Report to Anchorage Municipal Light & Power

Recommendations on Potential Energy Efficiency Incentives and Programs to be Offered by Municipal Light & Power

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Introduction to Energy Efficiency Programs

This report provides Anchorage Municipal Light and Power (ML&P) with alternatives for electric utility energy efficiency programs to determine funding amounts needed to develop and operate one of these programs for its customers. The report describes three portfolios of energy efficiency programs—named Portfolio #1, Portfolio #2, and Portfolio #3—each ensuring that all classes of customers are served.

The importance of an energy efficient economy cannot be overemphasized. Energy efficiency makes economic sense in our personal life and business activities, helps combat global warming by eliminating the need to burn fossil fuels, and enhances national security by reducing our dependence on foreign oil.

Unfortunately, certain market barriers tend to prevent individuals and businesses from investing in energy efficiency. Some of these barriers include:

- The consumers lack of knowledge about energy efficient products and their ancillary benefits.
- The split incentive between owners—who make investment decisions—and renters—who pay energy bills.
- The high costs of some efficiency measures and many consumers' inability to pay those costs.

The three energy efficiency portfolios discussed in this report are designed to overcome these barriers. These portfolios:

- Encourage customers to reduce their electrical use by purchasing and installing highly efficient products and equipment.
- Provide financial incentives to offset the higher costs for these products and equipment.
- Provide information and services to help make more informed investment decisions concerning energy efficiency.

The more sophisticated portfolios also provide technical services that help identify unique opportunities for saving energy in existing buildings and offer assistance in designing new highly efficient buildings.

The first two portfolios address efficiency improvements when purchasing products, replacing equipment, or constructing new buildings. These are essentially "lost opportunity" energy efficiency programs; they encourage customers to purchase or install the most energy efficiency product or equipment when it can be done at the lowest cost. For example, when replacing a refrigerator, these programs can offer a relatively small rebate (say $50) to influence a customer to purchase of a highly efficient refrigerator. If the rebate is not available (or it fails to influence) and the

customer buys an inefficient refrigerator, 15 year will pass (average life of a refrigerator) before that customer's purchasing decision can be influenced again. Thus, the opportunity for saving energy has been lost. Now the only way to encourage this customer to buy an efficient refrigerator would be to cover almost the full replacement cost.

Each portfolio contains low income and retrofit programs (not lost opportunity programs). Retrofit programs encourage upgrading equipment and faculties (including homes) at any point in the equipment's life. Portfolio #2 includes a retro-commissioning program (a type of retrofit program). Portfolio #3 introduces a full spectrum of retrofit programs.

Portfolio #1 is designed to be quickly implemented with little additional staff and a relatively small budget.

Portfolio #2 is much more comprehensive in encouraging customers to become more energy efficient. It accomplishes this by offering rebates and encouraging customer to install "custom" energy efficient measures, and provides services to help identify these opportunities. Fully implementing this portfolio requires a longer lead time, and a larger budget and staff.

Portfolio #3 is aggressive, comprehensive, and sophisticated. It includes programs that encourage customers to retrofit existing equipment with higher efficiency equipment. This third portfolio requires an even longer lead time to be fully implemented, and a larger budget and staff. In implementing the third portfolio, ML&P would have the most comprehensive and aggressive energy efficiency program in the entire country.

Table 1 compares the resource requirements and savings of the three portfolios.

	Portfolio #1	**Portfolio #2**	**Portfolio #3**
Annual savings (MWH)	3,865	8,138	13,564
Average annual budget	$542,000	$1,343,000	$3,225,000
Cost per kWh saved (ML&P and participant cost)	$0.012	$0.014	$0.014
Staffing requirements (FTE)	3	8	17
Months to full program implementation	3 to 6	6 to 9	6 to 12
National spending per capita ranking (percentile)[1]	72%	96%	99%

Table 1: Comparison of the three energy efficiency portfolios

[1] The percentile ranking is based on information presented in the American Council for an Energy Efficient Economy's Report E075 "The State Energy Efficiency Scorecard for 2006" Table 1.2. ML&P ranking is likely higher than would be expected because it lacks the economies of scale that other larger and statewide organization have but it still is a reasonable representation of its ranking.

"Appendix A: Energy Savings from the Portfolios" contains a table and chart of energy savings; "Appendix B: Staffing Requirements for Each Portfolio" contains a table of the detailed staffing requirements; and "Appendix C: Budget Details for Each Portfolio" shows budget details for each portfolio. The program budgets include staffing salaries, marketing and financial incentives and technical services available to customers.

Only about 40% to 50% of each portfolio's budget is dedicated to financial services—it takes more than rebates to encourage customers to be more energy efficient. Energy efficiency programs compete against energy inefficiency; against people's time, money, and interests in other personal matters; against a business's need to capitalize a new marketing campaign or exotic new marble flooring for a commercial building. Rebates can help get attention and mitigate the competition for capital, but marketing, sales, and some "hand-holding" are necessary for energy efficiency programs to be successful. As a result, all three portfolios contain recommendations for budgets for marketing, staffing, and technical assistance.

This report also contains a brief description about a very comprehensive and sophisticated approached to energy efficiency that had just been launched in Cambridge, Massachusetts known as the Cambridge Energy Alliance.

This report also addresses these other issues relating to energy efficiency:

- Funding mechanisms and rate impacts.
- Program costs for an IT system to measure savings and program costs.
- The need to conduct monitoring and evaluation studies
- The economic benefit-cost tests used to gauge the economic viability of energy efficiency programs or specific measures.

Energy Efficiency Terminology

Here are the definitions of a few terms used when describing energy efficiency programs.

Measure life: The number a years that an energy efficiency measure is expected to save energy.

Weighted average measure life: The average life of a group of energy efficiency measures with varying lives with the weighting based on amount of savings achieve by each measure.

Annualized MWH saved: The first year's MWH saved by an energy efficiency program or measure.

Lifetime MWH saved: The amount of energy saved by a measure over its life, calculated by multiplying the annualized MWH saved times the life of the measure or program.

Three Program Portfolios

This report presents and discusses three portfolios of energy efficiency programs:

Portfolio #1: Limited programs with a small budget

Portfolio #2: Expanded programs includes retro-commissioning

Portfolio #3: A comprehensive, aggressive suite of programs

Each portfolio builds on the previous one. Portfolio #2 builds on all the programs in Portfolio #1, and adds a few more sophisticated programs. Similarly, Portfolio #3 builds on Portfolio #3 and again expands the offerings with more aggressive programs. While the associated costs grow with each portfolio, so do the energy savings.

All three portfolios include a one-time cost to design and develop the program. This cost covers:

- Identifying energy efficiency measures and rebate levels included in each program, as well as their associated energy savings.
- Developing program procedures and marketing materials.
- Training staff.

Portfolio #1:
Limited Programs with a Small Budget

Portfolio #1: General Concept

This portfolio enables ML&P to quickly implement a set of energy efficiency incentives with minimal staff and a small budget. The portfolio offers incentives to customer classes to increase their electrical energy efficiency.

Portfolio #1 contains:

- An efficient products program for residential customers that offers rebates for the purchasing and installing highly efficient equipment or products. The programs would rely heavily on marketing and promotional efforts.
- A low income program that contracts with Alaska's DOE-funded Weatherization Assistance Program (WAP) or other low income agency to provide an agreed upon set of services that would complement the services the agency is already providing.
- Commercial and industrial market opportunities programs that offer rebates for purchasing high-efficiency equipment and installing new or replacing existing equipment.

These programs do not offer any other services or programs offered in Portfolio #2 and Portfolio #3.

Portfolio #1: Programs

Here is a brief description of each program in Portfolio #1 and how each would operate.

Efficient Products Program

This efficient products program offers cash rebates for purchasing ENERGY STAR® qualified clothes washers, refrigerators, and lighting including compact fluorescent light bulbs.

Open to all residential customers, the program also would serve the residential new construction market by providing homebuilders and new home buyers the same rebates to encourage purchasing ENERGY STAR® qualified appliances and CFL for newly built homes.

ML&P could expand this list of products to include ones that address situations that are relatively unique to Anchorage (such as engine block heater timers and LED outdoor lighting for the "City of Lights" celebration).

Customers would obtain a rebate application when purchasing these products. The program would be promoted primarily in conjunction with appliance retailers.

Low Income Program

This program would "piggy-back" on Alaska's DOE-funded Weatherization Assistance Program (WAP) administered by the Alaska Housing Finance Corporation or on any other state or federal programs targeted at low income households, adding to the incentives offered.

ML&P would pay through a negotiated fee schedule for services that WAP and other agencies provide to ML&P's low income customers. These services would extend the services already provided by these agencies. The type of measures and services that could be paid for by ML&P include:

- Screw-in and hard-wired CFL
- Waterbed measures
- Refrigerator removal
- Refrigerator replacement
- Electric weatherization
- Water saving measures
- Appliance timers
- Programmable thermostats
- Space heat fuel switching
- DHW fuel switching

ML&P could partner with the local gas utilities for this program to offer a full set of services covering both electrical and thermal efficiency.

"Appendix D: Common Traits of Exemplary Utility Funded Low-Income Energy Efficiency Programs" summarizes the common traits of exemplary utility-funded low-income energy efficiency programs.

Commercial and Industrial Market Opportunities Program

This program operates similarly to the efficient products program, but be targeted at businesses. It offers rebates to businesses for installing high-efficiency equipment for new construction and remodeling projects as well when replacing burned-out equipment. Businesses would submit a simple, easy-to-use application to apply for rebates.

Rebates would be offered for the following types of high-efficiency equipment:

- High-efficiency indoor and outdoor lighting
- High-efficiency HVAC equipment
- High-efficiency motors
- Lighting controls
- HVAC controls
- Walk-in cooler economizes

Promotion and marketing efforts would not only include end-use customers, but also trade allies, the building design community, real estate developers, and contractors.

Portfolio #1: Savings and Unit Costs

Once this portfolio of programs is fully operational, ML&P should be able to save on average about 3,865 MWH each year the programs operate. This amounts to about 0.35% of ML&P's annual retail energy sales.

Operating these programs for 10 years would essentially flatten energy sales; thus, energy sales in 2018 would be the same as in 2008.

First year development costs are estimated at $120,000 and would requiring an ongoing operating budget of $542,000 per year (including salaries). On a per capita spending basis, ML&P would rank at the 72% percentile when compared to spending by each of the 50 states.[2]

Table 2 summarizes the various savings and costs for Portfolio #1.

Savings	
Annual savings (MWH)	3,865
Annual savings as a percent of sales	0.35%
2018 energy sales as a percent of 2008 sales	100%
Costs	
First year design and development costs	$120,000
Average annual budget	$542,000
ML&P cost per lifetime kWh saved (ML&P cost)	0.9¢
Total cost per lifetime kWh saved (ML&P and participant cost)	1.2¢
Other Portfolio Requirements and Information	
Staffing requirements (FTE)	3
Months to full program implementation	3–6
Annual spending per capita	$8.47[3]
National spending per capita ranking (percentile)	72%

Table 2: Summary of Portfolio #1 program savings and costs

[2] The percentile ranking is based on information presented in the American Council for an Energy Efficient Economy's Report E075 "The State Energy Efficiency Scorecard for 2006" Table 1.2. ML&P ranking is likely higher than would be expected because it lacks the economies of scale that other larger and statewide organization have but it still is a reasonable representation of its ranking.

[3] Per capita spending is based on the population of ML&P service area (2000 Census) of 64,000

Portfolio #2:
Expanded Programs Includes Retro-commissioning

Portfolio #2: General Concept

To better address the different market sectors , Portfolio #2 offers more extensive and more sophisticated programs than those in Portfolio #1. As such, they require substantially more staffing and funding. These changes include:

The changes include :

- Four efficient products programs offering rebates to both residential and business customers for installing high-efficiency products in new construction and when replacing old equipment.
- An expansion of the two market opportunities programs described in Portfolio #1 to include custom equipment.
- A limited amount of funds for discretionary retrofit opportunities.
- A retro-commissioning program to create incentives for improving energy efficiency in existing buildings.

In addition, Portfolio #2 expands the low-income program.

Because this portfolio offers "custom" efficiency measures, ML&P would need to develop an economic screening test to determine if these measures are cost-effective investments from both the utility's and customer's perspective.

If all of Portfolio #2 is fully implemented, ML&P would be offering a set of programs on par with the most sophisticated and comprehensive programs offered by any utility in the country. With this level of investments in energy efficiency, ML&P must carefully plan each program and evaluates its capabilities to ensure these energy efficiency investments are optimal.

Portfolio #2: Programs

Here is a brief description of each program in Portfolio #2 and how each would operate.

Efficient Products Program

This program remains essentially the same as in Portfolio #1 except that the residential new construction projects are addressed through its own program.

This program's budget increases to intensify promotional efforts for expanding the participation and savings achieved by this program.

Residential New Construction Program

This program provides incentives to increase the overall electrical efficiency of single and smaller multifamily homes. (The commercial and industrial new construction program addresses large apartment complexes.)

The program aims to increase both the efficiency of the building itself and the efficiency of the various products installed within it. The incentives for installing clothes washers, refrigerators, and lighting would be equivalent to those in the Efficient Products program. This program continues by including energy code compliance training to contractors, and by sponsoring conferences and training seminars promoting the construction of highly efficient and zero-energy homes.

ML&P could jointly implement this program with the local gas utilities.

Low Income Program

The low income program is essentially the same as in Portfolio #1. The program's budget increases so a greater number of low income customers could be served each year.

Commercial and Industrial Market Opportunities Program

This program remains essentially the same as in Portfolio #1, with two changes. First, new construction projects are addressed under a separate program. Second, the program offers incentives as well as rebates.

In addition to simple rebates for qualifying high-efficiency equipment, the program provides incentives for custom measures that meet specific efficiency criteria. These custom measures are unique opportunities to increase the efficiency of a facility or production process. It could involve simply upgrading of a piece of equipment or a more complex upgrade requiring extensive analysis and system modifications . In both situations, a specific energy and cost analysis would be necessary to determine if providing an incentive for the project made economic sense.

Commercial and Industrial New Construction Program

This program provides the same services to the commercial and industrial (C&I) new construction market as the similar program in Portfolio #1, although as a separate program. In addition, it offers expanded and more specific services to better address the new construction market.

In addition to simple rebates for qualifying high-efficiency equipment, this program creates incentives for custom measures that meet specific efficiency criteria, and provides design assistance and facilitates a more comprehensive approach to increase the efficiency of the new facility.

Retro-commissioning Program[4]

Retro-commissioning (RCx) is a systematic, documented process identifying low-cost measures to improve the operation and maintenance of existing buildings, as well as bringing these buildings up to the design intentions of its current usage and restores them to optimal performance. To put it more simply, it is a "tune-up" of the building energy consuming systems.

The RCx process can be applied to existing buildings that have never been commissioned to restore them to optimal performance, or to buildings that were once commissioned but are now not operating as efficiently as the could.

RCx typically focuses on optimizing the performance of energy-using equipment such as mechanical equipment, lighting, and related controls, rather than replacing major equipment. As a result, indoor air quality, comfort, controls, energy, and resource efficiency are all improved.

RCx generally includes an audit of the entire building, first studying past utility bills and interviewing facility personnel, then executing and analyzing diagnostic monitoring and functional tests of building systems. Building systems are then tested and monitored again to fine tune improvements. This process helps find and repair operational problems, and identifies more complex problems. A final report of the RCx results, and a plan and schedule to recommission is created for the building's owner.

This program identifies energy professionals and trade allies that could provide RCx services and offers a financial incentive to customers that wanted take advantage of these services. Initially, the program would be offered on a limited basis to better gauge interest and participation. Based on this participation, the incentives would be adjusted to increase participation to an acceptable level so that savings targets can be met without exceeding its budget.

[4] Information concerning retro-commission is derived from information found at http://www.green.ca.gov/CommissioningGuidelines/default.htm

Portfolio #2: Savings and Unit Costs

Once this portfolio of programs is fully operational, ML&P should be able to save on average about 8,138 MWH each year the programs operate. This amounts to about 0.75% of ML&P's annual retail energy sales.

Operating these programs for 10 years until 2018 would result in 4% less energy sales than in 2008.

First year development costs are estimated at $295,000 and would require an ongoing operating budget of $1.3 million per year (including salaries). On a per capita spending basis, ML&P would rank at the 96% percentile when compared to spending by each of the 50 states.[5]

Table 3 summarizes the various savings and costs for Portfolio #2.

Savings	
Annual savings (MWH)	8,138
Annual savings as a percent of sales	0.75%
2018 energy sales as a percent of 2008 sales	96%
Costs	
First year design and development costs	$295,000
Average annual budget	$1,343,000
ML&P cost per lifetime kWh saved (ML&P cost)	1.0¢
Total cost per lifetime kWh saved (ML&P and participant cost)	1.5¢
Other Portfolio Requirements and Information	
Staffing requirements (FTE)	8
Months to full program implementation	6–9
Annual spending per capita	$21.00[6]
National spending per capita ranking (percentile)	96%

Table 3: Summary of Portfolio #2 program savings and costs

[5] The percentile ranking is based on information presented in the American Council for an Energy Efficient Economy's Report E075 "The State Energy Efficiency Scorecard for 2006" Table 1.2. ML&P ranking is likely higher than would be expected because it lacks the economies of scale that other larger and statewide organization have but it still is a reasonable representation of its ranking.

[6] Per capita spending is based on the population of ML&P service area (2000 Census) of 64,000

Portfolio #3:
A Comprehensive, Aggressive Suite of Programs

Portfolio #3: General Concept

This portfolio offers the most aggressive suite of programs that can be found anywhere in the country. It differs from Portfolio #1 and Portfolio #2 by offering more aggressive lost opportunity programs and more aggressive retrofit programs to address every customer class.

To launch a set of programs this comprehensive and sophisticated, ML&P would realistically need to make a five-year commitment in staffing and funds to be truly successful.

Portfolio #3: Programs

Here is a brief description of each program in Portfolio #3 and how each would operate.

Efficient Products Program

This program remains essentially the same as in Portfolio #2, but with an increased budget to market it more aggressively and consequently increase participation.

Low Income Program

The low income program is essentially the same as in Portfolio #1 and Portfolio #2. The program's budget increases even more so a greater number of low income customers could be served each year.

Residential New Construction Program

The residential new construction program remains essentially the same as in Portfolio #2. The program's budget, however, increases to pay for an increase in marketing and for larger incentives to increase participation so that an even greater amount of energy can be saved.

Commercial and Industrial New Construction Program

This program remains the same as in Portfolio #2, but with an increased budget for greater marketing and higher incentives.

Large Commercial and Industrial Retrofit Program

This large commercial and industrial retrofit program provides a range of electric and gas energy-saving services and incentives for existing ML&P commercial and institutional facilities. This program also incorporates the incentives from Portfolio #2's retro-commissioning program.

Incentives would be offered for qualified improvements (such as lighting, HVAC, motors, controls and natural water heaters, restaurant equipment, and improvements in industrial processes). Services would include energy surveys and technical analysis, contractor referrals, project facilitation, and post-installation assistance.

Instead of providing incentives for upgrading burned-out or nonworking equipment, this program encourages upgrading equipment while it is still useful and fully functional. The incentives would be structured to buy-down these projects to a period that has a reasonable payback for the customer.

Small Commercial and Industrial Direct Install Program

This program targets small commercial and industrial customers that use between 300 kWh and 12,500 kWh per month. The program offers turn-key services to upgrade energy consuming equipment at no cost to the customer. The type of equipment that would be graded for free would include lighting, lighting controls, HVAC controls, and certain electrically heated hot water equipment. Incentives would also be offered for other site-specific "customer upgrades" so that the upgrade costs could be recovered by the customer with one year's energy savings.

Portfolio #3: Savings and Unit Costs

Once this portfolio of programs is fully operational, ML&P should be able to save on average about 13,564 MWH each year the programs operate. This amounts to about 1.25% of ML&P's annual retail energy sales.

Operating these programs for 10 years until 2018 would result in 9% less energy sales in 2018 than in 2008.

First year development costs are estimated at $405,000 and would require an ongoing operating budget of $3.2 million per year (including salaries). On a per capita spending basis, ML&P would rank in the 99% percentile when compared to spending by each of the 50 states.[7]

Table 4 summarizes various savings and costs for Portfolio #3.

Savings	
Annual savings (MWH)	13,564
Annual savings as a percent of sales	1.25%
2018 energy sales as a percent of 2008 sales	91%
Costs	
First year design and development costs	$405,000
Average annual budget	$3,255,000
ML&P cost per lifetime kWh saved (ML&P cost)	1.5¢
Total cost per lifetime kWh saved (ML&P and participant cost)	2.2¢
Rate impact	
Other Portfolio Requirements and Information	
Staffing requirements (FTE)	17
Months to full program implementation	6–12
Annual spending per capita	$61.00[8]
National spending per capita ranking (percentile)	99%

Table 4: Summary of Portfolio #3 program savings and costs

[7] The percentile ranking is based on information presented in the American Council for an Energy Efficient Economy's Report E075 "The State Energy Efficiency Scorecard for 2006" Table 1.2. ML&P ranking is likely higher than would be expected because it lacks the economies of scale that other larger and statewide organization have but it still is a reasonable representation of its ranking.

[8] Per capita spending is based on the population of ML&P service area (2000 Census) of 64,000

Customer-Based Energy Efficiency Considerations

The Energy Policy Act of 2005 set energy goals for federal facilities. the goal: cut energy use by 2% per year in 2006 through 2015 (with 2003 being the base year). In addition, Congress and the President encourage agencies to use energy saving performance contracts (ESPCs) to finance and implement efficiency improvements and meet their energy goals.

An ESPC is a contract that allows federal agencies to accomplish energy projects for their facilities without up-front capital costs and without special Congressional appropriations to pay for the improvements. An ESPC project is a partnership between the customer and an energy services company (ESCO).

The ESCO conducts comprehensive energy audits and identifies improvements that will save energy. In consultation with the federal agency, the ESCO designs and constructs a project that meets the agency's needs and arranges financing to pay for it. The ESCO guarantees that the improvements will generate savings sufficient to pay for the project over the term of the contract. After the contract ends, all additional cost savings accrue to the federal agency. Contract terms can be up to 25 years.

The Public Authorities Class

ML&P serves two large federal facilities: Fort Richardson and Elmendorf Air Force Base. These two large customers represent approximately 18% of ML&P's annual energy sales.

These two customers might already have a contract with an ESCO and have projects underway or completed. ML&P might find it worthwhile to meet with each customer and determine how ML&P can facilitate any ongoing project. Even if these federal facilities have completed projects, ML&P's "lost opportunity" programs will still be valuable when equipment not address by an ESPC needs replacement as it burns out or breaks down, or when a new facility is constructed.

Energy Saving Performance Contracts For Other ML&P Customers

Portfolio #1 and Portfolio #2 both address lost opportunities in energy efficiency investments that make ESPCs difficult, if not impossible, to implement. ML&P should consider taking an ESPC approach for the commercial and industrial retrofit programs in Portfolio #3, if the projects are large enough to make it attractive to an ESCO.

ML&P would be wise not to provide financing for ESPC projects without seeking advice from banking experts that fully understand the risks in providing loans to commercial customers.

The Cambridge Energy Alliance

The city of Cambridge Massachusetts (home to Harvard University) has launched a innovative and comprehensive initiative known as the Cambridge Energy Alliance (www.cambridgeenergyalliance.org). Its goal is to reduce peak demand by 50 MW (15% of current usage) and fossil fuel use by 5% over the next five years. (By way of contrast, the portfolios presented in this report take a more traditional approach to energy efficiency.)

The Cambridge Energy Alliance (CEA), a nonprofit organization (separate from the City of Cambridge, but affiliated through its Board of Directors), is a $100 million initiative to implement massive energy efficiency and clean energy generation throughout the city of Cambridge. It is a collaboration among the City of Cambridge, Cambridge Health Alliance, and the Henry P. Kendall Foundation. CEA intends to hire a staff to manage projects and financing, and establish an advisory committee to involve a broad spectrum of stakeholders.

CEA will provide a full range of engineering, technical, installation, project management monitoring, and financial services. CEA intends to hire a stable of private energy services companies and contractors to perform energy assessments and implement measures. Independent engineers will monitor and verify the work of the ESCOs and contractors.

CEA will implement a $70 million revolving loan fund to finance work, which customers will pay back from their energy savings. CEA will assemble this revolving load fund from pension and annuity providers, life insurance companies, private equity, subordinate debt, and public and utility-related sources. No municipal funds will be directly involved.

CEA is still in its infancy, its effectiveness still to be proven. Still, the Municipality of Anchorage, as a whole, might seriously consider this concept. It would seem prudent, however, for Anchorage to wait and see how successful this concept is before launching a similar initiative.

General Recommendations

There are a number of broad recommendations that can be applied to all the portfolios. ML&P can:

- Commit to a minimum of five years of funding.
- Build capabilities locally to deliver energy efficiency programs.
- Be entrepreneurial about design and development of portfolios.
- Start with Portfolio #1 and grow from there.
- Support developing and implementing a city energy code.
- Offer combined electric and gas efficiency programs by partnering with EnStar.
- Support the development of an efficiency organization to serve the entire Rail Belt.

Commit to a minimum of five years of funding

There are a number of reasons it would be wise for ML&P to commit to a five year funding for any of the portfolios described in this report.

1. These programs need time to take hold. Although some of these energy efficiency programs can be fully implemented in as little a three months, customers will take much longer before becoming generally awareness of the programs.
2. Because these are mostly lost opportunity programs, customers need time to take full advantage of them since they have to wait for their current equipment and lighting to fail. The longer the programs operate, the more customers have the opportunity to participate. This serves to mitigate non-participants subsidizing participants.
3. It helps ensure that the programs attract talented people to operate them. It takes more than rebates to make these programs successful; it takes ambitious and committed energy efficiency professionals. Programs that are only going to be in place one or two years will not likely attract the talent that is needed to fully realize the programs' many goals.

Build capabilities locally to deliver energy efficiency programs

ML&P must look to the local businesses and labor markets to find and develop the talent necessary to run these programs. The energy efficiency programs more than just save energy; these programs create jobs and provide business opportunities for entrepreneurs.

Be entrepreneurial about design and development of portfolios

All the programs discussed in this report (with the exception of the Cambridge Energy Alliance concept) have a long history of success. Many are currently operating successfully in numerous states in the country. Rather than create these programs from scratch, ML&P can research these existing programs to help design the details for its programs. Some of the details that need to be addressed prior to launch include:

- Operational procedures
- Types of efficiency measures funded
- Rebate levels
- Efficiency standards
- Program marketing strategies

Start with Portfolio #1 and grow from there

Start with a manageable task by first implementing the programs in Portfolio #1. By starting with these relatively simple programs, staff can gain experience without being overwhelmed by the complexity and challenges inherent in the more sophisticated programs. As experience and insight into the operational challenges accrues, staff can expand the programs to those described in Portfolio #2 and Portfolio #3.

ML&P can also create a hybrid portfolio, containing elements from several of the portfolios, to best fit its current needs and abilities. For example, ML&P can implement a retro-commissioning program as part of Portfolio #1 or include a limited commercial lighting retrofit program that focuses on only replacing T-12 fluorescent lighting with high performance T-8 lighting.

Support developing and implementing a city energy code

One of the less expensive ways for encouraging energy efficiency is through energy codes and standards.

Many municipalities have adopted energy efficiency building codes for both residential and commercial buildings. The City of Anchorage needs to adopt a realistic and enforceable energy efficiency code, otherwise this strategy will have little impact on reducing energy consumption.

An energy code must complement energy efficiency programs that address new construction and renovations (not replace them). This energy code can encourage construction of even more efficient buildings than required by code. As the overall efficiency new buildings increase, codes can then be revised to a higher standard.

Offer combined electric and gas efficiency programs by partnering with EnStar

ML&P might consider working with EnStar (the local natural gas utility) to offer programs addressing both electric and natural gas efficiency. With this approach, customers served by both utilities could be offered a comprehensive set of service that increase their overall efficiency. While this approach would create some challenges (such as coordinating budgets and allocating staff time), but collaboration could easily resolve these issues.

Support the development of an efficiency organization to serve the entire Rail Belt

The Rail Belt is served by five electric utilities. The electric load and population served is relatively small when compared to many utilities in the lower 48. Because of this small size, ML&P could spearhead an effort to establish one organization to operate efficiency programs to serve all the customers served by the Rail Belt utilities.

There are a number of reasons that this approach makes sense. First, there are economies of scale that would lower overall program costs. Second, it would eliminate confusion and misplaced alliances between various program programs if each utility offers its own programs. Third, it would free the utilities from the challenges of operating efficiency programs and allow them to focus on its core operations.

There is one major downside to this approach. Efficiency programs offer a way for utilities to build strong customer relations with its customer. This opportunity would be lost if the responsibility for implementing program was turned over to an independent organization.

Other Issues Related to Energy Efficiency Programs

This section addresses other issues that ML&P can consider when developing and implementing energy efficiency programs.

Funding Energy Efficiency Programs and Their Impact on Rates

Energy efficiency program affect rates depends on two factors:

- The source of capital used to acquire the measures. Unless a program's vendor provides long-term financing, cash must be available on a timely basis to pay these vendors and contractors. There are several possible sources of capital.
- The accounting treatment for the expenses related to energy efficiency program measures. There are several possible methods of accounting treatment.

Sources of Capital

ML&P can finance projects either internally or externally. Internal sources include cash and revenues; external sources include general debt, project bonds, or issuing stock for corporations.

The simplest internal funding is cash-on-hand (when it is available). Using cash without booking deferred expenses reduces retained earnings. In all other cases, retained earnings would be unchanged as long as revenue remained adequate to cover the resulting cash outflows.

Another source is a revolving line of credit: supplying cash until repayment from revenues collected later in the year, or possibly rolled over to a subsequent period. Municipal utilities sometimes engage in interdepartmental borrowing when that is convenient. A large program is likely to require either a specific rate treatment (such as a surcharge or temporary increase) or cash raised through a long-term loan or issuance of bonds. These may be secured either generally or by pledging revenues raised specifically for the project (for instance, a rate surcharge).

Issuing debt incurs additional costs. Interest is the most significant, but first year costs can also include creating reserve funds. Financers generally require an unencumbered "coverage margin" in annual revenues equal to 25% to 100% of the interest. The amount of the margin falls to retained earnings *and is available as cash* (similar to depreciation) in the next period. Any financing that requires an increase in revenue for repayment requires the cooperation of regulators.

Accounting Treatments

There are several possible accounting treatments available to a municipal utility.

To minimize accounting overhead, small programs—both one-time programs as well as programs that extend over a period of years—can simply be expensed in the year implemented.

Although the energy efficiency program measures may extend over several years, the increase in accuracy represented by recognizing a depreciation life is negligible. This view is only strengthened for programs with installed assets no longer under a utility's control.

For programs involving significant expenditures, a balance sheet treatment avoids distorted and unfavorable outcomes in the current year's financial performance. Booking the program cost as a deferred expense and then expensing them over multiple years achieves the desired outcome.

The preferred method for expensing or depreciating the resulting asset depends on the source of capital. When the program is funded internally using cash available on the balance sheet, level expensing makes sense because it is straightforward. Although interest earnings associated with the cash account will be foregone, no interest expense specific to the project is incurred. Expensing externally funded programs is less simple.

The depreciation method might be important depending on the relative size of the debt service. Because interest expense is much higher in the early years, level depreciation results in a higher overall revenue requirement. Moving to a "sinking fund" depreciation method that results in combined annual interest and depreciation expense that is the same over the asset life (similar to a common mortgage payment) might be preferable in order to minimize rate shock.

"Appendix E: Details of Savings Benefits, Costs, and Rate Impacts" contains an analysis worksheet that looks at two alternate assumptions about project financing. The project costs will be expensed and recovered in rates in the year they are incurred (for example, through an EEC charge). Interest incurred to cover any recovery lag is insignificant (since the lag is in months rather than years and that working capital would be provided as needed from revolving funds). The "Net Benefit" lines summarize the change in revenue requirements due to the project. The "Required Rate Change" lines give the average and year-by-year rate increases after adjusting for changes in sales level.

The effect of amortizing costs rather than expensing them is also calculated, ramping ramp up costs along with savings. An amount to cover project costs in the first six years is amortized from 2009 to 2018. An amount for the remaining costs is amortized from 2014 through 2023. Interest is charged at the discount rate. Interest earned on the unexpended balance is credited against each annual payment, as is the Participant

Payment. This is analogous to financing the program and spreading the cost over 15 years. In both cases, rate increase requirements include only the utility portion of the project cost. The table is also adjusted for the annual reduction in MWH sales.

From the customer's perspective, the project results in savings from reduced consumption partially offset by an increase in rates.

Table 5 summarizes the results. Energy use drops from 1.89% to 6.63% across portfolios. Costs increase 0.73% to 1.70%. The net results indicate a need for net rate changes over the 20 year period of 0.02% in Portfolio #3 to 0.1% in Portfolio #2 with cash financing ("pay-as-you-go"); these are very similar with amortization of costs. The overall benefit from the customer's perspective runs from 1.73% to 5.70%.

Cash Funding vs Amortization over 20 Years			
Description	**Portfolio #1**	**Portfolio #2**	**Portfolio #3**
Years	20	20	20
Energy efficiency annualized; npv	$727,208	$1,458,306	$1,704,674
Estimated total revenue	100,000,000	100,000,000	100,000,000
Energy efficiency benefits as % of total revenue	0.73%	1.46%	1.70%
Average MWH saved	21,255	44,760	74,600
Average base MWH sales	1,125,506	1,125,506	1,125,506
MWH saved as % of MWH sales	1.89%	3.98%	6.63%
Required rate change: Pay-as-you-go	0.07%	0.10%	0.03%
Required rate change: Amortization	0.05%	0.09%	0.07%
Amortized participant payment	99,438	382,274	799,423
Overall customer benefit: Pay-as-you-go	1.72%	3.47%	5.74%
Overall customer benefit: Amortized	1.73%	3.49%	5.70%

Table 5: Summary of rate increase requirements

Tracking System

ML&P should consider developing or purchasing an IT system that can track the energy efficiency programs savings and costs. Some type of tracking system might be necessary for accounting and auditing purposes. More sophisticated tracking system can track measures installed in each customers home or business; the amount of energy saved by each measure; aggregate savings by end-use, and calculate winter and summer on-peak and off-peak savings; and other any other aspects of the programs the utility wants to track. This tracking information can help evaluate the effectiveness of programs.

Monitoring, Evaluating, and Verifying

Most utilities and organizations that operate energy efficiency programs allocate a percentage of their budget to study how well the programs are operating and their true impact on saving energy. These studies can help improve a program's process and control its quality. ML&P should consider allocating a portion of their budget for these studies regardless of the programs adopted.

Energy Efficiency Cost Effectiveness Tests

There are a number of cost/benefit tests that determine the economic sense for investing in an energy efficiency program or a specific project or measure. The tests that are commonly used are:

- The Total Resource Cost Test
- The Societal Cost Test
- The Participant Test
- The Utility Cost Test

The results of the tests are generally expressed as a number derived from dividing the total program benefits by the program costs. If this calculation yields a number greater than one, then the benefits exceed the costs and the program or project is considered a cost effective investment.

Table 6 summarizes the major components of these four cost/benefit tests and helps to better understand their difference. The first column lists the typical benefits and costs included in each test.

	Total Resource Cost Test	Societal Cost Test	Participant Test	Utility Cost Test
Benefits				
Incentive paid by utility				
Avoided supply costs	●	●		●
Customer's utility bill savings			●	
Avoided participant costs	●	●		
External benefits		●		
Costs				
Utility costs	●			●
Participant costs	●		●	
External costs		●		

Table 6: Components of energy efficiency benefits and cost tests

The Total Resource Cost Test

Utilities use the Total Resource Cost test to determine whether an investment in an energy efficiency program or measure should be made. The test compares the total costs of an energy efficiency program, including both the participants' and the utility's costs to the total resource cost savings. The resource costs savings are considered the benefits, which generally include electrical energy costs, capacity costs, and any other resource cost savings (such as water and fossil fuel).

The Societal Cost Test

This test comprises the Total Resource Cost Test, and includes other social costs (such as environmental externalities and social benefits of improved working environment). The societal cost and benefits used in this test are often limited to costs and benefits that can be readily quantified.

The Utility Cost Test

The Utility Cost Test measures the utility's cost of an energy efficiency program (including incentive costs), excluding any costs incurred by the participant. The benefits are similar to the Total Resource Benefit Test.

The Participant Test

The Participant Test indicates whether an efficiency project or measure is economically attractive to the customer. The benefits generally include the participant's retail bill savings over the life of the efficiency improvement. The costs include the participant's financial contribution to the project. Since many customers do not base their decision to participate in a program or invest in an efficiency upgrade entirely on quantifiable benefits and costs, this test is not always be a complete measure of the benefits and costs of a project (at least from the customer' perspective.

Table 7 shows the results of the two cost/benefit cost tests on the three portfolios. A ratio greater than one implies the benefits are greater than the costs. The data for the resource benefit test is conservative since it only includes electric resource savings and not other resources (such as water or fuels) that are ancillary benefits of electrical energy efficiency savings.

	Portfolio #1	Portfolio #2	Portfolio #3
Total Resource Benefits Test	2.55	2.02	1.40
Utility Test	3.26	2.97	1.93

Table 7: Results of the benefit cost tests[9]

[9] The societal test is not included because this report focuses on the direct benefits of energy efficiency and not on other societal costs and benefits. The participant test is omitted because participant costs and benefits can vary with each participant.

Appendix A: Energy Savings from the Portfolios

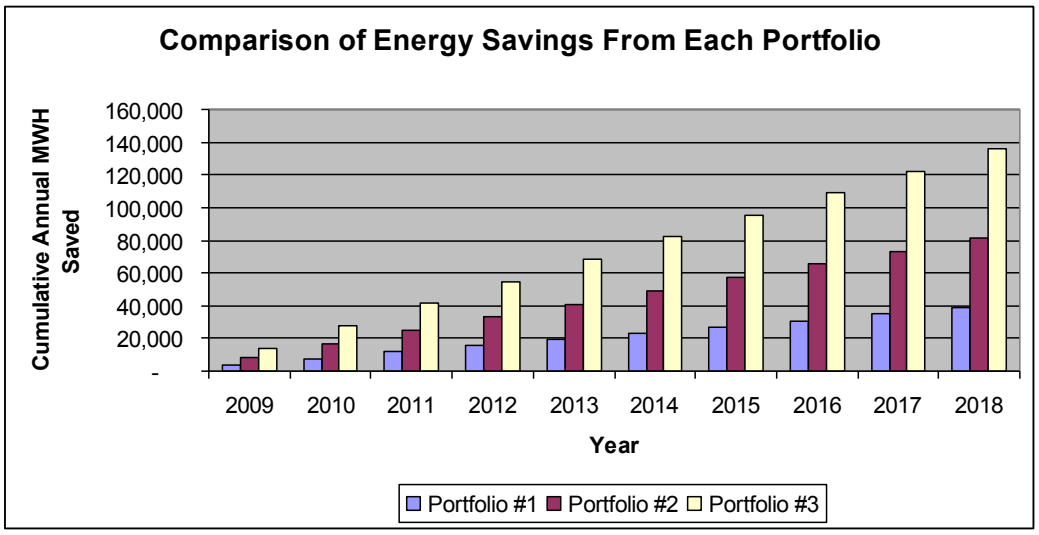
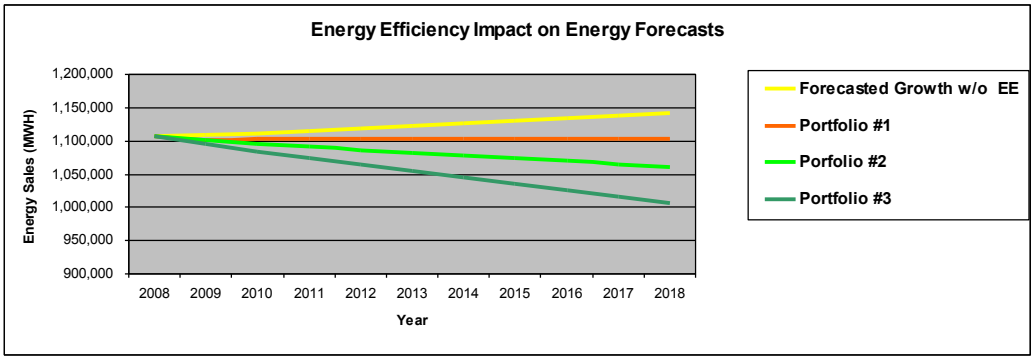


Table 8: Comparison of energy savings from each portfolio



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Forecasted Growth w/o EE	1,109,729	1,111,882	1,115,695	1,119,522	1,123,362	1,127,215	1,131,082	1,134,961	1,138,854	1,142,760
Portfolio #1										
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Incremental MWh Savings	3,877	3,855	3,865	3,864	3,864	3,864	3,864	3,864	3,864	3,864
Cumulative MWh Savings	3,877	7,732	11,596	15,460	19,325	23,189	27,053	30,917	34,781	38,645
Sales after Energy Savings	1,105,852	1,104,150	1,104,099	1,104,062	1,104,037	1,104,026	1,104,029	1,104,044	1,104,073	1,104,115
Portfolio #2										
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Incremental MWh Savings	8,307	8,261	8,215	8,182	8,149	8,117	8,085	8,053	8,022	7,991
Cumulative MWh Savings	8,307	16,568	24,782	32,964	41,113	49,230	57,315	65,368	73,390	81,381
Sales after Energy Savings	1,101,422	1,095,314	1,090,913	1,086,558	1,082,249	1,077,985	1,073,766	1,069,593	1,065,464	1,061,379
Portfolio #3										
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Incremental MWh Savings	13,845	13,768	13,691	13,636	13,582	13,528	13,475	13,422	13,370	13,318
Cumulative MWh Savings	13,845	27,613	41,304	54,940	68,522	82,050	95,525	108,947	122,317	135,636
Sales after Energy Savings	1,095,884	1,084,269	1,074,391	1,064,582	1,054,840	1,045,165	1,035,556	1,026,014	1,016,537	1,007,125

Table 9: Energy efficiency impact on energy forecasts

Appendix B: Staffing Requirements for Each Portfolio

	Program Operations Director FTE	Program Manager FTE	Assistant Program Manager FTE	Program Planning & Evaluation Manager FTE	Technical Manager	Field Staff	Office Manager		
Base Salary	$ 75,000	$ 60,000	$ 40,000	$ 60,000	$ 60,000	$ 60,000	$ 35,000		
Loaded Salary Factor	33%	33%	33%	33%	33%	33%	33%		
Loaded Salary	$ 99,750	$ 79,800	$ 53,200	$ 79,800	$ 79,800	$ 79,800	$ 46,550		
Portfolio #1 - Program Portfoilo								**Total FTE**	**Total $**
Residential Efficient Products & New Construction		0.8				0.2		1.0	$ 75,810
Low Income		0.3				0.2		0.5	$ 35,910
Commercial New Construction & Market Opportunties		1.0				0.6		1.6	$ 127,680
Total FTE Requirements		2.0				1.0	-	3.0	
Annual Salary Budget	$ -	$ 159,600	$ -	$ -	$ -	$ 79,800	$ -		$ 239,400
Portfolio #2 - Program Portfoilo								**Total FTE**	**Total $**
Efficient Products Program	0.1	0.8		0.2		0.1	0.1	1.2	$ 93,322
Residential New Construction	0.1	1.0		0.2		0.2	0.1	1.5	$ 121,252
Low Income Program	0.1	0.3		0.2		0.1	0.1	0.7	$ 53,422
C&I New Construction	0.1	1.0		0.2		0.6	0.1	1.9	$ 153,172
Commercial Market Opportunites Program	0.1	0.8		0.2		0.7	0.1	1.8	$ 141,202
Retrocommissioning	0.1	0.3		0.2		0.3	0.1	0.9	$ 69,382
Total FTE Requirements	0.5	4.0	-	1.0	-	2.0	0.5	8.0	
Annual Salary Budget	$ 49,875	$ 319,200	$ -	$ 79,800	$ -	$ 159,600	$ 23,275		$ 631,750
Portfolio #3 - Program Portfoilo								**Total FTE**	**Total $**
Efficient Products Program	0.1	0.8	0.3	0.1	0.1	0.1	0.1	1.8	$ 132,683
Residential New Construction	0.1	1.0	0.3	0.1	0.1	0.1	0.1	2.0	$ 152,633
Low Income Program	0.1	0.3	0.3	0.1	0.1	0.1	0.1	1.3	$ 92,783
Commercial New Construction Program	0.1	1.0	0.5	0.1	0.1	1.0	0.1	3.1	$ 229,900
Commercial Market Opportunites Program	0.1	1.0	0.5	0.1	0.1	1.0	0.1	3.1	$ 229,900
C&I Retrofit	0.1	1.0	0.5	0.1	0.1	1.0	0.1	3.1	$ 229,900
Small C&I Direct Install	0.1	1.0	0.5	0.1	0.1	0.6	0.1	2.7	$ 197,980
Total FTE Requirements	1.0	6.0	3.0	1.0	1.0	4.0	1.0	17.0	
Annual Salary Budget	$ 99,750	$ 478,800	$ 159,600	$ 79,800	$ 79,800	$ 321,480	$ 46,550		$ 1,265,780

Table 10: Staffing requirements for each portfolio

Appendix C: Budget Details for Each Portfolio

Portfolio #1 Budget Breakdown by Function

	2008 Budget	Percent Breakdown by Function	Subsequent Years
	$244,397		$542,714
Mid-2008 Start Discount	50%		
Design & Development	$125,000	0%	—
Administration Costs	$67,839	25%	$135,679
Implementation Costs	$51,558	19%	$103,116
Incentives Costs	—	56%	$303,920
Evaluation Costs	—	0%	—
	$244,397	100%	$542,714
Staffing			$238,794
Other			$303,920

Portfolio #1 Budget Breakdown by Program

	Program Design & Development	Percent Breakdown By Program	Estimate Annual Budgets at Full Implementation
Residential Efficient Products	$25,000	25%	$135,679
Low Income Program	$25,000	20%	$108,543
Commercial Market Opportunities	$25,000	55%	$298,493
IT System	$50,000		
Total Design & Development	$125,000	100%	$542,714

Table 11: Portfolio #1 budget breakdown by function and program

Portfolio #2 Budget Breakdown by Function

	2008 Budget	Percent Breakdown by Function	Subsequent Years
	$610,930		$1,370,630
Mid-2008 Start Discount	50%		
Design & Development	$295,000	0%	—
Administration Costs	$144,601	21%	$289,203
Implementation Costs	$171,329	25%	$342,658
Incentives Costs	—	49%	$670,238
Evaluation Costs	—	5%	$68,532
	$610,930	100%	$1,370,630
Staffing			$631,861
Other			$670,238

Portfolio #2 Budget Breakdown by Program

	Program Design & Development	% Breakdown By Program	Estimate Annual Budgets at Full Implementation
Residential Efficient Products	$25,000	18%	$246,713
Residential New Construction	$25,000	12%	$164,476
Low Income Program	$25,000	15%	$205,595
Commercial New Construction	$35,000	20%	$274,126
Commercial Market Opportunities	$35,000	25%	$342,658
Retro-commissioning	$25,000	10%	$137,063
IT System	$125,000	0%	—
Totals	$295,000	100%	$1,370,630

Table 12: Portfolio #2 budget breakdown by function and program

Portfolio #3 Budget Breakdown by Function

	2008 Budget	Percent Breakdown by Function	Subsequent Years
	$1,036,115		$3,304,265
Mid-2008 Start Discount	50%		
Design & Development	$405,000	0%	—
Administration Costs	$267,645	16%	$535,291
Implementation Costs	$363,469	22%	$726,938
Incentives Costs	—	54%	$1,777,695
Evaluation Costs	—	8%	$264,341
	$1,036,115	100%	$3,304,265
Staffing			$1,262,229
Other			$1,777,695

	Program Design & Development	Percent Breakdown By Program	Estimate Annual Budget at Full Implementation
Residential Efficient Products	$25,000	10%	$330,426.54
Residential New Construction	$25,000	8%	$264,341.23
Low Income Program	$25,000	10%	$330,426.54
Commercial New Construction	$35,000	12%	$396,511.85
Commercial Market Opportunities	$35,000	15%	$495,639.81
C&I Retrofit	$35,000	25%	$826,066.34
Small C&I Direct Install	$75,000	20%	$660,853.08
IT System	$150,000	0%	—
Totals	$405,000	100%	$3,304,265

Table 13: Portfolio #3 budget breakdown by function and program

Appendix D: Common Traits of Exemplary Utility Funded Low-Income Energy Efficiency Programs

In September 2005, the American Council for an Energy Efficient Economy ("ACEEE") published the report: "Meeting Essential Needs: The Results of a National Search for Exemplary Utility Funded Low-Income Energy Efficiency Programs".

The complete ACEEE report can be found at:

http://www.aceee.org/store/proddetail.cfm?CFID=415458&CFTOKEN=89068186&ItemID=398&CategoryID=7

The report listed common traits in exemplary low-income energy efficiency programs. An abbreviated list of those traits follows.

According to the report, an exemplary utility would:

- Partner with other agencies that may already be providing similar services to deliver them more efficiently.
- Select one agency to provide all services, making it simpler for the customer to participate.
- Target all types of energy use: electricity, natural gas, heating oil, and liquid petroleum gas.
- Educate customers as an integral part of the service package.
- Understand that "cost-effectiveness" should not necessarily be the most important consideration when designing and implementing the program.

The resultant program should:

- Examine the whole house as a complete system rather than independent measures.
- Use innovative approaches for hard-to-reach customers.
- Address the full spectrum of housing types: single family houses, multi-family buildings, and mobile homes.
- Recognize a population to serve that would benefit tremendously from lower energy costs.

ML&P should consider these traits when engaging in its own income energy efficiency program.

Appendix E: Details of Savings Benefits, Costs, and Rate Impacts

Energy Sales Growth Forecast

Growth Rate 2006-2010	0.19%
Growth Rate 2011-2015	0.34%

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Growth Without Energy Efficiency Programs	1,107,580	1,109,729	1,111,882	1,115,695	1,119,522	1,123,362	1,127,215	1,131,082	1,134,961	1,138,854	1,142,760

Avoided Energy at Blended Production & Market Cost of Fuel

MWH/Winter MW ratio	6,500
Assumed Weighted Averaged Measure Life	11
Discount Rate	6.5%
Sales Base	1,125,506
Revenue Base	100,000,000

Amortization of program costs is split into two amounts - the first 6 years and last 4 years, each spread over 10 years net of participant payments and interest earnings at 1% less than the discount rate.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Avoided Cost of Energy (Real $/MWH)	$ 23.26	$ 27.96	$ 32.67	$ 36.93	$ 32.69	$ 35.21	$ 37.69	$ 40.87	$ 44.34	$ 48.64	$ 53.79	$ 55.39	$ 56.50	$ 57.32	$ 58.42	$ 60.19	$ 62.16	$ 64.72	$ 64.70	$ 64.67	$ 64.64
Avoided Cost of Energy (Nominal $/MWH)	$ 23.26	$ 28.53	$ 34.02	$ 39.24	$ 35.44	$ 38.95	$ 42.54	$ 47.07	$ 52.12	$ 58.34	$ 65.83	$ 69.17	$ 72.00	$ 74.54	$ 77.52	$ 81.50	$ 85.89	$ 91.25	$ 93.07	$ 94.93	$ 96.83
Avoided Capacity ($/mW-yr)	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900	$ 47,900

1/ Real and nominal avoided energy costs provided by R. Reagan in 3/31/08 worksheet via email

Portfolio #1

Participant Costs as % of Utility Costs 30%

	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Energy Savings			3,877	7,732	11,596	15,460	19,325	23,189	27,053	30,917	34,781	38,645	38,645	34,769	30,914	27,049	23,185	19,321	15,457	11,593	7,728	3,864
Capacity Savings			0.60	1.19	1.78	2.38	2.97	3.57	4.16	4.76	5.35	5.95	5.95	5.35	4.76	4.16	3.57	2.97	2.38	1.78	1.19	0.59
Energy Benefits (Real $)	$10,990,993		$ 108,373	$ 252,620	$ 428,231	$ 505,364	$ 680,410	$ 873,900	$ 1,105,542	$ 1,370,826	$ 1,691,684	$ 2,078,740	$ 2,140,415	$ 1,964,547	$ 1,772,064	$ 1,580,262	$ 1,395,587	$ 1,201,073	$ 1,000,386	$ 749,993	$ 499,800	$ 249,803
Capacity Benefits	$1,676,560		$ 28,567	$ 56,975	$ 85,454	$ 113,931	$ 142,407	$ 170,883	$ 199,358	$ 227,834	$ 256,310	$ 284,786	$ 284,786	$ 256,219	$ 227,811	$ 199,333	$ 170,855	$ 142,379	$ 113,903	$ 85,428	$ 56,952	$ 28,477
Total Benefits	$12,667,554		$ 136,941	$ 309,596	$ 513,685	$ 619,296	$ 822,817	$ 1,044,784	$ 1,304,900	$ 1,598,660	$ 1,947,994	$ 2,363,526	$ 2,425,202	$ 2,220,767	$ 1,999,875	$ 1,779,594	$ 1,566,442	$ 1,343,452	$ 1,114,290	$ 835,421	$ 556,753	$ 278,280
M&P Costs	$3,881,673	$ 244,397	$ 542,714	$ 539,697	$ 541,034	$ 541,009	$ 540,990	$ 540,978	$ 540,973	$ 540,974	$ 540,982	$ 540,996										
Participant Costs	$1,095,658	$ -	$ 162,814	$ 161,909	$ 162,310	$ 162,303	$ 162,297	$ 162,294	$ 162,292	$ 162,292	$ 162,295	$ 162,299										
Total Costs	$4,977,330	$ 244,397	$ 705,528	$ 701,606	$ 703,344	$ 703,311	$ 703,287	$ 703,272	$ 703,265	$ 703,266	$ 703,276	$ 703,294										
Net Benefit (including participant costs)	$6,917,086	$ (244,397)	$ (568,588)	$ (392,010)	$ (189,659)	$ (84,016)	$ 119,530	$ 341,512	$ 601,635	$ 895,393	$ 1,244,717	$ 1,660,232	$ 2,425,202	$ 2,220,767	$ 1,999,875	$ 1,779,594	$ 1,566,442	$ 1,343,452	$ 1,114,290	$ 835,421	$ 556,753	$ 278,280
Net Benefit (utility only)	$8,012,744	$ (244,397)	$ (405,774)	$ (230,101)	$ (27,349)	$ 78,287	$ 281,827	$ 503,805	$ 763,927	$ 1,057,685	$ 1,407,012	$ 1,822,531	$ 2,425,202	$ 2,220,767	$ 1,999,875	$ 1,779,594	$ 1,566,442	$ 1,343,452	$ 1,114,290	$ 835,421	$ 556,753	$ 278,280
Reqd Rate Change	0.07%	0.3%	0.5%	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	-0.1%	-0.6%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Cumulative Present Value		$ (229,481)	$ (730,782)	$ (1,055,307)	$ (1,202,733)	$ (1,264,054)	$ (1,182,136)	$ (962,372)	$ (598,845)	$ (90,840)	$ 572,253	$ 1,402,721	$ 2,541,797	$ 3,521,192	$ 4,349,341	$ 5,041,294	$ 5,613,195	$ 6,073,747	$ 6,432,426	$ 6,684,927	$ 6,842,931	$ 6,917,086
Annualized Present Value Benefit	$ 727,208																					
Amortized Cost, net of interest earnings, participant cost			$ 51,154	$ 129,236	$ 206,203	$ 283,574	$ 206,220	$ 540,648	$ 618,009	$ 695,368	$ 772,726	$ 772,722	$ 523,239	$ 523,239	$ 523,239	$ 523,239	$ 523,239					
Utility Net Benefit if Amortized	$8,232,044	$ -	$ 85,786	$ 180,360	$ 307,482	$ 335,721	$ 616,597	$ 504,136	$ 686,891	$ 903,292	$ 1,175,268	$ 1,590,805	$ 1,901,963	$ 1,697,528	$ 1,476,637	$ 1,256,356	$ 1,043,204	$ 1,343,452	$ 1,114,290	$ 835,421	$ 556,753	$ 278,280
Rate Increase if Amortized	0.05%	0.00%	0.259%	0.250%	0.219%	0.320%	0.067%	0.463%	0.168%	0.135%	0.081%	-0.063%	-0.312%	-0.152%	-0.133%	-0.133%	-0.139%	-0.649%	-0.120%	-0.070%	-0.069%	-0.068%

Lifetime MWH saved	425,099
$npv Savings/Lifetime MWH saved	$ 29.80
$npv Cost/Lifetime MWH saved	$ 11.71
$npv Utility Cost/Lifetime MWH saved	$ 9.13
Utility B/C Ratio	3.26
Total Resource Test B/C Ratio	2.55

For Calculation Purposes Only										
3,877	7,732	11,596	15,460	19,325	23,189	27,053	30,917	34,781	38,645
0.60	1.19	1.78	2.38	2.97	3.57	4.16	4.76	5.35	5.95

Table 14: Savings benefits, costs, and rate impacts

Portfolio #2

Participant Costs as % of Utility Costs		50%																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Energy Savings			8,307	16,568	24,782	32,964	41,113	49,230	57,315	65,368	73,390	81,381	81,381	73,074	64,814	56,599	48,417	40,268	32,151	24,066	16,013	7,991
Capacity Savings			1.28	2.55	3.81	5.07	6.33	7.57	8.82	10.06	11.29	12.52	12.52	11.24	9.97	8.71	7.45	6.20	4.95	3.70	2.46	1.23
Energy Benefits (Real $)	$23,157,351		$ 232,229	$ 541,330	$ 915,191	$ 1,077,525	$ 1,447,583	$ 1,855,313	$ 2,342,244	$ 2,898,370	$ 3,569,564	$ 4,377,518	$ 4,507,396	$ 4,128,940	$ 3,715,303	$ 3,306,599	$ 2,914,403	$ 2,503,254	$ 2,080,889	$ 1,556,994	$ 1,035,564	$ 516,574
Capacity Benefits	$3,538,123		$ 61,215	$ 122,090	$ 182,627	$ 242,921	$ 302,974	$ 362,789	$ 422,369	$ 481,715	$ 540,830	$ 599,718	$ 599,718	$ 538,503	$ 477,628	$ 417,091	$ 356,797	$ 296,744	$ 236,929	$ 177,349	$ 118,003	$ 58,887
Total Benefits	$26,695,474		$ 293,444	$ 663,419	$ 1,097,818	$ 1,320,446	$ 1,750,557	$ 2,218,102	$ 2,764,612	$ 3,380,085	$ 4,110,394	$ 4,977,235	$ 5,107,114	$ 4,667,442	$ 4,192,931	$ 3,723,689	$ 3,271,200	$ 2,799,998	$ 2,317,818	$ 1,734,343	$ 1,153,567	$ 575,461
M&P Costs	$8,997,819	610,930	$ 1,370,630	$ 1,363,009	$ 1,355,451	$ 1,350,005	$ 1,344,615	$ 1,339,283	$ 1,334,006	$ 1,328,786	$ 1,323,621	$ -										
Participant Costs	$4,212,088	$ -	$ 685,315	$ 681,505	$ 677,726	$ 675,002	$ 672,308	$ 669,641	$ 667,003	$ 664,393	$ 661,811	$ -										
Total Costs	$13,209,906	$ 610,930	$ 2,055,945	$ 2,044,514	$ 2,033,177	$ 2,025,007	$ 2,016,923	$ 2,008,924	$ 2,001,010	$ 1,993,179	$ 1,985,432	$ -										
Net Benefit (ndding participant costs)	$11,856,267	$ (610,930)	$ (1,762,501)	$ (1,381,095)	$ (935,359)	$ (704,561)	$ (266,366)	$ 209,178	$ 763,603	$ 1,386,906	$ 2,124,962	$ 4,977,235	$ 5,107,114	$ 4,667,442	$ 4,192,931	$ 3,723,689	$ 3,271,200	$ 2,799,998	$ 2,317,818	$ 1,734,343	$ 1,153,567	$ 575,461
Net Benefit (utlty only)	$16,068,354	$ (610,930)	$ (1,077,186)	$ (699,590)	$ (257,633)	$ (29,559)	$ 405,942	$ 878,820	$ 1,430,606	$ 2,051,299	$ 2,786,773	$ 4,977,235	$ 5,107,114	$ 4,667,442	$ 4,192,931	$ 3,723,689	$ 3,271,200	$ 2,799,998	$ 2,317,818	$ 1,734,343	$ 1,153,567	$ 575,461
Reqtd Rate Change		0.10%	0.7%	1.2%	0.4%	0.3%	0.5%	0.3%	0.3%	0.2%	0.1%	0.0%	-1.5%	-0.1%	-0.4%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.2%	-0.2%	-0.1%
Cumulative Present Value			$ (573,643)	$ (2,127,569)	$ (3,270,907)	$ (3,997,983)	$ (4,512,229)	$ (4,694,779)	$ (4,560,171)	$ (4,098,779)	$ (3,311,913)	$ (2,179,890)	$ 309,784	$ 2,708,508	$ 4,766,928	$ 6,503,222	$ 7,951,091	$ 9,145,391	$ 10,105,265	$10,851,347	$ 11,375,541	$11,702,920	$ 11,856,267
Annualized Present Value Benefit	$ 1,458,306																						
Amortized Cost, net of interest earnings, participant cost			$ (78,021)	$ 150,686	$ 378,114	$ 603,588	$ 385,301	$ 1,284,297	$ 1,507,046	$ 1,728,906	$ 1,949,886	$ 2,611,696	$ 1,500,452	$ 1,500,452	$ 1,500,452	$ 1,500,452	$ 1,500,452						
Utlty Net Benefit if Amortized	$15,829,554	$ -	$ 371,465	$ 512,734	$ 719,703	$ 716,857	$ 1,365,256	$ 933,806	$ 1,257,566	$ 1,651,179	$ 2,160,508	$ 2,365,539	$ 3,606,662	$ 3,166,990	$ 2,692,479	$ 2,223,237	$ 1,770,747	$ 2,799,998	$ 2,317,818	$ 1,734,343	$ 1,153,567	$ 575,461
Rate Increase if Amortized		0.09%	0.00%	0.368%	0.602%	0.537%	0.752%	0.094%	1.187%	0.430%	0.361%	0.247%	0.558%	-1.257%	-0.355%	-0.310%	-0.305%	-0.313%	-1.783%	-0.266%	-0.158%	-0.153%	-0.147%
Lifetime MWH saved		895,195																					
$ Savings/Lifetime MWH saved		$ 29.82																					
$ Cost/Lifetime MWH saved		$ 14.76																					
$npv Utlty Cost/Lifetime MWH saved		$ 10.05																					
Utlty Test B/C Ratio		2.97																					
Total Resource Test B/C Ratio		2.02																					

For Calculation Purposes Only										
8,307	16,568	24,782	32,964	41,113	49,230	57,315	65,368	73,390	81,381
1.28	2.55	3.81	5.07	6.33	7.57	8.82	10.06	11.29	12.52

Portfolio #3

Participant Costs as % of Utility Costs		40%																						
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Energy Savings			13,845	27,613	41,304	54,940	68,522	82,050	95,525	108,947	122,317	135,636	135,636	121,791	108,023	94,332	80,695	67,113	53,585	40,110	26,688	13,318
Capacity Savings			2.13	4.25	6.35	8.45	10.54	12.62	14.70	16.76	18.82	20.87	20.87	18.74	16.62	14.51	12.41	10.33	8.24	6.17	4.11	2.05
Energy Benefits (Real $)	$38,595,585		$ 387,048	$ 902,216	$ 1,525,318	$ 1,795,875	$ 2,412,639	$ 3,092,189	$ 3,903,739	$ 4,830,617	$ 5,949,273	$ 7,295,863	$ 7,512,327	$ 6,881,566	$ 6,192,172	$ 5,510,998	$ 4,857,338	$ 4,172,090	$ 3,468,149	$ 2,594,990	$ 1,725,940	$ 860,956
Capacity Benefits	$5,896,872		$ 102,025	$ 203,483	$ 304,378	$ 404,868	$ 504,957	$ 604,649	$ 703,948	$ 802,858	$ 901,384	$ 999,530	$ 999,530	$ 897,504	$ 796,047	$ 695,151	$ 594,661	$ 494,573	$ 394,881	$ 295,582	$ 196,672	$ 98,146
Total Benefits	$44,492,457		$ 489,073	$ 1,105,699	$ 1,829,696	$ 2,200,743	$ 2,917,595	$ 3,696,837	$ 4,607,687	$ 5,633,475	$ 6,850,657	$ 8,295,392	$ 8,511,857	$ 7,779,070	$ 6,988,218	$ 6,206,149	$ 5,451,999	$ 4,666,663	$ 3,863,030	$ 2,890,572	$ 1,922,611	$ 959,102
M&P Costs	$22,993,994	$ 1,036,115	$ 3,322,740	$ 3,304,265	$ 3,285,942	$ 3,272,739	$ 3,259,674	$ 3,246,746	$ 3,233,955	$ 3,221,299	$ 3,208,778	$ 3,196,391										
Participant Costs	$8,808,447	$ -	$ 1,329,096	$ 1,321,706	$ 1,314,377	$ 1,309,095	$ 1,303,869	$ 1,298,698	$ 1,293,582	$ 1,288,520	$ 1,283,511	$ 1,278,556										
Total Costs	$31,802,441	$ 1,036,115	$ 4,651,836	$ 4,625,972	$ 4,600,319	$ 4,581,834	$ 4,563,543	$ 4,545,444	$ 4,527,537	$ 4,509,819	$ 4,492,290	$ 4,474,948										
Net Benefit (ndding participant costs)	$9,974,514	$ (1,036,115)	$ (4,162,762)	$ (3,520,273)	$ (2,770,623)	$ (2,381,091)	$ (1,645,948)	$ (848,607)	$ 80,150	$ 1,123,656	$ 2,358,367	$ 3,820,445	$ 8,511,857	$ 7,779,070	$ 6,988,218	$ 6,206,149	$ 5,451,999	$ 4,666,663	$ 3,863,030	$ 2,890,572	$ 1,922,611	$ 959,102
Net Benefit (utlty only)	$18,782,961	$ (1,036,115)	$ (2,833,667)	$ (2,198,566)	$ (1,456,246)	$ (1,071,996)	$ (342,078)	$ 450,091	$ 1,373,732	$ 2,412,176	$ 3,641,878	$ 5,099,001	$ 8,511,857	$ 7,779,070	$ 6,988,218	$ 6,206,149	$ 5,451,999	$ 4,666,663	$ 3,863,030	$ 2,890,572	$ 1,922,611	$ 959,102
Reqtd Rate Change		0.03%	1.2%	3.0%	0.6%	0.5%	0.9%	0.5%	0.5%	0.4%	0.3%	0.1%	-0.2%	-3.5%	-0.7%	-0.6%	-0.6%	-0.6%	-0.5%	-0.5%	-0.3%	-0.3%	-0.3%
Cumulative Present Value			$ (972,878)	$ (4,643,016)	$ (7,557,270)	$ (9,710,939)	$ (11,448,852)	$(12,576,876)	$ (13,122,960)	$ (13,074,531)	$(12,437,021)	$ (11,180,657)	$ (9,269,624)	$(5,271,751)	$(1,841,050)	$ 1,052,773	$ 3,465,888	$ 5,456,387	$ 7,056,178	$ 8,299,647	$ 9,173,305	$ 9,718,936	$ 9,974,514
Annualized Present Value Benefit	$ 1,704,674																						
Amortized Cost, net of interest earnings, participant cost			$ (3,174)	$ 513,073	$ 1,026,437	$ 1,535,720	$ 1,040,948	$ 3,204,418	$ 3,707,564	$ 4,208,706	$ 4,707,866	$ 4,712,821	$ 3,346,806	$ 3,346,806	$ 3,346,806	$ 3,346,806	$ 3,346,806						
Utlty Net Benefit if Amortized	$20,210,240	$ -	$ 492,247	$ 592,626	$ 803,259	$ 665,022	$ 1,876,648	$ 492,419	$ 900,123	$ 1,424,769	$ 2,142,791	$ 3,582,571	$ 5,165,051	$ 4,432,265	$ 3,641,413	$ 2,859,343	$ 2,105,194	$ 4,666,663	$ 3,863,030	$ 2,890,572	$ 1,922,611	$ 959,102
Rate Increase if Amortized		0.0%	0.7%	1.2%	1.0%	1.4%	0.0%	2.7%	0.9%	0.8%	0.6%	-0.1%	-1.6%	-0.7%	-0.6%	-0.6%	-0.6%	-3.9%	-0.5%	-0.3%	-0.3%	-0.3%
Lifetime MWH saved		1,491,991																					
$ Savings/Lifetime MWH saved		$ 29.82																					
$ Cost/Lifetime MWH saved		$ 21.32																					
$npv Utlty Cost/Lifetime MWH saved		$ 15.41																					
Utlty B/C Ratio		1.93																					
Total Resource Test B/C Ratio		1.40																					

For Calculation Purposes Only										
13,845	27,613	41,304	54,940	68,522	82,050	95,525	108,947	122,317	135,636
2.13	4.25	6.35	8.45	10.54	12.62	14.70	16.76	18.82	20.87

Table 15: Savings benefits, costs, and rate impacts