

6.1.3 Residential Home Retrofit Program

Objective

Produce long-term electric energy savings in the residential sector by helping customers analyze their energy use and recommending appropriate weatherization measures and the installation of high-efficiency lighting, appliances, and other equipment.

Target Market

Residential customers in existing single family homes and duplexes. The program targets promotion to customers with both above average consumption and mean household income to maximize savings impacts and the percentage of customers who implement improvements.

Program Duration

Components of the Home Retrofit Program would be phased in over three years in order to allow time for the development of contractor infrastructure sufficient to meet the program goals.

Program Description

The Home Retrofit Program would utilize a three-phase approach to capture savings in the single-family existing homes market.

Phase 1: On-Line Energy Analysis. Consumers would be invited to participate in an on-line energy analysis, the product of which is a report that explains how their electric bill is calculated, how their energy costs compare to other homes/businesses in the area, and disaggregates the various uses for electricity in their home to help them understand how they are using it. In addition, the report provides a prioritized list of recommended energy efficiency improvements that may reduce the customer's energy consumption. Armed with this information, consumers are better equipped to make informed decisions in managing their consumption, and identifying and prioritizing improvements.

A low-cost energy efficiency kit (e.g., two CFLs, one low-flow shower head, two faucet aerators) would be offered as an incentive for customers to complete a comprehensive online audit. Industry standard online audit software typically offers multiple levels of specificity that allow the customer to improve the accuracy of the report by providing additional data for analysis. Customers willing to complete the most comprehensive audit are more likely to install low-cost measures given the effort required.

Phase 2: Home Walk-Through Energy Analysis: The implementation contractor would provide customers with a one hour walk-through audit of their home, the product of which is a report detailing opportunities to improve their energy efficiency. The auditor would collect data on each home for use in identifying cost effective energy efficiency improvements using modeling software. The product of the audit would be a report that prioritizes potential improvements, estimates their cost after utility incentives are applied, and estimates the resulting energy cost savings and payback timeframe. The auditor would also install appropriate low-cost measures including CFLs and water-saving devices as a condition for participation in the initial audit.

The use of a blower door test at the time of the initial audit could be an area of discussion between APCo and the selected implementation contractor, as this detail of the program design could be an optional feature.

The implementation contractor would provide customers with two options for completing improvements identified through the energy audit. They may either:

- (1) choose a contractor from a prequalified list of contractors with pre-negotiated rates in which case the program will manage the project to provide a turn-key service, or
- (2) select a contractor from another list of pre-approved contractors as qualified by APCo.

However, customers would need to solicit quotes for work from contractors on their own, or choose to go into the marketplace and select and manage their own contractors. The utility would consider a small fee for the walk-through analysis, reimbursable if the customer proceeds with a number of recommended measures.

Prequalified “captive” contractors would be selected through a competitive bid process based on their level of expertise and piecemeal price for specified improvements. Utilizing a core group of captive contractors to provide turnkey direct installation services would improve installation rates as the time and effort required to select and manage contractors is a key barrier to consumers implementing improvements. Further, it would allow the utility to closely manage customer service and quality control to ensure measures are properly installed. Finally, it is expected that the utility would negotiate more favorable rates with captive contractors than customers would be able to secure in the open market due to the volume of work the program will generate. While initially it is anticipated that the implementation contractor would be the lead in conducting the audit and negotiating and selecting “captive contractors”, it is envisioned that overtime, this function would be transferred to leading private sector contractors who can provide a similar service.

Potential improvements that are not immediately addressed by consumers would be tracked and the data used for hyper-accurate targeting of future promotion. For example, APCo Virginia may implement an ongoing direct mail campaign including a letter that is periodically sent to a customer reminding them of the additional energy cost they have incurred as a result of not implementing an improvement. Bonus incentives may be offered during limited term promotions in conjunction with the campaign as a means to ramp up participation and manage goals and budgets.

Phase 3: Home Performance with ENERGY STAR: The utility’s implementation contractor would assist with the coordinated development of a statewide network of independent contractors who are trained and mentored on the delivery of a comprehensive energy analysis and measure installation under the Home Performance with ENERGY STAR model. This phase would be staged over three years, focusing initially on training contractors to Building Performance Institute (BPI) standards on building science, and over time focusing on marketing and incentive packages to accelerate customer awareness and demand. Customers would pay a market-based fee for the analysis and may receive partial reimbursement when recommendations are implemented.

Financial incentives for building shell measures would be available to homeowners, along with the lighting, appliance, and equipment incentives outlined in the market-channel programs. The utility may also offer low-interest financing in lieu of rebates.

Incentive Strategy

The on-line energy analysis would be provided free of charge to all residential customers. The walk-through energy analysis would have a fee associated with it (e.g., \$150) in order to represent the value of the service to customers and help screen those that are unlikely to implement improvements. Participants who implement at least \$1,000 worth of measures as a result of the analysis would have the audit fee

reimbursed. The comprehensive home performance analysis would have a market-based fee structure, again with reimbursement for measures implemented.

Consumers would also receive financial incentives for implementing the building shell measures listed below. The utility may also offer low interest financing through local financial institutions as an alternative to cash-back incentives.

Eligible Measures

The measures listed below have been specified for planning purposes. The utility would revise eligible measures as needed in accordance with current market conditions, technology development, EM&V results, and program implementation experience.

Measures addressed will include:

- Low Cost Measure Kit
- Attic Insulation
- Basement Wall Insulation
- Crawlspace Insulation
- Sidewall Insulation
- Air Infiltration Reduction
- Furnace replacement

Implementation Strategy

Key elements of the implementation strategy include:

- ***Purchase and installation of On-Line Energy Analysis.*** The utility would purchase online audit software from a credible vendor. The cost for the on-line analysis will be accounted for in this program and with associated savings.
- ***Hiring and training of energy advisors for walk-through analysis.*** For Phase 2 of the program, APCo Virginia's implementation contractor would recruit and train a team of residential energy advisors to deliver walk-through analyses and provide direct installation of low-cost measures. The contractor would also develop/provide a report format for the customer and arrange competitive pricing with local contractors for the weatherization work.
- ***Captive installation contractor recruitment and training.*** APCo Virginia's implementation contractor would facilitate the recruitment of HVAC, water heating, and insulation contractors to provide turn-key services through a competitive bid process which will be conducted on an annual basis. These contractors would be provided with training on best practices and will be subject to quality control inspections to ensure the quality of work and integrity of savings claimed.
- ***Market based contractor training.*** The implementation contractor would provide opportunities for any interested contractor to receive training on best practices and program terms and conditions to also become a qualified contractor
- ***Application processing.*** APCo Virginia's implementation contractor would coordinate processing of all incentive applications, verification of eligibility and prompt delivery of rebate checks to contractors/customers.

- **Development of market-based infrastructure of Home Performance contractors.** APCo Virginia's implementation contractor may coordinate with other Commonwealth utilities to develop a strategy and system for recruiting and training Home Performance contractors.
- **Collaboration with other utilities:** APCo would collaborate with other utilities when feasible to ensure coordination of home energy analyses so that both electric measures are addressed.

Strategies to limit free ridership and promote spillover include:

- The program would charge a fee for walk-through audits to represent the value of the service and to target customers who want to take action but feel they need more information before they're able to act.
- The program would offer incentives at a sufficient level to motivate customers who would not implement improvements in the absence of the program due to the first cost barrier.
- The program would utilize APCo's customer billing information to identify targeted high-use customers who are most likely to benefit from the audit program. Under confidentiality agreements, this data would be made available to the utility's implementation contractors to assist with targeted program marketing and research.

Implementation-related administrative requirements would be handled by a third party implementation contractor, selected through a competitive bid process. The implementation contractor would be responsible for:

- Energy Advisor recruitment and training
- Walk-through analysis, report, and scheduling tool
- Marketing strategy and materials
- Field services
- Contractor/store education, training and outreach
- Rebate processing
- Assist with development of network of Home Performance providers
- Data tracking and reporting
- Budget tracking and reporting
- Contact (call) center services
- Managing public relations
- Customer satisfaction/Problem resolution

Marketing Strategy

Three key marketing strategies are expected to drive participation in the program:

- Direct mail campaign targeted to specific geographic areas
- Utility newsletter bill inserts
- Program webpage
- Press releases in targeted communities
- Mass media advertising
- Through non-captive contractors

The program would rely primarily on targeted direct mail campaign to generate participation as this strategy allows for targeting by geographic area and customer and therefore greater control of workflow than mass media efforts. It is necessary to concentrate efforts on specific geographic areas to improve efficiency by ensuring auditors do not travel further than necessary between audits. Customers may be targeted for 2-3 successive mailings to maximize close rates. Utility bill inserts, mass media advertising, and press releases to targeted areas may be used on a limited basis to ramp up production as needed.

The program webpage and online bill analysis system would also promote the availability of the program to interested customers.

Contractors would be provided with information about the availability of the program and utility incentives through direct mail and periodic initiations to training sessions.

Milestones

Table 6-9. Project Milestones

Task	Timeframe
DSM Plan Approval	TBD
Selection of Program Implementation Contractor	3 months
Phase 1: On-Line Energy Analysis available to customers	8 months
Phase 2: Walk-through energy analysis available	8 months
Phase 2: Financial incentives for building shell measures available	1 year
Phase 3: Initial development of network of comprehensive Home Performance providers	2 years

EM&V Strategy

All evaluation activities would be conducted by a third party contractor selected through a competitive bidding process. An integrated evaluation approach would be taken which includes: addressing evaluation at the onset of program design, collecting evaluation data as part of program administration, assessing and documenting baseline conditions, establishing tracking metrics, developing and refining deemed savings measure databases, as well as, conducting primary and secondary research as part of impact, market, and process evaluations.

The overall goal of the impact evaluation would be to assess the development of the market infrastructure, savings for the program measures, and program cost-effectiveness. Primary impact metrics are energy savings per unit, program/contractor participants, net-to-gross ratio and program cost-effectiveness. Energy savings would be determined by a literature and data review, billing analysis of participants compared to non-participants and conducting field research with a selected sample of participants. A baseline market survey of contractors would be conducted to determine current practices; this survey will be repeated regularly to assess changes in the market infrastructure. Self-report surveys with both participants and non-participants would be used to assess free riders/spillover and process variables such as barriers to participation, and satisfaction with the program delivery. In addition the process evaluation would interview program managers and other trade allies to assess the delivery approach and operations. These surveys would be enhanced by collecting market data and assessing trends through secondary literature research.

The process evaluation would be conducted during the first program year and then coordinated with follow-on impact evaluation work to be performed once program-approved measures have been installed and operating for a sufficient time to enable a robust impact evaluation. Wherever it is possible, practical, and appropriate, evaluation activities would be conducted in conjunction with other utilities and agencies in the Commonwealth to share funding of studies and help ensure consistency.

Administrative Requirements

The utility would be responsible for general administrative oversight of the program portfolio which will require 0.25 FTE to address the following:

- Recruitment, selection, and management of the implementation contractor(s)
- Coordination of marketing strategy/public relations among programs and market sectors
- Coordination of all educational services
- Data warehousing
- Recruitment, selection, and management of the evaluation contractor
- Goal achievement within budget

Budget

Table 6-10. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$1,627,769	\$1,842,840	\$2,265,559	\$3,126,567	\$4,387,718	\$13,250,452

Incremental Annual Budget – Customer Incentive					
2009	2010	2011	2012	2013	Total 2009-2013
\$775,128	\$921,420	\$1,132,779	\$1,563,283	\$2,193,859	\$6,586,469

Incremental Annual Budget – Administrative					
2009	2010	2011	2012	2013	Total 2009-2013
\$852,641	\$921,420	\$1,132,779	\$1,563,283	\$2,193,859	\$6,663,982

Winter Savings Targets

Table 6-11. Incremental Net Annual Energy and Peak Demand Savings at Generator

Incremental Annual Energy Savings Net MWh (at Generator)					Cumulative Total 2009-2013
2009	2010	2011	2012	2013	
6,944	8,807	10,988	15,025	20,115	61,879
Incremental Annual Peak Demand Savings Net kW (at Generator)					Cumulative Total 2009-2013
2009	2010	2011	2012	2013	
5,466	6,418	7,628	10,149	14,865	44,525

Benefit-Cost Test Results

Table 6-12. Benefit-Cost Test Results

Benefit-Cost Test	2009-2013 Benefit-Cost Test Ratio
Total Resource Cost Test (TRC)	2.5
Utility System Resource Cost	3.8
Participant	3.8
Rate Impact Measure (RIM)	0.9

6.1.4 Residential Low Income Program

Objective

Generate energy savings for residential low-income customers through installation of a wide range of cost-effective weatherization upgrades and other measures in eligible dwellings.

Enhance services available to low-income customers in APCo Virginia service territory through a coordinated effort with local weatherization providers in order to provide comprehensive assistance at lower administration costs.

Target Market

The *APCo Low Income Program* targets moderate and high use customers with total annual household at or below 200% of federal poverty guidelines who receive electric service from APCo Virginia. Services would be targeted to diverse segments of the population including those living in single family and multi-family buildings, homeowners and renters, and to the extent possible – age and geographic diversity. Customers between 200% and 225% of federal poverty level who are high use would be eligible for services with co-payment.

Program Duration

To be determined.

Program Description

The Low Income Program is designed to provide home energy services to APCo Virginia customers with limited income to assist them in reducing their electric energy use and managing their utility costs. This program would help facilitate the implementation of cost-effective electrical energy-savings measures in residential low-income households.

The APCo Virginia program would be based on successful low-income programs of other utilities. In recognition of the need for effective integration with existing services, the program has the following components:

Measures addressed will include:

- High Use Baseload service is targeted toward eligible customers with high electric baseload (non heating/cooling) usage, defined as greater than 8,000 kWh/year, and includes extensive lighting retrofits, replacement of inefficient refrigerators and freezers, electric hot water reduction measures, and energy education.
- Moderate Use Baseload service is targeted toward eligible customers with annual baseload usage of between 4,000 and 8,000 kWh and includes the same measures as the High Use program, but allows for a more streamlined energy audit process.
- Targeted Energy Efficiency (TEE) service is targeted toward eligible customers with moderate or high electric heating and cooling loads (defined as greater than 6,000 kWh/yr in heating or cooling) that, in addition to the baseload measures, provides weatherization of the building shell including insulation and air sealing.

Low-income customers would not be required to pay for any portion of the cost of measures installed through the program. While the plan anticipates APCo playing an important role as a key program partner, it is understood that an independent implementation contractor would retain overall responsibility for program administration.

Incentive Strategy

Equipment and installation costs for all eligible measures would be provided free to eligible customers and properties. All funding for the program would be provided by APCo Virginia.

Eligible Measures

The measures listed below have been specified for planning purposes. The utility would revise eligible measures as needed in accordance with current market conditions, technology development, EM&V results, and program implementation experience.

Each of the program channels is summarized below as they are planned to be delivered to customers along with the associated measures. The list below has been specified for planning purposes only. The utility would establish eligible measures and incentive levels as needed in accordance with current market conditions, planning studies, technology development, EM&V results, and program implementation experience.

Electric Baseload Measures

- Compact fluorescent lamps (screw-in and pin-based fixtures)
- Refrigerator and freezer replacement
- Low-flow showerheads
- Faucet aerators
- Water heater insulation
- Pipe insulation
- Tank temperature turn reduction
- Water bed mattress pads

Weatherization Measures

- High-efficiency furnace with ECM motor
- Attic and wall insulation
- Crawlspace insulation
- Air sealing
- Duct sealing

Implementation Strategy

Program administration and implementation would be conducted by a qualified implementation contractor. The implementation contractor would be responsible for:

- Administrative coordination with local agencies
- Marketing strategy and materials
- Payment processing
- Data tracking and reporting
- Budget tracking and reporting
- Contact (call) center services
- Managing public relations

- Customer satisfaction/problem resolution

Implementation would be managed by qualified, third-party contractor(s) selected through a competitive bid process. The utility's implementation contractor would schedule a visit with the customers and send out a crew of installers to deliver services on a case-by-case basis. Most customers would receive one in-home visit. This visit would include an introduction to the program, an analysis of the customer's usage, an energy tour, energy education and an action plan. Following the visit, all customers would receive at least one follow-up contact. The follow-up contact can be via mail, phone, or in-person, based on an assessment of which would be of most benefit to the customers. The purpose of this follow-up is to complete the installation of efficiency measures, to remind customers of their responsibilities and to review the benefits of the program.

Key elements of the implementation strategy include:

- **Coordination** with the local weatherization providers to subsidize the installation of all cost-effective electric measures, including CFLs, refrigerator replacement and weatherization measures that can reduce electric heating use. Payments would be made directly to the weatherization agency for all implemented electric measures. Funds would also be available to supplement the agency's educational services currently provided. Agencies would be responsible for all necessary data collection (forms to be developed by APCo Virginia and the implementation contractors), providing a detailed breakdown of measures installed, invoices, customer release forms, and other information deemed necessary by APCo Virginia to document energy savings and cost.
- **Recruitment and hiring of private-sector contractors** by APCo Virginia's implementation contractor(s), using a competitive bid process to engage private-sector contractors to manage work in areas where local providers are unable to manage the volume of additional homes.
- **Target** occupants of single and multi-family properties with low-income residents to provide the turnkey direct install services for individual living units and common areas.
- **Training** will be available for all staff, as insured by the implementation contractor. Additionally, the implementation contractor would provide in-field monitoring and training, to ensure that field staff is finding all cost-effective opportunities for measures, as well as educating customers on energy savings actions. Where deficiencies are seen, the implementation contractor would provide supplemental training.

Marketing Strategy

Currently customers are selected and recruited based on an analysis of Percentage of Income Payment Plan (PIPP) customer electric usage data provided by the utilities to the Commonwealth agency that coordinates low income weatherization program services. The APCo Low Income Program would recruit customers based on an analysis of Percentage of Income Payment Plan (PIPP), for those customers falling under 175% of poverty level. Additionally, the APCo Low Income Program would serve customers up to 200% of poverty level, who are currently outside the reach of current programs.

Additional marketing efforts would target those hard-to-reach segments of the population and would build on existing efforts and be closely coordinated with local providers. Key elements of the marketing strategy include:

- Targeted outreach through local agencies
- Websites and newsletters

- Press release
- Posters in municipal buildings

Milestones

Table 6-13. Project Milestones

Tasks	Timeframe
DSM Plan Approval	TBD
Selection of Program Implementation Contractor	3 months
Initial meetings with local weatherization agencies	4 months
Program launch	6 months

EM&V Strategy

All evaluation activities would be conducted by a third party contractor selected through a competitive bidding process. An integrated evaluation approach would be taken which includes: addressing evaluation at the onset of program design, collecting evaluation data as part of program administration, assessing and documenting baseline conditions, establishing tracking metrics, refining deemed savings measure databases, as well as, conducting primary and secondary research as part of impact and process evaluations.

The overall goal of the impact evaluation would be to validate/re-calibrate the deemed energy savings values, verify installation and determine program cost-effectiveness. Primary impact metrics are savings per unit, program participants, and program cost-effectiveness. Surveys with program managers, contractors, owners of multi-family properties and other trades allies would be conducted to address process efficiency such as ease of participation, satisfaction, the operational conditions of the program and ways to improve the program.

The process evaluation would be conducted during the first program year and then coordinated with follow-on impact evaluation work to be performed once program-approved measures have been installed and operating for a sufficient time to enable a robust impact evaluation. Wherever it is possible, practical, and appropriate, evaluation activities would be conducted in conjunction with other utilities and agencies in the Commonwealth to share funding of studies and help ensure consistency.

Administrative Requirements

The utility will be responsible for general administrative oversight of the program which would require 1.0 FTE to address:

- Recruitment, selection, and management of the implementation contractor(s)
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials with input from the implementation contractor.
- Coordination of all educational services
- Data warehousing
- Recruitment, selection, and management of the evaluation contractor
- Goal achievement within budget

Budget**Table 6-14. Incremental Annual Budgets**

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$1,906,535	\$2,220,500	\$2,745,672	\$3,682,920	\$5,148,039	\$15,703,665
Incremental Annual Budget – Customer Incentive					
2009	2010	2011	2012	2013	Total 2009-2013
\$913,634	\$1,110,678	\$1,375,230	\$1,854,294	\$2,596,258	\$7,850,095
Incremental Annual Budget – Administrative					
2009	2010	2011	2012	2013	Total 2009-2013
\$992,901	\$1,109,822	\$1,370,441	\$1,828,626	\$2,551,781	\$7,853,571

Winter Savings Targets**Table 6-15. Incremental Net Annual Energy and Peak Demand Savings at Generator**

Incremental Annual Energy Savings Net MWh (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
4,632	6,206	8,010	9,830	12,925	41,603
Incremental Annual Peak Demand Savings Net kW (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
3,245	3,820	4,580	6,093	8,890	26,628

Benefit-Cost Test Results**Table 6-16. Benefit-Cost Test Results**

Benefit-Cost Test	2009-2013 Benefit-Cost Test Ratio
Total Resource Cost Test (TRC)	2.6
Utility System Resource Cost	3.9
Participant	4.1
Rate Impact Measure (RIM)	0.9

6.1.5 Residential New Construction Program

Objective

Produce long-term electric energy savings in the residential sector by affecting the construction of single family homes and duplexes that meet the ENERGY STAR National Performance Path efficiency standard.

Target Market

New homebuilders. Although all builders are eligible to participate, the program will specifically target all outreach activities to those builders who are not currently Tier 1 ENERGY STAR partners, meaning not every home they build meets the standard.

Program Duration

New construction services would be an ongoing element of the program portfolio. Services would begin in Year 1, though due to the long lead time required to train builders, for them to sell customers new ENERGY STAR homes, and to build the homes, we do not anticipate significant savings from this program until at least summer 2010.

Program Description

The New Construction program would recruit and educate select builders and their trades on the benefits associated with ENERGY STAR homes and building practices designed to improve upon baseline efficiency. Builders would be provided with financial incentives to meet the ENERGY STAR standard and to install premium-level efficient equipment.

The program would identify and recruit key builders who do not consistently (or seldom) build homes to meet the ENERGY STAR standard. Builders who choose to participate in the program would gain access to cash-back incentives designed to cover approximately 30% of the cost to upgrade and certify each home. In addition, they would be provided with personalized training on marketing ENERGY STAR to customers, the ENERGY STAR building standards, and building practices designed to meet them.

Incentive Strategy

A tiered incentive structure is planned for the New Construction program: \$500 for ENERGY STAR Homes that achieve a HERS Rating Index ≤ 85 , and \$1000 for ENERGY STAR Homes that achieve a HERS Score ≤ 70 . The intent is to encourage builders to strive for the higher standard (i.e. lower score), which results in nearly twice the first year savings. Builders would have to meet all requirements of the ENERGY STAR National Performance Path standard.

Due to economic conditions in APCo Virginia's service territory, builders would also be allowed to participate in prescriptive incentive offers through the water heating and HVAC programs regardless if the technologies they claim incentives on were installed as part of the requirement to meet the ENERGY STAR homes standard. To be clear, double dipping would be allowed, at least at the out-set of the program as a way to jump-start program participation.

The program would also provide an incentive of \$100 to Home Energy Raters on up to 5 ratings done for builders who have not previously achieved the ENERGY STAR standard.

Eligible Measures

The measures listed below have been specified for planning purposes. The utility would revise eligible measures as needed in accordance with current market conditions, technology development, EM&V results, and program implementation experience.

Implementation Strategy

Key elements of the implementation strategy include:

- ***Recruit/train team of Home Energy Raters.*** The utility's implementation contractor would need to identify existing resources with appropriate training and experience. New raters may need to be trained as well to RESNET standards. This can be done simultaneously with builder recruitment.
- ***Outreach to targeted builders.*** The utility's implementation contractor would utilize experienced field representatives to meet with builders, promote the benefits of ENERGY STAR homes, and generate interest in the program.
- ***Conduct builder training on marketing ENERGY STAR homes.*** Participating builder training efforts would focus first on the benefits associated with ENERGY STAR from the customer perspective including: improved efficiency, comfort, safety, and durability. Sales training would equip each builder with methods to "up sell" their customers on investing in meeting the ENERGY STAR standard. Builders would also be educated regarding the opportunity to improve their business by differentiating themselves using the nationally recognized ENERGY STAR Brand.
- ***Conduct builder training on the ENERGY STAR performance standard.*** The second phase of the training process would focus on the ENERGY STAR standard and building practices designed to meet it. Key topics would include techniques for improving the building shell to minimize thermal loss and air infiltration, the thermal bypass checklist, and identifying high efficiency equipment and the principals of proper installation.
- ***Coach and mentor participating builders and raters.*** Once the initial training is complete, the program would provide technical assistance, market recognition and financial incentives to participating builders and their trade partners, and raters on an ongoing basis.

Strategies to limit free ridership and promote spillover include:

- To minimize free ridership, the program would target builders who do not currently meet the ENERGY STAR standard. Secondary targets would include builders who currently meet the ENERGY STAR standard, but only on a minority of homes. It is important to note that builders who already meet the ENERGY STAR standard on a majority of their homes would still be eligible to receive the incentives under this proposed scope of work. However all outreach would be targeted to builders who are unlikely to be free riders in order to achieve a balance between customer equity and maximizing net energy savings.
- To further limit free ridership, builders must install both a high efficiency water heater and furnace in each home to qualify for the new construction incentive.

Implementation-related administrative requirements would be handled by a third party implementation contractor, selected through a competitive bid process. The implementation contractor would be responsible for:

- Managing subcontractors
- Budget tracking
- Contact (call) center services

- Enforce customer service standards
- Data tracking systems
- Onsite verification of incentive claims
- Managing public relations
- Problem resolution
- Manage and oversee procurement
- Supporting evaluation activities

Marketing Strategy

The program would be marketed to select builders primarily through direct business-to-business contacts. The utility's implementation contractor would develop opportunities to present the program at builder and other trade association meetings, and to place information in association newsletters. The program would be marketed to consumers at Home Shows, Parade of Homes, and other home-building focused events.

Milestones

Table 6-17. Project Milestones

Task	Timeframe
DSM Plan Approval	TBD
Selection of Program Implementation Contractor	3 months
Program planning and materials	7 months
Initial mailing to builders	8 months
Kickoff meetings with builders/trades	9 months
Program launch – new home season	9 months

EM&V Strategy

All evaluation activities would be conducted by a third party contractor selected through a competitive bidding process. An integrated evaluation approach would be taken which includes: addressing evaluation at the onset of program design, collecting evaluation data as part of program administration, assessing and documenting baseline conditions, establishing tracking metrics, developing and refining deemed savings measure databases, as well as, conducting primary and secondary research as part of impact and process evaluations.

The overall goal of the impact evaluation would be to validate/calibrate the deemed savings values, verify installation and determine program cost-effectiveness. Primary impact metrics are savings per unit, program participants, net-to-gross ratio and program cost-effectiveness. Deemed savings would be determined by a literature and data review, analysis of program records and conducting a field research study with a selected sample of participants. Primary market research (self-report surveys) with both participants and non-participants would be used to assess free riders/spillover, awareness of the program, ease of participation and satisfaction with the program and other process efficiency issues. Interviews with program managers, the implementation contractor, home builders, raters, and other market players would be conducted to assess the operational conditions of the program and to identify ways to improve the program delivery and participation. These surveys would be enhanced by collecting market data and assessing trends.

The process evaluation would be conducted during the first program year and then coordinated with follow-on impact evaluation work to be performed once program-approved measures have been installed and operating for a sufficient time to enable a robust impact evaluation. Wherever it is possible, practical, and appropriate, evaluation activities would be conducted in conjunction with other utilities and agencies in the Commonwealth to share funding of studies and help ensure consistency.

Administrative Requirements

The utility will be responsible for general administrative oversight of the program portfolio which would require 0.25 FTE to address the following:

- Recruitment, selection, and management of the implementation contractor(s)
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials and advertising
- Coordination of all educational services
- Data warehousing
- Recruitment, selection, and management of the evaluation contractor
- Goal achievement within budget

Budget

Table 6-18. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$97,231	\$114,086	\$64,195	\$204,886	\$224,587	\$704,985
Incremental Annual Budget – Customer Incentive					
2009	2010	2011	2012	2013	Total 2009-2013
\$46,300	\$57,043	\$32,097	\$102,443	\$112,294	\$350,178
Incremental Annual Budget – Administrative					
2009	2010	2011	2012	2013	Total 2009-2013
\$50,930	\$57,043	\$32,097	\$102,443	\$112,294	\$354,808

Winter Savings Targets

Table 6-19. Incremental Net Annual Energy and Peak Demand Savings at Generator

Incremental Annual Energy Savings Net MWh (at Generator)					Cumulative Total 2009-2013
2009	2010	2011	2012	2013	
1,072	1,373	787	1,761	1,879	6,872

Incremental Annual Peak Demand Savings Net kW (at Generator)					Cumulative Total 2009-2013
2009	2010	2011	2012	2013	
169	209	117	339	384	1,217

Benefit-Cost Test Results

Table 6-20. Benefit-Cost Test Results

Benefit-Cost Test	2009-2013 Benefit-Cost Test Ratio
Total Resource Cost Test (TRC)	2.5
Utility System Resource Cost	3.8
Participant	6.9
Rate Impact Measure (RIM)	0.5

6.1.6 Residential Load Cycling Program

Objective

To produce long-term electric demand savings in the residential sector by encouraging APCo Virginia residential customers to both shift their load away from peak demand periods and to reduce overall demand on the system during that peak period. This program also aims to increase the knowledge of the benefits of demand response within the residential customer base.

Target Market

The Residential Load Cycling Program targets existing APCo Virginia residential customers with electric hot water heaters, central air conditioning (CAC) or heat pump systems (HPs), in single-family housing.

Program Duration

The Load Cycling Program would be an ongoing element of the program portfolio.

Program Description

The Load Cycling Program would provide rate discounts to residential customers for allowing APCo Virginia to cycle customers' electric hot water heaters, central air conditioners or heat pumps during peak summer or peak winter demand periods. Equipment control would either be done through enhanced programmable thermostats or installed switches to the air conditioning or heat pump system.

The program includes customer educational and promotional pieces designed to assist home owners in understanding the program and its benefits, including website content, brochures, and other targeted program material. The program would also provide a marketing mechanism for HVAC and domestic hot water equipment vendors, distributors, and contractors to promote direct load control technologies to residential end-users.

Certain barriers exist to the adoption of load cycling equipment, including lack of awareness/knowledge about the benefits and costs of load cycling technologies and technology performance uncertainties. This program is designed to help overcome these barriers and encourage greater adoption of enabling technologies in the residential market. This would be addressed through targeted education and economic incentives, combined with customer follow-up and on-going support.

In addition to helping customers reduce and manage their demand costs, this program provides other societal and customer benefits. These include reduced greenhouse gas emissions, improved levels of service from energy expenditures, and lower overall rates and energy costs compared to other resource options.

The program's actual demand and energy savings would be determined through the program evaluation strategy. Evaluation activities should be planned at the same time as overall program planning, and implemented when the overall program is implemented, as will be discussed in more detail in the evaluation section.

Incentive Strategy

The primary incentives for this program are rate discounts of \$12.50 per unit per summer or winter month for residential customers for air conditioning or heat pumps and \$12.21 per electric hot water heater. Customers may also be provided with a \$150 remote-controlled thermostat, free of charge, in homes with central air conditioning or heat pumps in certain zip codes, given optimal thermostat signal reception.

Eligible Measures

Single family customers with electric hot water heating, central air conditioning or heat pump units would be eligible to receive either APCo-specified switching technology and/or enhanced programmable thermostats. The table below shows the cost of the program incentive and the technology cost incurred by APCo for switch or programmable thermostat technology.

Implementation Strategy

Designated APCo Virginia staff would provide the following implementation activities: program administration, marketing, vendor referrals, application and incentive processing, coordination of education and training program, participation tracking and reporting, quality control, and technical support.

Alternatively, APCo Virginia could outsource the program to an “implementation contractor”. APCo Virginia would also likely want to sub-contract the DLC switch installation to HVAC, hot water heating, or electrical contractors.

The Residential Load Cycling Program includes customer educational pieces that are designed to communicate the function and benefits of the enabling technologies, the incentives that are being offered, and how the program as a whole functions in concert with the customer’s electricity use. This type of education and promotion is also provided to trade allies and HVAC/hot water heating equipment contractors.

Marketing Strategy

The marketing and communications strategy would be designed to educate residential customers about the participation process and benefits of the Load Cycling Program. The strategy would include targeted outreach to customers directly and to customers via local HVAC and hot water heating businesses. Specifically, the marketing and communications strategy would include:

- Customer and HVAC/hot water heating trade ally brochure(s)
- Web content on program
- Direct mail and outreach to customers, including: targeted brochures detailing how they can apply to program and the benefits of program
- Program application forms, worksheets, contact information
- APCo website content that includes full program details, contact information, downloadable materials and applications, and links to other relevant service and information resources

The marketing strategy would also identify key customer segments and groups for target marketing and would prepare specific outreach activities for these customers.

APCo would design and develop the content, messaging, branding, and calls-to-action for all of the marketing and communication materials used to promote the program.

HVAC/hot water heating companies/contractors that sell and maintain central air conditioning or heat pump systems would be targeted and trained to advise their residential customers about the Load Cycling Program as the customer purchases, replaces, or repairs a given system. HVAC/hot water heating companies/contractors would receive educational materials to share with their customers through an initial mailing campaign, kick-off meetings, and in-person visits by trade allies.

Milestones

The following chart shows the timeline for the key program milestones and program advancement activities. These dates are subject to change, but it is essential that the program is launched with sufficient lead time for the heating season.

Table 6-21. Project Milestones

Tasks	Timeframe
DSM Plan Approval	TBD
Selection of Program Implementation Contractor	3 months
Program planning and materials	7 months
Initial mailing to A/C contractors/trade allies	8 months
Kickoff meetings with contractors/trade allies	9 months
Program launch – heating or cooling season	9 months

EM&V Strategy

All evaluation activities would be conducted by a third party contractor selected through a competitive bidding process. An integrated evaluation approach would be taken which includes: addressing evaluation at the onset of program design, collecting evaluation data as part of program administration, assessing and documenting baseline conditions, establishing tracking metrics, developing and refining deemed savings measure databases, as well as, conducting primary and secondary research as part of impact and process evaluations.

The overall goal of the impact evaluation would be to validate/calibrate the deemed savings values, verify installation and determine program cost-effectiveness. Primary impact metrics are savings per unit, program participants, net-to-gross ratio and program cost-effectiveness. Deemed savings would be determined by a literature and data review, analysis of program records and conducting a field research study with a selected sample of participants. Primary market research (self-report surveys) with both participants and non-participants would be used to assess free riders/spillover, awareness of the program, ease of participation and satisfaction with the program and other process efficiency issues. Interviews with program managers, the implementation contractor, home builders, raters, and other market players would be conducted to assess the operational conditions of the program and to identify ways to improve the program delivery and participation. These surveys would be enhanced by collecting market data and assessing trends.

The process evaluation would be conducted during the first program year and then coordinated with follow-on impact evaluation work to be performed once program-approved measures have been installed

and operating for a sufficient time to enable a robust impact evaluation. Wherever it is possible, practical, and appropriate, evaluation activities would be conducted in conjunction with other utilities and agencies in the Commonwealth to share funding of studies and help ensure consistency.

Administrative Requirements

APCo would be responsible for general administrative oversight of the program portfolio. It is estimated that a 0.5 full-time equivalent (FTE) would be required for program oversight. Key oversight functions include:

- Recruitment, selection, and management of the implementation contractor(s)
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials with input from the implementation contractor
- Coordination of all educational services
- Data warehousing
- Recruitment, selection, and management of the evaluation contractor
- Goal achievement within budget

Budget

Table 6-22. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$867,054	\$1,145,455	\$1,391,348	\$1,723,119	\$2,185,105	\$7,312,080
Incremental DLC Credits					
2009	2010	2011	2012	2013	Total 2009-2013
\$283,359	\$565,098	\$835,122	\$1,125,326	\$1,471,669	\$4,280,574
Incremental Annual Budget – Administrative					
2009	2010	2011	2012	2013	Total 2009-2013
\$583,695	\$580,357	\$556,226	\$597,793	\$713,436	\$3,031,506

Winter Savings Targets**Table 6-23. Incremental Net Annual Energy and Peak Demand Savings at Generator**

Incremental Annual Peak Demand Savings Net kW (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
4,834	4,806	4,607	4,951	5,909	25,107

Benefit-Cost Test Results**Table 6-24. Benefit-Cost Test Results**

Benefit-Cost Test	2009-2013 Benefit-Cost Test Ratio
Total Resource Cost Test (TRC)	1.5
Utility System Resource Cost	4.1
Participant	1.5
Rate Impact Measure (RIM)	1.1

6.2 Commercial & Industrial Programs

6.2.1 C&I Prescriptive Incentive Program

Objective

Generate energy savings for all commercial and industrial (C&I) customers through promotion of high efficiency electric lighting, HVAC, and motors. There are three primary objectives for this program:

- Increase the market share of commercial grade high efficiency technologies sold through market channels.
- Increase the installation rate of high efficiency technologies in C&I facilities by businesses that would not have done so in the absence of the program.
- Improve operating energy efficiency of existing long life equipment to ensure peak operating efficiency for C&I customers.

Target Market

All C&I customers would be eligible to participate in this incentive program when they purchase qualifying equipment or services. Generally, the program is designed to offer cross cutting technologies that address a variety of market sectors and industries. Proactive outreach efforts will utilize a targeted strategy to influence specific market participants.

- Market Providers (wholesalers, distributors, contractors, trade allies, and retailers that market qualifying technologies) of various products would be recruited to promote program awareness and participation among their end-use customers.
- High-impact/high-need customer sectors (such as schools, municipal buildings, hospitals, food service, and hospitality) to influence implementation of high efficiency equipment who would not have done so in the absence of the program.

Program Duration

The C&I Prescriptive Incentive Program would be an ongoing element of the program portfolio.

Program Description

Prescriptive incentive programs are designed to work through existing market channels to affect the installation of targeted technologies. Overall, market channels have a consistent means to drive customers to action and therefore apply to each of the market channels listed below unless otherwise noted. Regardless of the channel, each offers high efficiency technology alternatives to their standard equipment offerings.

The program would affect the purchase and installation of high-efficiency technologies through a combination of market push and pull strategies that stimulate market demand while simultaneously increasing market provider investment in stocking and promoting them in defined market channels. Additionally, vendors who service and maintain existing high energy use equipment such as HVAC technologies would be tapped to secure energy savings of operational equipment not ready for retrofit or replacement. These services would be offered in the market channel. The respective equipment would be

delivered to the market.

The program would increase demand by educating C&I customers about the energy and money saving benefits associated with efficient products and equipping market providers to communicate those benefits directly to their customers. To address the first-cost barrier for customers, the program would utilize financial incentives (i.e., cash-back mail-in rebates) averaging 20% to 40% of the incremental cost of purchasing qualifying technologies.

The program would stimulate market provider investment in stocking and promoting efficient products through a targeted outreach effort. The program implementation staff will employ field sales representatives to proactively train and equip market providers to convey the energy and money saving benefits to consumers and communicate equipment eligibility requirements. Further, the existence of cash-back incentives will elevate efficiency to a competitive issue that would naturally motivate market providers to stock and promote targeted products.

The program would also address the C&I customers who would benefit from tune-up and corrective action to increase the efficiency of existing HVAC equipment in order to increase operational performance. Market providers would educate customers of the importance and benefits of equipment maintenance. Field representatives would also proactively train and equip the service provider.

Incentive Strategy

Three incentive strategies would allow the greatest flexibility to target opportunities and control participation levels:

- Cash-back mail-in incentives equal to 20% to 40% of the incremental cost to purchase energy efficient products will be offered. Tiered incentive approaches could also be designed to promote investment in premium efficiency equipment and multi-measure projects as conditions change over time. Technologies that pass cost-effectiveness testing are listed below.
- Special incentive “bonuses” for customers may be offered for limited-time promotions to increase installation of key technologies. A special incentive for market providers (or “Spiff”) could be considered if sales fall below goal for any technologies.
- For certain measures (e.g., high performance T-8’s and CFL’s) and market areas, the program may directly buy-down the incremental cost of the measures at the point of sale, as such, significantly reducing the administrative burden for trade allies participating in the program.

Eligible Measures

The C&I Prescriptive Incentive Program targets measures where the unit energy savings can be reliably predicted and therefore standard per-measure savings (“deemed savings”) and incentive levels can be established. This simplifies the application process and reduces non-incentive costs. The prescriptive program and associated measures would be delivered in a market channel fashion as market providers offer goods and services.

Each of the program channels is summarized below as they are planned to be delivered to customers along with the associated measures. The list below has been specified for planning purposes only. The utility would establish eligible measures and incentive levels as needed in accordance with current market conditions, planning studies, technology development, EM&V results, and program implementation experience.

Lighting Measures

- Compact fluorescent lamps (screw-in and pin-based fixtures)
- LED exit sign
- High-performance T8 fixtures
- T5 fluorescent fixtures
- High-bay fluorescent fixtures
- Pulse start metal halide
- Electronic dimming ballast
- Delamping with reflectors
- Occupancy sensors

HVAC Measures

- High efficiency packaged HVAC equipment (PTAC, Rooftop units)
- Adding an economizer
- Programmable thermostat
- Reflective window film
- Cool roof replacing a standard roof
- AC Tune-up with advanced diagnostics

Motors and Drives Measures

- NEMA Premium® motors
- Adding electronic adjustable speed drive to fans and pumps (variable frequency drives under 200 hp controlled)

Implementation Strategy

Key elements of the implementation strategy include:

- ***Outreach to Market Providers.*** The program would utilize field representatives to inform and recruit participating market providers. Outreach would include orientation meetings and conducting in-person visits aimed at training and equipping market providers to communicate program information to customers. Field representatives would ensure that providers have an updated stock of program materials. Key market providers that would be targeted include:
 - Lighting distributors, wholesalers, and electrical contractors
 - HVAC distributors, mechanical contractors, and service providers
 - Motors/Variable Frequency Drive distributors and retailers
 - Select consumer retailers that sell to contractors and businesses
- ***Outreach to Targeted Customers.*** The program implementation staff would work with APCo account managers to get information to business and institutional customers. The target contacts will be in-house energy managers, facility managers, building operators, and related personnel tied to facility operation. The program implementation staff and/or APCo account managers would assist C&I customers in determining whether the prescriptive incentives or a custom approach would be most appropriate for their operations. The program implementation staff would assist customers as necessary with incentive application requirements.

All program-specific administrative requirements would be handled internally by a third party implementation contractor selected through a competitive bid process. The implementation staff would be responsible for:

- Marketing strategy and materials
- Market provider outreach, recruitment, and training
- Trade Ally relations and problem resolution
- Product eligibility knowledge and communication
- Reporting to utility
- Maintain and manage database

Marketing Strategy

The C&I Prescriptive Incentive Program would employ the following marketing strategies:

- ***Engage Market Providers.*** Outreach and training would be provided to a targeted group of providers that have business motivations for promoting prescriptive incentives to their customers. They would be equipped with marketing and promotional materials (e.g., product sheets, incentive forms, case studies) and training on program terms and conditions. Outreach activities will include:
 - Mailing program materials
 - Follow-up telephone calls
 - Orientation meetings
 - In person visits by field representatives
- ***Directly Market to Targeted Customers.*** Depending on potential budget limitations, APCo may decide to initially pursue a targeted marketing strategy with business customers to ensure that the program is not over-subscribed. Initial targeted customer sectors might include schools, municipal office buildings, retail, food service, and lodging. Outreach activities would include:
 - In-person visits by APCo account managers to the top business consumers.
 - Walk-through energy audits for the top business consumers to identify opportunities for efficiency improvements.
 - Targeted advertising in trade and business publications.
 - Outreach to trade and business associations to recruit their assistance in distributing information about programs through existing communication channels.
 - Promotions by trade allies.
- ***Provide Complete Website Presence.*** The C&I Prescriptive Incentive Program would be comprehensively outlined on the APCo website. Customers and market providers will be able to review qualifying measures and download incentive applications.

Cooperative Advertising. APCo may consider the option of cooperative marketing with interested equipment distributors in the promotion of high efficiency equipment.

Milestones

Table 6-25. Project Milestones

Task	Timeframe
DSM Plan Approval	TBD
Selection of Program Implementation Contractor	3 months
Program Materials Developed	4 months
Initial mailing to market providers	5 months
Program Launch – umbrella marketing begins	5 months
Follow-up telephone calls to market providers	6 months
Market provider orientation meetings	6 months

EM&V Strategy

All evaluation activities would be conducted by a third party contractor selected through a competitive bidding process. An integrated evaluation approach would be taken which includes addressing evaluation at the onset of program design, collecting evaluation data as part of program administration, assessing and documenting baseline conditions, establishing tracking metrics, developing and refining deemed savings measure databases, as well as conducting primary and secondary research as part of impact and process evaluations.

- The overall goal of the *impact evaluation* would be to validate/calibrate the deemed savings values and determine program cost-effectiveness. Self-report surveys with both participants and nonparticipants may be used to assess free riders/spillover. The participant and nonparticipant surveys would also address program awareness, barriers to participation, participant satisfaction, and process efficiency. These surveys would be enhanced by collecting market data and assessing trends as well as interviews with program staff, vendors, manufacturers, and other trade allies.
- The *process evaluation* would be conducted during the first program year and then coordinated with follow-on impact evaluation work to be performed once program-approved measures have been installed and operating for a sufficient time to enable a robust impact evaluation. Wherever it is possible, practical, and appropriate, evaluation activities would be conducted in conjunction with other utilities and agencies in the Commonwealth to share funding of studies and help ensure consistency.

Administrative Requirements

APCo would be responsible for general administrative oversight of the program portfolio. It is estimated that a 0.75 full-time equivalent (FTE) would be required for program and contractor oversight and 0.5 FTE for administrative support. Key oversight functions include:

- Recruitment, selection, and management of an implementation support contractor(s)
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials with input from the implementation contractor.
- Coordination of all educational services

- Data warehousing
- Recruitment, selection, and management of the evaluation contractor
- Goal achievement within budget

APCo and its implementation contractor would follow industry best practices during final program design and start-up to ensure success, including:

- Following an integrated evaluation approach as described above.
- Assessing current market conditions for energy efficiency product availability and pricing.
- Account manager and customer service training.
- Completing all program procedures from marketing through verification and payment and conducting a dry-run prior to launch.
- Preparing for stronger or weaker than expected participant response.

Budget

Table 6-26. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$2,091,280	\$2,796,926	\$3,951,333	\$5,168,031	\$6,520,793	\$20,528,364

Incremental Annual Budget – Customer Incentive					
2009	2010	2011	2012	2013	Total 2009-2013
\$1,262,101	\$1,649,774	\$2,231,139	\$3,130,943	\$4,337,362	\$12,611,320

Incremental Annual Budget – Administrative					
2009	2010	2011	2012	2013	Total 2009-2013
\$829,179	\$1,147,152	\$1,720,194	\$2,037,088	\$2,183,431	\$7,917,044

Winter Savings Targets

Table 6-27. Incremental Net Annual Energy and Peak Demand Savings at Generator

Incremental Annual Energy Savings Net MWh (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
18,845	28,679	43,005	40,628	41,726	172,883
Incremental Annual Peak Demand Savings Net kW (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
2,988	4,628	7,012	6,447	6,725	27,800

Benefit-Cost Test Results

Table 6-28. Benefit-Cost Test Results

Benefit-Cost Test	2009-2013 Benefit-Cost Test Ratio
Total Resource Cost Test (TRC)	2.1
Utility System Resource Cost	3.4
Participant	4.6
Rate Impact Measure (RIM)	0.6

6.2.2 C&I Custom Program

Objective

Influence C&I customers to elect and install high efficiency technologies not addressed through other C&I programs when considering equipment retrofits or energy saving process improvements. Many C&I efficiency projects involve multiple technologies resulting in interactive effects in which savings need to be calculated on a project basis. This program offers incentives that are customized to the specific results of the energy saving technologies implemented.

Target Market

The C&I Custom Program would be available to all commercial and industrial customers. Emphasis would be placed on targeting customers whose opportunities could most benefit from a custom approach. This would include customers that have had in-depth energy audits or have identified unique opportunities to improve efficiency but have not taken action. In addition, larger customers serviced by account managers would be emphasized in the early years of the program. In future program years, smaller consumption accounts would be proactively targeted. Direct customer outreach would target decision makers within the customers' organization including: energy managers, facility managers, financial and operations managers, chief engineer and facility/property managers, maintenance supervisors, and building operators. Target markets would include manufacturing facilities, hospitals, schools, hospitality, large offices, and large government facilities.

Program Duration

The C&I Custom Program would be an ongoing element of the program portfolio.

Program Description

The C&I Custom Program is designed to address any cost-effective electricity saving measure not addressed through other APCo Virginia programs, including prescriptive rebates. Projects in the Custom Program are more complex and address a system or process most often requiring unique design and technology solutions for each participant, so specific savings and incentives are determined when the project is specified. Major end-use system redesigns, including appropriate lighting system redesigns, are potential candidates for this program.

Fuel switching, natural gas saving measures, and previously completed projects would not be eligible measures in the C&I Custom Program. All technologies would be subject to eligibility and verification of savings projections.

In order to minimize free ridership, the C&I Custom Program project eligibility rules would be designed to motivate market providers and customers to: (1) pursue projects that they would otherwise not have implemented, (2) pursue these projects sooner than they otherwise would have, or (3) implement equipment/measures at a higher efficiency level than they otherwise would have.

Incentive Strategy

Customers would be eligible for incentive payments as a percentage of avoided costs. The specific incentive design is to be determined; however, separate incentive components for energy and demand savings could be considered as well as or instead of a simpler incentive based on the Custom Project's

demand impact (the typical approach used in other Custom programs). The incentive design would be determined according to the relative importance of energy and demand impacts, respectively. With separate incentives for energy and demand, APCo can adjust incentive payment rates in response to progress toward achieving energy or demand impact goals.

Limitations may be placed on C&I Custom Program incentives, including:

- Maximum project incentive: \$250,000/year
- Maximum customer incentive: \$500,000/year
- Minimum project payback: 1 year
- Maximum % of incremental cost: 50%
- Maximum % of total project cost: 30%

The maximum incentive a customer may receive is the lesser of the amount listed above. The program implementation staff would work closely with prospective customers to determine if the project qualifies for financial incentives and to assist them in completing an incentive application.

There would also be grants to co-fund select feasibility studies and audits up to a maximum utility contribution of \$15,000 to assist customers in identifying energy savings opportunities and to determine their potential. APCo Virginia would refund part of the customer's share of the study cost if identified projects are implemented, as an inducement to act on study recommendations.

In future years, APCo Virginia may decide to offer an energy efficiency RFP process for larger projects that would exceed the project maximum listed above. In an RFP solicitation, customers or energy efficiency service providers would be allowed to develop proposals and submit them to the utility for consideration in the C&I Custom Program. The incentive cost would be proposed as part of the submitted proposal and participants chosen based on project cost-effectiveness.

Implementation Strategy

Delivery of the C&I Custom Program would be achieved through the combined efforts of APCo Virginia energy efficiency program and marketing groups, APCo account managers, and an implementation contractor hired through a competitive bidding process.

APCo Virginia staff and the implementation contractor would work to generate awareness of the C&I Custom Program among customers and market providers of energy efficiency services and equipment. Several approaches to outreach would be employed which will evolve as the program matures, as described in the marketing strategy below. The objective of outreach activities is to identify and develop custom projects for further analysis.

Outreach by the APCo account managers would be emphasized in the early stages to expedite previously identified potential for projects that have been stalled at large customers. Greater emphasis would be placed on generating energy efficiency service provider referrals in 2010 and beyond to expand participation and reduce costs as the APCo Virginia's network of program allies grows.

APCo Virginia and the implementation contractor would work with customers and market providers to identify and pre-qualify prospective projects. This may involve completing custom engineering calculations that assess the energy savings potential, payback horizon, project eligibility, and incentive amount.

If the project is deemed eligible, the customer would be offered the opportunity to submit a more detailed Custom Program Application for measure incentives, or if further analysis is required, to submit an application for a feasibility study grant. Both applications would provide the guidelines for developing detailed project documentation for review by the program.

Once received, the Custom Program applications (for measure or study grants) would receive technical review by the implementation contractor. If the application is approved, the implementation contractor would issue a grant approval letter describing the terms for acceptance of the project. The customer would have a limited time (30 days) to sign the acceptance offer to reserve incentive funding. Upon customer signature of the incentive offer the customer would have a limited period of time (6 months) to complete the project to be eligible for reimbursement, or request a limited time extension.

Once projects are completed, the implementation contractor would assist the customer to verify the installation to ensure program integrity before issuing payment. Post installation inspections and documentation review would be completed by the implementation contractor to ensure the project is operating as intended. The inspection and documentation review may result in modifications to claimed savings and incentive amount. The implementation contractor would submit final incentive claims to APCo Virginia for payment.

All program-specific administrative requirements would be handled by a third party implementation contractor, selected through a competitive bid process. The implementation contractor would be responsible for:

- Marketing strategy and messaging
- Market provider outreach, recruitment, and training
- Project identification assistance and pre-qualification screening
- Administrative and technical assistance to customers in completing program applications
- Technical review of applications
- Program participant communications
- Post installation inspections and review
- Incentive claim requests
- Quality assurance of project and technology eligibility
- Data tracking and reporting
- Budget tracking and reporting
- Managing public relations
- Customer satisfaction and problem resolution

Marketing Strategy

The marketing for the C&I Custom Program involves multiple strategies to locate project opportunities that can be unique and site-specific. A direct networking approach would be employed with customers that have completed energy audits or have assigned account managers. Marketing via direct mail to energy efficiency service providers, local economic development organizations, and other business and professional associations would be included in the recruiting approach to expand the outreach to a wider base of customers. In addition, the program would be promoted through advertising in targeted media including professional society newsletters, business journals, press releases, and media outreach.

This strategy for prospecting for projects is highly dependent upon referrals and networking with program allies and utility staff to identify projects that have high probability of implementation. Custom projects can have longer lead times for implementation due to feasibility and design studies, equipment purchasing lead times, installation timelines, and capital equipment planning and approval cycles. As a result, it

would be advisable to begin aggressive marketing early in the program in order to fill the pipeline with projects in the 2009 calendar year and to queue projects for the escalation of program goals in future years.

Milestones

Table 6-29. Project Milestones

Task	Timeframe
DSM Plan Approval	TBD
Selection of Program Implementation Contractor	3 months
Program Materials Developed	4 months
Program Launch – Marketing	4 ½ months

EM&V Strategy

All evaluation activities would be conducted by a third party contractor selected through a competitive bidding process. An integrated evaluation approach would be taken, which includes addressing evaluation at the onset of program design, collecting evaluation data as part of program administration, assessing and documenting baseline conditions, establishing tracking metrics, as well as conducting primary and secondary research as part of impact and process evaluations.

- The overall goal of the *impact evaluation* would be to validate/calibrate the deemed savings values and determine program cost-effectiveness. Self-report surveys with both participants and nonparticipants may be used to assess free riders/spillover. The participant and nonparticipant surveys would also address program awareness, barriers to participation, participant satisfaction, and process efficiency. These surveys would be enhanced by collecting market data and assessing trends as well as interviews with program staff, vendors, manufacturers, and other trade allies.
- The *process evaluation* would be conducted during the first program year and then coordinated with follow-on impact evaluation work to be performed once program-approved measures have been installed and operating for a sufficient time to enable a robust impact evaluation. Wherever it is possible, practical, and appropriate, evaluation activities would be conducted in conjunction with other utilities and agencies in the Commonwealth to share funding of studies and help ensure consistency.

Administrative Requirements

Initial program administration would be conducted by APCo Virginia and key account representatives. During 2009, APCo would contract with, and transfer day-to-day program administration to a third-party. To develop and manage the third-party implementation, it is estimated that 1.0 FTE equivalent would be required for program oversight. Key oversight functions include:

- Recruitment, selection, and management of the implementation contractor(s)
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials with input from the implementation contractor.
- Coordination of all educational services
- Data warehousing

- Recruitment, selection, and management of the evaluation contractor
- Goal achievement within budget

APCo and its implementation contractor would follow industry best practices during final program design and start-up to ensure success, including:

- Following an integrated evaluation approach as described above.
- Account manager and customer service training.
- Establishing requirements for supporting documentation, analysis methods, and reporting requirements on technical studies.
- Completing all program procedures from marketing through verification and payment and conducting a dry-run prior to launch.
- Preparing for stronger or weaker than expected participant response.

Budget

Table 6-30. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$1,676,989	\$2,058,544	\$2,787,756	\$4,121,182	\$6,170,125	\$16,814,596
Incremental Annual Budget – Customer Incentive					
2009	2010	2011	2012	2013	Total 2009-2013
\$868,642	\$1,082,632	\$1,414,618	\$2,107,979	\$3,261,766	\$8,735,637
Incremental Annual Budget – Administrative					
2009	2010	2011	2012	2013	Total 2009-2013
\$808,347	\$975,912	\$1,373,138	\$2,013,203	\$2,908,359	\$8,078,960

Winter Savings Targets

Table 6-31. Incremental Net Annual Energy and Peak Demand Savings at Generator

Incremental Annual Energy Savings Net MWh (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
9,186	12,199	17,164	25,165	36,354	100,068
Incremental Annual Peak Demand Savings Net kW (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
727	990	1,427	1,993	2,831	7,968

Benefit-Cost Test Results

Table 6-32. Benefit-Cost Test Results

Benefit-Cost Test	2009-2013 Benefit-Cost Test Ratio
Total Resource Cost Test (TRC)	1.4
Utility System Resource Cost	2.1
Participant	4.7
Rate Impact Measure (RIM)	0.5

6.2.3 C&I New Construction Program

Objective

The objective of this program is to work through the design community to influence owners to capture immediate and long-term energy efficiency and peak load reduction opportunities that are available during the design and construction of new buildings, additions, and renovations in the non-residential market. To secure these opportunities it is necessary to overcome barriers such as resistance in the design community to adopt new practices, reluctance by owners to accept increased first cost for efficient options, removing proposed measures through value engineering, and tendency to design individual systems for worst-case conditions rather than efficiency of an integrated system over the range of expected operating conditions.

Target Market

Any-size commercial, industrial, government (local, Commonwealth, and federal), or institutional new construction project in the planning or early design-stage will be considered, provided the design team and owner are willing to pursue an integrated design strategy and improve multiple building systems. To be eligible, major renovations would be required to involve a change in occupancy classification or affect at least two of these three systems: building envelope, HVAC systems, or lighting systems. Projects would have to be pre-approved for participation.

Program Duration

The C&I New Construction Program would be an ongoing element of the program portfolio. Services would begin in 2009, though due to the long lead time required to identify project leads, to work with projects in the design phase, and to construct the buildings, significant savings from this program would not be anticipated until mid-year 2010. From design phase meetings to payment of incentives at building completion requires from 6 months to 3 years, averaging 12 months to 18 months.

Program Description

The program would capture energy efficiency and peak load reduction opportunities through a comprehensive effort to influence building design and construction practices. The program would work with design professionals and construction contractors to influence prospective building owners and developers to construct high performance buildings that provide improved energy efficiency, systems performance, and comfort. Energy saving targets would be accomplished by stimulating incremental improvements of efficiency in lighting, HVAC, and other building systems. The program would seek to capture synergistic energy savings by encouraging the design and construction of buildings as integrated systems. A variety of different commercial new construction guidelines exist to provide design targets: LEED®; Advanced Buildings®, ASHRAE Advanced Energy Design Guides, Green Globes®, etc.

An important focus of efforts would be moving the knowledge gained by designers and architects through program participation into their standard construction practices. The program has been designed to integrate educational activities into implementation while achieving energy savings from active construction projects.

Program resources to achieve energy saving and market transformation objectives are applied through four primary offerings to participants (participants include design team members, contractors, owners, and developers):

- Targeted ***Education, Information, and Outreach*** on integrated design practices and benefits will be provided directly to participants through the program and to the broader market by coordinating with outside efforts. Program staff time and resources would focus on information dissemination and teach/learn-by-example during projects with program participants. To encourage market transformation while recruiting program participants, the program would coordinate with outside efforts including LEED, Advanced Buildings, ASHRAE, AIA, and others. The credibility and relationships built through involvement in outside efforts will help the program recruit construction projects that are early in the design process, when opportunities to integrate energy saving measures into the project are greatest.
- The program would offer ***Technical Assistance Services*** to provide capabilities that are not yet fully adopted in the market. Services may include facilitation in the design process, reviewing plans and construction bid documents, assisting with design selections, analyzing energy savings, and verifying installation and operation of measures. Technical assistance may be provided by the program administrator or by third-parties contracted for their special expertise.
- The program would offer financial ***Design Incentives*** to the design team to help offset the costs of developing designs that provide as-built performance which is more energy efficient than their standard practice designs. Payments to the primary design team member would be made after the start of construction once program payment criteria have been met.
- The program would offer financial ***Measure Incentives*** to owners and developers to help reduce cost barriers to adopting electric energy saving measures that have not yet been accepted as standard practice for construction. Payments would be made after the program verifies that measures are installed and fully operating or capable of full operation in the case of seasonal uses.

Technical assistance, design incentives, and measure incentives would be offered in varying degrees on individual projects to balance the program resources applied with the potential for saving energy and changing behavior. The program would channel projects through one of two participation approaches:

- ***Comprehensive “Whole Building” Approach*** offers the highest level of technical assistance and financial incentives for custom design solutions. This approach allows the design team the greatest flexibility to meet energy performance goals by adopting integrated design solutions analyzed through whole-building energy simulations. This approach is chosen when project size, schedule, complexity, and interest level justify a high level of program resources to achieve the full benefits of integrated building design.
- ***Systems Approach*** provides a menu of financial incentives and technical assistance to encourage integrated design at the system and component level. Measure incentives are paid for meeting the performance criteria described in program materials for system and component performance. Design incentives are available for employing the integrated design approaches and meeting the program threshold requirements. This approach is chosen when there is opportunity to achieve energy savings through integrated design, but the project size or schedule warrants a more streamlined approach.

Building size, project type, design stage, and project opportunities would guide the selection of participation approach offered on the project. This determination would be made by the program on a case-by-case basis. Generally, new construction and major “gut” renovation projects over 75,000 square feet will be channeled to the Comprehensive Approach when there is commitment by the owner and design team in the pre-design or schematic design stage to explore a wide range of design options. New construction and major renovation projects smaller than 75,000 square feet would most often be channeled to the Systems Approach, as would projects larger than 75,000 square feet that do not justify

the Comprehensive Approach. Single end-use lighting or HVAC projects or those too late in design to follow an integrated approach would be referred to prescriptive rebate programs.

Incentive Strategy

To minimize free-ridership, it is intended that design team and measure incentives cover 50% or more of incremental cost. Incentives are set relative to a baseline for cost and energy performance developed to reflect current practice in the service territory. The default baseline would be current state energy code, standard practice determined by research or EM&V, or legally required design specifications. Pre-approval is required for all incentives.

Of the pool of financial incentive dollars available for a project, the program would direct up to approximately 30% toward design team incentives and technical studies and 70% to efficiency measures. In the Comprehensive Approach, design team incentives would be set at up to 10% of a project's measure incentive. Prescriptive design incentives may be considered over time to encourage certain measures and design approaches. The program would provide energy modeling as an incentive to participate or offer the design team a nominal incentive to follow program compliance and reporting requirements when conducting owner-funded simulations.

The Comprehensive Approach would have a measure incentive structure that pays independently for kWh and kW, to give flexibility to design teams to make design trade-offs. A separate kW component would encourage consideration of advanced HVAC designs such as geothermal systems or downsizing HVAC. The program would set the incentive at \$0.05/kWh + \$150/kW, a level comparable to successful programs operated in the Midwest. A single tier is the simplest approach for design teams and owners to comprehend and react to when considering alternative designs.

The Systems Track would use the same dollars per unit incentives as the C&I Prescriptive program, with some exceptions. Lighting needs to have a program check to limit the lighting power density by building type (design watts per square foot) to ensure there are savings relative to the energy code. Lighting power density improvements would be paid at the rate of 15 cents per square foot for designs that achieve savings of 15% to 25% below code, depending on building type. An incentive based on square feet would give maximum flexibility to design teams to pick the most appropriate fixtures for their project. Occupancy sensors are standard practice for new construction in certain building types and would not be eligible for incentives in those cases.

During the program, baseline assumptions would be monitored and revised as necessary to more accurately represent current standard practice. Incentives would be adjusted as needed in response to market acceptance, evaluation feedback, changing baseline practices, and state energy code upgrades.

Eligible Measures

Cost-effective electrical efficiency and peak load reduction measures that improve upon the program's baseline are eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel and grid connected renewable energy systems would not be eligible for incentives through this program. Peak reduction measures that result in negative net kWh savings (e.g., thermal cool storage and some geothermal HVAC systems) would be eligible but have the total incentive reduced at the per kWh incentive rate.

Implementation Strategy

To maximize program effectiveness, an implementation contractor with in-house new construction design and analysis capabilities and experience would be selected to implement the program. The implementation contractor would provide staff to conduct program management, tracking, marketing, and

implementation. Implementation staff would provide technical assistance services to participants, assist participants with program requirements, conduct technical assistance and simulation services, oversee contract technical specialists, perform quality control duties, and inspect measure installations.

Marketing Strategy

A key element for success in the program is securing the involvement of the professional design community early in the design process of construction projects. Project recruitment would be a byproduct of the educational effort on sustainable design targeting the design community. Projects sought would be those early in the design phase and where program intervention could produce significant energy and demand savings. The program would employ lunch and learn presentations, individual contact, and outreach through professional organizations to engage design professionals. The program would coordinate with locally active education efforts.

The design community would be a key resource in reaching building owners and developers, and the program would actively assist the design community in educating owners on the benefits of high performance buildings.

Milestones

Table 6-33. Project Milestones

Task	Timeframe
DSM Plan Approval	TBD
Selection of Program Implementation Contractor	3 months
Program Materials Developed	5 months
Program Launch -- Marketing	6 months

EM&V Strategy

APCo Virginia would hire an independent evaluator to provide ongoing input on quality assurance, project documentation requirements, and savings verification as well as conduct program evaluation. An integrated evaluation approach would be taken which includes addressing evaluation at the onset of program design, collecting evaluation data as part of program administration, assessing and documenting baseline conditions, and establishing tracking metrics.

The baseline for all projects in the C&I New Construction Program would be the more efficient of what the participant would do absent the program intervention or code required minimums. A baseline would be established and documented for each project that enters the program. Energy savings would be claimed relative to the project-specific baseline. If a design team does not have a base design to analyze, a default minimum baseline would be used. The initial default minimum program baseline would be set at current state energy code.

Administrative Requirements

APCo Virginia would be responsible for oversight of the implementation contractor, managing the tracking system, and providing funds for administration, marketing, implementation, and incentive check disbursement. It is estimated that a 0.25 full-time equivalent (FTE) would be required for program oversight. The implementation contractor responsibilities include ongoing program design, marketing

materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, incentive amount approval, and program goal achievement.

APCo and its implementation contractor would follow industry best practices during final program design and start-up to ensure success, including:

- Following an integrated evaluation approach as described above
- Account manager and customer service training
- Establishing requirements for supporting documentation, analysis methods, and reporting requirements on technical studies
- Completing all program procedures from marketing through verification and payment and conducting a dry-run prior to launch.
- Preparing for stronger or weaker than expected participant response

Budget

Table 6-34. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$40,693	\$44,967	\$130,267	\$287,723	\$550,558	\$1,054,207

Incremental Annual Budget – Customer Incentive					
2009	2010	2011	2012	2013	Total 2009-2013
\$19,378	\$22,483	\$65,133	\$143,861	\$275,279	\$526,135

Incremental Annual Budget – Administrative					
2009	2010	2011	2012	2013	Total 2009-2013
\$21,315	\$22,483	\$65,133	\$143,861	\$275,279	\$528,073

Winter Savings Targets

Table 6-35. Incremental Net Annual Energy and Peak Demand Savings at Generator

Incremental Annual Energy Savings Net MWh (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
331	384	1,115	2,133	4,087	8,050

Incremental Annual Peak Demand Savings Net kW (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
35	40	116	182	350	723

Benefit-Cost Test Results

Table 6-36. Benefit-Cost Test Results

Benefit-Cost Test	2009-2013 Benefit-Cost Test Ratio
Total Resource Cost Test (TRC)	1.4
Utility System Resource Cost	2.3
Participant	3.8
Rate Impact Measure (RIM)	0.5

6.2.4 C&I Direct Load Control Program

Objective

To encourage APCo Virginia's C&I customers to both shift their load away from peak demand periods (summer or winter) and to reduce overall demand on the system during that peak period. This program also aims to increase the knowledge of the benefits of demand response within the non-residential customer base.

Target Market

The C&I Direct Load Control (DLC) program targets non-residential customers in the APCo Virginia service territory with central air conditioning or heat pump systems, specifically targeting small C&I customers, with larger account managed customers being the secondary target market. Electric water heaters also have load control potential and could be added, depending upon the enabling technology employed by the program.

Program Duration

The C&I Direct Load Control Program would be an ongoing element of the program portfolio.

Program Description

The DLC program would provide rate discounts to participants who allow APCo Virginia to cycle its customer's air conditioners or heat pumps during periods of summer or winter peak system demand. The program is designed to:

- Install the enabling technologies used for this program, including installed switches to the HVAC system and/or enhanced programmable thermostats.
- Provide incentives to facility owners and operators for the installation of the enabling technologies.
- Provide a marketing mechanism for HVAC equipment vendors, distributors and contractors to promote direct load control technologies to end users.
- Overcome market barriers, including:
 - Customers' lack of awareness and knowledge about the benefits and cost of DLC, and
 - Performance uncertainty associated with DLC projects.
- Ensure that the participation process is clear, easy to understand and simple.

Certain barriers exist to the adoption of DLC equipment, including lack of awareness/knowledge about the benefits and costs of DLC technologies and technology performance uncertainties. This program is designed to help overcome these market barriers and encourage greater adoption of DLC equipment in the C&I market.

The program would be structured as a broadly applicable C&I DLC program since the demand savings for HVAC equipment is similar across many C&I market segments. APCo Virginia could make participating in this program a condition of service for new construction customers. Having a simple program structure and rate discount provides customers with certainty and ease of use regarding the rate discount they will receive for installing an enabling technology.

The program's actual demand and energy savings would be determined through the program evaluation.

Incentive Strategy

A rate discount of approximately \$5 per ton of air conditioning per peak month would be the primary incentive for this program, although specific cycling strategies that achieve higher savings may be provided a higher incentive.

Eligible Measures

APCo Virginia would specify complying DLC switching technology and/or enhanced programmable thermostats that would be installed in the program.

Implementation Strategy

Program implementation activities include administration, marketing, vendor referrals, application and incentive processing, coordination of education and training activities, participation tracking and reporting, quality control, and technical support. APCo Virginia account representatives are expected to promote the program to their customers. Alternatively, APCo could outsource the program to an "implementation contractor". APCo Virginia would likely sub-contract the DLC switch installations to HVAC or electrical contractors.

The C&I DLC program includes customer educational and promotional pieces designed to assist facility owners, operators and decision makers with the information necessary to install DLC in their facilities. The program also would include customer and trade ally education to assist with understanding the enabling technologies that are being promoted, the incentives that are offered, and how the program functions.

Marketing Strategy

The marketing and communications strategy would be designed to inform customers of the availability and benefits of the program and how they can participate in the program. The strategy would include outreach to customers directly and via HVAC companies. The APCo website would direct customers to information about the program. More specifically, the marketing and communications plan would include:

- Direct mail and outreach to customers and customer representatives. Marketing activities would include:
 - Brochures that describe the benefits and features of the program including program application forms and worksheets. The brochures will be mailed upon demand.
 - Targeted direct mailings used to educate customers on the benefits of the program and explaining how they can apply.
 - APCo website content providing program information resources, contact information, downloadable application forms and worksheets, and links to other relevant service and information resources.
 - Presentations by the program manager to key customers and customer groups to actively solicit their participation in the program.
- The marketing strategy would identify key customer segments and potentially geographical areas for targeted marketing, and will prepare specific outreach activities for these customers.

APCo would design and develop the content, messaging, branding, and calls to action of all of the marketing and collateral materials used to promote the program.

Milestones

Table 6-37. Project Milestones

Task	Timeframe
DSM Plan Approval	TBD
Selection of Program Implementation Contractor and Enabling Technologies	4 months
Final Program Design and Materials Developed	6 months
Program Launch	7 months

EM&V Strategy

All evaluation activities would be conducted by a third party contractor selected through a competitive bidding process. An integrated evaluation approach would be taken, which includes addressing evaluation at the onset of program design; collecting evaluation data as part of program administration; assessing and documenting baseline conditions; establishing tracking metrics; developing and refining deemed load reduction values; as well as conducting primary and secondary research as part of impact and process evaluations.

- The overall goal of the *impact evaluation* would be to validate/calibrate the deemed load reduction values and determine program cost-effectiveness. Self-report surveys with both participants and nonparticipants may be used to assess net impacts. The participant and nonparticipant surveys would also address program awareness, barriers to participation, participant satisfaction, and process efficiency. These surveys would be enhanced by collecting market data and assessing trends as well as interviews with program staff, vendors, manufacturers, and other trade allies.
- The *process evaluation* would be conducted during the first program year and then coordinated with follow-on impact evaluation work to be performed once program-approved measures have been installed and operating for a sufficient time to enable a robust impact evaluation. Wherever it is possible, practical, and appropriate, evaluation activities would be conducted in conjunction with other utilities and agencies in the Commonwealth to share funding of studies and help ensure consistency.

Administrative Requirements

It is estimated that a 0.5 full-time equivalent (FTE) would be required for program management, and 0.5 FTE will be required for administrative tasks. Designated APCo Virginia staff person(s) would provide program administration, marketing, vendor referrals, application and incentive processing, coordination of education and training activities, participation tracking and reporting, quality control, and technical support. APCo Virginia account representatives are expected to promote the program to their customers. Alternatively, APCo Virginia could outsource the program to an "implementation contractor". APCo Virginia would likely want to sub-contract the DLC switch or enhanced thermostat installations to HVAC or electrical contractors.

APCo Virginia and its implementation contractor would follow industry best practices during final program design and start-up to ensure success, including:

- Following an integrated evaluation approach as described above.
- Confirming enabling technology performance.
- Account manager and customer service training.
- Completing all program procedures from marketing through verification and payment and conducting a dry-run prior to launch.
- Preparing for stronger or weaker than expected participant response.

Budget

Table 6-38. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$3,375,961	\$4,837,284	\$6,172,566	\$7,830,447	\$10,027,316	\$32,243,575

Incremental Annual DLC Credits					
2009	2010	2011	2012	2013	Total 2009-2013
\$1,473,886	\$2,942,287	\$4,352,571	\$5,870,951	\$7,685,548	\$22,325,244

Incremental Annual Budget – Administrative					
2009	2010	2011	2012	2013	Total 2009-2013
\$1,902,075	\$1,894,997	\$1,819,995	\$1,959,496	\$2,341,768	\$9,918,331

Winter Savings Targets

Table 6-39. Incremental Net Annual Energy and Peak Demand Savings at Generator

Incremental Annual Peak Demand Savings Net kW (at Generator)					
2009	2010	2011	2012	2013	Cumulative Total 2009-2013
10,247	10,209	9,805	10,556	12,616	53,433

Benefit-Cost Test Results**Table 6-40. Benefit-Cost Test Results**

Benefit-Cost Test	2009-2013 Benefit-Cost Test Ratio
Total Resource Cost Test (TRC)	1.6
Utility System Resource Cost	2.3
Participant	0.6
Rate Impact Measure (RIM)	2.1

6.3 Multi-Sector Programs

6.3.1 Energy Education and Training Program

Objective

The Energy Education and Training programs are designed to build customer awareness of energy efficiency in general as well as APCo Virginia programs to begin market transformation and build demand.

Target Market

Media outreach and advertising is primarily for the mass market, but training is targeted to larger C&I customers.

Program Duration

These programs would be directly managed by APCo Virginia and are expected to be ongoing. These new programs should have a goal of increasing the adoption of the efficiency programs as well as bringing APCo Virginia's commitment to efficiency to its customers.

Program Description

APCo Virginia would plan a media campaign and training effort to address the lack of awareness of their customer base to these new programs in a variety of ways. In addition, general energy education should be a key focus. The development and distribution of targeted marketing materials and participation in promotional events should be a primary focus.

There are several barriers to the adoption of energy efficiency. In some cases it is simple lack of awareness or misinformation. In other cases, it is a lack of contractor or professional contractors to make efficiency a realistic decision choice. For other cases, many technology choices are made spur-of-the-moment or in a fail-and-replace scenario where the person or contractor contacted are aware of the portfolio programs and make the efficient decision. In all cases, these programs should further APCo Virginia's commitment to efficiency and bridge the portfolio program goals and the consumer lack of adoption.

Incentive Strategy

The goals and needed incentives would vary by program supported and will be clearly stated, along with goals with regard to customers reached, people trained, items sold/given away or whatever the program's incentives and strategy call for.

Eligible Measures

Each supported program would have its own specific measures, eligibility and other measure requirements. In the Energy Education Program, the following are the measure details.

Implementation Strategy

The implementation strategy for each program would be spelled out in the specific function of the program. The implementer and APCo would agree upon strategy and budget during the program agreement discussions.

Implementation-related administrative requirements would be handled by APCo Virginia, who will be responsible for:

- Overseeing the work of any sub contractors
- Overseeing the work of the energy education contractor
- Data tracking and reporting
- Budget tracking and reporting
- Managing public relations
- Customer satisfaction/Problem resolution

Marketing Strategy

Each program component would have a specific marketing strategy that would be stated in the description of the program and agreed upon by APCo Virginia.

Milestones

Table 6-41. Project Milestones

Tasks	Timeframe
Selection of sub Contractors	1 month
Program planning and materials developed	3 months
Program launch – marketing begins	3 months

EM&V Strategy

All evaluation activities would be conducted by a third party contractor selected through a competitive bidding process. An integrated evaluation approach would be taken, which includes addressing evaluation at the onset of program design; collecting evaluation data as part of program administration; assessing and documenting baseline conditions; establishing tracking metrics; developing and refining deemed savings measure databases; as well as conducting primary and secondary research as part of impact and process evaluations.

The overall goal of the impact evaluation would be to validate/calibrate the deemed savings values, verify installation and determine program cost-effectiveness. Primary impact metrics are savings per unit, program participants, net-to-gross ratio and program cost-effectiveness. Validation/calibration of deemed savings values for the measures will be determined by primary field research. Self-report surveys with both participants and nonparticipants would be used to assess free riders/spillover, installation and retention rates, as well as the satisfaction with the various measures. Interviews with program managers, the implementation contractor and relevant organizations would be conducted to assess the operational conditions of the program and to identify ways to improve the program. These surveys would be enhanced by collecting market data and assessing trends.

The process evaluation **would** be conducted during the first program year and then coordinated with impact evaluation work to be performed once program-approved measures have been installed and operating for a sufficient time to enable a robust impact evaluation.

Administrative Requirements

It is estimated that a 1.0 full-time equivalent ("FTE") would be required for program management. APCo Virginia will be responsible for general administrative oversight of each supported program, which will include the following to address:

- Recruitment, selection, and management of the subcontractor(s)
- Coordination of marketing strategy/public relations among programs and market sectors
- Coordination of all media and educational services
- Data warehousing
- Recruitment, selection, and management of the evaluation contractor
- Goal achievement within budget

Budget

Table 6-42. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$2,000,000	\$1,500,000	\$1,250,000	\$1,250,000	\$1,250,000	\$7,250,000

Winter Savings Targets

N/A

Benefit-Cost Test Results

N/A

6.3.2 New Pilots/Emerging Technology Program

Objective

To identify and learn more about new energy efficient technologies and program strategies with potential to capture additional electric and gas energy savings.

Target Market

Dependent on specific technology/program.

Program Duration

APCo Virginia would initially focus on the successful start-up and delivery of other well-established pilot programs that have been proven to capture significant energy savings in similar regions throughout the country. Beginning in the second year of the portfolio, APCo Virginia would initiate research and analysis of other innovative technologies and strategies to reduce residential energy consumption. These efforts would be ongoing and pilot programs rolled out as appropriate.

Program Description

The following pilot programs represent new initiatives and technology approaches APCo Virginia could pursue, among others, to capture additional energy savings:

- Residential Power-Management to address the rapidly growing plug-load; education through monitoring devices and management tools such as advanced power strips and the whole-house switch.
- Residential-sized HVAC equipment optimized for performance in cold-climate (may include new developments in heat-pump technology)
- Focus greater attention on performance and installation quality, particularly in the areas of insulation, HVAC, lighting controls, and retrocommissioning. In addition, align contractor training with consumer outreach through existing high efficiency trained contractor websites.
- Coordinated development of integrated program design such as green building and Zero-Energy New Homes that deliver multiple resource benefits to expand the market share for energy efficiency and enhance the program's overall cost-effectiveness
- Promotion of LED lighting technology in consumer and commercial applications, both indoors and out. Participate in the support of the DOE TINSSL program and L-Prize program for the support of new LED applications
- Encourage the use of new technologies for lighting control and daylighting such as high-efficacy light fixtures or controls such as dimmers and vacancy sensors. New technologies are coming on the market and industry initiatives are renewing interest in home automation. Wireless lighting control protocols have been developed and are becoming increasingly economical, which will greatly increase their market penetration
- Participation in statewide initiatives to reward manufacturers for highest efficiency appliance design and push for a broader array of attractive and energy-efficient fixture designs
- Neighborhood initiatives that motivate energy conservation through better information and normalized comparative energy use-data

- Partner with local government and regional agencies and non-profits to sponsor a local efficiency awareness raising events, such as the Change-A-Light Challenge that encourages residents to change out a light bulb in their home

Administrative Requirements

It is estimated that a 0.5 full-time equivalent ("FTE") would be required for program management. APCo Virginia will be responsible for general administrative oversight of the program.

Incentive Strategy

N/A

Eligible Measures

N/A

Implementation Strategy

N/A

Marketing Strategy

N/A

Milestones

N/A

EM&V Strategy

N/A

Administrative Requirements

It is estimated that a 1.0 full-time equivalent ("FTE") would be required for program management. APCo Virginia will be responsible for general administrative oversight of each supported program, which will include the following to address:

- Recruitment, selection, and management of the subcontractor(s)
- Coordination of marketing strategy/public relations among programs and market sectors
- Coordination of all media and educational services
- Data warehousing
- Recruitment, selection, and management of the evaluation contractor
- Goal achievement within budget

Budget

Table 6-43. Incremental Annual Budgets

Incremental Annual Budget – Total					
2009	2010	2011	2012	2013	Total 2009-2013
\$150,000	\$300,000	\$300,000	\$300,000	\$300,000	\$1,350,000

Winter Savings Targets

N/A

Benefit-Cost Test Results

N/A

6.4 Program Cost Summary

The estimated investment for these programs, in 2009 dollars, would be approximately \$15.6 million in 2009, \$20.0 million in 2010, \$24.8 million in 2011, \$32.0 million in 2012, and \$41.6 million in 2013, for a total \$134 million; this is shown in Table 6-44. The projected investments include 10% one-time startup costs (included in program administration¹⁰ costs) for the first year of program implementation.

¹⁰ Administrative costs in this study are all costs for a given program aside from customer incentives: planning, marketing and sales, business process administration such as rebate processing, and evaluation, measurement and verification. General overhead costs such as general DSM department overheads, general education/training and pilot program funding are estimated separately from specific programs, but are included in the overall portfolio benefit-cost analysis.

7 PORTFOLIO IMPLEMENTATION

APCo Virginia would implement the proposed portfolio of programs through a combination of in-house utility staff and competitively selected third-party implementation contractors. APCo Virginia would issue Requests for Proposals (“RFP”)s to qualified firms related to RFPs for the delivery of similar programs targeting specific sectors. Summit Blue believes that by issuing multiple RFPs, it would be possible to obtain more competitive, cost-effective and qualified implementation responses.

Implementation contractors are eligible to respond to one or all of the RFPs. From start to finish, Summit Blue anticipates the process of issuing RFPs, evaluating responses and negotiating contracts along with associated program start-up time could result in 2009 launch date, at the earliest, for some programs (dependent upon those factors previously mentioned in Section E.3., Portfolio Implementation, page 31) . The remaining programs would begin later due to a need for longer preparation time prior to launch.

7.1 Finalizing Implementation Plans

Once contracts are finalized with the selected implementation contractors, the first major task would be preparation of detailed implementation plans. APCo Virginia would ask the implementation contractors to draft in-depth start-up plans, procedures manuals, and other program implementation planning and delivery guideline documentation, detailing key milestones, measures, incentive levels and overarching launch and communication strategies.

7.2 Portfolio Management

APCo Virginia would serve as the overall program administrator for delivery of the Energy Efficiency Portfolio. To expedite a quick launch of the programs, and to take advantage of cutting-edge program implementation experience from other parts of the country, APCo Virginia would plan to engage third-party implementation contractors. Contractors would be selected through a competitive request for proposal process for delivery of programs.

APCo Virginia would anticipate providing high-level administrative, contract management, program design and marketing oversight of the selected implementation contractors. A portfolio of this proposed size and scope would require careful management oversight. APCo Virginia would have a small and dedicated group of energy efficient program staff overseeing third-party implemented programs and promotion of cross-sector education and awareness activities.

APCo Virginia staff would also take primary responsibility for general energy efficiency education and awareness strategies and activities, including the corporate Web site, online energy audit software, mass-market media, general education and efficiency awareness promotions.

In summary, APCo Virginia would provide comprehensive program contract oversight, including management, financial planning and budgeting, regulatory and legal support, as well as:

- High-level guidance and direction to the implementation contractors, including review and revision of proposed annual implementation plans and proposed milestones and engagement with the contractor team on a daily basis when working through strategy and policy issues.
- Review and approval of implementation contractor invoices and ensure program activities are within investment and on schedule.

Table 6-44. Estimated Annual Total Investments by Program for APCo Virginia (2009\$)

Consumer Sector	2009	2010	2011	2012	2013	2009-2013	% of Portfolio Total
Products	\$806,998	\$1,385,579	\$2,046,757	\$2,336,383	\$2,428,506	\$9,004,224	6.7%
Recycling	\$79,066	\$265,002	\$260,779	\$256,815	\$252,906	\$1,114,569	0.8%
Retrofit	\$1,627,769	\$1,842,840	\$2,265,559	\$3,126,567	\$4,387,718	\$13,250,452	9.9%
Low Income	\$1,906,535	\$2,220,500	\$2,745,672	\$3,682,920	\$5,148,039	\$15,703,665	11.7%
New Construction	\$97,231	\$114,086	\$64,195	\$204,886	\$224,587	\$704,985	0.5%
Demand Response	\$867,054	\$1,145,455	\$1,391,348	\$1,723,119	\$2,185,105	\$7,312,080	5.5%
Consumer Sector Total	\$5,384,653	\$6,973,462	\$8,774,310	\$11,330,690	\$14,626,861	\$47,089,975	35.1%
Business Sector	2009	2010	2011	2012	2013	2009-2013	% of Portfolio Total
Prescriptive	\$2,091,280	\$2,796,926	\$3,951,333	\$5,168,031	\$6,520,793	\$20,528,364	15.3%
Custom	\$1,676,989	\$2,058,544	\$2,787,756	\$4,121,182	\$6,170,125	\$16,814,596	12.5%
New Construction	\$40,693	\$44,967	\$130,267	\$287,723	\$550,558	\$1,054,207	0.8%
Demand Response	\$3,375,961	\$4,837,284	\$6,172,566	\$7,830,447	\$10,027,316	\$32,243,575	24.1%
Business Sector Total	\$7,184,923	\$9,737,721	\$13,041,922	\$17,407,384	\$23,268,793	\$70,640,743	52.7%
Other Costs	2009	2010	2011	2012	2013	2009-2013	% of Portfolio Total
APCo Virginia DSM Department	\$750,000	\$1,250,000	\$1,250,000	\$1,500,000	\$2,000,000	\$6,750,000	5.0%
General Education/ Training/Media	\$2,000,000	\$1,500,000	\$1,250,000	\$1,250,000	\$1,250,000	\$7,250,000	5.4%
Energy Conservation Kits	\$150,000	\$200,000	\$200,000	\$200,000	\$200,000	\$950,000	0.7%
Pilot Program Fund	\$150,000	\$300,000	\$300,000	\$300,000	\$300,000	\$1,350,000	1.0%
Other Costs Total	\$3,050,000	\$3,250,000	\$3,000,000	\$3,250,000	\$3,750,000	\$16,300,000	12.2%
PORTFOLIO TOTAL	\$15,619,576	\$19,961,182	\$24,816,232	\$31,988,074	\$41,645,653	\$134,030,718	100.0%

- Review of implementation contractor operational databases for accuracy, ensuring incorporation of data into APCo Virginia's comprehensive portfolio tracking database to be used for overall tracking and regulatory reporting.
- Review of measure saving estimates maintained by the implementation contractor.
- Oversight and coordination of evaluation, measurement, and verification contractors.
- Public education and outreach to community groups, trade allies and trade associations.
- Guidance and direction on new initiatives or strategies proposed by the implementation contractors.
- Communication to implementation contractors about other APCo Virginia initiatives that may provide opportunities for cross-program promotion.
- Review and approval of printed materials and advertising plans.
- Evaluation of portfolio and program effectiveness and recommended modifications to programs and approach as needed.
- Periodic review of program metrics, conduct investment analysis, and review of evolving program design.

7.3 Survey of Existing Utility Programs Staffing

In an effort to better assist APCo Virginia in preparing for the launch and maintaining of efficiency programs, Summit Blue created a survey and contacted several utilities who are running efficiency programs to help guide planning efforts for APCo Virginia's staffing and departmental functions. The utilities that completed the survey are:

- AEP Texas
- Alliant Energy
- AmerenIL
- AmerenUE
- APS
- Integrys
- Minnesota Power
- National Grid
- Otter Tail Power

From these surveys, information has been gathered that looks at utility staffing, its handling of efficiency programs and lessons learned.

Structuring the Efficiency Department

There are a few main findings with regard to the structuring of the utility in preparation for the efficiency programs. The first is what department of the utility the efficiency operations are housed. Table 7-1 represents the results received.

Table 7-1. Efficiency Department Structuring Survey Results

Energy Efficiency Department Name	Department Reports to	Sub-Departments Under Efficiency Department	
DSM Compliance	Administrative Services	Customer Services	New Product Development
DSM Programs Department	Business Support	Demand Response	None (4 responses)
Energy Efficiency and Distributed Resources	Customer Info and Programs	Distributed Resources	Product Delivery
Energy Efficiency Programs & New Product Development	Customer Service	Energy Efficiency Implementation	Program Development
Energy Efficiency	Customer Service & Marketing	Evaluation and Regulatory	Program Management
Energy Security	Customers and Markets	Market Development	
Market Planning	Regulatory Affairs	Market Research	

The results show differences amongst surveyed utilities with regard to what department the efficiency programs fall under as well as the name/function of the actual efficiency area. Some information is more prevalent than others, however. The first is that many energy efficiency program areas are subordinated to the Customer Service area of the utility. Another is that in most cases the program area is named Energy Efficiency and thus has its own identity showing its efficiency function. Within the structure of the utility, it is also worth noting that in almost one half of the utilities there were no departments under the efficiency area. Of those with subordinate departments the added functions were diverse but focused on market, programs, and delivery of services. It is worth noting that only the largest (and most long standing) of efficiency departments had subordinate areas, and thus it may be that these subordinate departments were added after the efficiency efforts are matured. Another final note is the prevalence of combining of efficiency with demand response and new products. It seems natural that demand side services would fall under one department, whether they are subordinate or above the efficiency area.

With regard to the staffing of the efficiency offices, the results vary. Table 7-2 shows the staffing levels as compared to the size of the efficiency portfolio (measured in dollars).

Table 7-2. Efficiency Department Staffing Survey Results

Energy Department Staffing	Portfolio Size (\$)	Full Time Equivalents (FTEs) Managing Contractors	Utility Role
191	\$114 million	NA	Manages programs and implements many of the energy efficiency programs
4.5	\$1.8 million	0.5	Mix (audits, market research, low income, some lighting by contractors)
40	\$91 million	5	Mix of outsource/implement (Education, Shared Savings, Prescriptive and Custom Rebates, New Construction done by utility)
5	\$3.5 million	NA	Mix. 50% outsourced, 50% implemented by utility
8	\$17 million	8	Outsourced
1	\$2.8 millions	1	Outsourced
6	\$7.6 million	6	Outsourced
11	~\$7.5 million	6	Outsourced (Prime contractors has ~36 FTEs to programs)
8	\$25.5 million	7	Outsourced (residential new construction done by utility)

There is a wide variation in staffing and funding for efficiency programs. The most obvious distinction is in whether the utility implements their own programs or if contractors are used to implement. If implementing there seems to be a much larger staffing need. If contracting, most of the energy efficiency staff seems to be used to manage the chosen contractor(s). The key considerations in choosing to self-implement or outsourcing includes delivery cost, professional experience, separation of verification and implementation, legislative/regulatory mandates and program launch timing. In the surveys completed, only one utility manages their own portfolio, while five contract out the entire portfolio. In addition, three of the utilities have a blended approach where some are self-implemented and the rest are contracted. With regard to staff size, the second major distinction seems to lie in the total funding of the portfolio. For small (few million dollars) portfolios, the staffing needs seem to require one or two people to manage the contractor(s). For portfolios in the low tens of millions of dollars, staffing levels seem to average around \$1-3 million in portfolio budget per FTE (if programs are largely outsourced to implementation contractors).

Lessons Learned

Most utilities surveyed are new to efficiency programs, having created efficiency areas given legislation or regulatory changes (rate cases, energy efficiency portfolio standards, etc). Most of the utilities face the initial decision to self-implement or contract out their programs, but in most cases in the Midwest, the programs are implemented by contractors. Most of the utilities do not have the institutional experience or expertise to quickly (which is most often the case with legislated programs) design and launch programs. In most cases, the utilities employed organizations to assist in designing programs and assisting in the administration of the programs. In addition, implementers are employed to launch the programs themselves. Utilities, however, must still keep close contact with the implementers and also stakeholders as the programs progress.

The other main lesson learned from the surveys was that all utilities did staff up in order to ensure the proper execution of their efficiency requirements. The average figures seem to be one full time employee for each \$1-3 million in efficiency programs. These staff requirements are largely program managers who interact with contractors day-to-day and ensure the utility is in lock-step with the implementer in making sure all targets are achieved.

7.4 Marketing and Outreach Strategy

The marketing and outreach strategy for this portfolio of programs will encourage participation among customers, key market players and trade allies. The objective of the marketing and communications strategy is to make customers and key market actors aware of program offerings and benefits, and to influence their decision making when purchasing or installing energy systems or equipment in favor of more energy efficient options.

The specifics of the marketing strategy will depend on the program and the demographics of the group being engaged. Depending on the market to be reached, marketing will generally include a mix of broadcast, Internet, print media, radio, direct contact, direct mail, bill inserts, or presentations. The program descriptions describe the proposed marketing approach for each program.

Additionally, APCo Virginia would work with regional, Commonwealth, and national programs and partners to optimize cooperative marketing programs and campaigns. Marketing efforts will be designed to dovetail with other organization and government agency efforts to achieve energy efficiency, other statewide or regional efficiency programs and campaigns, including any ultimately initiated by the VASCC.

7.5 Tracking and Reporting

APCo Virginia should consider building a comprehensive internal tracking and reporting system to record all activities from the DSM portfolio of programs. Data tracking systems are being used successfully in numerous other states, and APCo Virginia would benefit from the learning that has occurred there. Implementation contractors would be responsible for tracking and reporting energy efficiency program activities by entering details of each project into the comprehensive data tracking system. The system would allow customized reporting to meet any reporting requirements in a quick, transparent and accurate manner.

7.6 Midstream Adjustments

While this plan presents detailed information on approach, energy efficiency measures and proposed incentive levels, the Commonwealth of the Virginia economy along with unforeseen changing market conditions, would require regular review and revisions of portions of this plan to reflect new information. As such, adjustments to these programs would likely be necessary.

7.7 Inter-Utility Coordination

APCo Virginia would work with other Virginia utilities to maximize the effectiveness of the programs; and regular communication and coordination will be necessary. APCo Virginia would collaborate with others to provide effective programs, reporting and evaluation processes, as well as exchange ideas for the benefit of its customers.

7.8 Leveraging Other Efficiency Initiatives

Within Virginia, several entities are promoting energy efficiency including: the Commonwealth government; Southeast Energy Efficiency Alliance (“SEEA”); U.S. Environmental Protection Agency and U.S. Department of Energy’s “ENERGY STAR” brand; other Commonwealth of Virginia programs; as well as Federal tax credits. APCo Virginia and its implementation contractors should work diligently to remain aware and up-to-date and to cooperate with efficiency efforts being directed at Virginia energy users. Wherever feasible, co-marketing efforts should be employed in an attempt to send a clear and consistent message on the benefits of energy efficiency and the resources available to help achieve it. APCo Virginia should help its customers maximize the energy efficiency incentives available.

7.9 Trade Ally Coordination

Trade allies are essential to effective implementation of energy efficiency programs. Trade allies are considered program partners and will be treated accordingly. Relationships with trade allies would be cultivated and nurtured through numerous methods to ensure effective communication in both directions. Trade allies would be regularly informed of program progress. Changes and feedback from trade allies about “what is working and what is not” in the field are essential. To ensure good two-way communication, coordination, “listening sessions,” and frequent communications would be emphasized with these key partners to advance program goals. A schedule of meetings, workshops, educational seminars, program update breakfasts, and clear and concise program descriptions would be distributed to the trade allies at the program kick off meetings. Ongoing training and program updates also would be a key part of program delivery.

8 EVALUATION, MEASUREMENT AND VERIFICATION (“EM&V”)

8.1 Overview

Program evaluation, measurement, and verification (“EM&V”) activities are central to the success of APCo Virginia’s portfolio and would be used to verify program savings impacts and monitor program performance. These activities serve as a way to determine the actual program level savings being delivered and to maximize energy efficiency investments.

Effective EM&V ensures that expected results are measurable, achieved results are robust and defensible, program delivery is effective in maximizing participation, and the overall portfolio is cost-effective.

Definition of Evaluation, Measurement and Verification

Evaluation encompasses process, impact and market evaluation activities as defined below:

Process evaluations are directed at addressing whether the programs were implemented as designed, examining perceived market barriers and opportunities, measuring participant satisfaction, documenting the program process, and exploring opportunities for efficiency improvements. Process evaluations are generally performed by using a combination of interviews with program managers, implementation contractors, trade allies, participants, program drop-outs and non-participants. They often include a detailed review of program documents, application forms, and policies and procedures, including record keeping and data collection. Sometimes, they include surveys with non-participants to examine program awareness and market barriers to participation. Process evaluations often document each significant component of the programs, including program accomplishments, administrative processes, participant experiences, customer satisfaction, and successes and failures.

Impact evaluations validate the energy and demand savings produced by a program. These evaluations validate program-reported savings by verifying the type, quantity and efficiency of measures installed, examining the measures replaced by the program for retrofit applications, or estimating the normal or standard baseline equipment for new construction applications. Impact evaluations calculate net savings by adjusting program-reported savings to account for measures that would have been installed even if the program had not existed (defined as free ridership) and for measures that were inspired by the program, but not captured by the tracking system (typically called spillover). These evaluations use data from program tracking databases, interviews with participants, on-site inspection and monitoring, and occasionally, secondary sources, such as program evaluations done for similar programs. Methods for impact evaluations include engineering calculations, simulation modeling calibrated to site billing data, and statistical/regression analysis of energy use data.

Market evaluations examine program and market assessment “indicators” developed for each program and assess how these indicators change over time. The indicators are typically derived from a program logic formulation developed during program design and early implementation. The program logic model is a simple representation of the program and the underlying hypotheses that are expected to account for the program’s success in the market. Typically, program logic models are organized around the program inputs, processes, and outputs. From this formulation, a set of key market indicators that can be tracked

over time is developed (and modified over time, as needed). These indicators are designed to measure the progress of a program across specified time periods in terms of affecting key touch points in the market. This might include the change over time in the number of qualified contractors. The indicators are designed to reflect significant changes in how the market operates, the information absorbed and used by the market, choices key market actors make on a routine basis, and the attitudes and beliefs of key market actors. Data to support market evaluations are typically gathered through surveys with trade allies, manufacturers, participants, and nonparticipants, as well as from secondary sources, such as national databases.

- **Measurement** includes developing a program data tracking system to support the evaluation effort; i.e., measuring of results and verifying the installation and retention of measures and equipment promoted by the DSM program where appropriate.
- **Verification** includes a review, audit, and verification of claimed program savings and recommendations for improvement.

Framework for Evaluation

Appropriate EM&V requires that a framework be established that encompasses both planned EM&V efforts and data collected as part of program implementation. This section provides an overview of the monitoring, verification, and evaluation efforts recommended to support appropriate EM&V. The basic requirements and approaches for planning program-specific evaluations, including the allocation of funds across evaluation efforts, are also discussed in this section. Importantly, EM&V efforts evolve over time and change as programs move from initial roll-out with few participants to full-scale implementation.

Most evaluation activities would be conducted by third-party evaluation consultants selected through a competitive bid process. This approach ensures the program evaluation effort is fair and objective. Impact evaluations are most often performed by organizations independent of those responsible for designing and implementing programs to ensure objectivity. Process evaluations and market effects studies typically are also prepared by independent evaluators, but process evaluations in particular are used less to verify performance than to help improve performance and, as such, require active participation by the program administrator/implementer.

Although some of these activities are inherently program management activities and, therefore, the responsibility of APCo Virginia, all parties are best served by establishing a forum for ongoing stakeholder participation that provides the opportunity for parties to shape the structure of the evaluation process initially and as a function of the evaluation results.

8.2 Approach to Evaluation

The overall suggested evaluation approach is based on an **integrated cross-disciplinary model** that includes evaluators as members of “project teams” involved in the various stages of program planning, design, monitoring and evaluation. This is a very cost-effective method that has been very successful for other program administrators (such as NYSERDA).

Timing of EM&V activities and reporting can have a significant effect on the accuracy and usefulness of findings. Data collection done months or years after a program intervention can be weakened by fading memories, lost data, and confounding events that have happened in the intervening time. EM&V reports that come well after program intervention can arrive too late to provide input at key program implementation stages.

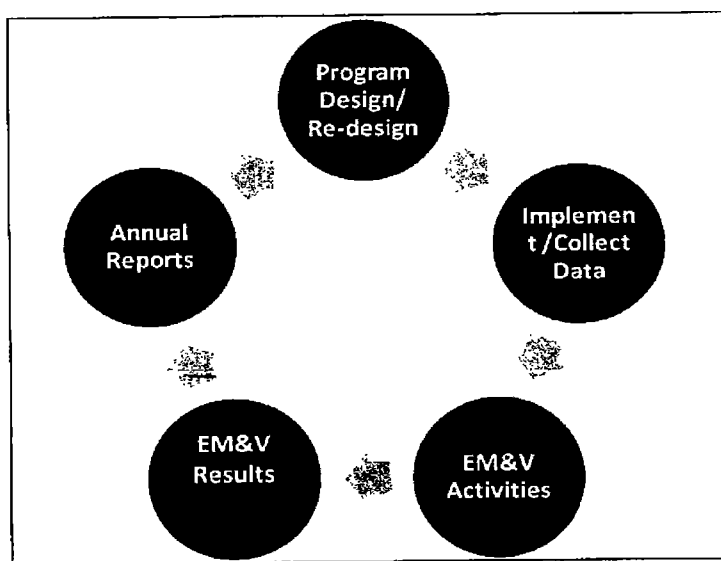
EM&V plans are designed to mitigate these problems. The process by which this is done is to integrate select data collection within the program implementation process and to provide near real-time feedback on key indicators of program progress. EM&V processes that take an “integrated data collection” (“IDC”) approach to planning seek out opportunities in the program implementation process where evaluation data can be collected efficiently, cost-effectively, accurately, and produce timely results. One example is the program application forms. Other interactions with customers where important data can be collected include initial customer contact (questions on where the customer heard about the program), during implementation (where data on the equipment baseline can be collected), and payment of incentives (questions on what measures were installed due to the program may best be collected at this time). Of course, this approach will be highly dependent of the program design and the points where the program interacts with the customer or trade ally.

The IDC approach requires the EM&V and implementation staff to work closely together to develop a protocol for collecting data as part of the standard program implementation practices and customer correspondence associated with the program. It also is important for the program implementation staff to see successful M&V as part of their responsibility; i.e., the program will get credit for the savings that can be verified and program implementers can have a dramatic influence on how accurately this in-field verification can be accomplished.

This IDC protocol garners participant feedback in near real-time to support process, market, and impact analyses. Examples include exit surveys with training participants designed by evaluation staff, but administered by program implementation staff; evaluation inputs on program application forms so key baseline data is collected before existing equipment is replaced, and regular transfer of program data to evaluators, so follow-up surveys can be implemented soon after program participation.

Figure 8-1 below shows the program evaluation cycle.

Figure 8-1. Steps of the EM&V process



Approximately three to five percent of overall portfolio program costs would be allocated to the following activities, further described in the following sections:

- EM&V related activities

- Project savings verification and due diligence
- Independent program evaluations
- Independent assessment of annual program impacts
- Internal quality assurance and control
- Coordination of evaluation activities with other players

8.3 Examples of EM&V Related Activities

Implementation and/or evaluation support contractors would assist in the development of key program and evaluation related components. These include:

- Development of an APCo Virginia specific Measures Database savings estimates for prescriptive measures in a Technical Reference Manual ("TRM"). The TRM would detail all measure savings assumptions, including base efficiency, high efficiency, measure size, measure life, free ridership, and spillover estimates.
- Review the portfolio tracking system database that captures measure and/or project data, develops initial estimates of savings, and retains participant information to assist with subsequent EM&V activities.
- Direct market baseline research and market characterization to support improved Plan implementation.
- Review program and measure cost-effectiveness.

8.4 Project Savings Verification and Due Diligence

APCo Virginia would work with implementation contractors to develop and implement quality assurance/quality control ("QA/QC"), inspection, and due diligence procedures for those programs for which deemed savings are not appropriate. These procedures would vary by program and are necessary to assure customer eligibility, completion of installations, and the reasonableness and accuracy of savings. The activities that APCo Virginia would undertake in performing EM&V procedures may include, but are not limited to, the following:

- Review of custom incentive applications and project proposals for eligibility and completeness
- Inspect and verify a statistically valid sample of installations for purposes of ensuring compliance with program requirements
- Prepare and facilitate EM&V plans where needed based on the project, and assure adherence to IPMVP protocols.

8.5 Independent Program Evaluations

Descriptions of proposed evaluations for each program are included in the program plans.

The key components of the process and impact evaluations include:

- Evaluations conducted by an independent, DSM evaluation consultant obtained through an RFP process
- Verification, by an appropriate sample, that efficiency measures are installed as expected
- In-field measure performance measurement and data collection
- Energy and demand savings analysis to compute the results that are being achieved
- Cost-effectiveness analysis by program and overall DSM portfolio
- Process evaluation to indicate how well programs are working to achieve objectives
- Identification of important opportunities for improvement

8.6 Assessment of Annual Impacts

APCo Virginia's EM&V contractor would prepare an annual report of energy efficiency program results, which will incorporate findings from evaluation activities completed that year, changes to programs, and new programs implemented, as well as gross and net savings and costs and cost-effectiveness results by program and portfolio. It is anticipated that the EM&V contractor's work, as well as participation in the process by the implementation contractor, would result in numerous areas where improvements and refinements to the APCo Virginia deemed measure database are necessary.

In addition to the procedures outlined above for verifying savings from the portfolio, APCo Virginia would implement appropriate internal controls to assure the quality of program design and implementation and establish a consistent and integrated tracking and reporting system for all programs in the portfolio. APCo Virginia would produce scheduled reports on all customer interactions, including customers recruited, incentive applications received, incentives processed, and installations verified, and would establish procedures for ongoing verification.

APCo Virginia would require implementation contractors or staff to routinely contact or visit a sample of participating customers to assess the quality of program delivery and the installation of measures for which incentives were claimed. APCo Virginia would also track, on an on-going basis, incentive fulfillment time, technical services delivery times (how long between customer request and audit completion for example), incentive documentation, and customer complaints, among other metrics of program performance.

9 GLOSSARY OF TERMS

Achievable Potential: the amount of energy use that efficiency can realistically be expected to displace assuming the most aggressive program scenario possible (such as providing end-users with payments for the entire incremental cost of more efficient equipment). This is often referred to as maximum achievable potential. Achievable potential takes into account real-world barriers to convincing end-users to adopt efficiency measures, the non-measure costs of delivering programs (for administration, marketing, tracking systems, monitoring and evaluation, etc.), and the capability of programs and administrators to ramp up program activity over time.

Applicability Factor: the fraction of the applicable dwelling units that are technically feasible for conversion to the efficient technology from an **engineering** perspective (e.g., it may not be possible to install CFLs in all light sockets in a home because the CFLs may not fit in every socket in a home).

Base Case Equipment End Use Intensity: the electricity used per customer per year by each base-case technology in each market segment. This is the consumption of the electric energy using equipment that the efficient technology replaces or affects. For example purposes only, if the efficient measure were a high efficiency lamp ("CFL"), the base end use intensity would be the annual kWh use per bulb per household associated with an incandescent light bulb that provides equivalent lumens to the CFL.

Base Case Factor: the fraction of the end use electric energy that is applicable for the efficient technology in a given market segment. For example, for residential lighting, this would be the fraction of all residential electric customers that have electric lighting in their household.

Coincidence Factor: the fraction of connected load expected to be "on" and using electricity coincident with the system peak period.

Cost-effectiveness: a measure of the relevant economic effects resulting from the implementation of an energy efficiency measure. If the benefits outweigh the cost, the measure is said to be cost-effective.

Cumulative Annual: refers to the overall savings occurring in a given year from both new participants and savings continuing to result from past participation with measures that are still in place. Cumulative annual does not always equal the sum of all prior year incremental values as some measures have relatively short measure lives and, as a result, their savings drop off over time.

Demand Response: the ability to provide peak load capacity through demand management (load control) programs. This methodology focuses on curtailment of loads during peak demand times thus avoiding the requirement to find new sources of generation capacity.

Early Replacement: refers to an efficiency measure or efficiency program that seeks to encourage the replacement of functional equipment before the end of its operating life with higher-efficiency units

Economic Potential: the subset of the technical potential screen that is economically cost-effective as compared to conventional supply-side energy resources. Both technical and economic potential screens are theoretical numbers that assume immediate implementation of efficiency measures, with no regard for the gradual "ramping up" process of real-life programs. In addition, they ignore market barriers to ensuring actual implementation of efficiency. Finally, they only consider the costs of efficiency measures themselves, ignoring any programmatic costs (such as marketing, analysis, administration) that would be necessary to capture them.

Effective Useful Life (“EUL”): the number of years (or hours) that the new energy efficient equipment is expected to function. Useful life is also commonly referred to as “measure life.”

End-use: a category of equipment or service that consumes energy (e.g., lighting, refrigeration, heating, process heat).

Energy Efficiency: using less energy to provide the same or an improved level of service to the energy consumer in an economically efficient way. Sometimes “conservation” is used as a synonym, but that term is usually taken to mean using less of a resource even if this results in a lower service level (e.g., setting a thermostat lower or reducing lighting levels). This recognizes that energy efficiency includes using less energy at any time, including at times of peak demand through demand response and peak shaving efforts.

Free Driver: individuals or businesses that adopt an energy efficient product or service because of an energy efficiency program, but are difficult to identify either because they do not receive an incentive or are not aware of exposure to the program.

Free Rider: participants in an energy efficiency program who would have adopted an energy efficiency technology or improvement in the absence of a program of financial incentive.

Incremental: savings or costs in a given year associated only with new installations happening in year.

Impact Evaluation: is the estimation of gross and net effects from the implementation of one or more energy efficiency programs. Most program impact projections contain ex-ante estimates of savings. These estimates are what the program is expected to save as a result of its implementation efforts and are often used for program planning and contracting purposes and for prioritizing program funding choices. In contrast the impact evaluation focuses on identifying and estimating the amount of energy and demand the program actually provides.

Integrated Data Collection (“IDC”): an approach in which surveys of key market actors and end-use customers (“EUCs”) are conducted in “real time” as close to the key intervention points as possible; usually integrated as part of the standard program implementation or other program paperwork process.

Lost-opportunity: refers to an efficiency measure or efficiency program that seeks to encourage the selection of higher-efficiency equipment or building practices than would typically be chosen at the time of a purchase or design decision.

Market Characterization: refers to evaluations focused on the evaluation of program-induced market effects when the program being evaluated has a goal of making longer-term lasting changes in the way a market operates. These evaluations examine changes within a market that are caused, at least in part, by the energy efficiency programs attempting to change that market.

Market Transformation: an approach in which a program attempts to influence “upstream” service and equipment provider market channels and what they offer end customers, along with educating and informing end customers directly. The emphasis is on influencing market channels and key market actors other than end customers.

Measure: any action taken to increase efficiency, whether through changes in equipment, control strategies, or behavior. Examples are higher-efficiency central air conditioners, occupancy sensor control of lighting, and retro-commissioning. In some cases, bundles of technologies or practices may be modeled

as single measures. For example, an ENERGY STAR™ home package may be treated as a single measure.

MegaWatt (“MW”): a unit of electrical output, equal to one million watts or one thousand kilowatts. It is typically used to refer to the output of a power plant.

MegaWatt-hour (“MWh”): one thousand kilowatt-hours, or one million watt-hours. One MWh is equal to the use of 1,000,000 watts of power in one hour.

Net-to-gross (“NTG”) Ratio: a factor representing net program savings divided by gross program savings that is applied to gross program impacts to convert them into net program load impacts

Portfolio: either a collection of similar programs addressing the same market, technology, or mechanisms; or the set of all programs conducted by one organization.

Process Evaluation: a systematic assessment of an energy efficiency program for the purposes of documenting program operations at the time of the examination and identifying improvements that can be made to increase the program’s efficiency or effectiveness for acquiring energy resources.

Program: a mechanism for encouraging energy efficiency. May be funded by a variety of sources and pursued by a wide range of approaches. Typically includes multiple measures.

Program Potential: the efficiency potential possible given specific program funding levels and designs. Often, program potential studies are referred to as “achievable” in contrast to “maximum achievable.”

Remaining Factor: the fraction of applicable units that have not yet been converted to the electric energy efficiency measure; that is, one minus the fraction of units that already have the energy efficiency measure installed.

Replace on Burnout (“ROB”): a DSM measure is not implemented until the existing technology it is replacing fails. An example would be an energy efficient water heater being purchased after the failure of the existing water heater.

Resource Acquisition: an approach in which end customers are the primary target of program offerings (e.g., using rebates to influence customers’ purchases of end use equipment).

Retrofit: refers to an efficiency measure or efficiency program that seeks to encourage the replacement of functional equipment before the end of its operating life with higher-efficiency units (also called “early retirement”) or the installation of additional controls, equipment, or materials in existing facilities for purposes of reducing energy consumption (e.g., increased insulation, low flow devices, lighting occupancy controls, economizer ventilation systems).

Savings Factor: the percentage reduction in electricity consumption resulting from application of the efficient technology used in the formulas for technical potential screens.

Technical Potential: the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end-users to adopt the efficiency measures. It is often estimated as a “snapshot” in time assuming immediate implementation of all technologically feasible energy saving measures, with additional efficiency opportunities assumed as they arise from activities such as new construction.

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Summary: Testimony Exhibit KMM-2, pages 64-132 to Direct Testimony of Kevin M. Murray filed by Lisa G. McAlister (Part 3b of 4) electronically filed by Ms. Vicki L. Leach-Payne on behalf of Industrial Energy Users-Ohio