%	0.17	89%	0.14
Auto Closers	0.27	0.01	5%	0.26	95%	0.22
LEDs for Open Cases	0.49	0.01	2%	0.48	98%	0.41
Gaskets	0.82	0.18	21%	0.65	79%	0.55
Night Covers	1.67	1.67	NA	0	0%	0.00
Controls	1.84	1.38	75%	0.46	25%	0.39
Strip Curtains	1.88	0.27	14%	1.61	86%	1.37
Motors	4.06	3.19	79%	0.87	21%	0.74
LEDs for Reach-In Cases	5.06	0.85	17%	4.21	83%	3.58
Condensers, FHPCs, and Compressors	25.67	1.83	7%	23.84	93%	3.92
Cases	27.43	0.79	3%	26.64	97%	4.38
TOTAL	69.49	10.31	15%	59.18	85%	15.69

*Remaining programmatic opportunities displayed in this table are calculated by applying the average overall remaining programmatic savings percentage (27%) to the measure-specific remaining comprehensive savings estimates.

The results highlight three key findings:

- Energy-efficient cases, condensers, floating head and suction control strategies, and compressors represent approximately 85% of remaining comprehensive savings opportunities, yet only between 3% (cases) and 7% (condensers, FHPC, compressors) of total opportunities have been achieved through rebates.
- The ESG Program has very successfully achieved savings from the categories of refrigeration controls, such as anti-sweat heaters and motors—achieving more than three-quarters of total comprehensive saving opportunities.
- Low-cost measures, such as strip curtains, gaskets, and auto-closers, represent high remaining comprehensive saving opportunities, but represent less than 5% of total opportunities.

Table 10 provides estimates of remaining comprehensive saving opportunities by measure category and cost bundle. Measures expected to be discontinued have been assigned zero remaining savings opportunities.

Table 10. Savings Opportunities by Measure Category and Cost Bundle, for audited stores

Measure Categories	Cost Bundle	Remaining Comprehensive Saving Opportunities (aMW)	Remaining Programmatic Saving Opportunities (aMW)	Remaining Comprehensive Op. by Cost Bundle (aMW)	Remaining Programmatic Saving Op. by Cost Bundle (aMW)
Auto Closers	1	0.26	0.22	2.68	2.28
Gaskets	1	0.65	0.55		
Strip Curtains	1	1.61	1.37		
Vending Machine Controls	1	0.17	0.14		
Controls	2	0.46	0.39	6.01	5.11
LEDs for Open Cases	2	0.48	0.41		
LEDs for Reach-In Cases	2	4.21	3.58		
Motors	2	0.87	0.74		
Cases	3	26.64	4.38	50.48	8.30
Condensers, FHPCs, and Compressors	3	23.84	3.92		
TOTAL		59.18	15.69	59.18	15.69

Market Research

As a supplement to the findings of the energy-savings opportunities assessment, Cadmus surveyed various stakeholder groups interacting with the program, including: decision makers at participating grocery stores, BPA utility customers, refrigeration contractors, and BPA and the program implementation contractor staff. The research objectives included:

- Understand how stakeholders impacted by the ESG Program view opportunities for energy savings.
- Identify market barriers to making refrigeration upgrades in grocery stores.
- Assess the likelihood and nature of near-term energy-efficient improvements in grocery stores.
- Explore differences and similarities between regions and store types.

Findings from this market research also will provide BPA with information about the ESG Program’s value and influence from the perspectives of utility customers and end users within its territory.

Methodology

Cadmus used multiple methods to gather data from six main stakeholder groups, including: phone interviews, in-person interviews, and an online survey. Table 11 outlines the stakeholder groups, research methods, and sample sizes. Appendix B includes the final survey instruments and interview guides.

Table 11. Market Research Summary

Stakeholder Group	Research Method	Sample Size (n)
ESG Trade Allies	Phone Interviews	12
Participating Grocery Stores	Phone Interviews	39 Independent Stores 6 National Account Stores
Nonparticipating Grocery Stores	Phone Interviews	5
BPA Utility Customers	Online Surveys	59
BPA Staff	In-person, In-depth Interview	3
ESG Program Implementation Contractor Staff	In-person, In-depth Interview	4

Sample Selection

Trade Allies

Currently, 28 active trade ally companies participate in the ESG Program, specializing in lighting, motors, cases, compressors and controls, gaskets, or a combination of measures. Of these trade allies, Cadmus generated a sample of those most active in the program (i.e., those conducting the largest number of projects), and completed 12 interviews. Trade allies completed one to 95 ESG Program projects. The population skewed heavily toward a small group of contractors completing a large portion of projects:

10 companies performed nearly 80% of all ESG Program projects in the program implementation contractor database.

Grocery Stores

Cadmus surveyed 32 independent stores receiving rebates through the program. Cadmus contacted seven additional stores receiving an audit, but not yet acting on the implementer’s recommendations, as well as six national account stores and five nonparticipating stores (which had not received an audit or a rebate from the ESG Program), for a total of 50 completed telephone surveys. Table 12 provides the sample frame.

Table 12. Grocery Store Survey Sample Frame

Store Type	Population of Unique Store Accounts (N)	Target Completes	Actual Completes (n)
Independent Stores that Received Rebate	270	30	32
Independent Stores that Received Audit - no Action	28	7	7
National Stores	10	8	6
Total from the ESG Program database	308	45	45
Nonparticipating Stores in Clark County, Washington*	10	5	5
Overall Total	318	50	50

* Cadmus purchased grocery store data for these 10 nonparticipating stores in Clark County, Washington, from Dun & Bradstreet, Inc., then cross-checked these stores against the ESG Program database.

Independent Store Sample

To reach a representative sample of independent grocery stores receiving rebates through the program, Cadmus stratified the sample of stores, first by region and then by project size,⁹ leading to a total of 30 stores. To stratify by region, Cadmus allocated sample points, based on the total number of ESG Program projects in the following seven segments, as defined by ZIP Code:

1. Eastern Oregon
2. Western Oregon
3. Eastern Washington
4. Western Washington
5. Seattle-Tacoma Metro Area
6. Montana
7. Idaho

Appendix C contains a detailed overview of the sample plan and sample point allocation.

⁹ Cadmus aggregated total energy savings achieved per store (the sum of all projects completed by any given store), and categorized the stores as having high or low kWh savings. High-kWh stores had total reported energy savings of 100,000 kWh or greater.

BPA Utility Customers

Through the online customer surveys, Cadmus sought to reach participants from each utility that currently offers or has offered the ESG Program in the past. Table 13 provides the sample frame.

Table 13. Utility Survey Sample Frame

Utility Type	Quantity (n)	Target Completes	Actual Completes (n)	Response Rate
Currently Offer ESG	56	56	43	77%
Offered ESG in the Past	37	37	16	43%
Total	93	93	59	63%

Market Research Findings

Cadmus did not base data collection on a statistically representative sample. Therefore, findings described in this section should not be viewed as conclusive evidence, confirming or disproving findings from the program opportunity assessment. Rather, these qualitative findings add additional context to the assessment of savings opportunities, and can aid BPA in its decision-making process regarding the program’s future design and delivery, based on stakeholder and customer insights and feedback.

Remaining Opportunity to Save Energy – Utility Perspective

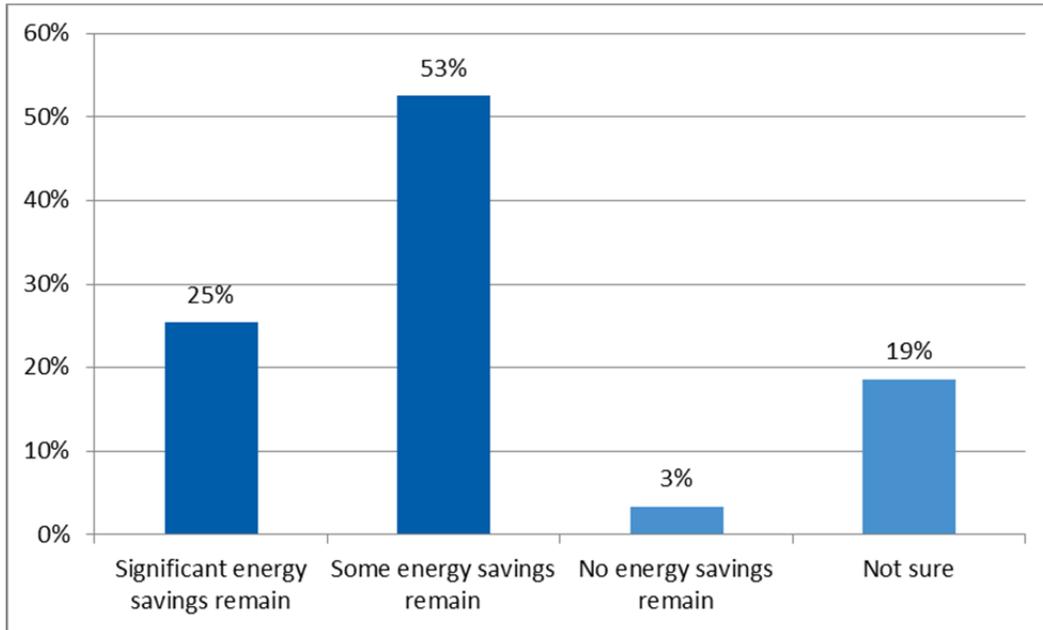
Utilities perceive savings remain from refrigeration in grocery stores within their territories. Some regional differences emerged in utility estimations of how attainable these savings can be, with western utilities (utilities in Western Washington and Oregon) tending to be more optimistic than those in the eastern parts of BPA’s region.

Utilities and trade allies reported different ways savings can best be achieved. For example, these groups offered differing opinions about store types providing greater opportunities to save energy (national accounts versus independent grocers) and refrigeration measures offering the most energy-savings opportunities. Descriptions of these opportunities follow.

Opportunities in Utility Service Territories – Utility Perspective

Overall, nearly 80% of respondents perceived either *significant energy savings* or *some energy savings* remained in their territory. The majority (53%) of respondents said just *some energy savings* remained, as shown in Figure 2.

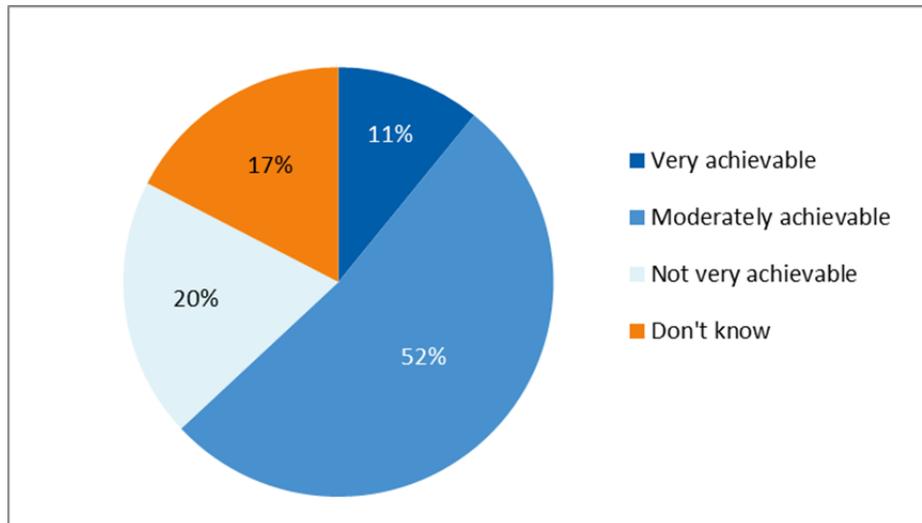
Figure 2. Utility Self-Report Estimates of Remaining Energy-Savings Opportunities in their Service Territory



Source: Online utility survey question: “What is your impression of how much energy savings from refrigeration remain in the grocery store market in your service territory?” (n=59)

Those utilities indicating energy savings remained were asked how achievable they considered the savings. About one-half (24 out of 46, or 52%) said the savings were moderately achievable, as shown in Figure 3. The category of customers who reported they did not know was nearly as large as those reporting the savings not very achievable.

Figure 3. Achievability of Remaining Energy Savings



Source: Online utility survey question: “How Achievable are those Energy Savings?” (n=46)

Utilities in western regions reported *significant energy savings* remain more than twice as often as those in eastern regions, and over four times as often as utilities in Idaho, Montana, and Wyoming. In addition, western utilities were the only ones reporting these savings as *very achievable*. Appendix E contains detailed findings.

Opportunities in Stores

Program stakeholders expressed different views regarding opportunities to save energy presented by different store types and sizes. Trade allies were equally divided between those saying larger, national chains presented the most savings opportunities and those saying independent stores presented the most savings opportunities. Utilities largely perceived independent stores offered more energy-savings opportunities than large chains. According to the ESG Program implementation contractor, the most important factor in a store's remaining energy-savings opportunities has not been its type or size, but rather the store's position on the market adoption curve for energy-efficiency equipment.

According to the program implementer, late adopters offer the most energy-savings opportunities, but typically can be the hardest to reach. The program implementation contractor reported savings can be achieved when ownership, leadership, or financial situation changes the equipment and technologies such stores are willing to implement.

Program implementation and management staff reported opportunities in existing stores already participating in the program. While program staff said energy-savings opportunities still likely exist in stores within all regions, the rural geographies of Montana, Idaho, and eastern parts of Washington and Oregon have posed challenges in reaching stores within these areas.

Opportunities in Technologies

Cadmus asked trade allies about market trends for installing energy-efficient equipment in grocery stores. Not all trade allies provided input on this topic. Those that did reported the following technologies trending upward and presenting future opportunities:

- LED lighting (n=5). Horizontal LEDs in open cases and LEDs with motion sensors in walk-ins are becoming more prevalent.
- Exterior lighting (n=2). Cost-effective savings now exist to upgrade exterior lighting for fuel canopies and in convenient stores. LED parking lot lighting upgrades were identified as existing cost-effective opportunities.
- No-heat doors (n=1).
- Multiplex compressor racks (n=1).
- VFDs for condenser motors (n=1).
- Increases in gasket expenditures as more retrofit case doors are installed (n=1).

Some trade allies reported the following technologies trending down and presenting fewer savings opportunities:

- Anti-sweat heat controls and ECMs (n=3). The market has become saturated, and new equipment comes equipped with these features.
- LED case lighting (n=1). Vertical LED replacement in open cases has slowed as new cases have LEDs.

Cadmus asked the utilities to select the refrigeration technologies offering the most energy-savings opportunities. Table E2 in Appendix E presents the findings from this question.

Future Energy-Efficiency Upgrades in Grocery Stores

The large majority (34 of 45, or 76%) of participating grocery stores that Cadmus interviewed reported they are planning to make energy-efficiency upgrades to their store or stores within the next year.¹⁰ This finding remained consistent across store types (national versus independent) and regions. Of this group, nearly two-thirds reported refrigeration equipment would likely be a part of those upgrades, and over 90% said they would probably use ESG Program rebates for those improvements.

Of both independent and national accounts, 15 of 45 participating stores said they were *very likely* to make energy-efficiency upgrades to their store within the next year, while 19 said they would be *somewhat likely*. National accounts (n=6) reported they were *very likely* to make upgrades more often than independent stores, but the small sample size (as shown in Figure 4, below) makes meaningful conclusions difficult to draw.

Nonparticipating stores (n=4) split, with two stores reporting they would be *somewhat likely* to make upgrades, and two stores reporting they would be either *somewhat unlikely* or *not likely at all*.

Because national accounts have many individual stores across the region, Cadmus asked each respondent how many of their stores they anticipate would make upgrades within BPA's territory. Table E3 in Appendix E presents these findings.

¹⁰ Includes stores receiving an audit, but not acting on the recommendations.

Figure 4. Likelihood Participating Stores Will Make Energy-Efficiency Upgrades Within the Year



Source: Store survey question: “How likely would you say you are to make energy efficiency upgrades to your store(s) in the Northwest within the next year?” (Independent stores n=39, National accounts n=6)

Refrigeration Upgrades

When respondents were asked a follow-up question about how likely their stores would be to make upgrades specifically to refrigeration equipment, representatives from all national accounts indicated they were likely to make refrigeration upgrades. Approximately 60% of participating independent stores indicated being likely to make refrigeration upgrades. Several companies shared their existing plans with Cadmus, as summarized below:

- National Accounts.** This year, one company plans to install doors on reach-in cases in its stores in the Northwest. Another company reported its six stores plan to retrofit refrigeration equipment, which includes installing VFDs on condensers and compressors, ECMs, and LED lighting in cases.
- Independent Stores.** Five stores reported existing plans to upgrade refrigeration, which may include LED lighting (n=3), case replacements (n=3), and door gaskets (n=1).

Likelihood to Use the ESG Program for Upgrades

Cadmus asked grocery store respondents reporting planned refrigeration upgrades (n=22) how likely they would be to apply for rebates through the ESG Program.¹¹ The vast majority of respondents (20 of 22, or 90%) said they would be either *very likely* or *somewhat likely* to use the program; respondents from all national accounts said they would be *very likely*. One independent store respondent said *not at all likely* as the equipment probably would not qualify under the program.

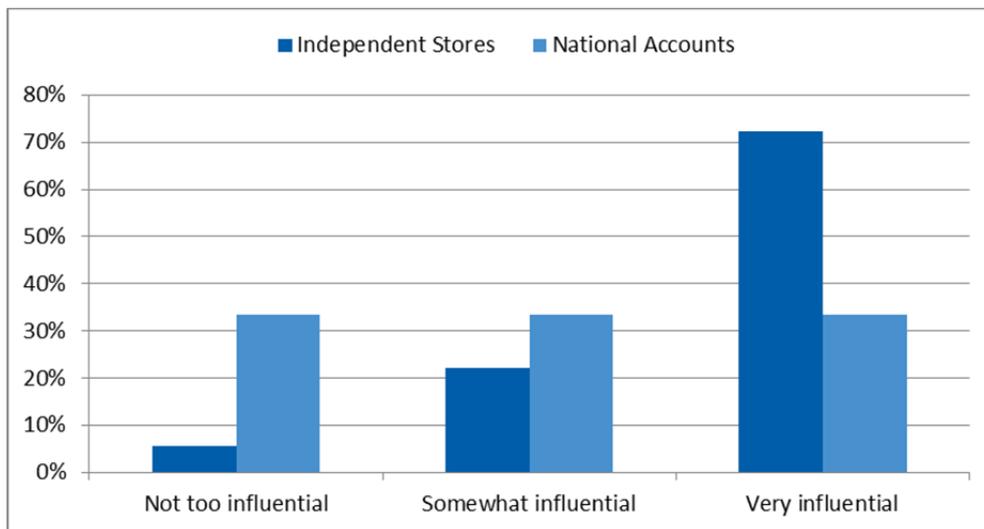
¹¹ Cadmus asked this question only from respondents from stores that have the ESG Program available to them.

ESG Program Influence

The majority of respondents from independent stores and national accounts reported the ESG Program as *very influential* in their decisions to make upgrades. Specifically, 26 of 36 independent stores (72%) reported the program as *very influential*. Responses from decision makers at national accounts distributed to a greater degree, with two reporting the ESG Program as *very influential*, two reporting it *somewhat influential*, and two companies reporting it *not too influential* in their decisions to make upgrades (as shown in Figure 5).

One of the two decision makers reporting the program *not too influential* was the same one reporting their company unlikely to make energy-efficiency upgrades. The other respondent noted the program had a limited impact on the company's nationwide remodel and retrofit projects, and the company's corporate policy already included energy efficiency.

Figure 5. Influence of ESG in Decision to Make Energy-Efficiency Store Improvements



Source: Store survey question: "How influential would you say the EnergySmart Grocer Program was in your decision to make energy-efficiency improvements to your store(s) in the Northwest?" (Independent stores n=36, national accounts n=6)

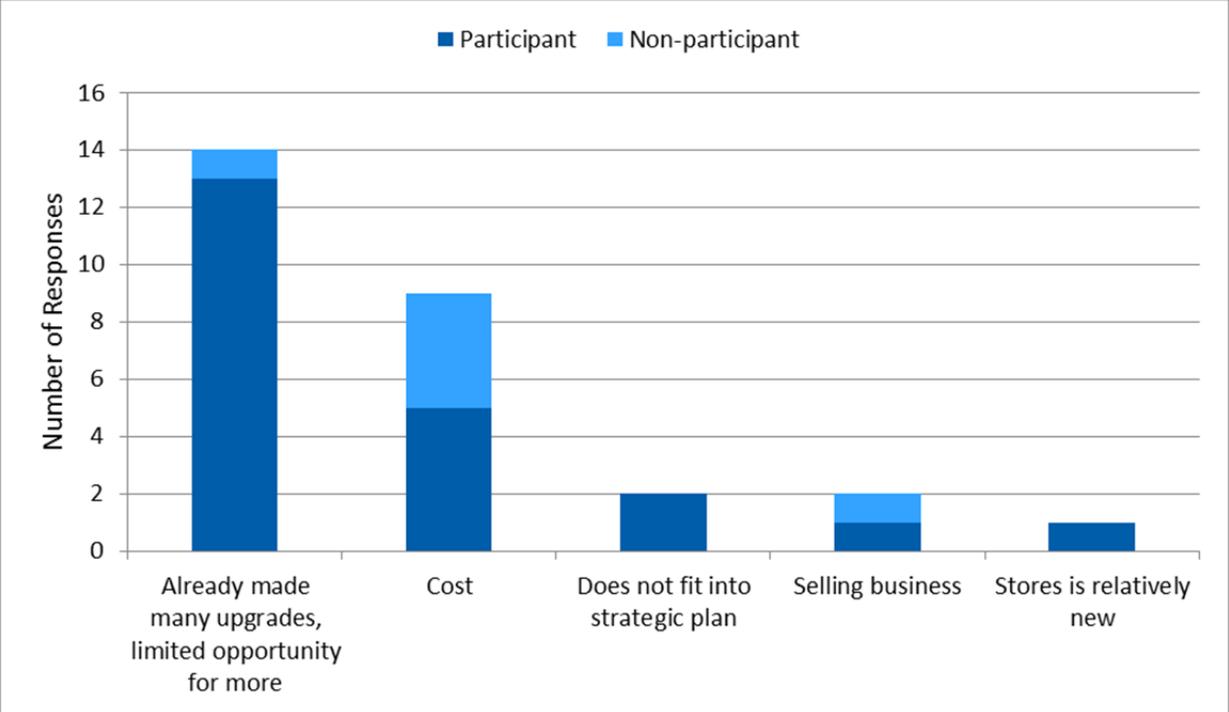
Reason for Not Making Upgrades

Only one of six national account representatives reported being unlikely to make energy-efficiency upgrades in BPA's territory within the next year. This respondent reported that, while it was not out of the question, upgrades in the region were unlikely due to low energy prices, particularly compared to other regions. This company prioritized energy-efficiency upgrades based on the projected return-on-investment in different parts of the country, therefore making it challenging for projects in the Northwest to compete with faster payback periods in regions with more expensive electricity. Though several other respondents reported low electricity prices as a market barrier, this was the only case citing it as a reason for not making improvements.

Independent stores unlikely to make improvements cited a variety of reasons, with the most common response (14 of 22 respondents) being that the store already made energy-efficient improvements with

limited opportunity for more (as shown in Figure 6). This was a multiple-response question that allowed more than one answer. Cost was the number one reason reported by nonparticipating stores.

Figure 6. Reason for Independent Grocers Not Making Upgrades



Source: Store survey question: “Why is it unlikely that you will make future upgrades?” (n=22; multiple responses)

To explore the finding that most respondents perceived limited opportunity for further efficiency improvements in their stores, Cadmus matched store account information from the survey to the ESG Program database to assess each store’s implementation of energy-savings measures. The analysis showed that, contrary to respondents’ perceptions, considerable saving opportunities remained at these stores.

Table 14 reports the data for these two groups, according to cost bundles.

Table 14. Percent of Energy Savings Achieved Compared to Likelihood to Make Upgrades

Likelihood to Make Refrigeration Upgrades	Cost Bundles	Savings Achieved (% of Comprehensive Saving Opportunities)	Remaining Comprehensive Saving Opportunity
Stores Unlikely to Make Upgrades	Cost Bundle 1 (Easy)	46%	54%
	Cost Bundle 2 (Medium)	70%	30%
	Cost Bundle 3 (Difficult)	2%	98%
Store Likely to Make Upgrades	Cost Bundle 1 (Easy)	41%	59%
	Cost Bundle 2 (Medium)	72%	28%
	Cost Bundle 3 (Difficult)	13%	87%

Notably, both groups achieved 41% to 46% of the savings from cost bundle 1 measures and about 70% of the savings from cost bundle 2 measures. Therefore, both groups have approximately the same levels of remaining opportunities to achieve more savings. Cost bundles 1 and 3 show substantial remaining opportunity savings for both groups.

Program Satisfaction and Value among Utilities

Cadmus asked utilities about their satisfaction with the program’s administration and their plans to offer the program in the future. Overall, utilities across most regions expressed satisfaction, and most utilities currently offering the program plan to continue. A strong majority reported the program offers value to their customers. This aligns with the finding that nearly all independent grocery stores reported the program as influential in their decision making.

Satisfaction

The majority (35 of 43, or 81%) of respondents from utilities currently offering the ESG Program reported being satisfied with the program overall, as indicated by their response of *very satisfied* or *somewhat satisfied*. Additionally, the majority (70%) said the program was *very valuable* to their customers.

Six of 43 respondents reported they were *not very satisfied* with the program. To explore differences on a regional basis, Table 15 lists utility satisfaction ratings by region, and illustrates dissatisfaction with the program was not limited to a particular region, state, or states. However, Idaho and Montana had the highest ratio of dissatisfied utilities, at one of three, while Western Oregon has one of nine, and Washington had two of 13.

Table 15. Utility Satisfaction Ratings by Region

Utility Region	Very Satisfied	Somewhat Satisfied	Not Very Satisfied	Not Sure	Total Responses
Eastern Oregon	2	1			3
Eastern Washington	3	3		2	8
Idaho	1	1	1		3
Montana	1	3	2		6
Seattle-Tacoma Metro Area	1				1
Western Oregon	6	2	1		9
Western Washington	10	1	2		13
Total	24	11	6	2	43

Program satisfaction did not strongly predict how likely a utility would report offering the program in the future. Satisfaction ratings also did not correspond with how valuable the utility considered the program. Four respondents reporting dissatisfaction still reported likely to offer the program in the future. Five of the six utilities reporting being *not very satisfied* still considered the program valuable to their customers.

Utility satisfaction did correspond somewhat to how many stores the utility respondent thought the program reached within their territory. Those reporting the program reaching 95% to 100% of their stores were more likely to be *very satisfied* than those reporting it reaching fewer than 60% of their stores.

Reasons Utilities Stopped Offering the Program

Sixteen utilities previously offering the ESG Program (but not currently offering it) participated in the online survey. Cadmus asked this group why they stopped offering the program. The most common response was: the utility needed to allocate energy-efficiency incentive (EEI) funds to another program (n=6 of 16).

Other responses included: limited potential for more savings (4 of 16); limited demand for energy efficiency in this market segment 3 of 16); and dissatisfaction with program delivery (3 of 16) (as shown in Table 16). These reasons were not mutually exclusive, and utilities may have selected more than one reason for no longer offering the program.

Table 16. Reasons for No Longer Offering the ESG Program

Response	Frequency	Percent
We needed to allocate EEI funds to another program.	6	29%
All the grocery stores in my service territory already participated so there was limited potential for more energy savings.	4	19%
Dissatisfaction with the program delivery.	3	14%
Limited demand for energy-efficiency measures offered through this program among grocery store owners.	3	14%
Other: Budget cutbacks from BPA.	2	10%
Other: The EEI funds commitment to offer the program was too high.	2	10%
Other: Have not seen a representative in more than a year and decided to shift funds.	1	5%
Total	21	100%

Source: Utility online survey question: “What were the main reasons why you stopped offering the program? Please select all the reasons that impacted your decision.” (n=16)

Likelihood to Offer the Program in the Future

The vast majority of utilities currently offering the program (39 of 43, or 91%) said they were *somewhat likely* or *very likely* to offer it in the future. Utilities offering the program now reported being likely to offer the program in the future more often than utilities no longer offering the program.

The likelihood split for offering the ESG Program in the future among those no longer including it in their energy-efficiency portfolios (n=16). Of these respondents, 44% said they were *somewhat likely* to offer it, and 44% said they were either *not very likely* or *not likely at all* to offer it. Only one utility representative in this group said it would be *very likely* to offer it in the future, and one reported not being sure.

Market Barriers

Cadmus asked all stakeholder groups about barriers to realizing savings from refrigeration technologies in the grocery store segment. BPA, the program implementation contractor, and trade allies tended to discuss program design and delivery challenges (for example, regional gaps and inconsistencies), while representatives from grocery stores (both independent and national accounts) did not.

The grocery store representatives spoke from direct experience in implementing projects within the Northwest. While independent stores cited cost as the primary barrier to making upgrades, only one national account reported cost as a barrier, with other issues more prevalent for national accounts.

Table 17 shows barriers reported across all stakeholder groups, from an end-user perspective.

Table 17. Market Barriers to Making Energy-Efficient Refrigeration Upgrades in Grocery Stores

Market Barrier	Number of Responses from Stakeholder Groups					Total
	Independent Stores (n=17)*	National Stores (n=6)	Trade Allies (n=12)	Program Implementer (n=4)	BPA (n=3)	
Cost	8	1	4	4		17
Regional disparity in program offerings			2	4	3	9
Amount of program incentive money available			2	4	3	9
Inconvenience, hassle, logistics, time constraints	4			4		8
Impact on merchandise	2			4		6
Low price of electricity in Northwest		2		4		6
Contractors in Eastern and rural areas of BPA's territory				3	3	6
Awareness	3		2			5
Structural and design issues; space constraints	5					5
Juggling expansion and remodeling plans		3		1		4
Getting contractors to act quickly enough	1					1
Corporate buy-In		1				1

*This question was only asked of participating grocery stores reporting they were likely to make upgrades to refrigeration equipment

Challenges with Program Design and Program Administration

This section includes comments from the program implementation contractor, trade allies, and BPA, as noted. The program implementation contractor identified the majority of program design challenges. The utility survey did not address program design.

The EEI funding structure for utility customers proved to be the main challenge facing the program's impact. Four of 12 trade allies discussed this issue, including the program implementation contractor and BPA. In prior years, the program implementation contractor worked with BPA under a direct-acquisition contract to implement the program across the entire BPA region. Under the current funding structure, utility customers decide whether to allocate their EEI funds for the ESG Program, resulting in gaps in the program across service territories and varying funding levels.

According to the program implementation contractor and trade allies, the new program structure impacted the program's ability to realize energy-savings opportunities in two primary ways:

1. **Availability of Incentive Funds.** Utilities allocate varying amounts of funds for the program. The program implementation contractor reported that, in some cases, utilities allocate rebates for

much less than what could potentially be achieved in the service territory, thereby impacting the extent that the program can be marketed and delivered. Two trade allies reported that smaller public utility districts typically can run out of funding.

2. **Regional Disparity.** In the program implementation contractor's view, the inability to offer regional initiatives to national accounts reduces the financial feasibility of energy-efficiency projects for these customers. In the past, this caused some national accounts not to implement any projects within the region. Two trade allies reported that varying measure eligibility and incentive amounts across utilities created challenges when working in multiple territories. Further, it proved less profitable for trade allies to travel long distances for a smaller number of projects.

Other program challenges cited by the program implementation contractor and trade allies included:

- **Program Incentive Structure.** The program implementation contractor reported the program's incentive structure could be a limiting factor for capturing energy savings on a per-project basis, as the largest energy savers generally include more expensive technologies. One trade ally agreed, citing more-efficient technologies can be hard to sell because the ESG Program does not offer incentives relative to the measures' energy savings. This trade ally cited LED lighting measures as an example.
- **Implementer Contract Term.** In the last cycle, a time lapse occurred between contracts, which the program implementation contractor said created challenges in maintaining program momentum and keeping stores informed.
- **Cost-effectiveness.** Currently, each measure must pass cost-effective tests. According to the program implementation contractor, some individual technologies do not meet the cost-effective tests, but may be cost-effective if bundled with other measures.
- **Approval Process.** EBCx and new construction projects must undergo BPA's Custom Project process, which the program implementation contractor reported can result in longer approval times.

Measure-Specific Obstacles

Cadmus asked trade allies if they experienced particular obstacles with specific refrigeration measures. They identified challenges installing the following technologies:

- **VFDs and Floating Heads.** Experienced contractors prove essential for installing these measures, because upgrading such equipment can cause other problems with refrigeration systems, potentially requiring further maintenance or additional service and adjustments. Installing VFDs often requires installing new controllers at an additional cost to the customer. Finally, contractors found store owners often unaware of the energy-savings opportunities from upgrading to VFDs.
- **ECM Controls.** This technology requires installing two-speed ECMs, which many stores do not have. This presents another cost hurdle, as the ESG Program does not rebate two-speed motors.

- **Walk-in Evaporator Motor Controls.** Controls must be monitored and adjusted after installation to ensure they perform properly. That may require contractors making multiple store visits, which does not prove ideal for contractors or customers.

Opportunities for Improving Program Impacts

Trade allies and the program implementation contractor provided numerous suggestions to improve the ESG Program’s ability to capture energy savings from refrigeration improvements.

Program Design and Delivery

Two trade allies suggested increasing program marketing and outreach to improve customer awareness, and one suggested increasing faster turnaround times for custom measures. The program implementation contractor suggested streamlining the custom approval process to speed up approvals for EBCx and new construction projects. The program implementation contractor suggested the following:

- Consider discounting the incentives on easy-to-implement, inexpensive measures, and increasing incentives for new technologies or existing technologies that offer deeper savings.
- Provide a bonus to grocery store owners for undertaking more comprehensive projects (for example, four or more measures).
- Provide incentives or a bonus structure to contractors delivering services to rural areas. Consider using discussions underway within the RTF to gauge potential receptiveness and to explore the effect on regional equity.
- Explore options to leverage advanced metering information, and promote EBCx to gain more intelligence about various markets and high-energy users.
- Revise cost-effectiveness criteria to allow bundling measures.

When asked what the program implementation contractor could do to improve the program, a majority of the trade allies (eight of 12) said the program implementation contractor does a good job with the program, or offered no suggestions.

Program Administration and Oversight

The program implementation contractor offered the following suggestions for improving the program administration’s efficiency:

- Allow more budget flexibility, which would reduce overhead costs and channel more resources toward program delivery.
- Wrap new measure development into the budget to reflect changes in the RTF approval process.

- Consider aligning the contract term with the Northwest Power and Conservation Council's five-year planning cycle, which would help with program planning and to reduce gaps in program delivery between contract periods.

New Measures

Four contractors identified several new measures to be included in the program, including:

- Hussmann protocols;
- New controllers when replacing drives;
- Replacement of glass doors on cases with no-heat doors;
- Updated controls for updated condensers;
- Efficient motors for air handlers; and
- Maintenance cleaning for cases and condensers.

Conclusions and Recommendations

Based on research results, Cadmus provides the following conclusions and recommendations to BPA.

Significant savings opportunities remain for grocery store refrigeration equipment.

Cadmus estimates approximately 40 aMW of programmatic saving opportunities and 105 aMW of comprehensive saving opportunities remain for refrigeration upgrades, new construction efficiency improvements, and other measures currently not offered by the program in the grocery market (Table 18).

Current program measures represent approximately 50% (20.1 aMW) of the remaining programmatic saving opportunities, with 50% of those savings derived from medium- and low-temperature cases, doors, floating head and suction control strategies, condensers and compressors. New measures, such as existing building commissioning (EBCx) and new construction represent approximately 50% of the remaining opportunities.

Table 18. BPA Grocery Opportunity Assessment

Resource Type	Program Achieved Savings (aMW)	Comprehensive Savings Opportunities		Programmatic Saving Opportunities	
		aMW	Pct. of Total	aMW	Pct. of Total
Current Program Measures	10.7	75.8	72%	20.1	50%
EBCx	0	6.5	6%	5.6	14%
New Construction	0	1.3	1%	1.1	3%
New Measures	0	21.8	20%	13.4	33%
TOTAL	10.7	105.4	100%	40.1	100%

The ESG Program has very successfully achieved savings from refrigeration controls (such as anti-sweat heater controls) and motors categories. More than three-quarters of all comprehensive saving opportunities have been achieved for these categories. This success partly resulted from additional program interventions and increased incentive levels.

Energy-efficient low- and medium-temperature cases, condensers, floating head and suction control strategies, and compressors represent approximately 85% of all saving opportunities from current measures. To date, these measures have achieved only a small fraction of savings, representing about 5% of available savings within these specific measure categories.

New construction, EBCx, and new technologies, such as adaptive controls and efficient display case evaporator coils, represent less than one-third of comprehensive saving opportunities, but 50% of programmatic opportunity. These new measure categories, which can be applied to a wide range of existing customers, would appear to represent deeper energy savings than some current program measures.

Recommendations:

- Consider increasing incentives for medium- and low-temperature cases, doors, and condensers and compressors, which represent the bulk of comprehensive, energy-saving opportunities from current measure offerings.
- Concurrently, consider lowering incentives for measure groups, such as controls and motors, approaching market saturation.
- Evaluate procedures for approving new construction and EBCx projects to help streamline the process and increase uptake.
- Consider offering additional incentives for undertaking more comprehensive projects with deeper savings (such as, projects with four or more measures).

Demand for energy-efficiency among grocery stores remains high, and more outreach and education may help accomplish energy savings from refrigeration technologies.

Most grocery stores planning energy-efficiency upgrades in the near term intend to take advantage of incentives available through the ESG Program, and consider the program influential in their decision making. Stores most commonly cited perceptions of limited opportunities as reasons for not making upgrades. Audit data for these respondents, however, indicated considerable opportunities still remain at their stores.

Recommendation:

Explore opportunities for raising awareness and additional education among store owners regarding their specific options to make refrigeration upgrades. This will help overcome knowledge barriers among store owners who believe little opportunity remains. Such outreach should include information on: measures the program currently incents; and new measures, as they are added.

Independent and national grocery stores report barriers that appear unrelated to the program's delivery challenges.

The program implementer reported geographic gaps in program offerings across BPA's territory impact the financial viability of conducting large-scale projects at multiple locations for national grocery store companies. These gaps stem from variations in utility participation in ESG, which became an issue in 2011, when the region shifted to local control of incentive budgets through the Post-2011 policy framework.

A comparison of market barriers reported by various stakeholder groups revealed independent grocers' primary barriers to upgrading their energy efficiency include: cost, structural, and space constraints; and inconvenience. Barriers reported by national accounts involved: coordinating corporate remodeling and expansion schedules; the impacts of low electricity prices in the Northwest on return-on-investment; and (to a lesser degree) cost and corporate reluctance to fund projects.

Recommendation:

Certain factors may fall outside of the program's control, such as the allocation and use of EEI funds. However, options may exist to mitigate the impacts of these barriers on the program. For example, a financial bonus could be offered to national accounts for making simultaneous upgrades in multiple locations within the region. This could increase the return-on-investment due to economies of scale, and help counteract the effects of gaps in regional offerings. A tiered structure could also be offered, using bonuses to influence small stores and national chains. Stores installing more than a predetermined number of measures could qualify for additional incentives.

Most utilities expressed realistic expectations regarding remaining opportunities for energy savings from grocery store refrigeration in their territories, but utilities would benefit from a better understanding of what savings are attainable.

More than one-half (31 out of 59, or 53%) of utilities reported *some* energy savings opportunities remain in their territories. Also, more than one-half of surveyed utilities currently offering the program predicted the program could continue in their territories for one to three years, based on current delivery rates. Some utilities expressed greater optimism, however, reporting *significant* energy savings remain, with the savings *very attainable*.

As reported by BPA program staff, the program's turn-key design results in utilities' varying degrees of involvement in program administration, with little to no involvement typical. Cadmus' survey findings confirmed knowledge gaps likely exist regarding the number of stores the ESG program has reached in utilities' territories as well the remaining opportunities within the territory in general.

Recommendation:

Many utilities would benefit from a better understanding of the remaining energy-saving opportunities within their territories. BPA should consider developing a communications strategy to address remaining savings within the utilities' territories, based on this study's findings, and should then work with utilities and stakeholders to identify market barriers and to generate solutions specific to their territories. This would allow BPA to work with utilities to determine the best way to capture remaining energy-savings opportunities from refrigeration in grocery stores, and possibly to help utilities determine future EEI fund allocations.

Appendix A: Energy-Saving Opportunities by Utility

Error! Reference source not found. summarizes remaining, energy-savings opportunities by utility, calculated using the difference of total comprehensive saving opportunities and rebated savings that have occurred through program activity. Of 92 utilities listed, nearly 70% of the remaining comprehensive saving opportunities exist for participants in 14 of those utilities. Approximately 47% of remaining comprehensive opportunities occur in Snohomish County Public Utility District (PUD) (17%), Seattle City Light (17%), Clark Public Utilities (7%), and Tacoma Power (7%) territories.

Utility	Accounts	Total Comprehensive Savings Opportunities (aMW)	Total Rebated Savings (aMW)	Rebated Savings as a Pct. of Total Comp. Op.	Remaining Comprehensive Savings Opportunities (aMW)	Pct. Remaining Comp. Op.	Remaining Programmatic Opportunities (aMW)*
Ashland, City of	8	0.64	0.08	13%	0.56	< 1%	0.15
Bandon, City of	3	0.34	0.03	7%	0.32	< 1%	0.08
Benton Public Utility District	16	1.52	0.32	21%	1.20	2%	0.32
Benton Rural Electric Association (REA)	1	0.12	0.03	24%	0.09	< 1%	0.02
Big Bend Electric Cooperative, Inc.	4	0.25	0.00	2%	0.24	< 1%	0.06
Blaine, City of	1	0.13	0.04	33%	0.09	< 1%	0.02
Bonnors Ferry, City of	2	0.20	0.01	3%	0.19	< 1%	0.05
Burley, City of	4	0.47	0.03	6%	0.45	< 1%	0.12
Canby Utility Board	3	0.39	0.04	11%	0.35	< 1%	0.09
Cascade Locks, City of	1	0.03	0.01	24%	0.02	< 1%	0.01
Central Electric Cooperative, Inc.	1	0.09	0.00	NA	0.09	< 1%	0.02
Central Lincoln People's Utility District	20	2.05	0.20	10%	1.85	2%	0.49
Centralia City Light	2	0.28	0.04	14%	0.24	< 1%	0.06
Cheney Light Department, City of	3	0.29	0.04	13%	0.25	< 1%	0.07
Chewelah, City of	1	0.11	0.02	13%	0.10	< 1%	0.03
Clallam Co., Public Utility District No. 1	10	0.91	0.11	13%	0.80	1%	0.21
Clark Public Utilities	48	6.27	0.86	14%	5.40	7%	1.43
Clatskanie People's Utility District	3	0.15	0.01	7%	0.14	< 1%	0.04
Clearwater Power Company	2	0.15	0.02	12%	0.13	< 1%	0.03
Columbia Basin Electric Cooperative	5	0.22	0.01	5%	0.21	< 1%	0.06
Columbia River Public Utility District	5	0.36	0.09	25%	0.27	< 1%	0.07

Utility	Accounts	Total Comprehensive Savings Opportunities (aMW)	Total Rebated Savings (aMW)	Rebated Savings as a Pct. of Total Comp. Op.	Remaining Comprehensive Savings Opportunities (aMW)	Pct. Remaining Comp. Op.	Remaining Programmatic Opportunities (aMW)*
Columbia Rural Electric Association (CREA)	1	0.09	0.00	NA	0.09	< 1%	0.02
Coos Curry Electric Cooperative	7	0.68	0.07	11%	0.61	< 1%	0.16
Coulee Dam, Town of	1	0.09	0.02	22%	0.07	< 1%	0.02
Cowlitz County, Public Utility District No. 1	19	1.69	0.12	7%	1.56	2%	0.41
Drain, City of	1	0.09	0.01	9%	0.08	< 1%	0.02
Ellensburg, City of	4	0.44	0.07	17%	0.37	< 1%	0.10
Elmhurst Mutual Power & Light Co.	4	0.66	0.11	17%	0.55	< 1%	0.15
Emerald People's Utility District	5	0.34	0.05	16%	0.29	< 1%	0.08
Eugene Water & Electric Board	38	3.75	0.29	8%	3.46	5%	0.92
Ferry County Public Utility District 1	2	0.13	0.02	13%	0.11	< 1%	0.03
Flathead Electric Cooperative	22	2.50	0.29	12%	2.21	3%	0.59
Forest Grove Light and Power, City of	1	0.02	0.01	29%	0.02	< 1%	0.00
Franklin County Public Utility District	11	0.85	0.11	13%	0.74	< 1%	0.20
Glacier Electric Cooperative, Inc.	5	0.35	0.06	16%	0.29	< 1%	0.08
Grant County Public Utility District	20	1.78	0.16	9%	1.62	2%	0.43
Grays Harbor PUD	11	1.08	0.24	22%	0.84	1%	0.22
Hermiston Energy Services	3	0.49	0.04	8%	0.45	< 1%	0.12
Hood River Electric Cooperative	3	0.16	0.02	10%	0.15	< 1%	0.04
Idaho County Light & Power Cooperative Association, Inc.	1	0.00	0.00	16%	0.00	< 1%	0.00
Idaho Falls Power	8	0.96	0.07	7%	0.89	1%	0.24
Inland Power & Light	4	0.35	0.05	14%	0.30	< 1%	0.08
Klickitat Public Utility District	3	0.35	0.08	21%	0.28	< 1%	0.07
Kootenai Electric Cooperative	4	0.44	0.11	25%	0.33	< 1%	0.09
Lakeview Light & Power	6	0.57	0.06	11%	0.50	< 1%	0.13
Lane Electric Cooperative	2	0.16	0.03	18%	0.13	< 1%	0.04
Lewis County, Public Utility	14	1.17	0.18	16%	0.99	1%	0.26

Utility	Accounts	Total Comprehensive Savings Opportunities (aMW)	Total Rebated Savings (aMW)	Rebated Savings as a Pct. of Total Comp. Op.	Remaining Comprehensive Savings Opportunities (aMW)	Pct. Remaining Comp. Op.	Remaining Programmatic Opportunities (aMW)*
District #1							
Lincoln Electric Cooperative, Inc	2	0.28	0.00	< 1%	0.28	< 1%	0.07
Lost River Coop	1	0.08	0.01	10%	0.07	< 1%	0.02
Lower Valley Energy	4	0.26	0.06	25%	0.19	< 1%	0.05
Mason County Public Utility District No.3 (PUD #3)	7	1.07	0.01	< 1%	1.06	1%	0.28
Mason County PUD No 1	1	0.07	0.00	< 1%	0.07	< 1%	0.02
McCleary, City of	1	0.13	0.06	44%	0.07	< 1%	0.02
McMinnville Water & Light	7	0.42	0.00	< 1%	0.42	< 1%	0.11
Midstate Electric Cooperative, Inc.	4	0.40	0.10	24%	0.30	< 1%	0.08
Milton-Freewater City Light & Power	1	0.17	0.03	15%	0.14	< 1%	0.04
Mission Valley Power	10	0.72	0.15	20%	0.58	< 1%	0.15
Missoula Electric Coop	3	0.17	0.03	15%	0.15	< 1%	0.04
Monmouth Power & Light	1	0.09	0.02	18%	0.07	< 1%	0.02
Nespelem Valley Electric Co-op, Inc.	1	0.01	0.00	49%	0.00	< 1%	0.00
Northern Wasco County People's Utility District	9	0.79	0.04	5%	0.76	< 1%	0.20
Northwestern Energy	2	0.18	0.00	NA	0.18	< 1%	0.05
Okanogan County Electric Cooperative	1	0.06	0.02	36%	0.04	< 1%	0.01
Okanogan County PUD No. 1	12	0.83	0.21	26%	0.62	< 1%	0.16
Orcas Power & Light Cooperative	5	0.44	0.16	37%	0.28	< 1%	0.07
Oregon Trail Electric Consumers Cooperative	15	1.43	0.14	10%	1.29	2%	0.34
Pacific County Public Utility District No. 2	8	0.59	0.13	23%	0.46	< 1%	0.12
Parkland Light & Water Company	3	0.40	0.01	3%	0.39	< 1%	0.10
Pend Oreille Public Utility District	6	0.42	0.07	16%	0.36	< 1%	0.09
Peninsula Light Company	10	1.46	0.12	8%	1.34	2%	0.36
Plummer, City of	1	0.12	0.02	13%	0.11	< 1%	0.03
Port Angeles, City of	4	0.31	0.03	11%	0.27	< 1%	0.07
Public Utility District #1 of Chelan County	7	0.64	0.00	NA	0.64	< 1%	0.17

Utility	Accounts	Total Comprehensive Savings Opportunities (aMW)	Total Rebated Savings (aMW)	Rebated Savings as a Pct. of Total Comp. Op.	Remaining Comprehensive Savings Opportunities (aMW)	Pct. Remaining Comp. Op.	Remaining Programmatic Opportunities (aMW)*
Ravalli Electric Co-op	1	0.01	0.00	10%	0.01	< 1%	0.00
Richland Energy Services, City of	8	1.21	0.08	7%	1.13	1%	0.30
Rupert, City of	2	0.15	0.04	30%	0.11	< 1%	0.03
Salem Electric	4	0.39	0.04	11%	0.34	< 1%	0.09
Seattle City Light	129	14.19	1.48	10%	12.71	17%	3.37
Skamania County Public Utility District No. 1	1	0.10	0.03	36%	0.06	< 1%	0.02
Snohomish County Public Utility District No. 1	113	14.50	1.88	13%	12.63	17%	3.35
Soda Springs, City of	2	0.13	0.02	20%	0.10	< 1%	0.03
Springfield Utility Board	14	2.10	0.12	6%	1.98	3%	0.53
Sumas, City of	2	0.11	0.02	16%	0.09	< 1%	0.02
Tacoma Power	49	6.24	0.99	16%	5.25	7%	1.39
Tillamook Peoples Utility District	7	0.52	0.11	21%	0.41	< 1%	0.11
Umatilla Electric Cooperative Association	2	0.16	0.04	28%	0.11	< 1%	0.03
United Electric Cooperative	1	0.08	0.01	17%	0.06	< 1%	0.02
Vera Water & Power	5	0.46	0.11	24%	0.35	< 1%	0.09
Wahkiakum Public Utility District	2	0.09	0.00	3%	0.09	< 1%	0.02
Wasco Electric Cooperative	2	0.09	0.00	1%	0.09	< 1%	0.02
Weiser, City of	1	0.13	0.03	22%	0.10	< 1%	0.03
West Oregon Electric Cooperative, Inc.	2	0.15	0.01	5%	0.15	< 1%	0.04
TOTAL	816	86.5	10.7	12%	75.8	100%	20.1

*Remaining programmatic opportunities displayed in this table are calculated by applying the average overall remaining programmatic savings percentage (27%) to the utility-specific remaining comprehensive savings estimates.

Appendix B. Survey Instruments



EnergySmart Grocer Market Assessment Draft BPA In-Depth Interview Guide – Oct. 15, 2012

BPA Program Staff

Program Goals

1. The program currently has reached 3,000 stores. How does that fit with the original goals for this program – is this more than you had anticipated? Less? Why?
2. How many utilities are currently participating?

Program administration and delivery

3. Can you explain how the funding works, including the BPA Turnkey option and the Self-Funded option?
4. Are you aware of Northwest utilities offering their own grocery program and incentives outside of the BPA program, but in BPA territory?

As you know, the focus of this study is to identify remaining market potential for refrigeration measures and specifically the EnergySmart Grocer's program. We have a couple of questions to explore limitations that might affect the program's ability to capture market potential.

5. Are there challenges that PECCI has experienced with delivery? Where? How?
6. Do you think the program has a sufficient trade ally network to support the program? Why do you give that answer?
7. Is there anything that you think that could change about the delivery that could improve participation or increase savings?
8. Does the program work in the recommissioning domain?
 - a. If yes, how is this working and do you know the approximate savings being generated from this market?
 - b. If no, should this be considered and do you have an estimate of the potential?

Utility Role

9. You have mentioned that utilities have somewhat limited involvement in the delivery, and the engagement of utilities varies on a case-by-case basis. What are their primary roles in the program?

10. Do they identify any customers in their territories through their own data, or does PECI provide them with a list?
11. From your perspective, are the most useful things to be asking them about in the interview simply their opinions on market saturation in their territory? Or are there other things that that they would have specific insight on that PECI may not know? (For example, customer attitudes toward energy efficiency).

Market Barriers

12. What are you hearing from stakeholders or utility representatives about the main market barriers to getting grocery store owners engaged?
13. a. What are the main reasons why some utilities have stopped offering the program?
b. Have the reasons been addressed?
14. Are there still service areas that may be underserved by this program? What are the main reasons why you think they are underserved?
15. What do you think is the single most important reason why customers in this sector don't make efficiency upgrades? What other reasons stop store owners?
 - a) Lack of up front capital
 - b) Lack of financing options
 - c) Lack of interest/no time to pay attention to energy efficiency
 - d) Lack of good information about efficiency options/savings
 - e) Not wanting to disrupt business/customers; inconvenience
 - f) Energy not a big operating cost
 - g) Lack of experience with efficiency
 - h) Not wanting to take on debt

Market opportunities and potential

We are wrapping up. With these final questions we'd like to learn a little more about where you see the program headed and what you would like to see in the future.

16. Do you see any market opportunities that the EnergySmart Grocer program may **not** be addressing, within the grocery store market in the Northwest? (On the measure level, facility size, type of service, etc)
17. Are there any new measures in the pipeline?
 - a. If yes, what is the timeframe and anticipated savings.
18. Are there any changes that you would **like** to see made to the program in the future to continue addressing the grocery market in the Northwest?

- 19.** What are your impressions about refrigeration market saturation in the Northwest?
- a. Do you still see potential left? If yes, how much do you think remains?
 - b. Where does this potential remain? (specific regions, utilities...)
 - c. Going back to this idea of exploring possible limitations, from your perspective, does the program's budget allow for sufficient incentives in order to capture that potential?
 - d. How would you go about capturing that potential? (new measures, new deliveries, current design..?)

20. Do you have any final comments or thoughts?



**EnergySmart Grocer Market Assessment
PECI In-Depth Interview Guide – Oct. 15, 2012**

PECI (Program Manager/Senior Management, Key Account Manager, Field Staff)

****PROGRAM MANAGER QUESTIONS****

Intro: As you know, the focus of this study is to identify remaining market potential for refrigeration measures and specifically the EnergySmart Grocer's program. We have some questions to make sure we understand the program thoroughly, to explore limitations that might affect the program's ability to capture market potential, and to help us understand the market and market barriers.

Program Delivery

PD1. From your perspective, how is delivery going? What are the challenges?

PD2. How do you define market segments in your database? For example, are small, medium, and large stores defined by square footage? What are the parameters?

PD3. Is there anything you think could change about the delivery that could improve participation or increase savings?

PD4. Does the program work in the recommissioning domain?

- a. If yes, how is this working and do you know the approximate savings being generated from this market?
- b. If no, should this be considered and do you have an estimate of the potential?

PD5. How are savings tracked?

Participation and Tracking

PAR1. Are there still service areas that may be underserved by this program and represent potential for savings? What is your perception on the barriers that keep them from participating?

PAR2. How do you obtain potential participant lists?

- a. Do you think that it's possible to get more comprehensive information on the number of grocery stores?
- b. About what percentage of the grocer market have you identified and tracked in your program database?

PAR3. Do you have a sense of the types of businesses still unaccounted for? Does it reflect a similar distribution to the known market (e.g., percent distribution of super markets, medium grocers, minimarts, other?)

Trade Allies

TA1. Let's talk a little bit about the participating contractors. How many contractors currently participate in the program?

TA2. What are the main ways that contractors learn about the program?

TA3. What are the strategies you use for getting contractors involved? Do you think it's successful? What are the barriers?

TA4. What are the main trade associations that you work with? From your perspective, are there any other trade associations or market actors that may present opportunities for engaging more end-users?

TA5. a. How are contractors paid?

b. Does this influence which recommended measures get installed?

TA6. Do you think the program has a sufficient trade ally network to support the program? Why do you give that answer?

Market Opportunities and Potential

We are wrapping up. With these final questions we'd like to learn a little more about where you see the program headed and what you would like to see in the future.

MO1. Do you see any opportunities that the Energy Smart Grocer program may not be addressing, within the grocery store market in the Northwest? (On the measure level, facility size, type of service, etc)

MO2. Are there any new measures in the pipeline?

- a. If yes, what is the timeframe and anticipated savings.

MO3. Are there any changes that you would **like** to see made to the program in the future to continue addressing the grocery store market in the Northwest?

MO4. What are your impressions about refrigeration market saturation in the Northwest?

- a. Do you still see potential left? If yes, how much do you think remains?
- b. Where does this potential remain? (specific regions, utilities...)

- c. From your perspective, does the program's budget allow for sufficient incentives in order to capture that potential?
- d. How would you go about capturing that potential? (new measures, new deliveries, current design..?)

****KEY ACCOUNT MANAGER QUESTIONS****

Intro: As you know, the focus of this study is to identify remaining market potential for refrigeration measures and specifically the EnergySmart Grocer's program. We have some questions to make sure we understand the program thoroughly, to explore limitations that might affect the program's ability to capture market potential, and to help us understand the market and market barriers – particularly those that are unique to national grocery store chains.

National Accounts

NA1. Are there any national accounts in the Northwest that do not participate in the EnergySmart Grocer Program? (Which ones?)

PD1. From your perspective, how is delivery overall going? What are the challenges?

PD3. Is there anything that you think that could change about the delivery that could improve participation or increase savings?

NA2. Out of all the energy efficiency projects national supermarkets perform on any given year, about how many of these are incentivized through the program?

Participation and Tracking

PAR1. Are there still customers or regions that may be underserved by this program and represent potential for savings? What is your perception on the barriers that keep them from participating?

PAR2. How do you obtain potential participant lists?

Target Market Characteristics and Market Barriers

TM1. How concerned are businesses in this sector with energy costs? How much of their operating costs are from energy?

TM2. To what extent does energy efficiency enter into their decisions about upgrading or replacing equipment?

TM3. Besides cost-savings, what motivates them to take actions that result in reducing their energy use?

TM4. Out of the measures that are offered, what types of energy efficiency projects do grocery stores tend to undertake? What types of projects do they tend to avoid? Why?

TM5. How often are customers recommended refrigeration measures that they do not choose to install? Why?

TM6. What do you think is the single most important reason why customers in this sector don't make efficiency upgrades? What other reasons stop customers?

- a) Lack of up front capital
- b) Lack of financing options
- c) Lack of interest/no time to pay attention to energy efficiency
- d) Lack of good information about efficiency options/savings
- e) Not wanting to disrupt business/customers; inconvenience
- f) Energy not a big operating cost
- g) Lack of experience with efficiency
- h) Not wanting to take on debt

Market Opportunities and Potential

We are wrapping up. With these final questions we'd like to learn a little more about where you see the program headed and what you would like to see in the future.

MO1. Do you see any opportunities that the Energy Smart Grocer program may not be addressing, within the grocery store market in the Northwest? (On the measure level, facility size, type of service, etc)

MO2. Are there any new measures in the pipeline?

- a. If yes, what is the timeframe and anticipated savings.

MO3. Are there any changes that you would **like** to see made to the program in the future to continue addressing the grocery store market in the Northwest?

MO4. What are your impressions about refrigeration market saturation in the Northwest?

- a. Do you still see potential left? If yes, how much do you think remains?
- b. Where does this potential remain? (specific regions, utilities...)
- c. From your perspective, does the program's budget allow for sufficient incentives in order to capture that potential?
- d. How would you go about capturing that potential? (new measures, new deliveries, current design..?)

****FIELD STAFF QUESTIONS****

Intro: As you know, the focus of this study is to identify remaining market potential for refrigeration measures and specifically the EnergySmart Grocer's program. We have some questions to make sure we understand the program thoroughly, to explore limitations that might

affect the program's ability to capture market potential, and to help us understand the market and market barriers.

Program Delivery Field Staff

PDFS1. Walk us through a typical project, beginning with how the customer is initially identified and approached. (on who identifies and what data source they use.)

PDFS2. How do you conduct the audit and obtain data?

Participation

PAR1. Are there still customers or regions that may be underserved by this program and represent potential for savings? What is your perception on the barriers that keep them from participating?

Trade Allies

TA1. Let's talk a little bit about the participating contractors. How many contractors currently participate in the program?

TA2. What are the main ways that contractors learn about the program?

TA3. What are the strategies you use for getting contractors involved? Do you think it's successful? What are the barriers?

TA4. What are the main trade associations that you work with? From your perspective, are there any other trade associations or market actors that may present opportunities for engaging more end-users?

TA5. TA5. a. How are contractors paid?

b. Does this influence which recommended measures get installed?

Target Market Characteristics and Market Barriers

TM1. How concerned are businesses in this sector with energy costs? How much of their operating costs are from energy?

TM2. To what extent does energy efficiency enter into their decisions about upgrading or replacing equipment?

TM3. Besides cost-savings, what motivates them to take actions that result in reducing their energy use?

TM4. Out of the measures that are offered, what types of energy efficiency projects do grocery stores tend to undertake? What types of projects do they tend to avoid? Why?

TM5. How often are customers recommended refrigeration measures that they do not choose to install? Why?

TM6. What do you think is the single most important reason why customers in this sector don't make efficiency upgrades? What other reasons stop customers?

- a) Lack of up front capital
- b) Lack of financing options
- c) Lack of interest/no time to pay attention to energy efficiency
- d) Lack of good information about efficiency options/savings
- e) Not wanting to disrupt business/customers; inconvenience
- f) Energy not a big operating cost
- g) Lack of experience with efficiency
- h) Not wanting to take on debt

Market Opportunities and Potential

We are wrapping up. With these final questions we'd like to learn a little more about where you see the program headed and what you would like to see in the future.

MO1. Do you see any opportunities that the Energy Smart Grocer program may not be addressing, within the grocery store market in the Northwest? (On the measure level, facility size, type of service, etc)

MO2. Are there any new measures in the pipeline?

- b. If yes, what is the timeframe and anticipated savings.

MO3. Are there any changes that you would **like** to see made to the program in the future to continue addressing the grocery store market in the Northwest?

MO4. What are your impressions about refrigeration market saturation in the Northwest?

- a. Do you still see potential left? If yes, how much do you think remains?
- b. Where does this potential remain? (specific regions, utilities...)
- c. From your perspective, does the program's budget allow for sufficient incentives in order to capture that potential?
- d. How would you go about capturing that potential? (new measures, new deliveries, current design..?)

Closing

Do you have any final comments or thoughts?



**EnergySmart Grocer Market Assessment
Final Trade Ally Survey Instrument – Oct. 22, 2012**

Interviewer Name: _____ Date: _____

Trade Ally Company: _____

Contact Person: _____

NOTES:

This guide is designed for a phone interview with contractors. The interviewer will consult the database and ask questions accordingly.

Note: Answers in parentheses are never read by the interviewer.

Hello, my name is _____ calling from the Cadmus Group on behalf of the Bonneville Power Administration. May I please speak with [FIRST NAME] [LAST NAME]? I am calling about their participation in the EnergySmart Grocer Program. [IF CONTACT IS NOT AVAILABLE, SCHEDULE CALL BACK].

[**IF NEEDED:** BPA is interested in learning about contractor experiences with the EnergySmart Grocer Program. This is not a sales call.]

INTRODUCTION

Hello, my name is _____ calling from the Cadmus Group on behalf of the Bonneville Power Administration. BPA is conducting a market assessment for the Northwest grocery store market, and we are interested in hearing perspectives of EnergySmart Grocer Trade Allies as part of the study. This survey should take approximately 10 or 15 minutes. Are you the best person to talk with about this?

[IF CONTACT IS NOT AVAILABLE, SCHEDULE CALL BACK]. [RECORD NEW CONTACT INFORMATION IF CONTACT IS DIFFERENT].

SCREENERS

S1. First, I'd just like to make sure my records are correct. Your company is currently participating in the EnergySmart Grocer Program and your company has completed approximately [X MANY] projects, is that correct?

1. (Yes)
2. (No) [ASK IF THERE IS SOMEONE THERE TO TALK TO, OTHERWISE TERMINATE]
98. (Don't know) [ASK IF THERE IS SOMEONE THERE TO TALK TO, OTHERWISE TERMINATE]
99. (Refused) [ASK IF THERE IS SOMEONE THERE TO TALK TO, OTHERWISE TERMINATE]

S2. And the main regions that you work in are [READ from DATABASE], is that correct?

1. (Yes)
2. (No) (Record correct information)
98. (Don't know) [ASK IF THERE IS SOMEONE THERE TO TALK TO, OTHERWISE TERMINATE]
99. (Refused) [ASK IF THERE IS SOMEONE THERE TO TALK TO, OTHERWISE TERMINATE]

Next, I'd like to get your thoughts on the market barriers and opportunities for energy efficient refrigeration technologies in grocery stores in the Northwest.

Market Opportunities and Potential

First, I'd like to ask you a few questions about the technologies that you see your grocery store customers using.

- 1) What types of energy efficiency measures do you typically install for the EnergySmart Grocer Program?
- 2) Have you seen trends or changes over time with the types of measures that grocery stores are installing? (probe for changes)
- 3) Which refrigeration measures or technologies do you see offering the greatest opportunity to save energy?
- 4) What types of energy efficient refrigeration equipment is available, but not being installed in stores?

- 5) Are there any challenges with upgrading to this particular technology, from a contractor's perspective?
- 6) What about from a grocery store owner's perspective?
- 7) What new or emerging energy efficient refrigeration technologies might be on the market within the next three years?
- 8) Are there any refrigeration technologies that are not currently offered under the EnergySmart Grocer Program that you think should be?

Next, I'd like to ask you a few questions about differences that you see between store types.

- 9) Do you see any differences in energy savings opportunities between store sizes or types of grocery stores? For example, chains, or independently owned stores? [RECORD COMMENTS VERBATIM]
 - a. Yes
 - b. No

[ASK IF Q11=A and not captured in comments]

- 10) Do you see any differences between small, independently owned stores and large chains in:
 - a. The type of energy efficient equipment that they are installing?
 - b. Spending patterns on capital improvements/ renovations?
 - c. Has this changed over time or remained about the same?
 - i. Same
 - ii. Changed over time

- 11) What other trends in the grocery store market do you think may impact opportunities for energy efficiency? For example, more new construction, or less new construction than 10 years ago?

Little guys being bought out by chains & that impacts energy efficient equipment purchases?
[RECORD COMMENTS:]

- 12) Are there any store types where the energy savings are mostly complete or getting really difficult to achieve?

- 13) Earlier you told me you work in [XXXX] regions. Are there areas you work in where you see more energy saving opportunities than others? Again, just thinking about grocery stores and refrigeration measures.

- 14) Is there anything you think PECI could change about the EnergySmart program that would improve participation or increase savings?

- 15) And what about the utilities or BPA? Is there anything they could change about the program that would improve participation or increase savings?

Closing

CL1. Do you have any other comments or thoughts on the market potential for energy efficient grocery stores in the Northwest?

Thank you for your time.



**EnergySmart Grocer Market Assessment
Final Participating Utility Online Survey Instrument – Nov. 14, 2012**

The final survey will be issued as an **online questionnaire** using survey software CVENT.

INTRODUCTION SCREEN

The Bonneville Power Administration is conducting a market assessment of the Northwest grocery store market. You have been selected to complete this survey because of your unique knowledge about grocery stores in your region and your experience with the EnergySmart Grocer Program.

The goal of our study is to understand the remaining energy savings potential from **grocery store refrigeration equipment** in the Northwest. Your answers to this survey will help us gain an understanding about market saturation and energy savings opportunities.

SCREENER

1. Which description best fits your utility?
 - a. My utility is currently offering the EnergySmart Grocer program to customers
 - b. My utility offered EnergySmart Grocer in the past, but not now

CURRENT-PARTICIPANT BATTERY

2. How long have you offered the Energy Smart Grocer program in your territory?
 - a. 1 year
 - b. 2 years
 - c. 3 years
 - d. 4 years
 - e. 5 years
 - f. 6 years
 - g. Don't know
3. To the best of your knowledge, what percent of grocery stores in your service region have either received an energy audit or a rebate through the EnergySmart Grocer Program? Please only consider stores if they are a supermarket such as Albertsons, Safeway, or a small locally owned grocery store. Please do not count convenient stores or gas stations.
 - a. 95-100% of the grocery stores (excluding convenience stores) in your territory

- b. 80-94% of the grocery stores (excluding convenience stores) in your territory
- c. 60-79% of the grocery stores (excluding convenience stores) in your territory
- d. 40-59% of the grocery stores (excluding convenience stores) in your territory
- e. 20-39% of the grocery stores (excluding convenience stores) in your territory
- f. 0-19% of the grocery stores (excluding convenience stores) in your territory
- g. Don't know

[ASK IF Q3 = B,C,D,E,F]

4. For the remaining grocery stores that **have not** received an audit or a rebate through the program, what do you think are the main reasons why they have not participated? Please select what you see as the top three reasons.

(MULTIPLE RESPONSE ANSWER)

- a. The stores have not been approached about the program so they don't know about the program
 - b. Up-front equipment costs not covered by the program
 - c. Recent renovations
 - d. Already making energy efficiency improvements without the program
 - e. Inconvenience
 - f. Time constraints
 - g. Lack of experience with energy efficiency; don't understand the benefits
 - h. Inconsistency in rebate offerings across regions or utility service territories.
 - i. Return on investment not high enough
 - j. I'm not sure of the reason why stores have not participated
 - k. Other, specify _____
5. How likely do you think these stores are to participate in the future? Would you say:
- a. Very likely
 - b. Somewhat likely
 - c. Not very likely
 - d. Not likely at all
 - e. Not sure

[ASK IF Q5=A]

6. Earlier, you mentioned that one of the main reasons why some stores haven't participated was because they don't know about the program. To the best of your knowledge, how many of your grocery store customers have not yet been approached about the EnergySmart Grocer program by either PECEI or a contractor?

(OPEN END)

7. Overall, what is your impression of how much energy savings from refrigeration remain in the grocery store market in your service territory? Consider stores that have not completed projects and those that participated before but could do more.
- a. Significant energy savings remain
 - b. Some energy savings remain
 - c. No energy savings remain

d. Not sure

[ASK IF Q8=A OR B]

8. How achievable are those savings? Please choose the scenario you think describes the grocery store market in your territory the best.

- a. The savings are very achievable. There are many stores that have a wide range of energy efficient refrigeration options available to them. The demand for these measures is high.
- b. The savings are moderately achievable. Many refrigeration measures have been implemented, and the remaining opportunities may be more expensive. There is still demand for energy efficient refrigeration technologies.
- c. The savings are not very achievable at this time. The stores that have participated have done most of what's available to them. New refrigeration measures may require lower price points before stores will be ready to implement them, or a better understanding of what the newest refrigeration technologies on the market are.
- d. Other [OPEN END COMMENT BOX]_____

9a. Why do you say that? [open end]

[ASK IF Q8=A OR B]

9. At the rate the program has been delivered in 2012, approximately how many more years do you think the program could continue in your territory?

- a. 1 years
- b. 2 years
- c. 3 years
- d. 4 years
- e. 5 years
- f. Over 5 years
- g. Over 10 years
- h. Don't know

[ASK IF Q8=A OR B]

10. Which refrigeration technologies do you see offering the most potential to save energy?

Please select all that apply.

- a. Strip curtains
- b. Gaskets
- c. Doors
- d. Anti-sweat heat (ASH) Controls
- e. Evaporator Fan Motors in Walk-in cases
- f. Evaporator Fan Motors in Reach-in cases
- g. Efficient compressors
- h. Floating head/Floating suction pressure systems
- i. LED Case Lighting

- j. Efficient Cases
- k. LED motion sensors
- l. Delamping T12/T8
- m. Oversized condenser
- n. VFD for Condensers
- o. Don't know
- p. Other, Specify_____
- q. None of these

[ASK IF Q8=A OR B]

11. Do you see more energy savings opportunities in certain store sizes or store types than others? (i.e., small locally-owned stores, or large stores such as Safeway, etc).
- a. Yes
 - b. No

[ASK IF Q13=A]

12. Which types of grocery stores do you see offering the most potential to save energy?
Please select all that apply.
- a. Small locally-owned grocery stores
 - b. Supermarket chains (Comment box/Please specify:_____)
 - c. Other, specify_____
 - d. Don't know

13. Does your utility have a planning estimate of how much refrigeration opportunity remains in grocery stores? If you do, please provide in kilowatt hours if possible.

[OPEN END]

14. How likely is your utility to continue to participate in the EnergySmart Grocer program in the future?
- a. Very likely
 - b. Somewhat likely
 - c. Not very likely
 - d. Not likely at all
 - e. Not sure

[ASK IF Q.16 = d, "Not Likely at All."]

15. Why do you say that? [OPEN END]

Program Value

16. Generally, how satisfied are you with the EnergySmart Grocer program?
- a. Very satisfied
 - b. Somewhat satisfied
 - c. Not very satisfied

- d. Not satisfied at all
- e. Not sure

17. How would you describe the value of the program in providing your customers with affordable options to reduce energy costs?
- a. Very valuable
 - b. Somewhat valuable
 - c. Not very valuable
 - d. Not valuable at all
 - e. Not sure

Emerging Technologies

18. Have you received any feedback from grocery store customers, contractors, or other stakeholders about new energy-efficient refrigeration technologies that are not currently incentivized under the program?
- a. Yes [provide COMMENT BOX: WHICH ONES?]
 - b. No

Closing

Thank you very much for your time. Have a nice day.



**EnergySmart Grocer Market Assessment
Final Past Utility Participant Online Survey Instrument – Nov. 14, 2012**

The final survey will be issued as an **online questionnaire** using survey software CVENT.

INTRODUCTION SCREEN

The Bonneville Power Administration is conducting a market assessment of the Northwest grocery store market. You have been selected to complete this survey because of your unique knowledge about grocery stores in your region and your experience with the EnergySmart Grocer Program.

The goal of our study is to understand the remaining energy savings potential from **grocery store refrigeration equipment** in the Northwest. Your answers to this survey will help us gain an understanding about market saturation and energy savings opportunities.

SCREENER

1. Which description best fits your utility?
 - a. My utility is currently offering the EnergySmart Grocer program to customers
 - b. My utility offered EnergySmart Grocer in the past, but not now

PAST-PARTICIPANT BATTERY

Reason for Not Offering the Program

1. What were the main reasons why you stopped offering the program? Please select all the reasons that impacted your decision and rank them in the order of importance, using 1 as the most important.
 - a. All the grocery stores in my service territory already participated and there was limited potential for more energy savings
 - b. We needed to allocate energy efficiency incentive (EEI) funds to another program
 - c. Dissatisfaction with the program delivery
 - d. Limited demand for energy efficiency measures offered through this program among grocery store owners
 - e. Other, specify _____

[ASK IF 1=B]

2. What were the main factors you considered in allocating your EEI funds?
(OPEN END)

3. Generally, how satisfied were you with the EnergySmart Grocer program?
 - a. Very satisfied
 - b. Somewhat satisfied
 - c. Not very satisfied
 - d. Not at all satisfied

4. To the best of your knowledge, what percent of grocery stores in your service region have either received an energy audit or a rebate through the EnergySmart Grocer Program? Please only consider stores if they are a supermarket such as Albertsons, Safeway, or a small locally owned grocery store. Please do not count convenient stores or gas stations.
 - a. 95-100% of the grocery stores (excluding convenience stores) in your territory
 - b. 80-94% of the grocery stores (excluding convenience stores) in your territory
 - c. 60-79% of the grocery stores (excluding convenience stores) in your territory
 - d. 40-59% of the grocery stores (excluding convenience stores) in your territory
 - e. 20-39% of the grocery stores (excluding convenience stores) in your territory
 - f. 0-19% of the grocery stores (excluding convenience stores) in your territory
 - g. Don't know

[ASK IF Q4 = B,C,D,E,F]

5. For the remaining grocery stores that **did not** receive an audit or rebate through the program, what do you think are the main reasons they did not participate? Please select what you see as the top three reasons.
(MULTIPLE RESPONSE ANSWER)
 - a. The stores were not approached about the program so they didn't know about the program
 - b. Up-front equipment costs not covered by the program
 - c. Recent renovations
 - d. Already making energy efficiency improvements without the program
 - e. Inconvenience
 - f. Time constraints
 - g. Lack of experience with energy efficiency; didn't understand the benefits
 - h. Inconsistency in rebate offerings across regions or utility service territories.
 - i. Return on investment not high enough
 - j. I'm not sure of the reason why stores did not participate
 - k. Other, specify _____

6. Overall, what is your impression of how much energy savings from refrigeration remain in the grocery store market in your service territory? Consider stores that have not completed projects and those that participated before but could do more.
 - a. Significant energy savings remain
 - b. Some energy savings remain
 - c. No energy savings remain

- d. Not sure

[ASK IF Q7=A OR B]

7. How achievable are those savings? Please choose the scenario you think describes the grocery store market in your territory the best.
- a. The savings are very achievable. There are many stores that have a wide range of energy efficient refrigeration options available to them. The demand for these measures is high.
 - b. The savings are moderately achievable. Many refrigeration measures have been implemented, and the remaining opportunities may be more expensive. There is still demand for energy efficient refrigeration technologies.
 - c. The savings are not very achievable at this time. The stores that have participated have done most of what's available to them. New refrigeration measures may require lower price points before stores will be ready to implement them, or a better understanding of what the newest refrigeration technologies on the market are.
 - d. Other [OPEN END COMMENT BOX]_____

8a. Why do you say that? [OPEN END]

[ASK IF Q7=A OR B]

8. Which refrigeration technologies do you see offering the most potential for energy savings? Please select all that apply.
- a. Strip curtains
 - b. Gaskets
 - c. Doors
 - d. Anti-sweat heat (ASH) Controls
 - e. Evaporator Fan Motors in Walk-in cases
 - f. Evaporator Fan Motors in Reach-in cases
 - g. Efficient compressors
 - h. Floating head/Floating suction pressure systems
 - i. LED Case Lighting
 - j. Efficient Cases
 - k. LED motion sensors
 - l. Delamping T12/T8
 - m. Oversized condenser
 - n. VFD for Condensers
 - o. Don't know
 - p. Other, Specify_____
 - q. None of these

[ASK IF Q7=A OR B]

9. Do you see more energy savings opportunities in certain store sizes or store types than others? (i.e., small locally-owned stores, or large stores such as Safeway, etc).
- Yes
 - No

[ASK IF Q11=A]

10. Which types of grocery stores do you see offering the most potential for energy savings?

Please select all that apply.

- Small locally-owned grocery stores
 - Supermarket chains (Please specify:_____)
 - Other, specify_____
 - Don't know
11. Does your utility have a planning estimate of how much refrigeration opportunity remains in grocery stores? If you do, please provide in kilowatt hours if possible. [OPEN END]
12. How likely is your utility to participate in the EnergySmart Grocer program in the future?
- Very likely
 - Somewhat likely
 - Not very likely
 - Not likely at all

[ASK IF 13 = d. "Not likely at all"]

13. Why do you say that? [OPEN END]

Emerging Technologies

14. Have you received any feedback from grocery store customers, contractors, or other stakeholders about new energy-efficient refrigeration technologies that are not currently incentivized under the program?

- Yes [provide COMMENT BOX: WHICH ONES?]
- No

Closing

Thank you very much for your time. Have a nice day.



EnergySmart Grocer Market Assessment Participating Grocery Store/Retailer Phone Survey – Dec 12, 2012

The final survey will be electronically programmed using the survey software CVENT prior to fielding. This will allow for consistency in data collection and reporting between the phone and online survey efforts. The interviewer will consult the database and ask questions accordingly.

Note: Answers in parentheses are never read by the interviewer.

Hello, my name is _____ calling from the Cadmus Group on behalf of the Bonneville Power Administration. May I please speak with [FIRST NAME] [LAST NAME]? [IF CONTACT IS NOT AVAILABLE, SCHEDULE CALL BACK].

[IF NEEDED: BPA is interested in learning about your experiences with the EnergySmart Grocer Program. This is not a sales call. I have a short list of questions that will take approximately 10 minutes].

INTRODUCTION

Hello, my name is _____ calling from the Cadmus Group on behalf of the Bonneville Power Administration. We are conducting a study regarding energy-efficient refrigeration technologies in the Northwest, and we are contacting grocery stores that have participated in the EnergySmart Grocer Program.

S1. Our records show that you [RECEIVED A REBATE] [RECEIVED A STORE ENERGY AUDIT] from the EnergySmart Grocer Program in the past. Is this correct?

1. (Received rebate)
2. (Received audit) [SKIP TO NA0]
3. (Incorrect – has not participated) [ASK IF THERE IS SOMEONE ELSE WHO MIGHT KNOW ABOUT THE PROGRAM]
98. (Don't know) [ASK IF THERE IS SOMEONE ELSE WHO MIGHT KNOW ABOUT THE PROGRAM]
99. (Refused)

Potential for Refrigeration Upgrades and Influence of Program

[ASK IF S1=1 Received rebate]

0. How influential would you say the EnergySmart Grocer Program was in your decision to make energy efficiency improvements to your store or stores in the Northwest? Would you say:

1. Very influential
2. Somewhat influential
3. (Neutral/neither) [DO NOT READ]
4. Not too influential
5. Not influential at all

[ASK IF S1=1 Received rebate]

1. How likely would you say you are to make other energy efficiency upgrades to your store or stores in the Northwest within the next year? Would you say...
 1. Very likely
 2. Somewhat likely
 3. (Neutral/neither) [DO NOT READ]
 4. Not too likely
 5. Not likely at all
 98. Don't know

[ASK IF Q1=VERY LIKELY OR SOMEWHAT LIKELY]

2. Using the same scale, how likely are you to make upgrades to your store's *refrigeration systems and equipment*, within the next year?
 1. Very likely
 2. Somewhat likely
 3. (Neutral/neither) [DO NOT READ]
 4. Not too likely
 5. Not likely at all
 98. Don't know

[ASK IF Q1 OR Q1= Not too likely or Not likely at all]

3. Why is it unlikely that you will make future upgrades?
 1. (Cost)
 2. (Inconvenience)
 3. (Impact on merchandise)
 4. (Don't know where to start or what's available)
 5. (Have already made upgrades; limited opportunity for more)
 6. (Had bad experience, won't use the program again)
 7. (Does not fit into strategic/financial planning)
 00. (Other, Specify_____)

[NEXT, SKIP TO ET1]

[ASK 4-4b IF Q2= Very Likely or Somewhat Likely]

4. Do you have any specific refrigeration upgrades or remodels already planned? And as a reminder, this information is completely confidential. We are simply interested in identifying market trends in energy-efficient equipment. [IF YES, what are they?]

4a. How likely are you to apply for rebates from the EnergySmart Grocer program for installing energy-efficient refrigeration equipment? Would you say:

1. Very likely
2. Somewhat likely
3. (Neutral/neither) [DO NOT READ]
4. Not too likely
5. Not likely at all
98. Don't know

[ASK IF Q4a = Not too Likely, Not Likely at All, or Don't Know]

4b. Can you tell me a little more about why you are unlikely to use the program to receive rebates?

[DO NOT READ, MARK ALL THAT APPLY]

1. (Too much hassle; time)
2. (Not all of our stores qualify for the program/utilities not participating)
3. (Had a bad experience; unsatisfied with program)
4. (Program doesn't cover what we want to install/replace)
5. (Company does not apply for incentives/Self-Direct policy)
00. (Other, Specify _____)
98. Don't know

[ASK IF Q3= Very Likely or Somewhat Likely]

5. Thinking about your *refrigeration equipment* only, what are the challenges with making energy efficiency upgrades? [DO NOT READ, MARK ALL THAT APPLY]

1. (Cost)
2. (Inconvenience)
3. (Impact on merchandise)
4. (Don't know where to start or what's available)
5. (Have already made upgrades; limited opportunity for more)
8. (Time constraints)
9. (No barriers)
00. (Other, Specify _____)
98. (Don't know)

[NEXT, SKIP TO ET1]

Barriers to Making Recommended Upgrades

[ASK IF S1=2]

NA0. My records show that you have not yet received rebates from the EnergySmart Grocer program for upgrading to energy efficient equipment, is that correct?

1. (Yes)
2. (No) [ASK WHAT THEY DID AND RESTART SURVEY AT Q1]
98. (Don't know) [ASK IF SOMEONE ELSE IS THERE WHO MIGHT KNOW]

99. (Refused)

[ASK IF NA0 = 1]

NA1. Can you tell me more about the reasons why you have not installed the equipment recommended for your business?

[DO NOT READ, MARK ALL THAT APPLY]

1. (Don't have the money to make improvements)
2. (Incentives are not high enough)
3. (Inconvenience)
4. (Time constraints)
5. (Don't think energy savings will occur)
6. (Not all of our stores qualify for the program)
7. (Company does not apply for incentives/self-direct policy)
00. (Other, Specify _____)
98. (Don't know)

NA2. And how likely is it that your store will install any of the recommended upgrades?

[READ LIST]

1. Very likely
2. Somewhat likely
3. (neutral/neither) [DO NOT READ]
4. Not very likely
5. Not likely at all
98. (Don't know)
99. (Refused)

[ASK IF NA2 = Very Likely or Somewhat Likely]

NA4. And would you say you would make the upgrades in...

1. 1-2 years
2. 3-5 years
3. Over five years
98. Don't know

[ASK IF NA2= Very Likely or Somewhat Likely]

NA3. Do you have any specific refrigeration upgrades or remodels already planned? [IF YES, what are they?]

Emerging Technologies

[ASK EVERYONE]

ET1. Are there any energy-efficient refrigeration technologies that you would like to install, that are not currently rebated by the program?

1. (Yes) (Which technologies? _____)
2. (No)

98. (Don't know)

99. (Refused)

Closing

Thank you very much for your time. Have a nice day.



EnergySmart Grocer Market Assessment Key Account Phone Interview Guide– Dec 12, 2012

The final survey will be electronically programmed using the survey software CVENT prior to fielding. This will allow for consistency in data collection and reporting between the phone and online survey efforts. The interviewer will consult the database and ask questions accordingly.

Note: Answers in parentheses are never read by the interviewer.

Interviews with Key Accounts will be scheduled ahead of time in coordination with PECL.

INTRODUCTION

Hello, my name is _____ calling from the Cadmus Group on behalf of the Bonneville Power Administration. Thank you for taking the time to speak with me. As you may know, BPA is conducting a study regarding energy-efficient refrigeration technologies in the Northwest, and we are contacting grocery stores that have participated in the EnergySmart Grocer Program. Your answers are strictly confidential.

Potential for Refrigeration Upgrades and Influence of Program

1. First, how likely would you say you are to make more energy efficient upgrades to any of your stores in BPA's territory in the next year? Would you say...
 1. Very likely
 2. Somewhat likely
 3. (Neutral/neither) [DO NOT READ]
 4. Not too likely
 5. Not likely at all
 98. Don't know

[ASK IF Q1=VERY LIKELY OR SOMEWHAT LIKELY]

2. Using the same scale, how likely are you to make upgrades to your stores' *refrigeration systems and equipment*, in the next year?
 1. Very likely
 2. Somewhat likely
 3. (Neutral/neither) [DO NOT READ]
 4. Not too likely
 5. Not likely at all
 98. Don't know

[ASK IF Q1 or Q2 = 1 OR 2]

2b. Do you have an estimate of how many stores you anticipate making upgrades? [RECORD RESPONSE]

[ASK IF Q1 OR Q2= Not too likely or Not likely at all]

3. Why is it unlikely that you will make future upgrades?

[DO NOT READ, MARK ALL THAT APPLY]

1. (Cost)
2. (Inconvenience)
3. (Impact on merchandise)
4. (Don't know where to start or what's available)
5. (Have already made upgrades; limited opportunity for more)
6. (Had bad experience, won't use the program again)
7. (Does not fit into strategic/financial planning)
00. (Other, Specify_____)

[ASK 4-4b IF Q2= Very Likely or Somewhat Likely]

4. Do you have any specific refrigeration upgrades or remodels already planned? And as a reminder, this information is completely confidential. We are simply interested in identifying market trends in energy-efficient equipment. [IF YES, what are they?]

4a. How likely are you to apply for rebates from the EnergySmart Grocer program for installing energy-efficient refrigeration equipment? Would you say:

1. Very likely
2. Somewhat likely
3. (Neutral/neither) [DO NOT READ]
4. Not too likely
5. Not likely at all
98. Don't know

[ASK IF Q4a = Not too Likely, Not Likely at All, or Don't Know]

4b. Can you tell me a little more about why you are unlikely to use the program to receive rebates?

[DO NOT READ, MARK ALL THAT APPLY]

1. (Too much hassle; time)
2. (Not all of our stores qualify for the program/utilities not participating)
3. (Had a bad experience; unsatisfied with program)
4. (Program doesn't cover what we want to install/replace)
5. (Company does not apply for incentives/Self-Direct policy)
00. (Other, Specify_____)
98. (Don't know)

[NEXT, SKIP TO ET1]

[ASK IF Q4a = 1 OR 2]

4c. Do you have an estimate of how many stores you anticipate applying for rebates through the EnergySmart Grocer program? [RECORD RESPONSE]

[ASK IF Q2= Very Likely or Somewhat Likely]

5. Thinking about your *refrigeration equipment* only, what are the challenges with making energy efficiency upgrades? [DO NOT READ, MARK ALL THAT APPLY]
1. (Cost)
 2. (Inconvenience)
 3. (Impact on merchandise)
 4. (Don't know where to start or what's available)
 5. (Have already made upgrades; limited opportunity for more)
 8. (Time constraints)
 9. (No barriers)
 00. (Other, Specify _____)
 98. (Don't know)

[SKIP IF 4a = 4,5; Company unlikely to use ESG]

6. How influential would you say the EnergySmart Grocer Program is in your decision to make energy efficiency improvements to your stores in the Northwest? Would you say:
1. Very influential
 2. Somewhat influential
 3. (Neutral/neither) [DO NOT READ]
 4. Not too influential
 5. Not influential at all

Eligible Stores

[SKIP IF 4a = 4,5; Company unlikely to use ESG]

7. Does your [GROCERY STORE CHAIN] have any stores that are *eligible* to receive rebates from EnergySmart Grocer, but have not received rebates?
1. (Yes)
 2. (No)
 98. (Don't know)

[ASK Q8-Q9 if Q7 = Yes]

8. Can you tell me a little more about why that store has not applied for or received any rebates from the EnergySmart Grocer Program? [DO NOT READ, MARK ALL THAT APPLY]
1. (Have not been approached about the program/doesn't know who to contact)
 2. (Doesn't have the money to make improvements)
 3. (Recently renovated store)
 4. (Already making energy efficiency improvements without the program)
 5. (Inconvenience)

- 6. (Lack of interest/no time)
- 7. (Lack of experience with efficiency/skepticism about savings)
- 8. (Applied for a rebate but application was rejected)
- 9. (Program doesn't cover what we want to install/replace)
- 00. (Other, specify _____)
- 98. (Don't know)
- 99. (Refused)

9. How likely do you think that/those specific stores are to participate in the EnergySmart Grocer Program in the future? Would you say...

- 1. Very likely
- 2. Somewhat likely
- 3. (Neutral/neither) [DO NOT READ]
- 4. Not too likely
- 5. Not likely at all
- 98. (Don't know)

Emerging Technologies

[ASK EVERYONE]

ET1. Are there any energy-efficient refrigeration technologies that you would like to install, but are not currently incentivized under BPA's EnergySmart Grocer program?

- 1. (Yes) (Which technologies? _____)
- 2. (No)
- 98. (Don't know)
- 99. (Refused)

Closing

Thank you very much for your time. Have a nice day.



EnergySmart Grocer Market Assessment Non-Participating Grocery Store Phone Survey – Dec 10, 2012

The final survey will be electronically programmed using the survey software CVENT prior to fielding. This will allow for consistency in data collection and reporting between the phone and online survey efforts. The interviewer will consult the database and ask questions accordingly.

Note: Answers in parentheses are never read by the interviewer.

Hello, my name is _____ calling from the Cadmus Group on behalf of the Bonneville Power Administration. May I please speak with [FIRST NAME] [LAST NAME]? [IF CONTACT IS NOT AVAILABLE, SCHEDULE CALL BACK].

[IF NEEDED: BPA is interested in learning about your decisions regarding the installation of new refrigeration equipment. This is not a sales call. I have a short list of questions that will take approximately 10 minutes].

INTRODUCTION

Hello, my name is _____ calling from the Cadmus Group on behalf of the Bonneville Power Administration. We are conducting a study regarding energy-efficient refrigeration technologies in the Northwest, and we are contacting grocery stores to learn more about decisions to install or upgrade equipment.

Potential for Refrigeration Upgrades

1. First, how likely would you say you are to make energy efficiency upgrades to your store within in the next year? Would you say...
 1. Very likely
 2. Somewhat likely
 3. (Neutral/neither) [DO NOT READ]
 4. Not too likely
 5. Not likely at all
 98. Don't know

[ASK IF Q1=VERY LIKELY OR SOMEWHAT LIKELY]

2. Using the same scale, how likely are you to make upgrades to your store's *refrigeration systems and equipment*, within the next year?
 1. Very likely
 2. Somewhat likely
 3. (Neutral/neither) [DO NOT READ]

- 4. Not too likely
- 5. Not likely at all
- 98. Don't know

[ASK IF Q1 OR Q2= Not too likely or Not likely at all]

- 3. Why is it unlikely that you will make future upgrades?
 - 1. (Cost)
 - 2. (Inconvenience)
 - 3. (Impact on merchandise)
 - 4. (Don't know where to start or what's available)
 - 5. (Have already made upgrades; limited opportunity for more)
 - 7. (Does not fit into strategic/financial planning)
 - 00. (Other, Specify_____)
 - 98. (Don't know)

[ASK IF Q2= Very Likely or Somewhat Likely]

- 4. Do you have any specific refrigeration upgrades or remodels already planned? And as a reminder, this information is completely confidential. We are simply interested in identifying market trends in energy-efficient equipment. [IF YES, what are they?]

[ASK IF Q2= Very Likely or Somewhat Likely]

- 5. Thinking about your *refrigeration equipment* only, what are the challenges with making energy efficiency upgrades? [DO NOT READ, MARK ALL THAT APPLY]
 - 1. (Cost)
 - 2. (Inconvenience)
 - 3. (Impact on merchandise)
 - 4. (Don't know where to start or what's available)
 - 5. (Have already made upgrades; limited opportunity for more)
 - 8. (Time constraints)
 - 9. (No barriers)
 - 00. (Other, Specify_____)

Closing

Thank you very much for your time. Have a nice day.

Appendix C. New Measure Analysis

New Measures	Measure Description	Key Assumptions	Source of Savings	No. of Applicable Stores	Comprehensive Energy Savings Opportunities (aMW)
Enhanced FHP and FSP controls	Both of these measures provide incremental savings to the existing FHP Controls and FSP Controls measures that exist in the ESG Program. Additional savings are achieved by further optimizing controls setpoints. It was assumed this measure could be applied to 55% of existing stores, as this is the estimated number of stores with an EMS as a requirement for this measure. This % estimate was based on the audit data store type (KA and non-KA) and store size.	<ol style="list-style-type: none"> 1) Savings were based on a recent RTF presentation and are pending RTF approval 2) FSP controls savings were, on average, 201 kWh/compressor horsepower 3) FHP controls savings were, on average, 457.6 kWh/compressor horsepower 4) Average store compressor horsepower = 200 	<p>RTF Presentation Slides and workbooks</p> <p>US DOE Energy Savings Potential and R&D Opportunities for Commercial Refrigeration - Final Report, Navigant, 2009.</p>	434	5.2
Adaptive controls—refrigeration	This measure is a standalone controller that optimizes setpoints and controls defrost cycles for refrigerated cases and walk-ins. Savings result from a reduction in evaporator fan run-times, a reduction in defrost cycling, and reduced compressor run times. This measure only applies to smaller stores that do not have an existing EMS, estimated to be 45% of existing stores, based on the assumptions noted above.	<ol style="list-style-type: none"> 1) 150,000kwh/site 20% of 750,000 (total refrigeration energy per store) 2) Applies to smaller I2I stores that do not have a lot of technology. 	<p>A case study of this measure indicates savings range from 15-35%, so 20% seems reasonable.</p> <p>Case Study: http://www.etcc-ca.com/sites/default/files/reports/Fridge_%26_Freezer_Control_Final_Report_2012_11_23.pdf</p>	382	6.5

New Measures	Measure Description	Key Assumptions	Source of Savings	No. of Applicable Stores	Comprehensive Energy Savings Opportunities (aMW)
Variable capacity modulation for refrigeration compressors	This measure requires either the replacement of existing compressors with variable-speed compressors or the installation of unloaders or a variable speed drive on existing compressors, if they are available. Variable-speed controls allow the compressor to operate more efficiently at part-load, therefore reducing compressor energy consumption. This measure applies to grocery stores with multiplex systems, and it was assumed to would apply to 55% of existing stores, as this is the portion of stores assumed to have an EMS used typically used to control multiplex compressor systems.	1) 80,000 kWh savings/store	US DOE Energy Savings Potential and R&D Opportunities for Commercial Refrigeration - Final Report, Navigant, 2009.	434	7.5
ECMs on condenser fans	This measure requires the replacement of existing condenser fan motors, which are typically PSC or shaded pole, with ECMs. While a feasible measure, this measure competes with the oversized condenser, VFDs on condenser fans, and FHP controls with VFD measures already existing in the savings analysis, as they all require a VFD on the condenser fan motor. Because VFD savings are higher and included in the analysis for 589 sites, the savings opportunity for ECMs on condenser fans was only included for the remaining 227 stores. Even if a customer decided to replace the existing fan motors with ECMs and removed the already rebated VFDs, incremental savings would not occur between the VFD measure and ECM as both achieve savings the same way—by varying the same fan motor speed.	1) 450 kWh savings per motor 2) 24 condenser fan motors per site	California Energy Code Case Reports 2013, ESG Program Implementer recommendation	227	0.3

New Measures	Measure Description	Key Assumptions	Source of Savings	No. of Applicable Stores	Comprehensive Energy Savings Opportunities (aMW)
Efficient display case evap. coils	This measure requires installation of more efficient evaporator coils in cases and walk-in applications. The coils are designed with a larger surface area, achieving energy savings by increasing the amount of heat transfer across the coil, which decreases the load on the compressor. Because any coil technically could be replaced, it was assumed this measure could apply to all existing stores.	<ul style="list-style-type: none"> 1) Current savings estimates range from 27-140 kWh/ft. of case 2) Average store gas 300 ln.ft. of case 3) 25,000 kWh/site 	<p>US DOE Energy Savings Potential and R&D Opportunities for Commercial Refrigeration - Final Report, Navigant, 2009.</p> <p>Case study: http://www.eceee.org/conference_proceedings/ACEE_E_buildings/2004/Panel_3/p3_23/paper</p>	816	2.3

Appendix D. Survey Disposition Plan

Table D1. Independent Store Sample Stratified by Region and Size

Region	Qty Independent Store (Rec'd Rebate)	% of Total	Target Completes	Actual Completes
Eastern Oregon				
High kWh (greater than 100,000kWh)	4		1	1
Low kWh (Less than 100,000 kWh)	14		1	2
Regional Total	18	7%	2	3
Western Oregon				
High kWh (greater than 100,000kWh)	14		2	3
Low kWh (Less than 100,000 kWh)	14		1	1
Regional Total	28	10%	3	4
Eastern Washington				
High kWh (greater than 100,000kWh)	18		2	2
Low kWh (Less than 100,000 kWh)	20		2	2
Regional Total	38	14%	4	4
Western Washington				
High kWh (greater than 100,000kWh)	51		5	5
Low kWh (Less than 100,000 kWh)	29		4	4
Regional Total	80	30%	9	9
Seattle-Tacoma Metro				
High kWh (greater than 100,000kWh)	48		5	5
Low kWh (Less than 100,000 kWh)	27		3	3
Regional Total	75	28%	8	8
Montana				
High kWh (greater than 100,000kWh)	12		1	1
Low kWh (Less than 100,000 kWh)	16		2	2
Regional Total	28	10%	3	
Idaho				
High kWh (greater than 100,000kWh)	1		0	0
Low kWh (Less than 100,000 kWh)	2		1	1
Regional Total	3	1%	1	1
Overall Totals	270	100%	30	32

Table D2. Independent Store Sample Stratified by Region and Size

All regions	Qty Independent Store (Rec'd Rebate)	% of Total	Target Completes	Actual Completes
<i>High kWh (greater than 100,000kWh)</i>	148	55%	16	17
<i>Low kWh (Less than 100,000 kWh)</i>	122	55%	14	15
Overall Totals	270	110%	30	32

Table D3. Grocery Store Survey Sample Frame (All Stores)

Store Type	Unique Store Accounts	% of Total	Target Completes	Actual Completes
Independent Stores that Received Rebate	270	88%	30	32
Independent Stores that Received audit; no action	28	9%	7	7
National Accounts	10	3%	8	6
Total from ESG Program database	308	100%	45	45
Nonparticipating stores in Clark County, Washington*	10	-	5	5
Overall Total	318	-	50	50

*Grocery store data was purchased from Dun & Bradstreet, Inc., and cross-checked against the ESG Program database. Ten nonparticipating stores were found.

Appendix E. Detailed Survey Findings

Table E1. Utility Estimates of Remaining Energy-Savings Opportunities by Region

Region	Significant Energy Savings Remains	Some Energy Savings Remains	No Energy Savings Remain	Not Sure
How much energy savings from refrigeration remain in the grocery store market in your service territory?				
Eastern Washington and Oregon	15%	77%	-	8%
Idaho, Montana, and Wyoming	7%	43%	7%	43%
Western Washington and Oregon	38%	47%	3%	13%
Region	Very Achievable	Moderately Achievable	Not Very Achievable	Not Sure
How achievable are these energy savings?				
Eastern Washington and Oregon	0%	50%	25%	25%
Idaho, Montana, and Wyoming	0%	43%	29%	29%
Western Washington and Oregon	19%	56%	15%	11%

Source: Online utility survey questions: “What is your impression of how much energy savings from refrigeration remain in the grocery store market in your service territory?” (n=59) and “How Achievable are those Energy Savings?” (n=46)

Table E2. Refrigeration Technologies with the Most Opportunities to Save Energy, According to Utilities

Technology	Frequency Mentioned	Percent of Respondents Mentioning
LED Case Lighting	29	52%
Efficient Compressors	26	46%
Gaskets	24	43%
Efficient Cases	23	41%
Evaporator Fan Motors in Reach-in Cases	21	38%
Anti-Sweat Heat (ASH) Controls	20	36%
Evaporator Fan Motors in Walk-in Cases	20	36%
Strip Curtains	18	32%
Floating Head/Floating Suction Pressure Systems	16	29%
Delamping T12/T8	14	25%
VFD for Condensers	14	25%
Doors	13	23%
LED Motion Sensors	10	18%
Oversized Condenser	7	13%

Source: Online utility survey question: “Which refrigeration technologies offer the most potential to save energy?” (n=56), Respondents were allowed to select more than one measure.¹²

¹² This question was not asked of utilities reporting no energy savings remained in their territories.

Table E3. Estimations of Stores Making Upgrades in BPA’s Territory

National Account Respondent	Number of Stores to Make Upgrades	Notes
Company 1	5	
Company 2	Not sure	
Company 3	125	125 stores in the Northwest will be receiving upgrades, respondent unsure how many stores are in BPA’s territory
Company 4	45	45 stores in the Northwest will be receiving upgrades, respondent unsure how many stores are in BPA’s territory
Company 5	Not sure	As many as are eligible
Company 6	0	Unlikely to make upgrades at all

Source: Key Account interview question: “How many stores do you anticipate will making upgrades within the next year?” (n=6)