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Energy Efficiency Program Plan for Frankfort Plant Board



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Executive Summary

The purpose of this project was to develop an energy efficiency program plan for the Frankfort Plant Board (FPB). While developing this plan, VEIC was encouraged to engage customers, community members, Board members, and FPB staff and incorporate their input into the final program plan.

The primary goals for the energy efficiency programs, as shared by FPB staff and stakeholders, are to:

- Provide programs for all ratepayer classes;
- Help customers reduce energy consumption and therefore lower their bills; and
- Maximize the amount of overall savings per dollar spent by FPB on energy efficiency programs.

VEIC conducted interviews with 42 stakeholders that represent the interests of FPB and the residential, business, institutional and government, and industrial customer classes. Through these interviews, VEIC gathered input and ideas that were incorporated into energy efficiency program recommendations presented in this report.

Based on input from local stakeholders, combined with VEIC's experience designing and delivering energy efficiency programs nationally, VEIC recommended an initial suite of energy efficiency programs for FPB to offer to its customers. These programs were selected because they provide options for each customer class, directly help customers reduce energy consumption, maximize the savings per dollar spent, and address community feedback to offer informative, engaging, accessible, and affordable programs for all.

The programs recommended for Phase I implementation are:

- **Community outreach and education** to educate residents on energy conservation and energy efficiency;
- **In-store LED light bulb discounts** that works with hardware and grocery stores to offer discounted ENERGY STAR® rated LED bulbs;
- **Energy efficiency kits** that make free energy-saving products available to low income residents through food pantries, community action agencies, and other local organizations;
- **Appliance recycling** to promote the early retirement of operable but inefficient appliance by removing and recycling inefficient appliances, such as refrigerators and freezers;
- **Online product store** offering rebates for energy-efficient products through an online portal;
- **Prescriptive rebates** to incentivize the purchase of energy-efficient products and equipment, for both residential products and commercial equipment;
- **Energy advising and technical assistance** to advise large commercial and industrial energy users on cost savings through energy efficiency, including long-term capital plans; and
- **Custom incentives** to help large commercial and industrial customers install qualified energy projects that are less common or more complex than those typically included in prescriptive rebate programs.

Due to FPB’s small scale and the opportunity to reduce program costs by teaming up with other municipalities or cooperative programs, VEIC recommends that FPB initially hire a trusted and experienced third-party implementer through an RFP process, while exploring the opportunity to join existing programs offered by other utilities in Kentucky and the Midwest. VEIC can assist FPB with a list of potential implementers for the RFP process. Once programs are well-established, savings have been demonstrated, and community support has been built, VEIC recommends evolving the program offerings depending on changing market conditions and budgets.

The table below summarizes the projected range of annual costs and energy savings that FPB could expect if FPB chooses to move forward with the recommended Phase I energy efficiency programs. Energy efficiency is expected to cost FPB significantly less than procuring electricity at wholesale.

Table 1: Estimated program costs, savings and costs per kWh saved.

| Estimated Annual Program Costs | Estimated Annual Program Energy Savings | Estimated Program Administrator Cost per kWh |
|--------------------------------|---|--|
| \$300,000 – \$1,000,000 | 1,700 – 5,000 MWh | \$0.06 – \$0.15 per kWh |

VEIC recommends that FPB take the following steps to move forward with implementing the Phase I energy efficiency program portfolio:

- September 2018 Board Meeting
 - Accept the final report from VEIC entitled Energy Efficiency Program Plan for Frankfort Plant Board.
 - Pursue the recommended Phase I energy efficiency programs.
- October/November 2018
 - Develop and issue an RFP for implementation, requesting Phase I programs at a minimum, allowing for respondents to propose additional programs to add to the portfolio.
- January 2019
 - Review responses to RFP and decide if FPB will hire an implementer or implement in-house.
- February 2019
 - Allocate budget based on responses to RFP.

This suggested schedule may vary depending on Board decisions, and external and internal factors.

1 Introduction

Imagine residents of Frankfort and Franklin County saving money on their energy bills through energy efficiency programs offered by their municipal utility.

Visualize industrial manufacturers becoming more cost-effective in their production, better able to weather world events and trade wars, creating jobs, and attracting other suppliers to Franklin County, bolstered by the technical assistance and financial programs offered by Frankfort Plant Board (FPB).

Envision FPB customers better understanding their energy costs and feeling empowered to control their bills, improving customer satisfaction and reducing the number of customer complaints.

Picture FPB procuring electricity for its customers at the lowest cost available on the market today: the price offered by energy efficiency programs.

This vision can become reality through cost-effective investments in energy efficiency programs.

1.1. Purpose of the Project

The purpose of this project is to develop an energy efficiency program plan for FPB. While developing this plan, VEIC was encouraged to engage customers, community members, Board members, and FPB staff and incorporate their input into the final program plan.

The primary goals for the energy efficiency programs, as shared by FPB staff and stakeholders, are to:

- Provide programs for all ratepayer classes;
- Help customers reduce energy consumption and therefore lower their bills; and
- Maximize the amount of overall savings per dollar spent by FPB on energy efficiency programs.

The program plan provides a blueprint for system-wide energy efficiency and conservation programs to be offered by FPB to electric customers. It presents program options for FPB's consideration and recommendations on how FPB can best achieve community goals through energy efficiency.

1.2. Benefits of Energy Efficiency for FPB's Territory

Energy efficiency programs within FPB's territory would offer many benefits, including:

- Lower customers' utility bills;
- Improved health, safety, and comfort in homes and businesses;
- Increased businesses' productivity and reduced operating costs, making businesses more competitive and allowing them to grow;
- A stronger local economy and job creation;
- A less expensive source of energy, at a lower cost than wholesale power purchases;
- Reduced peak demand and infrastructure costs;
- Enhanced energy independence and resilience for the region; and

- Increased sustainability and reduced environmental impacts of electricity production and distribution.

Customers have come to expect energy efficiency programs from their utilities. By offering avenues for customers to reduce their energy bills, FPB will strengthen its relationship with its customer base.

Energy efficiency programs also help industrial customers improve their bottom line. Industrial customers are often the largest energy users, and may favor geographic locations that offer energy efficiency incentives and technical assistance. Offering energy efficiency programs to these large users can support retention and growth of existing industrial customers, and make Frankfort and Franklin county a more attractive place for new industrial customers to locate.

2 Kentucky and FPB Overview

The following sections include relevant contextual information about FPB and its local stakeholders, as well as energy efficiency policies and programs offered in Kentucky and the Midwest region.

2.1. FPB Overview

FPB serves primarily Franklin County, with some customers located in the adjacent counties of Shelby and Woodford (Figure 1). FPB’s electric department serves approximately 21,400 electric customers, consisting of 17,000 residential, 4,000 commercial and 400 large power customers. Electric sales to all users add up to about 667,000 MWh annually, with the industrial and government customers representing most of the consumption, followed by residential customers (Figure 2).

The population of Frankfort is not expected to grow in the next decade, but Franklin County is expecting some growth (

Figure 3).

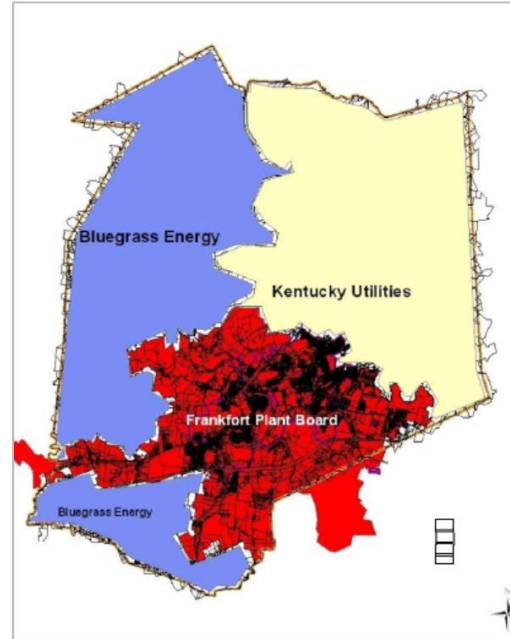


Figure 1: Electric service providers in Franklin county. Source: Franklin County Comprehensive Plan, 2010 Update.

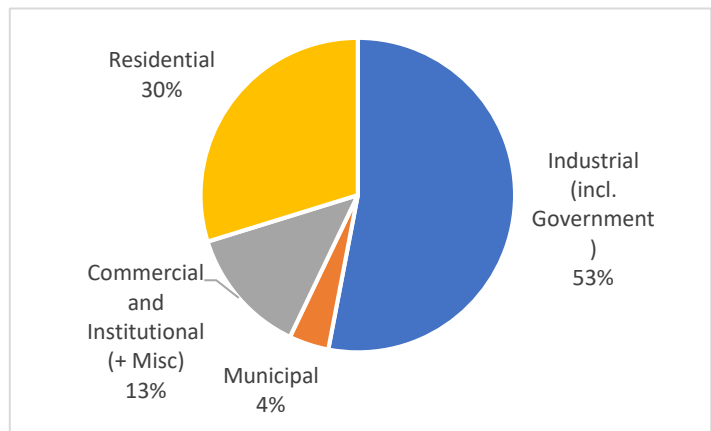


Figure 2: Breakout of electric consumption by customer class.

Electric rates in Kentucky are low compared to the rest of the nation, and the state ranks ninth in the nation in lowest electric rates, at 10.49 cents/kWh.¹ FPB's average retail rate (average of all customers) is currently 9.3765 cents/kWh.²

Despite low electricity costs, the average residential energy expenditure is in the range of \$2,000-\$2,500 (\$170-200 per month), including electricity and natural gas.³ The energy burden for households making less than 50% of the Area Median Income is excessive, representing an 8-22% share of their total expenditure annual (Figure 4). These low-income households would benefit the most from a reduction in their energy bills.

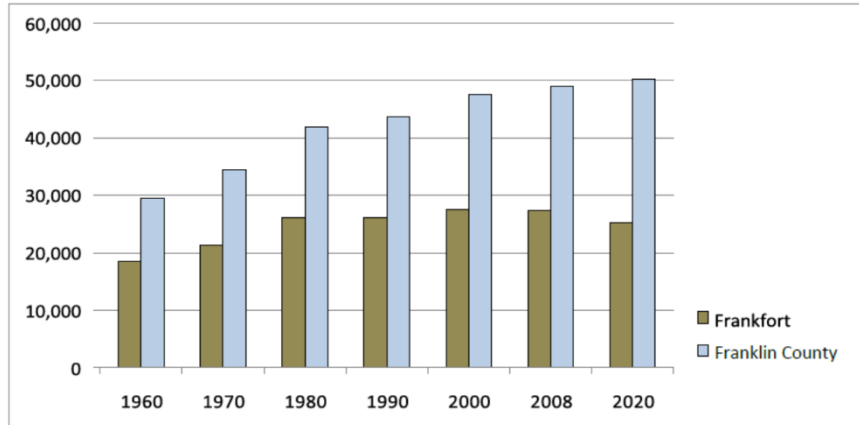


Figure 3: Frankfort and Franklin County population trend and forecast (Source: Frankfort/Franklin County Comprehensive Plan, 2010 Update).

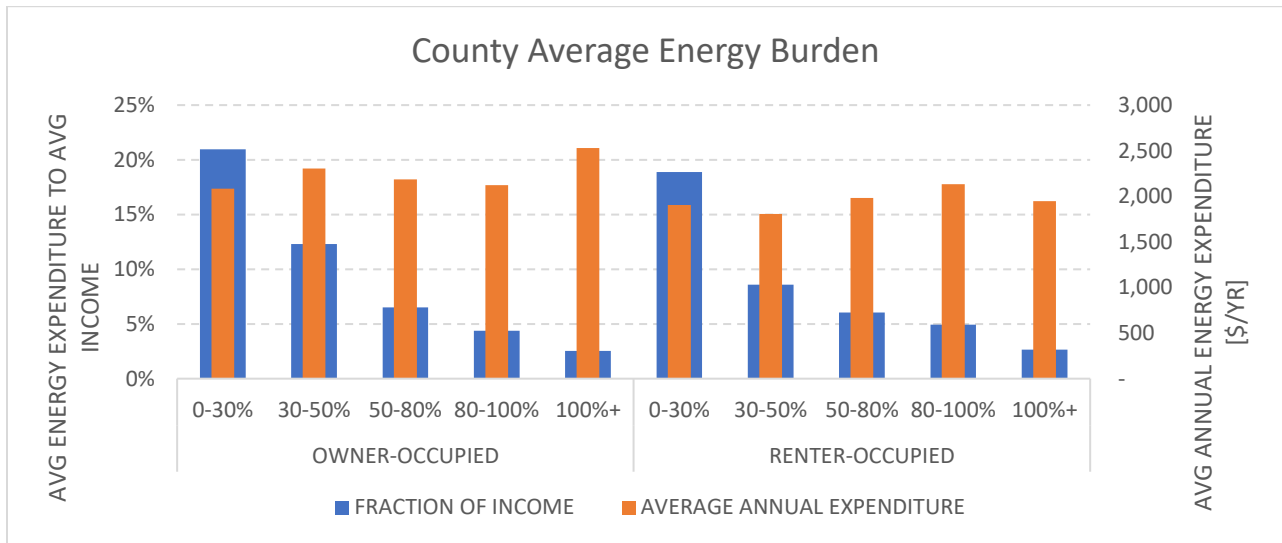


Figure 4: Average energy expenditure (orange) and energy burden (blue) for Franklin County, by income bracket as a percentage of Area Median Income (AMI). Source: DOE LEAD data, by counties (East South Central).

¹ Source: Energy Information Administration- Year 2016; Only includes kWh usage cost, and does not include any additional service charges

² Only includes kWh usage cost, and does not include any additional service charges

³ Source: DOE LEAD data, by counties (East South Central).

2.1.1. Energy Efficiency Programs Offered by Other Kentucky Utilities

Kentucky has four regulated, investor-owned utilities (Kentucky Utility, Louisville Gas & Electric, Kentucky Power and Duke Energy Kentucky), 28 municipal utilities, and 26 electric cooperatives. Kentucky Power and Duke Energy Kentucky discontinued their energy efficiency programs in 2018, based on a directive from the Kentucky Public Service Commission to suspend programs while it evaluates future value and benefit of programs. Of the 26 cooperatives in the state, 16 are part of the East Kentucky Power Cooperative, which offers the National Rural Energy Cooperative Association (NRECA) Touchstone Energy programs for energy efficiency as well as supplemental programs. The other cooperatives and municipal utilities do not offer energy efficiency programs, with the exception of a few offerings described later in this section.

The following section provide details on the energy efficiency programs offered by Kentucky utilities, and the level of savings and cost-effectiveness that they deliver.

Program Cost-Effectiveness Demystified

Generally, programs that have a cost-effectiveness ratio greater than one bring more benefits to the community than they cost. There are several ways to measure cost effectiveness:

- The utility cost test looks at cost-effectiveness from the utility's standpoint;
- The participant cost test looks at it from the customer's perspective;
- The total resource cost test (TRC) looks at combination of factors; and
- The societal cost test incorporates all the benefits and costs to society in the calculations.

A few key points need to be considered when reviewing the cost-effectiveness of a portfolio of energy efficiency programs:

- Cost-effectiveness is calculated over the life of the energy efficiency measures implemented and the resulting energy savings over several years.
- Cost-effectiveness of the portfolio of programs will be highly dependent on the programs selected and implemented. When costlier programs (in terms of dollars per unit of electricity saved) are included, it can bring down the overall cost-effectiveness of the portfolio of programs.
- The results of cost-effectiveness test are highly dependent on the avoided costs of electricity (i.e. how much it costs for a utility to purchase, transmit, distribute electricity, including demand charges), which vary by utility.
- The benefit to cost ratio of programs will likely be higher for the first few years a portfolio of programs is implemented, when all the low-hanging fruits can be picked at a relatively low cost, and then it will likely decrease over time, as it becomes relatively more difficult to find inexpensive energy savings.
- Lighting savings often comprise a large proportion of many energy efficiency portfolio. Lighting savings will likely decline in 2020-2021, when new lighting federal standards are fully implemented.

Kentucky Utility and Louisville Gas & Electric

Kentucky Utility (KU) and Louisville Gas & Electric (LG&E) (PPL companies) are regulated utilities headquartered in Louisville, KY that serve nearly 1.3 million customers in Kentucky. LG&E serves 326,000 natural gas and 411,000 electric customers in Louisville and 16 surrounding counties. KU serves 553,000 electric customers in 77 Kentucky counties.

Both KU and LG&E have administered energy efficiency programs since 2008. According to the KU website, the utilities set a goal in 2008 of saving approximately 500 megawatts of capacity and, to date – with a year remaining for the existing programs – they have reached that goal. They have received approval from the Kentucky Public Utility Commission to reduce energy efficiency program budgets and offerings starting in 2019, citing that they do not need to offset additional capacity for the immediate future. They also cited falling avoided capacity and energy costs, which reduces the overall benefits of the programs and makes it more difficult for energy efficiency measures to pass cost-effectiveness screening tests. Increasing labor, project, and program costs also present cost-effectiveness challenges. A list provided in Appendix A shows the portfolio of programs to be administered by KU and LG&E starting 2019, as well as the portfolio of programs being discontinued in 2019. All programs being discontinued were supporting the residential customers.

Funding for Energy Efficiency Programs

Regulated utilities in Kentucky fund energy efficiency programs through a Demand-Side Management (DSM) Cost Recovery Mechanism and receive performance incentives for achieving energy savings goals. Lost revenues from not selling as much electricity are calculated using the marginal rate, minus variable costs and then multiplied by the estimated kWh savings from a DSM measure.⁴ Total monthly cost of the DSM Cost Recovery Mechanism to residents and small businesses is approximately \$0.00243 per kWh used.⁵ Additionally, performance incentives are designed to provide financial rewards for utilities and encourage implementation of cost-effective DSM programs. Performance incentives range from 10-15% of net savings after program costs.⁶ These are funded from periodic rate increases.

Program Metrics

Information about the performance of each KU and LG&E programs in previous years was not readily available. However, the public utility commission filing and testimony for the proposed program filing starting in 2019 was available. Table 2 shows the planned budget and anticipated savings estimates for the next three years at the portfolio level. Table 3 presents the planned participation, savings, budgets and benefit/cost ratio using the Total Resource Cost (TRC) test at the program level for 2019. Figure 5 and Figure 6 show that while energy savings for the programs come primarily from the non-residential programs, most of the program participation is expected to come from the low-income focused program.

⁴ KY Statute Ch. 278, Title 285; Dockets 2007-00477; 2008-00473

⁵ <https://lge-ku.com/sites/default/files/kuelecrates.pdf>

⁶ <https://database.aceee.org/state/kentucky>

Table 2: KU and LGE planned budgets and savings for 2019 – 2021⁷

| | 2019 | 2020 | 2021 |
|----------------------|----------------|----------------|----------------|
| Budget | \$14.3 million | \$14.4 million | \$13.7 million |
| Energy Savings (MWh) | 38,120 | 38,120 | 30,893 |
| Demand Saving (MW) | 189.8 | 181.6 | 172.2 |

Table 3: 2019 Program Planned Participation, Savings and Budgets⁸

| Programs | Participation | Budget | MWh Savings | MW Savings | Benefit/Cost Ratio (TRC) |
|--------------------------------------|----------------------|-----------------------|--------------------|-------------------|---------------------------------|
| WeCare | 4,000 | \$6.3 million | 5,077 | 0.4 | 0.44 |
| Residential and SMB Demand Response | 231,470 | \$2.4 million | 0 | 162.2 | N/A - DR |
| Non-Residential Rebates | 825 | \$2.8 million | 25,500 | 5.2 | 1.14 |
| School Energy Management Program | 461 | \$0.7 million | 7,227 | 1.7 | 0.30 |
| Large Nonresidential Demand Response | 240 | \$0.5 million | 0 | 20.3 | N/A - DR |
| AMS Customer service offering | 2,000 | \$0.5 million | N/A | N/A | N/A – not tracking benefits |
| Program Administration | N/A | \$0.7 million | N/A | N/A | N/A |
| Total: | | \$14.3 million | 37,804 | 188.1 | |

⁷ https://psc.ky.gov/psccef/2017-00441/rick.lovekamp%40lge-ku.com/12062017050458/LGE_KU_Testimony_and_Exhibits.pdf

⁸ https://psc.ky.gov/psccef/2017-00441/rick.lovekamp%40lge-ku.com/12062017050458/LGE_KU_Testimony_and_Exhibits.pdf

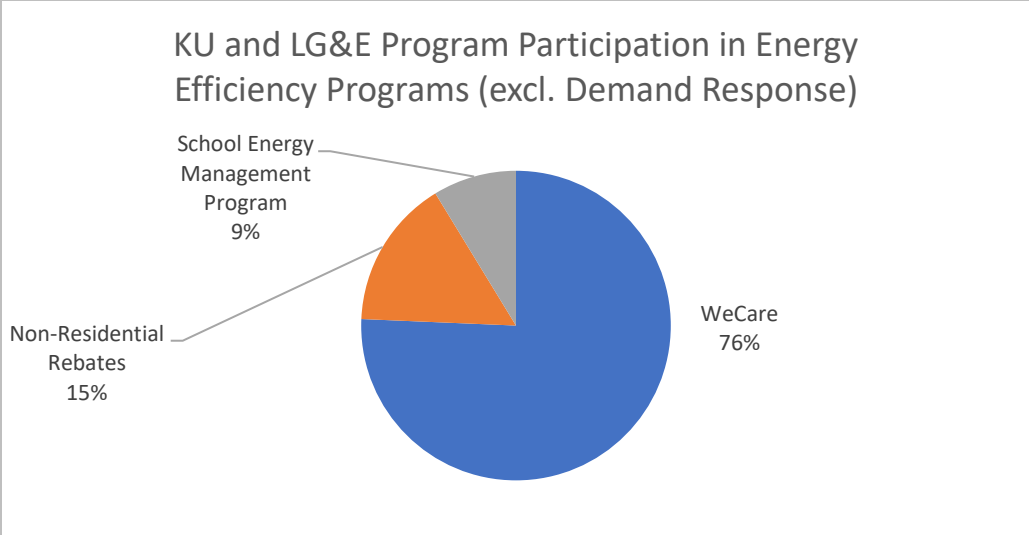


Figure 5: KU and LG&E Energy Efficiency and DSM Program Participation by Program

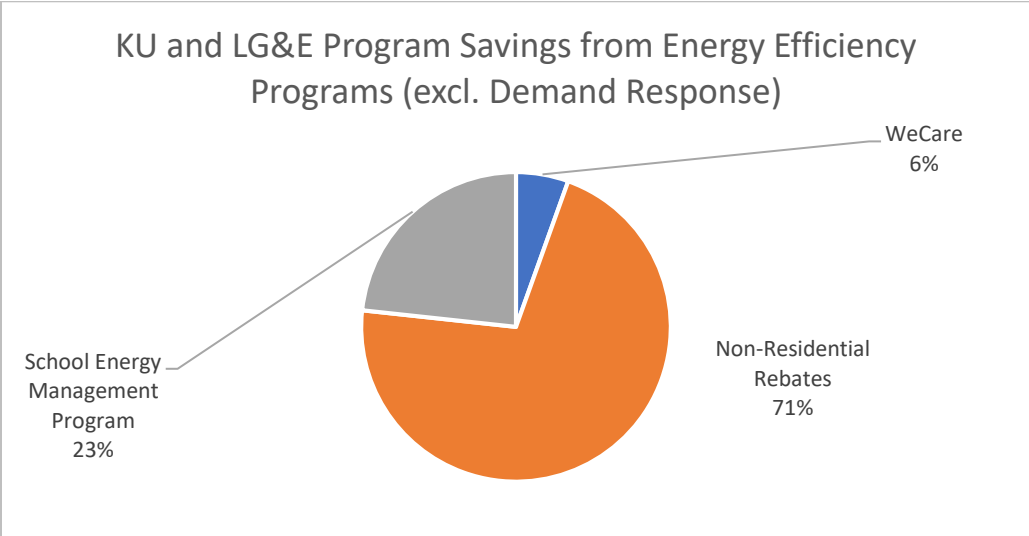


Figure 6: KU and LG&E Energy Efficiency and DSM Program Savings by Program

East Kentucky Power Cooperative

East Kentucky Power Cooperative (EKPC) is a not-for-profit generation and transmission (G&T) electric utility with headquarters in Winchester, KY. It supports 16 owner-member distribution cooperatives serving more than one million Kentuckians. The member co-ops distribute energy to over 530,000 Kentucky homes, farms, businesses, and industries across 87 counties.

The 16 members in Kentucky are:

- Big Sandy RECC
- Blue Grass Energy Cooperative
- Clark Energy Cooperative
- Cumberland Valley Electric
- Farmers RECC
- Jackson Energy Cooperative
- Licking Valley RECC
- Nolin RECC
- Owen Electric Cooperative
- Salt River Electric Cooperative

- Fleming-Mason Energy Cooperative
- Grayson RECC
- Inter-County Energy
- Shelby Energy Cooperative
- South Kentucky RECC
- Taylor County RECC

The National Rural Electric Cooperative Association (NRECA) cooperative members are part of a national network called Touchstone Energy. One of the value propositions for Touchstone Energy is to provide a framework for electric energy efficiency and demand response programs to its members. Most of the programs support residents, the market segment primarily supported by rural cooperatives. In Kentucky, EKPC develops the programs for its 16 members and funds some administration and the incentives. EKPC has an approved list of energy contractors but member coops can also staff energy advisors. Although EKPC includes an in-home audit program in its program portfolio, residents must complete the online energy analysis using the *Billing Insights* tool prior to requesting an in-home audit. Through the online tool, residents learn what programs they can participate in to reduce their energy bills. If they still need an in-home audit they can request one through their local coop. This approach has reduced the number of in-home audits and increased the odds that the audit will lead to the installation of energy efficiency measures. In 2015 and 2016, 5,254 residents completed the *Billing Insights* home energy survey and only 185 residential in-home energy audits were performed (3%).⁹

According to the annual reports, in 2015 and 2016, the DSM portfolio collectively achieved average annual energy reductions of nearly 194 million kilowatt hours (kWh), and average annual peak reductions of almost 107 megawatts (MW).¹⁰

Programs offered by EKPC are listed in Appendix A.

Funding Programs

EKPC funds energy efficiency and demand response programs through defined transfer payments directly to the owner-member cooperative. These payments are outlined in the “EKPC Rates, Rules and Regulations for Furnishing Wholesale Power Service for Rural Electric Cooperative Members Throughout Kentucky,” as filed annually in November with the Kentucky Public Service Commission. The payments are calculated at a set amount per level of participation in the program. The payments are expected to include administrative costs, lost revenue, and the recommended incentive to the retail member. Lost revenue calculations may fluctuate based on current rates.¹¹ Customers are expected to pay any additional costs above the recommended incentive. For example, the Duct Sealing Program requires the EKPC approved contractor or owner-member representative to conduct a "pre" and "post" blower door test to verify reductions in addition to completing the required duct sealing. EKPC provides a transfer payment of up to \$500 to the owner-member to cover administrative costs, lost revenue, and the \$250 recommended incentive to the retail member for the duct sealing project. The incentive rebate applications are accepted and the incentives processed by the member cooperative, not EKPC.

⁹ DSM 2015 and 2016 Annual Reports - <https://www.ekpc.coop/pdfs/2016%20EKPC%20DMS%20DLC%20Annual%20Report.pdf>

¹⁰ DSM Program Annual Report 2016

¹¹<https://psc.ky.gov/tariffs/electric/East%20Kentucky%20Power%20Cooperative.%20Inc/East%20Kentucky%20Power%20Cooperative.pdf>

Program marketing is also handled by the member coop using materials and templates provided by EKPC.

Program Metrics

Information about the performance of each EKPC programs in 2015 and 2016 for the combined 16 cooperatives is available in the Demand Side Management Annual Reports. Table 4 shows the available program metrics at the portfolio level.

As illustrated in Figure 7, most of the program participation is from lighting and appliance rebates, and most of the program savings (Figure 8) from Commercial and Industrial lighting measures, and products rebates (including Heat Pumps). The in-home energy audit program resulted in negligible participation and savings relative to the rest of the programs, but the online home audit program and home weatherization programs resulted in relatively good savings for the low level of participation.

Table 8, in Appendix, shows the actual participation, savings, budgets, and benefit/cost ratio using the Total Resource Cost (TRC) test at the program level for 2016.

Although in past years EKPC worked with a 3rd party evaluation firm, DNV GL, there was no indication that EKPC program data listed in the reports and represented in Table 8, and in Appendix A, were evaluated by a 3rd party independent evaluation firm. It is also unclear if any additional resource costs from the owner-member cooperatives are included into the Program Metrics.

Table 4: EKPC 2015 and 2016 Program Metrics¹²

| | Year 1 – 2015 | Year 2 – 2016 |
|---------------------------------------|----------------------|----------------------|
| Participation | 84,503 | 85,924 |
| Budget | \$9.5 million | \$10.9 million |
| Energy Savings (MWh) | 24,824 | 34,320 |
| Summer Demand Saving (MW) | 6.796 | 7.223 |
| Winter Demand Saving (MW) | 5.468 | 6.039 |
| Lifetime MWh Savings | 320,263 | 459,391 |
| Total CO2 Equivalent Reduction | 640,525,545 | 918,781,098 |

¹² DSM 2015 and 2016 Annual Reports

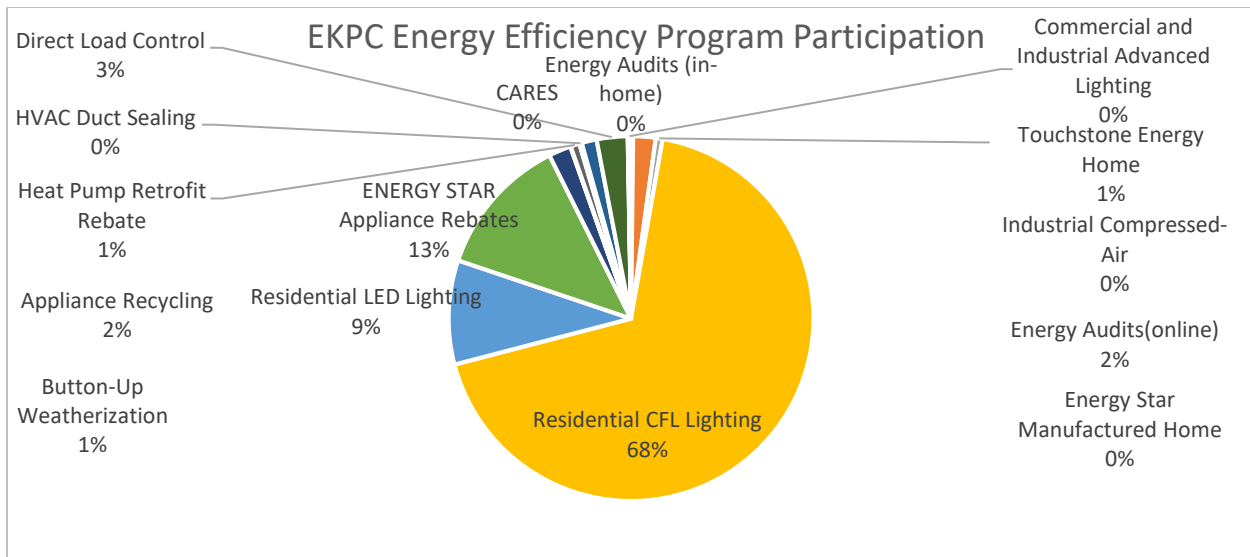


Figure 7: Distribution of EKPC Program Participation.

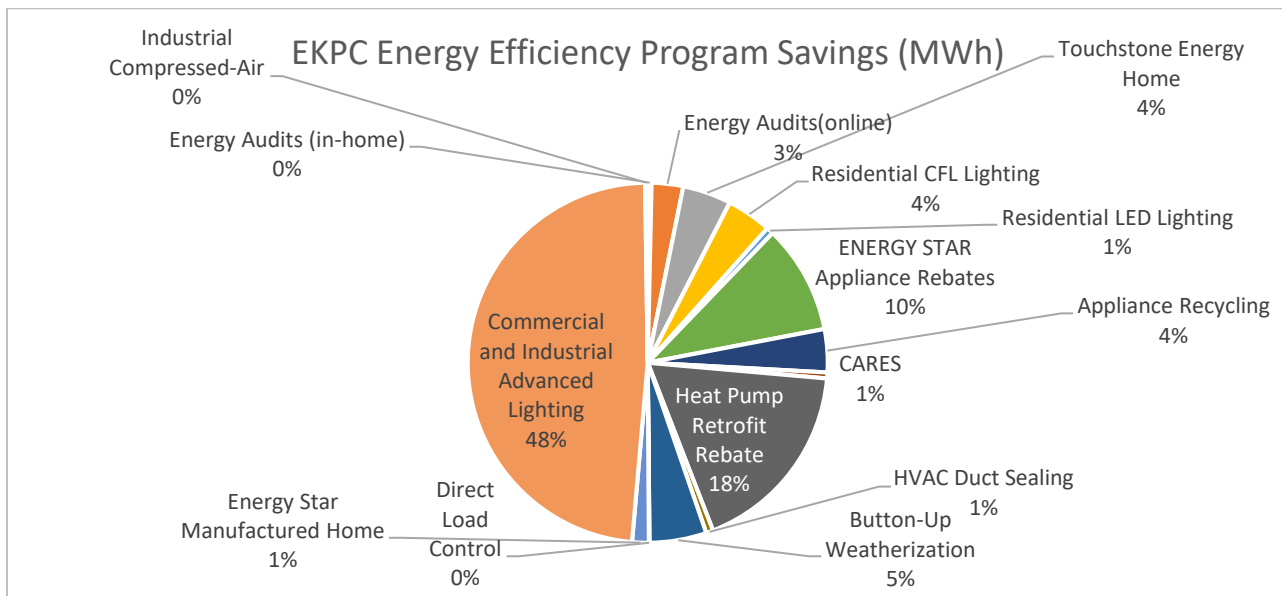


Figure 8: Distribution of EKPC Program Savings.

Other Programs Supported in Kentucky

1. How\$martKY: On-bill, energy efficiency financing program developed by Mountain Association for Community Economic Development (MACED). MACED assists with home-energy evaluations and provides loan capital, while municipal and EKPC owner-member cooperatives provide rebates and program marketing materials. Six of the EKPC member cooperatives participate in the on-bill financing as a supplemental offering for the EKPC energy efficiency programs.
2. Benham\$aves: Benham Power Board launched the Benham\$aves on-bill financing program in collaboration with the How\$martKY program in 2015¹³. Benham Power Board

¹³ <https://www.kftc.org/blog/benham-power-board-launches-innovative-residential-energy-efficiency-program>

pays the upfront costs of insulation, upgrades to heating and air conditioning units, and other energy efficiency measures for qualifying low to medium income customers who choose to participate. Capital for the program, and some administrative costs are raised from donations and investments from private foundations, individuals or state and federal grant programs. Residents repay the investment over a 15-year period, using a portion of the energy savings. The program is designed to ensure that the monthly repayment is no more than 85% of the projected monthly savings with the retrofits paying for themselves over time and customers start saving money immediately, compared to their previous energy bills. Benham collaborates with COAP, a local nonprofit organization that provides affordable housing. COAP performs the home energy assessments and makes recommended energy improvements, which are mostly air sealing and insulation, in participating homes. This program has been developed with collaboration and financial support from many community partners, including COAP, Inc., Kentuckians for the Commonwealth, Inc., MACED, Appalshop Inc., and Harlan County Community Foundation, Inc.

3. **eScore:** Tennessee Valley Authority (TVA) supports 12 municipal utilities and cooperatives and some of these offer the TVA eScore™ program¹⁴. EScore is an online tool which helps customers score the energy efficiency of their home and helps them find a TVA Quality Contractor Network (QCN) member to make the energy efficiency improvements. Additionally, the TVA eScore team can perform an evaluation and offer a list of recommended improvements to share with the QCN member to make the energy improvements.

2.1.2. Other Municipal Programs supported in The Midwest

There are many energy efficiency programs supported by Midwestern municipal utilities. Many of those utilities are active in the Midwest Energy Efficiency Alliance (MEEA). Some of the larger utilities with energy efficiency programs include:

Table 5: Energy efficiency programs offered by Midwestern municipal utilities.

| Municipal Utility | Number of Customers served | Types of electric energy efficiency programs | Delivery Approach | Approx. Annual Budget |
|---|----------------------------|--|---|--|
| Cedar Falls Utilities, Cedar Falls, IA | 37,000 | <ul style="list-style-type: none"> • In-home energy audit • Residential product rebates • Appliance recycling rebates • In store LED lighting rebates • C & I prescriptive rebates • C & I custom incentive • C & I technical support and walkthrough | In-house staff and systems using manual forms, email and mail | \$910,000 for energy efficiency programs for residents and businesses in 2017. ¹⁵ |

¹⁴ <https://www.2escore.com/>

¹⁵ https://www.cfu.net/webres/File/about-us/CFU%20Annual%20Report%202018_Web.pdf

| Municipal Utility | Number of Customers served | Types of electric energy efficiency programs | Delivery Approach | Approx. Annual Budget |
|---|--|---|--|---|
| City Utilities of Springfield, MO | 150,000 | <ul style="list-style-type: none"> • Programmable and smart thermostats rebates • Attic insulation improvement rebates • High efficiency air conditioners rebates • Air source and geothermal heat pump rebates • EnergyStar® new construction rebates • C & I free energy audits and technical support for the largest users • C & I free lighting audits and rebates | In-house staff and systems using an on-line portal for rebate submission | \$1.5 million for energy efficiency and renewable energy programs are funded through annual rate increase packages. ¹⁶ |
| City Water, Light & Power, Springfield, IL | 111,000 | <ul style="list-style-type: none"> • Subsidized in-home audits • Air source and geothermal heat pump rebates • C & I free technical assistance • Low income free weatherization program was discontinued in March 2018 | In-house staff and systems using manual rebate forms mailed to the utility | \$3 million to fund energy efficiency programs ¹⁷ |
| Columbia Water and Light, Columbia, MO | 50,000 | <p>Promoted as Columbia Power Partners.</p> <ul style="list-style-type: none"> • High efficiency air conditioners and heat pump rebates • Attic insulation improvement rebates • Home performance with Energy Star (HPwES), in-house free audit and energy efficiency improvement rebates. • C & I lighting rebates • C & I energy efficiency low interest loans • C & I free technical support including infrared thermography and compressed air leak detection | In-house staff and systems using manual rebate forms, faxed or mailed | Not available |
| Southern Minnesota Municipal Power Agency (SMMPA), Rochester, MN | 118,000 through 18 municipal utilities in MN | <ul style="list-style-type: none"> • Residential product rebates • Central air conditioner clean and tune rebates • LED lighting rebates • C & I subsidized business energy audit • C & I prescriptive rebates • C & I custom incentives | Hybrid model SMMPA provides program design and technical support; utility handles incentive payment and application support. Manual rebate forms, faxed or mailed to utility, not SMMPA | Cumulative annual budget is approximately 2.5 million; ¹⁸ unclear if this includes the rebate processing by each participating utility |
| American Municipal Power, Inc. (AMP), Columbus, OH | 650,000 through 135 members across 9 states | <p>Delivered through Efficiency Smart to 25 members, currently:</p> <ul style="list-style-type: none"> • Appliance recycling rebates • In store LED rebates • Low income free LED program • Residential products rebates • On-line product store • Meter loan program • C&I free technical support • C&I prescriptive rebates • C & I custom incentives | 3 rd party implementer, VEIC, handles all aspects of the energy efficiency program including reviewing applications and processing incentive payment; online application portal | Annual budget range \$3.3 million to \$9 million depending on number of participating members |

¹⁶ <https://www.cityutilities.net/wp-content/uploads/cu-budget.pdf>

¹⁷ <https://www.cwlp.com/AboutCWLP.aspx>

¹⁸ <https://www.leg.state.mn.us/docs/2017/mandated/170154.pdf>

Many of the Joint Action Agency (JAA) or cooperative groups like EKPC do not have specific budgets or saving targets at the program level. Instead, the budgets and savings targets are determined for each participating community and vary based upon the number of participating communities that year. For example, in the seven years that AMP's Efficiency Smart has been offered, the number of participating communities has ranged from 21 to 49. Efficiency Smart's cumulative annual savings achieved ranged from 15,500 MWh to 61,200 MWh and each participating municipal utility has specific three-year energy saving targets, with performance guarantees.

Program Metrics

The following figures represent average annual program-wide output for the Efficiency Smart program, as one example of the type of programming offered by other municipal utilities across the Midwest.

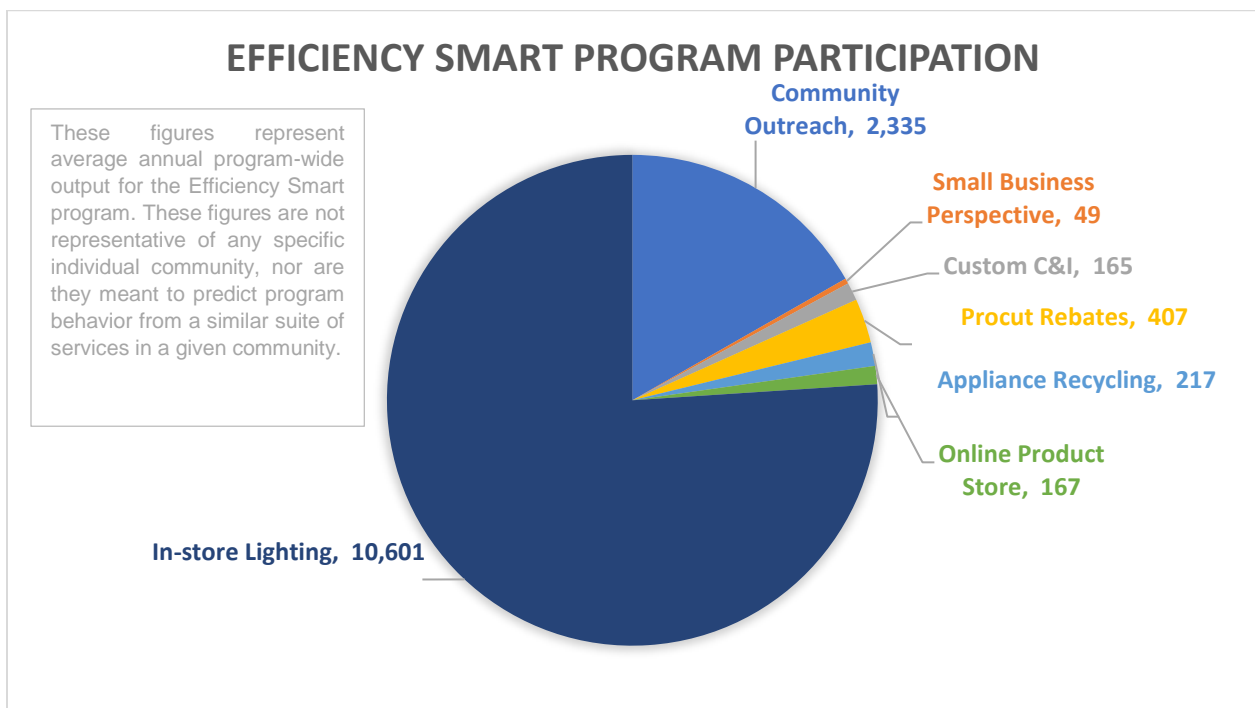


Figure 9: Distribution of Efficiency Smart program participation since 2015.

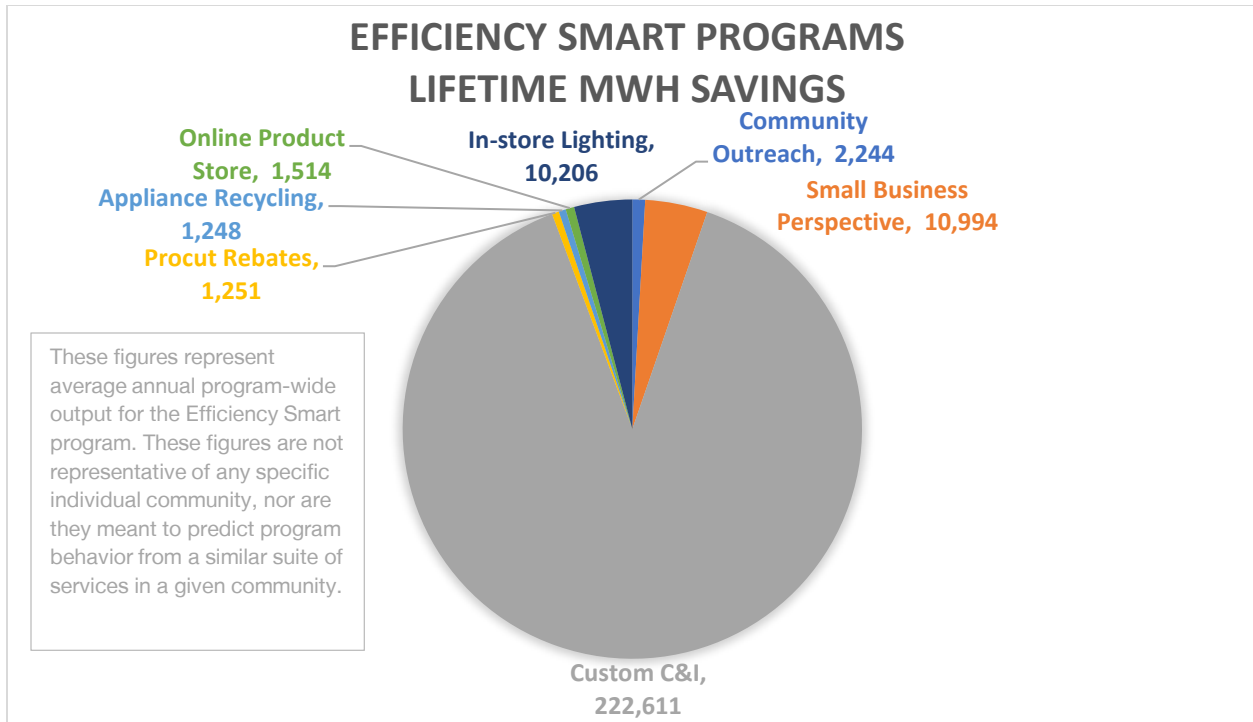


Figure 10: Lifetime savings distribution for Efficiency Smart since 2015.

2.1.3. Key Policies Applicable to FPB’s territory

Kentucky ranks 28th in the nation on the American Council for an Energy-Efficient Economy (ACEEE) energy efficiency scorecard, meaning that only a few policies and incentives are in place at the state level to support energy efficiency, compared to other states that have more state funds and policies in place. Kentucky does not have an Energy Efficiency Resource Standard policy to drive sustained investment in energy efficiency by regulated utilities, nor another dedicated source of funding (e.g., compliance payment funds, greenhouse gas initiative revenues, etc.). The most notable policies in Kentucky that are directly applicable for the development and implementation of energy efficiency programs include: ¹⁹

- A few statewide programs such as:
- The School Energy Managers Project (SEMP) provides support for energy managers at the school district level.
- Industrial Revenue Bonds, where State and local government-issued bonds can finance industrial buildings, including energy efficiency projects.
- Local Government Efficiency Retrofit Program (LGERP), administered by the Department for Local Government. The program provides low cost loans and small matching grants to city and county governments for taking on energy savings performance contracts.
- Kentucky statutes incentivize agencies to review the possibility of using Guaranteed Savings Performance Contracting and implement one if appropriate.
- The Kentucky Housing Authority requires buildings to be built 20% above code for funding through the Authority. The Energy Code for residential construction is currently the 2009

¹⁹ Source: ACEEE scorecard: <https://database.aceee.org/state/kentucky>

IECC with state amendments, while commercial construction must comply with the 2012 IECC.

- Property Assessed Clean Energy (PACE) financing is available in the State, and is currently approved within Frankfort City limits, but not in the remainder of FPB’s territory.
- A software, Commonwealth Energy Management and Control System,²⁰ was developed to benchmark, track, control and diagnose energy use in state government buildings. The information in the database is publicly available on the web.

2.1.4. Feedback from Stakeholder Engagement

VEIC conducted interviews with 42 stakeholders that represent the interests of FPB, the residential,²¹ business,²² institutional and government,²³ and industrial²⁴ customer classes. Through these interviews, VEIC gathered input and ideas that were incorporated into energy efficiency program recommendations presented in this report.

With regard to residential customers, the community interviews highlighted that even though electric rates are low compared to the rest of the country, energy bills are perceived as high. In addition, residents often do not grasp the connection between high usage and high bills, and how they can lower their bills. Education and targeted marketing of programs would help address this disconnect.

The residential market consists of approximately half home owners and half renters. This is a relatively high proportion of renters compared to other municipalities. Notably, roughly half of homes heat with natural gas and half with electricity. Any program aimed at reducing heating bills would benefit from coordination with the gas utility.



Figure 11: Historic building in Downtown Frankfort.



Figure 12: Redevelopment of the downtown convention center and office tower.

²⁰ <http://kyenergydashboard.ky.gov/>

²¹ 16 representatives from: Blue Grass Community Action Partnership, Kentucky Housing Corporation, Housing Authority of Frankfort, South Frankfort Neighborhood, Tanglewood Neighborhood Association, Envision Franklin County, and local churches and residents.

²² Two representatives from: KY Home Builders Association, Downtown Frankfort.

²³ Seven representatives from: City and County Government, State Facilities Manager, State Energy Office, County Schools, Kentucky State University.

²⁴ Two representatives from: Kentucky Capital Development Corporation, Montaplast.

As there are many renters and historical buildings in Frankfort (e.g. Figure 11), and the city sees very little residential new construction, energy efficiency programs should initially focus on products that can be installed in all homes, including rentals and historical buildings. VEIC recommends that the more complex issues of addressing the renter split incentive (i.e. the landlord bearing the cost of the upgrade, the renter reaping the benefits, and vice versa), and of hiring specialized contractors that can work on historical buildings be addressed once the programs have demonstrated success and savings, and are supported by the community.

The community members interviewed showed a strong desire to support vulnerable populations, and a program rolled-out in partnership with local partners would be desirable (e.g. Blue Grass CAP, Housing Authority of Frankfort, Kentucky Housing Corporation, local church programs).

The business representatives interviewed noted that, similarly to the residential market, many Small and Medium Businesses (SMB) rent space in historical buildings (e.g. Figure 13). Programs offered should be designed to help both renters and building owners.

The demolition of the convention center (Figure 12) and office tower led to a temporary decrease in business activity downtown. However, the community is optimistic that once the new structure is in place and inhabited, business activity will grow.



Figure 13: Small businesses in the downtown area.

The manufacturing industry has been growing in Franklin county. Some large industry (e.g. Buffalo Trace) is located within the Frankfort City limit, but most of the manufacturing industry is located outside of Frankfort, within Franklin County. Industrial customers are generally very aware of the benefits of energy efficiency, especially the larger manufacturers. Similarly, access to financing is not a barrier for the large industrial electric customers. Technical expertise to help the industrial customers prioritize upgrades would be generally welcomed by the industrial customer class.

State government is the largest employer in town, with over 6 million square feet of state facilities. State, county, and municipal government, as well as schools/colleges have done some upgrades to their facilities through energy service performance contracting, but many upgrade opportunities likely remain. Technical assistance would help address current staffing constraints in these markets, and identify additional cost-effective upgrades.

The commercial, industrial and institutional representatives interviewed all highlighted a need for workforce development. Growing the demand for energy efficiency will be a first step for developing the necessary workforce. As the energy efficiency programs demonstrate success and are well-received and supported by the community, skill building programs may then be helpful in developing the local workforce at a faster pace.

Several efforts are in place in Frankfort with goals that are aligned with the goals of an energy efficiency program. Partnerships with these existing initiatives should be sought whenever possible when designing and implementing an energy efficiency program:

- State Energy Office has offered many programs in the past but many end in 2018. The KY Green and Healthy Schools / National Energy Education Development Project (NEED) school education program will remain past the end of 2018. NEED provides workshops for teachers, curriculum materials and kits for energy activities in the classroom. NEED also assists schools in forming student energy teams for energy education.
- Energy Project Assessment District (EPAD), available in Frankfort, offers financing options for energy efficiency upgrades. The funds can be repaid by participating property owners with a voluntary assessment on the property tax bill over a term of up to 20 years.

- Blue Grass Community Action Partnership is an action agency serving the low-income residents of nine counties including Franklin County.
- Kentucky Housing Corporation aims to develop preserve and sustain affordable housing in Kentucky.
- Housing Authority of Frankfort aims to provide safe and affordable housing to low and moderate income residents in Frankfort.
- Envision Franklin County provide education on opportunities for clean energy initiatives in Kentucky.
- Historically, Lighten Up Frankfort has encouraged groups of individuals to form teams and commit to actions to reduce the teams' greenhouse gas emissions.

2.1.5. Energy Efficiency Opportunities in FPB's Service Territory

Interviews with community representatives and a high-level review of the market in Frankfort informed our assessment of the largest opportunities for energy savings in FPB's service territory. The project did not include a comprehensive study of energy efficiency opportunities in the region, so we have not quantified the scale of savings available from these opportunities.

The largest electricity savings potential will likely be found in:

- Kentucky State University (KSU): where interviewees have noted that the infrastructure is antiquated and, while some improvements were made, many remain.
- State government facilities in aggregate, mainly due to the size of that market.
- Industrial customers, due to the size of that market, and the energy-intensive activities taking place there.
- County and municipal facilities: the jail and sewage treatment plant upgrade and/or new plant development are likely to present the greatest opportunities in that sector, with other municipal buildings offering additional savings.
- Street lighting: Increasing the pace of conversion of street lighting to LEDs, upgrading lighting for buildings lit at night.

Energy Efficiency programs must balance pursuit of the largest energy savings opportunities with the need to serve all customer classes – a high priority for FPB and local stakeholders. The greatest customer satisfaction potential is likely to occur through:

- Residential programs that are accessible to all residents (renters and home-owners alike), low cost and easy to participate in.



Figure 14: Bridge LED lights and conventional street lights.



Figure 15: Nighttime lighting of the courthouse.

- Residential programs serving vulnerable populations (e.g. low-income, fixed income).
- Programs that provide benefits to the larger customers (e.g. industrial), which make up a very large proportion of FPB's electricity sales. Programs that are attractive to large employers can lead to job creation and attract new industries to Frankfort/ Franklin county.



Figure 16: Municipal building and fire station.

2.2. Energy Efficiency Implementation Options and Recommendations

This section provides an overview of program implementation options available to FPB, including a discussion of staffing needs under the different options, expected ranges of savings, investments and budgets, and other important considerations.

2.2.1. Implementation Options

There are three main implementation options for utilities to deliver energy efficiency programs:

- 1) Implement in-house
 - a) Hire an outside implementer
 - b) Join existing programs
- 2) Implement on your own
- 3) A hybrid approach

Implement In-house

Implementing programs in-house works best when the utility has internal resources available to support energy efficiency program functions, a large customer base to justify economies of scale, and a large budget to support the infrastructure needed. Functions needed to implement energy efficiency programs include: program staff for technical support, accounting functions, marketing and outreach, program customer support, etc.

Critical tasks required for successful program implementation include:

- Manage the marketing of the various programs.
- Design program-specific web pages and educational material.
- Provide program specific customer support.

- Manage rebate applications and incentive payments.
- Provide account management and engineering-level technical assistance for larger customers.
- Manage a database of program activities such as customers, program participation, savings and, incentives paid.
- Manage subcontractors (e.g. appliance recycling, online store, rebate fulfillment contractor).
- Establish partnerships with community organizations and local retailers/vendors.
- Train customer service on program offerings.
- Report on program savings.
- Manage savings verification (EM&V) contractors.

Examples of utilities implementing programs in-house include Midwest municipal utilities such as Cedar Falls Utilities in IO and City Utilities of Springfield, MO. Also, the Benham Plant Board implements the BenhamSaves program in-house, drawing on local resources to help fund and support this program for low income residents. This is the only energy efficiency program that they implement due to size and available resources. The advantage of implementing programs in-house is that FPB would retain full control of how the programs are implemented. The major disadvantages are the additional staff and in-house expertise needed to support the programs. There is also greater risk of running into challenges when developing brand new programs, and higher costs due to the lack of economies of scale.

Staffing Needs

To implement a program in-house, significant staffing needs would have to be addressed. For example, to implement the Phase 1 programs recommended in this report, a minimum of the following would be required:

- One Outreach Specialist to perform account management, community outreach, and vendor relationship duties.
- One Program Manager to oversee incentive budget, prescriptive programs, and rebate processing.
- One Technical Expert to create savings calculation tools, perform calculations, and provide technical support to C&I customers.
- Existing staff resources to support data and reporting, marketing and public relations, customer support, and administrative functions.

In total, staff resources to implement Phase 1 programs in-house require at a minimum 4.5-6 full-time employee's worth. In addition, IT systems would need to be purchased or modified to track participation and savings in the energy efficiency programs. It can be very difficult to predict how much it will cost to implement a program in-house, as it will depend on many decisions related to the exact portfolio of programs, participation and savings targets for each program, and the subcontractors selected to process applications, develop a database, etc.

Hire an Outside Implementer

Implementing energy efficiency programs through an external implementation vendor works best when resources are not available within the utility, or the customer base is too small to justify the infrastructure needed to support programs. Even when an outside implementer is used, outreach

and education, for example, are most effective if they are a shared task developed in partnership with the implementer. If an outside implementer is used, two options are available:

1. Join an existing energy efficiency program and benefit from the energy efficiency of scale of several utilities joining forces. If FPB were to hire an outside implementer with extensive experience implementing in other locations, this would ensure that programs are introduced and run with fewer hurdles, resulting less demand on FPB's staff and customer services. For example, AMP hires implementers for its energy efficiency programs. Similarly, in Wisconsin the municipal utilities participate in the statewide energy efficiency program, Focus on Energy. This program utilizes implementers for the statewide program portfolio.
2. Hire an implementer to deliver a customized energy efficiency program. This can be an option when there are large consistent annual budgets and when budget is extremely limited and therefore only one or two programs are implemented. For example, KU/LG&E hire an implementer or multiple implementers for their energy efficiency program portfolio.

A key advantage of hiring an outside implementer is that they can provide services beyond the strict implementation of an incentive program. They can offer performance-based contracts with guaranteed savings to minimize risks for the utility. Implementers benefit from economies of scale and often provide other services, such as:

- Residential and business newsletters and other informative publications
- Providing a customer support team available to answer calls.
- Hiring third-party evaluation, measurement, and verification (EM&V) contractors.
- Tracking program data and providing progress reports.
- Developing web content.

The advantages of hiring an outside implementer include the opportunity to achieve economies of scale, and the ease of implementation for FPB. Hiring an outsider contractor would add little additional workload on FPB employees, with no impact on staff satisfaction. The disadvantages of hiring an outside contractor includes a loss of full control of the mix of programs that are implemented, and little control over the details of the implementation plan and schedule.

Staffing and Procurement Needs

Based on programs offered through Efficiency Smart and VEIC's general knowledge of effective start-up programs and implementation costs, we would anticipate that the annual budget for energy efficiency programs offered through hiring an outside implementer for a municipal utility of FPB's size could be as low as \$300,000 a year or as high a \$1 million a year, depending on the programs chosen and desired savings level. Energy efficiency program implementers may have varying costs, depending on programs offered, savings, and contractual period requirements. From our experience, many offer performance incentives and guaranteed energy savings and many have a set contract period.

Some FPB staff trainings will be required prior to program launch:

- Customer service staff will need to be trained on the program offerings
- Marketing, website and public relation staff will need direction from the implement and will need to develop pieces about the scope of the programs. This will ensure strong

integration and collaboration between the implementer and the municipal utilities website, marketing and PR efforts.

Hybrid

A hybrid approach involves implementing an energy efficiency program through an external implementation contractor but keeping some essential elements of program implementation in-house. This approach works best when some internal resources are available for marketing support, education and outreach but other program needs such as technical support or rebate processing require external support.

Under a hybrid program implementation approach, FPB could choose to hire an outside implementer to run some of the energy efficiency programs, and supplement the offering with a few programs offered in-house, benefiting from the ease and low-risk of implementing through a third-party implementer, but retaining some of the decision-making ability that is lost with relying on an implementer for all program offerings.

For example, EKPC and SMMPA handle some of the program tasks for their members but expect their members to handle other tasks. Columbia Water and Light implements most programs in-house but collaborate with other Missouri utilities by utilizing the same program implementer for the Home Performance with ENERGY STAR program.

2.2.2. Funding and Budgets

Program Budgets

As illustrated in Figure 17, the costs of program implementation can vary greatly, depending on many local market characteristics and program implementation choices. The programs illustrated here represent statewide or very large utility programs. If FPB were implementing programs in-house, FPB could expect the costs to be higher than the top of the range illustrated in the following graphs, at least initially, due to the absence of economies of scale. If FPB were to join an existing program, then FPB may see comparable costs, as long as the programs are offered on a large scale.

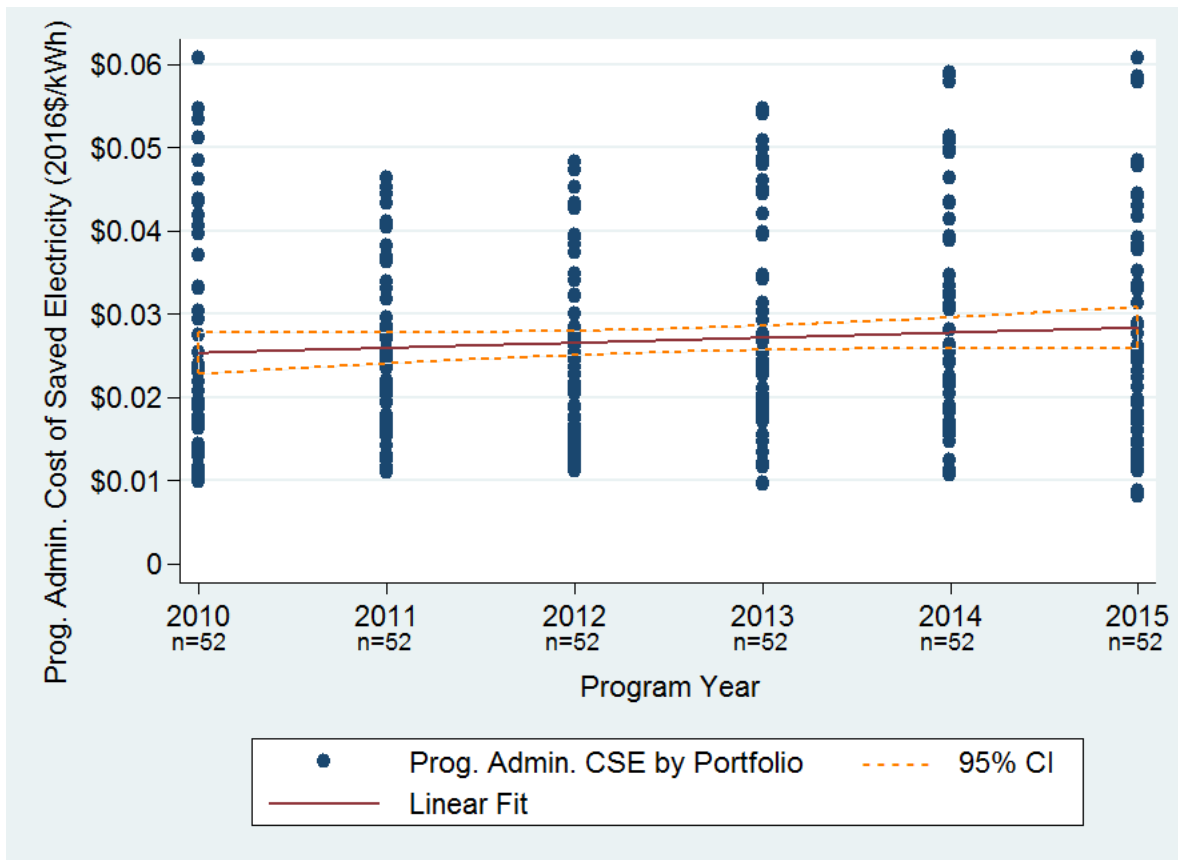


Figure 17: Trends in costs of saved electricity for energy efficiency program administrator nationwide.
 Source: LBNL: The Cost of Saving Electricity Through Energy Efficiency Programs Funded by Utility Customers: 2009–2015. June 2018. http://eta-publications.lbl.gov/sites/default/files/cose_final_report_20180619_1.pdf

The cost of saved electricity varies depending on program types (Figure 18), with customer product rebates and prescriptive incentives being the most cost effective residential programs, and whole house retrofit and new construction programs being the most expensive per kWh of electricity saved. It is important to note that these costs are very variable and in the case of whole house retrofit programs for example, vary nationwide by a factor of three.²⁵

²⁵ Source: The Total Cost of Saving Electricity through Utility Customer-Funded Energy Efficiency Programs, Ian M. Hoffman, et al. Berkeley Lab. April 2015



Figure 18: Average total costs (program administrator (PA) + participant costs) of saved electricity by residential program type. Source: LBNL: The Cost of Saving Electricity Through Energy Efficiency Programs Funded by Utility Customers: 2009–2015. June 2018. http://eta-publications.lbl.gov/sites/default/files/cose_final_report_20180619_1.pdf

Funding Energy Efficiency Programs

Other municipal utilities in the region typically recover their costs for implementing energy efficiency programs through a small rate increase, existing operating budgets or reserves, new sources of revenue, anticipated budget reductions and/or by trading renewable credits (not applicable in KY). FPB will need to evaluate which approach works best for the utility.

The FPB Board will need to evaluate the budget to decide on the best funding mechanisms for the program. Relative to FPB’s annual wholesale power cost of \$53 million, the energy efficiency programs will represent a very small (0.6% of the wholesale cost of power) and cost-effective investment towards the community’s wealth and well-being, and develop positive customer relations.

2.2.3. Other Considerations

Data Tracking and Confidentiality

To be able to track projects in different stages of implementation, and report program savings and costs, FPB will need a robust data tracking system. If hiring an outside contractor, FPB should

ensure a robust and proven data tracking system is available. If FPB decides to implement in-house, VEIC recommends hiring an experienced consultant to assist in the design of the data tracking and reporting database, or buying an off-the-shelf solution that has been extensively used and field-tested for tracking energy efficiency projects. Designing a tracking and reporting system to be used solely by FPB will add risk and cost, but could offer opportunities for integration with FPB's existing billing systems.

FPB will need to ensure that data is tracked such that all the information necessary for program implementation and reporting is entered and tracked, and that confidential information remains confidential. This will insulate the municipal utility from confidential information being shared unintentionally. Customers, especially industrial customers, take confidentiality seriously and FPB should be prepared to have energy advisors sign non-disclosure agreements with each industrial customer.

Evaluation, Monitoring, and Verification (EM&V)

Third party implementers often hire a third-party firm to verify that the energy savings reported to the utility are real and measurable. Third-party verification is important to ensure that the utility's investment in energy efficiency results in the expected outcomes. VEIC recommends that FPB hires an implementer that uses third-party savings verification as part of their operations, or if that is not feasible or FPB decides to implement programs in-house, that FPB hires a third-party savings verification firm directly. Savings verification could occur at a later phase of program implementation, and would not need to be performed annually, but savings should regularly be verified by a third party, every three years for example.

For savings verification to be successful, project and measure-level data needs to be accurately tracked and reported, and FPB should ensure that the selected implementation contractor has good systems in place to track project and measure-level data, and is able to report savings in aggregate at the utility's desired level of details.

Implementation Schedule

From our experience, when third-party implementers launch new energy efficiency programs, some programs will be available right away, while others will take longer to get off the ground.

Ideally, within the first two months of energy efficiency program implementation:

- The customer service call center is ready to answer questions, from the very first day.
- Promotional and educational material is made available to FPB's customers.
- The energy efficiency website is up and running from the start, with rebates for products available on the website. If an external implementer is used, links on FPB's and the municipality of Frankfort's websites will direct customers to the implementer's website.
- All key stakeholders understand what programs will be offered and the implementation timeline.

In the next three to six months, relationship-based programs (e.g. technical assistance, partnerships) will grow, but will not result in savings yet. The pipeline of upcoming savings will grow as relationships are built and opportunities identified, but electric savings will typically be realized after 6-12 months of program implementation.

Next, subcontracted or partner-administered programs will be launched, after the appropriate partnerships have been secured. These include appliance recycling (which requires a recycling subcontractor), and in-store lighting campaigns (which require partnerships with local retailers and lighting distributors). Building relationships with retailers, explaining the program, and gaining their trust can take time. Products will also need to be shipped from the manufacturer or distribution center to the retailer. Little savings are expected in the first 3-6 months for these types of programs. They aim to change the market, and this takes time to yield measurable savings.

The best results during the initial launch phase come in communities where the community is actively involved, and an education and outreach campaign can help achieve that. The community can help introduce program staff to local businesses and potential partners and can utilize their own media channels to support the program.

Marketing

A marketing plan for energy efficiency programs should take a holistic approach to the full suite of program offerings, linking marketing strategies and tactics to program-level goals. The plan may start with an assessment of existing marketing channels and opportunities available in FPB's service territory and would likely include either a dedicated website or program information integrated into an existing website. Other general marketing tactics may include: print advertising, digital advertising, on-bill messaging, bill inserts, flyers, social media, earned media articles, electronic or print newsletters, display advertising, point-of-purchase displays and printed materials for distribution.

Residential program marketing (B2C) typically includes more mass-media tactics such as print advertising and flyers while business program marketing (B2B) typically includes more targeted tactics such as utility office referrals and account management strategies. If FPB chooses to offer energy efficiency services under a separate brand, co-branding with FPB's logo is desirable to link the utility to the energy efficiency programs.

3 Recommended Energy Efficiency Programs for FPB

Upon reviewing many potential energy efficiency programs and their applicability to FPB’s territory and customers, VEIC provided FPB with a matrix of program options (included in Appendix B). The matrix presents the pros and cons of each program, and whether VEIC recommends implementing these programs as an initial phase of program launch (Phase I), or considering offering these programs at a later phase of program implementation or not at all. The matrix of program options and Phase I program selection was presented in detail to FPB staff and at the July 2018 Board meeting, and was positively received.

This section summarizes VEIC’s recommendations for Phase 1 deployment, as well as a longer-term strategy for building FPB’s energy efficiency portfolio over time. It also summarizes the recommended implementation and staffing approach, and provides a range of program costs for the Phase 1 program portfolio.

3.1. Phase I Program Portfolio

Table 6 below presents a summary of the recommended Phase I energy efficiency programs. These programs were selected because they provide options for each customer class, directly help customers reduce energy consumption, maximize the savings per dollar spent, and address community feedback to offer informative, engaging, accessible, and affordable programs for all.

The summary table is followed by brief overviews of each recommended program. Detailed program briefs for each recommended program are provided in Appendix C.

Table 6: VEIC’s Phase I Program Recommendations

| Program Type | Expected Relative Participation | Expected Relative Savings | Expected Relative Cost Effectiveness |
|---|---------------------------------|---------------------------|--------------------------------------|
| Home Owners and Renters, Small and Medium Businesses | | | |
| Community Outreach/Education | High | N/A | N/A |
| LED Light Bulb Discounts | Very High | Moderate | Very High |
| Energy Efficiency Kits for Low Income Customers | Low | Low | High |
| Appliance Recycling | Low | Low | Moderate |
| Product Rebates | Low | Low | Low |
| Online Store for Efficient Products | Variable | Variable | High |
| Commercial, Institutional, and Industrial | | | |
| Energy Advising / Technical Assistance | Low* | N/A | N/A |
| Prescriptive Rebate | Variable | Variable | Moderate |
| Custom Incentive | Low* | High | Variable |

*Although Participation is listed as Low, this means that the total number of possible participants are small because most service territories have far less C, I & I customers as they do residential customers. However, within this small group of participants this program generates moderate participation.

3.1.1. Residential

Community Outreach and Education

Public events, informative and educational presentations, and other community outreach strategies are used to educate residents on energy conservation and energy efficiency. While not intended to capture and track direct savings resulting from this program, community outreach and education are key aspects to any energy efficiency portfolio, particularly from a customer service and satisfaction perspective.

In-store LED Light Bulb Discounts

An LED Light Bulb Discount program offers discounted ENERGY STAR® rated LED bulbs to residents by developing a memorandum of understanding (MOU) with hardware or grocery stores. A successful approach for this program typically involves selecting a quality product from a trusted manufacturer, and providing that product for free to the retailer with the energy efficiency program paying for the products.

Energy Efficiency Kits

Often implemented in partnership with food pantries, community action agencies, and other entities that support low income residents, Energy Efficiency Kit programs provide free energy savings products to low income customers. These kits include products and offerings that residents can install themselves, as well as include educational materials. The distribution of the kits could be offered in partnership with Blue Grass Community Action Partnership, the Kentucky Housing Corporation, and the Housing Authority of Frankfort.

Appliance Recycling

Appliance Recycling programs promote the early retirement of operable but inefficient appliance by removing and recycling inefficient appliances. Products typically considered for these programs include second refrigerators and standalone freezers.

Product Rebates

Providing rebates to incentivize the purchase of efficient products, especially expensive products that are purchased infrequently, is one of the most commonly offered energy efficiency programs. Support can be provided based on product tiers (ENERGY STAR® Most Efficient, CEE tiers, and others), and incentives should be scaled to the level of savings captured.

Online Store for Products

Rebates for energy efficient products that can be easily shipped and installed by the customer can be set up and provided through online product portals.

3.1.2. Commercial, Institutional, and Industrial

Energy Advising and Technical Assistance

Through providing energy management and technical assistance for large energy users, energy advisors assess a facility's energy costs and energy efficiency. This can be done through bill analysis and facility walk-through survey. An energy advisor will have prior energy efficiency project knowledge and expertise and partner with the customer to comprehensively understand their business, including objectives and long-term capital plans.

Prescriptive Rebates

In a Prescriptive Rebate programs, a list or form details eligible energy efficient products and rebate amounts per product. A program typically starts with products that are often selected by many customers (including the SMB market). This list can then grow at each phase of implementation, and will likely include measures such as: lighting and controls including LED street lighting; smart thermostats; HVAC systems; motors; refrigeration; pumps and compressed air.

Custom Incentives

In Custom Incentive programs, incentives are provided to customers for measures installed in qualified projects that are less common or more complex than those typically included in Prescriptive Rebate programs. As with Prescriptive Rebate programs, custom incentive payment occurs after the equipment is installed and operational at the customer's location.

3.2. Implementation Approach

Due to FPB's small scale and the opportunity to reduce program costs by teaming up with other municipalities or cooperative programs, VEIC recommends that FPB initially hire a trusted and experienced third-party implementer through an RFP process, while exploring the opportunity to join existing programs offered by other utilities in Kentucky and the Midwest. VEIC can assist FPB with a list of potential implementers for the RFP process. Once programs are well-established, savings have been demonstrated, and community support has been built, VEIC recommends evolving the program offerings depending on changing market conditions and budgets.

3.3. Expected Energy Savings and Program Costs

Electric sales to all FPB customers are approximately 667,000 MWh annually. The programs recommended in Phase I have the potential to yield energy savings of 0.25% to 0.75% of retail electric sales, depending on the level of investment and scale of the programs. This is a savings of 1,700 to 5,000 MWh each year from the Phase I portfolio (lifetime cumulative savings will be much higher). The expected cost for implementing Phase I programs is expected to be in the range of \$300,000 to \$1 million depending on the scale of implementation, and whether programs are implemented in-house or through a third-party implementer.

National surveys have found that the cost of procuring electricity through energy efficiency is low (\$0.01-0.06 per lifetime kWh for program implementers working at a large scale).²⁶ Due to the small scale of program implementation in Frankfort, the cost per unit of energy saved is likely to be higher (around \$0.06-0.15 per kWh in our professional judgment). The table below summarizes the projected range of annual costs and energy savings that FPB could expect if FPB chooses to move forward with the recommended Phase I energy efficiency programs. Energy efficiency is expected to cost FPB significantly less than procuring electricity at wholesale.

Table 7: Estimated program costs, savings and costs per kWh saved.

| Estimated Annual Program Costs | Estimated Annual Program Energy Savings | Estimated Program Administrator Cost per kWh |
|--------------------------------|---|--|
| \$300,000 – \$1,000,000 | 1,700 – 5,000 MWh | \$0.06 – \$0.15 per kWh |

²⁶ Source: LBNL: The Cost of Saving Electricity Through Energy Efficiency Programs Funded by Utility Customers: 2009–2015, 2018

3.4. Program Evolution: Long Term Strategy

The portfolio of programs recommended in Phase I supports the community's overarching goals, with a focus on providing cost-effective program participation and savings. Over the next few years as FPB emerges as a municipal utility leader in energy efficiency programs in Kentucky, the long-term strategy for energy efficiency programs should continue to be engaging, accessible, and affordable. The program portfolio should evolve as it continues to grow and expand on existing offerings and approaches. This expansion will require increased budget but will lead to greater savings. Appendix B: Matrix of Program Options provides more details and options for specific programs mentioned below.

Looking forward, FPB's evolving program portfolio should:

- ✓ *Continue to expand on the visibility of the energy efficiency programs* within the community. Community outreach and education will always be key, and plans to incorporate behavioral elements – rooted in the social science of how to measurably change behavior – to build engagement into all program designs is increasingly important. Programs that involve segmentation and behavioral engagement may be good candidates for inclusion in FPB's evolving program portfolio. Providing access to engaging platforms that share energy usage and identify actions to take to reduce energy consumption will continue to increase program participation and reduce energy consumption. Targeting specific markets such as renters, homeowners, small and medium businesses, and largest energy users with different messages will grow participation and savings. Example programs that may be beneficial:
 - Online Energy Audit
 - Home Energy Reports (also used for small and medium businesses)
 - Energy Behavior Change for Renters

- ✓ *Explore partnership models*, such as a small grant program for nonprofits serving the low-income community, a partnership with the local weatherization agency to directly install lower cost electric-saving measures during weatherization projects, a collaboration with the local food bank to distribute efficient products or free energy efficiency products kits to expand knowledge of energy efficiency to students in middle schools and their families. Example programs that may be beneficial:
 - Crowdfunding for non-profits or donations to support low income energy efficiency
 - Energy efficiency audit and weatherization programs
 - Energy efficiency education for students
 - Partnerships with Blue Grass Community Action Partnership, the Kentucky Housing Corporation, and the Housing Authority of Frankfort\

- ✓ *Utilize technology that builds on customer data about energy usage availability*, including the enhanced features and benefits that will eventually be available from FPB's deployment of AMI throughout the service territory. Since AMI data can also be utilized for demand response programs, close coordination with KYMEA will be important to ensure that any demand response programs do not unfairly shift costs to other KYMEA members will be important. Access to data for analytics will help to develop behavior-based energy efficiency programs and peak demand reduction

opportunities, and better target programs to those that need the improvements the most. For example, a program that leverages smart thermostats to engage customers in reducing energy use and peak demand could be a valuable addition to FPB's portfolio.

- ✓ *Consider adding financing options.* Financing mechanisms are a key ingredient for cost-effective energy efficiency programs. Financing can often be designed to help customers achieve positive cash flow, making projects much more compelling. FPB should revisit the recommendations from the Frankfort's Energy Future report developed in 2016.²⁷ The How\$mart on-bill financing program could be a great option for a municipal utility like FPB. The utility should explore including on-bill financing and/or on-bill tariffs as well as partnerships with lenders on energy efficiency loan products. FPB should also further assess the value of the Energy Project Assessment District- EPAD financing program and interest among the FPB stakeholders. Example financing offerings that may be beneficial:
 - How\$mart on-bill financing program
 - Energy project assessment district- EPAD (often called PACE)
 - Residential and small business low interest financing working with a local credit union

In addition to expanding FPB's program portfolio, FPB might consider leading the collaboration of an energy efficiency program portfolio developed through KYMEA for its member utilities. This could be developed using a similar strategy to Efficiency Smart developed for American Municipal Power, Inc, or Efficiency Works, developed by Platte River Power Authority for its members. The portfolio could include the Phase I programs and evolve by engaging some of the suggestions listed above.

In-home audit programs often see large vocal support from residents but much less action taken once the program is available. Unless free measures are offered, such as an energy efficiency kit or LED bulbs, the audit itself does not result in savings, because there are no guarantees that the home owner will do any of the recommended upgrades. As mentioned during the Kentucky energy efficiency programs section, KU & LG&E are discontinuing their home audit program in 2019 and East Kentucky Power Coop member owners are leading with the online energy audit and then conducting much fewer in-home energy audits. FPB had also supported a pilot project for in-home audits about ten years ago, when FPB offered free energy efficiency audits to its residents, delivered through an in-house staff member. FPB staff shared that they saw a very small uptake, with only about a dozen residents receiving the audit and a smaller, unknown number of participants followed through on audit recommendations and installed energy efficient equipment. For these reasons, VEIC does not recommend an in-home audit as a Phase I approach, and recommends caution, or starting with a pilot supporting the most vulnerable residents, if FPB plans on including that program in future offerings.

²⁷ <https://sites.google.com/site/envisionfranklincounty/frankfort>

4 Next Steps

4.1. VEIC's Recommendations

- September 2018 Board Meeting
 - Accept the final report from VEIC entitled *Energy Efficiency Program Plan for Frankfort Plant Board*.
 - Pursue the recommended Phase I energy efficiency programs.
- October/November 2018
 - Develop and issue an RFP for implementation, requesting Phase I programs at a minimum, allowing for respondents to propose additional programs to add to the portfolio.
- January 2019
 - Review responses to RFP and decide if FPB will hire an implementer or implement in-house.
- February 2019
 - Allocate budget based on responses to RFP.

This suggested schedule may vary depending on Board decisions, and external and internal factors.



5 Appendices

5.1. Appendix A: Programs Offered by Other KY Utilities

5.1.1. KU & LG&E Programs

Programs Continuing in 2019 - 2025

- WeCare: Education and weatherization program provides energy audits, energy education, and installation of weatherization and energy conservation measures in qualified single-family homes, tenant units and common areas of qualifying multifamily properties. \$1,500 per single family home and \$750 per tenant unit or common areas
- Nonresidential Rebates: Prescriptive and Custom rebates for commercial, institutional and industrial customers includes new construction and retrofits
- School Energy Management Program: Funds and supports the Kentucky School Board Association (KSBA) program through continued hiring and retention of qualified, trained energy specialists by public, private, and independent school districts through June 30, 2020 to lead the continued expansion of energy efficiency improvements within each district. utilizing energy more wisely, with the objective that each school district will reduce energy consumption by an annual rate of 2.5 percent and achieve energy utilization indices (“EUI”) of fifty or lower.
- Advanced Meter Systems Opt-in: Allows the utility to offer up to 10,000 advanced meters to those Rate RS or GS customers who elected to participate. Through November 30, 2017, more than 5,400 customers have AMS meters deployed to their residences or places of business. Participants’ consumption is captured, communicated, and stored, allowing participants to monitor their hourly usage through an online portal (MyMeter) within two business days.
- Residential Load Management/ Demand Conservation: Customers with switches installed on qualifying central air conditioning units and heat pumps, water heaters and pool pumps can receive bill reductions for participating in demand response to reduce the peak summer events.
- Nonresidential Load Management/ Demand Conservation: Largest energy users that have participated in the program previously can receive energy bill reductions for participating in demand response to reduce the peak summer events.
- Program Development & Administration: Funds staff and contractors supporting programs with research, pilot ideas, market segmentation, procurement and contract administration, and EM&V)

Programs Discontinued Starting in 2019

- Residential Home Energy Products Rebates
- Residential Fridge & Freezer Recycling
- Residential Home Energy Audits
- Residential Smart Energy Profile/Home Energy Reports
- Customer Education & Public Information

5.1.2. EKPC Programs

Existing Residential Programs

Energy Education and Outreach: Using outreach and energy education to increase participation in the programs. New campaigns included direct mail, bill inserts, brochures, digital advertising and social media.

Energy Insights: (in-home audit and Online Billing *Insights*) Residents are requested to use the online tool which uses the Apogee online audit platform and answer some questions to identify energy improvement opportunities. If still needed, they can request an in-home energy audit from their local utility. Residents receive an LED screw in bulb for completing the Billing *Insights*.

Touchstone Energy Home: New construction incentive program for homes that exceed more than 20% of standard HERS rating for new home construction in Kentucky.

LED Lighting: Distributes 2 free LED to residents that attend annual cooperative meetings.

ENERGY STAR Appliance Rebates: Purchase new energy efficient products (Refrigerator \$100, Freezer \$50, Dishwasher \$50, Clothes Washer- \$75, Heat Pump water heater, Heat pump and central A/C - \$300.)

Appliance Recycling: Appliance Recycling Centers of America (ARCA) picks up/recycles old refrigerators and freezers, up to 2 per year - \$50 incentive.

CARES: Enhanced weatherization rebate (\$2,000) through community action agencies for WAP participants.

Heat Pump Retrofit Rebate: Incentive to replace existing electric furnace or base board heat with efficient heat pump- 3 levels of incentives depending on size and energy efficiency level.

HVAC Duct Sealing: Certified contractors inspect your home's heating and cooling duct system to ensure maximum energy efficiency. Rebates are available for qualifying energy measures.

Button-Up Weatherization: Program energy advisor inspects for leaks and offer vital tips on insulation, air sealing and more. Rebates are available for qualifying energy measures.

Direct Load Control: Switches are installed at no cost at residences and SMB and incentives are provided to reduce peak usage through demand response events.

Energy Star Manufactured Home: Upgrade existing older manufactured home to a new home with ENERGY STAR certified standards. Program works directly with manufacturer and focuses on low income residents.

Existing Commercial and Industrial Programs

Commercial and Industrial Advanced Lighting: Incentives are offered to existing C & I facilities to install high efficiency lamps and ballasts such as LED exit signs, LED fixtures and advanced controls

Industrial Compressed-Air: Incentives are offered to existing C & I facilities to fund a leak-detection audit and repair leaks.

Table 8: EKPC 2016 Program participation, savings and budgets²⁸

| Programs | Participation | Budget | MWh Savings | MW Savings | Benefit/Cost Ratio (TRC) |
|-------------------------------|----------------------|------------------------|--------------------|-------------------|---------------------------------|
| Energy Education and Outreach | No tracking | Part of overall budget | N/A | N/A | N/A |
| Energy Audits (in-home) | 161 | \$11,512 | 103 | 0.055 | N/A |
| Energy Audits(online) | 1699 | \$121,488 | 859 | .459 | N/A |
| Touchstone Energy Home | 517 | \$720,600 | 1,324 | 0.002 | 1.98 |
| Residential CFL Lighting | 58,200 | \$52,380 | 1,222 | .326 | 2.62 |
| Residential LED Lighting | 7878 | 34,261 | 189 | 0.051 | 2.13 |
| ENERGY STAR Appliance Rebates | 10,636 | 1,936,105 | 2,970 | 1.05 | 1.49 |
| Appliance Recycling | 1,686 | \$369,637 | 1,173 | .287 | 2.01 |
| CARES | 34 | \$78,043 | 161 | 0.073 | 1.34 |
| Heat Pump Retrofit Rebate | 675 | \$1,496,154 | 5,365 | 0.298 | 1.25 |
| HVAC Duct Sealing | 185 | \$93,000 | 193 | 0.236 | N/A |
| Button-Up Weatherization | 1136 | \$650,080 | 1550 | 1.563 | 1.52 |
| Direct Load Control | 2336 | \$1,174,824 | 16 | 2.241 | 2.68 |

²⁸ DSM 2015 and 2016 Annual Reports

| Programs | Participation | Budget | MWh Savings | MW Savings | Benefit/Cost Ratio (TRC) |
|---|----------------------|---------------------------|--------------------|-------------------|---------------------------------|
| Energy Star Manufactured Home | 38 | \$163,400 | 454 | 0.128 | 4.09 |
| Commercial and Industrial Advanced Lighting | 207 | \$1,712,888 | 14,665 | 4.693 | 2.22 |
| Industrial Compressed-Air | 1 | \$3,288 | 68 | 0.018 | 1.62 |
| Total: | | \$14.3 million | 37,804 | 188.1 | |

5.2. Appendix B: Matrix of Program Options

[Separate Microsoft Excel document with multiple tabs]

5.3. Appendix C: Program Briefs

5.3.1. Phase I Program Briefs

Introduction

The following section provides details on the programs recommended for implementation during Phase I. In the Program Briefs, examples for program participation, cost effectiveness, and savings, for comparison purposes. These are not intended to capture or be indicative of values FPB could expect. Values are presented from the Efficiency Smart program through American Municipal Power, Inc.²⁹ and Kentucky Touchstone Energy Programs through East Kentucky Power Cooperative (EKPC)³⁰. This energy efficiency program plan will assist FPB in deciding on the path forward, but it is not an *implementation* plan, as the exact path forward has not been established yet. As such, this plan cannot provide the level of details that an *implementation* plan would offer, such as a schedules and expected savings and costs for FPB's program implementation. During the RFP process for a program implementer, FPB should request an implementation plan be presented in response to the RFP.

Residential

Community Outreach and Education

Target Market: Renters, Homeowners, Small/Medium Businesses

Type of Program: Education / Behavior

Measures Included: None

Program Description: While not intended to capture and track direct savings resulting from this program, community outreach and education are key aspects to any energy efficiency portfolio, particularly from a customer service and satisfaction perspective. Public events, informative and educational presentations, and other community outreach strategies are utilized to educate residents on energy conservation and energy efficiency. Collecting names, email addresses, and cell phone numbers from residents and businesses is important for marketing and education efforts, and can be accomplished through multiple channels, such as a free raffle with a chance to win an energy efficiency kit. Updating and maintaining a content-rich website is another important element of community outreach and education. FPB could develop information sheets and website content, including information on local builders and trade allies qualified to provide energy efficiency services, branded in a way that resonates with the local community. A well branded website prominently featuring energy efficiency programs can be combined with a broad-based social marketing campaign to work with residents, businesses, and municipal government to complete energy upgrades in homes, small businesses, and municipal buildings, as well as include behavior change techniques.

Pros: Community outreach provides an excellent, low-cost approach to combine education with energy conservation/ energy efficiency. It provides positive customer and community relations, as well as an opportunity to partner with and involve local community organizations. It is also a

²⁹ Figures from Efficiency Smart represent average annual program-wide output. These figures are not representative of any specific individual community, nor are they meant to predict program behavior in any specific community.

³⁰ EKPC figures are from the Demand Side Management 2016 Annual Report from East Kentucky Power Cooperative.

good approach to programs for utilities that are just getting started with energy efficiency programs and that have limited budgets.

Cons: The primary downside to community outreach and education is that it is very difficult to capture savings directly resulting from the efforts. It is therefore better utilized to advance customer service goals, rather than savings goals.

Implementation Timetable: An outreach and education program should commence immediately, as it will establish the community relationships necessary for implementation of all other FPB programs. Promotional material should be ready and available on the website on the first day of program launch.

Annual Participation: High, but not typically quantified.

Cost Effectiveness: Not applicable.

Savings: Not applicable.

Examples of other Kentucky utilities or municipal utilities implementing Community Outreach and Education programs:

- Efficiency Smart has several municipal utilities in Ohio and Delaware using this approach of community outreach events.
- Salt River Project included an educational video developed by NRDC on their website. They also developed some tips on how to make customers' homes more energy efficient that they use with community outreach.
- JEA offers education through a Free Energy and Water Evaluation Kit. Inside the kit are worksheets and materials that can show customers how to lower monthly energy and water costs, while making their home more comfortable. The kits, which may be checked out and kept for three weeks, are available at various libraries. They also offer Home Energy and Water Evaluation Kit one-hour workshops to help residences use the kit and learn about how to save energy.

In-store LED Light Bulb Discounts

Target Market: Renters, Homeowners, Small/Medium Businesses

Type of Program: Midstream/ Prescriptive

Measures Included: Screw in LED Bulbs - ENERGY STAR® only (or best-in-class alternative).

Program Description: An LED Light Bulb Discount program will offer discounted ENERGY STAR® rated LED bulbs to residents by developing a memorandum of understanding (MOU) with hardware or grocery stores. A successful approach for this program typically involves selecting a quality product from a trusted manufacturer, and providing that product for free to the retailer with the energy efficiency program paying for the products. Through an MOU, the retailer agrees to retail the product at an agreed-upon price (often \$1.00 or \$0.99). The retailer makes a profit on those products, the customer gets LED bulbs at a good price, and the utility gets a cost-efficient way to distribute those bulbs and gain electric savings. The program may also include training of the sales staff on energy efficiency lighting, as well as educational material for customers that purchase the bulbs with other energy savings tips or programs offered by the utility. These programs often include a product purchase maximum per store visit.

Pros: This easy, low-cost, self-installed technology makes this a good first step for interested customers in energy efficiency. It provides positive customer and community relations, and involves local retailers. This program improves in-store stocking of LED lightbulbs and possibly other energy efficient products such as dimmers, occupancy sensors, and advanced power strips.

Cons: Programs should account for reduced savings from sales to customers outside of service territory ("leakage rate"). However, leakage can be minimized by selecting non-chain, locally-owned stores that are geographically central to FPB's service territory, as well as using targeted marketing channels. Additional challenges include an inability to verify customers' addresses or confirm that customers actually install the LED bulbs in high-use areas. Savings from LED lighting will be dramatically reduced if proposed lighting standards for screw-in LED lightbulbs go into effect in January 2020, so this program may have a less than three-year life.

Implementation Timetable: This program is usually able to implement within the first 3 - 6 months of program launch (or more) depending upon interest from local retailers. Time spent during the initial three months of implementation will involve enrolling retailers, establishing MOUs, and shipping bulbs to retail locations. LED light bulb discount programs often provides the majority of savings from the residential sector in the initial program years.

Annual Participation: Very high. LED Light Bulb Discount programs represent a significant proportion of a typical energy efficiency portfolio participation. For Efficiency Smart, an annual average of 10,601 participants are recorded and an average of 4 bulbs per participant; the East Kentucky Power Cooperative (EKPC) reported 7,878 LED bulbs in 2016.

Cost Effectiveness: Very high, due to low incentives, low labor requirement, and moderate marketing costs. For each program they implement, EKPC reports a Total Resource Cost (TRC), representing the ratio of overall program benefits to costs. For 2016, they reported a TRC of 2.13 for their LED discount program.

Savings: Moderate in terms of the whole portfolio, but very high proportion of residential savings. While LEDs programs typically account for a large proportion of overall participation in energy efficiency program portfolios, they contribute a much smaller proportion of savings. For Efficiency Smart, annual average savings of 1,746 MWh are recorded for lifetime savings of 10,206 MWh; the EKPC reported annual savings of 189 MWh and lifetime savings of 1,513 MWh for 2016.

Examples of other Kentucky utilities or municipal utilities implementing LED retail programs:

- Through Efficiency Smart, several municipal utilities in Ohio and Delaware have partnered with local stores to provide LEDs for less than \$1.00 each.
- Efficiency Works™ – a partnership between Platte River and the utilities of its owner municipalities fund instant rebates for ENERGY STAR® rated LEDs sold at local hardware stores, do-it-yourself, discount and lighting design stores located in Fort Collins, Longmont and Loveland, Colorado. Efficiency Works also offers in-store instant rebates for qualified lighting controls, such as dimmers and occupancy sensors.
- ShopSmart with JEA offers instant rebates on ENERGY STAR (LED) bulbs. Rebate amounts vary depending on the product and package quantity. JEA rebates are taken from the original price, so the sticker price shown includes your instant LED rebate. There

is a large list of participating retailers including local Walmart, Costco and Home Depot and small local hardware stores. These stores also recycle used bulbs.

Energy Efficiency Kits

Target Market: Low Income Renters and Homeowners

Type of Program: Education / Prescriptive

Measures Included: ENERGY STAR® (or best-in-class alternative) rated LED bulbs and LED night lights

Program Description: Often implemented in partnership with food pantries, community action agencies, and other entities that support low income residents, Energy Efficiency Kit programs provide free energy savings products to low income customers. These kits will include products and offerings that residents can install themselves, and often include educational materials. Typically kits include ENERGY STAR® (or best-in-class alternative) rated LED products, but can also include water conservation products, such as faucet aerators and showerheads, as well as furnace filter whistles. In addition to providing savings for low income residents, some utilities also utilize a local disadvantaged workforce to assemble the kits.

Pros: Energy Efficiency Kits provide an excellent, low-cost approach to combine education with energy conservation/ energy efficiency. They provide positive customer and community relations, as well as an opportunity to partner with and involve local community organizations. Partnership with local agencies reduces program labor cost, and because local agencies are often trusted by hard-to-reach customers, this can make outreach more successful. Energy Efficiency Kit programs are also a good approach for utilities that are just getting started with energy efficiency programs and that have limited budgets, as they can control the number of kits to purchase and how and when to distribute them.

Cons: To account for the fact that not all customers will install the LEDs most utilities use a reduced savings estimate. Also, savings from LED lighting will be dramatically reduced if proposed lighting standards for screw-in LED bulbs go into effect in January 2020, so this program may have a less than three-year life.

Implementation Timetable: The preparation time for implementing an Energy Efficiency Kits program involves compiling educational material, assembling kits, and establishing partnerships. If hiring an outside implementer that already has a contract in place with a company assembling the kits, this can occur quite quickly. If implementing in-house, selecting a company and executing a contract to assemble the kits could take longer.

Annual Participation: Low, depending on the size of hard-to-reach market size. From the Efficiency Smart program, average annual participation from all communities is 2,335. Could be moderate for FPB customers.

Cost Effectiveness: High, due to a low incentive costs and low to moderate labor that is minimized through partnerships. Goes down significantly if kits are shipped to customers.

Savings: Low, but proportional to participation. High value for public relations. From the Efficiency Smart program, average annual savings from all communities is 421 MWh.

Examples of other Midwest utilities or municipal utilities implementing Energy Efficiency Kit programs:

- Through Efficiency Smart, several municipal utilities in Ohio and Delaware have partnered with local community action agencies to provide kits that include 4 LED lightbulbs.
- Duke Energy Ohio offers low income customers energy efficiency products such as LEDs, low-flow showerheads and faucet aerators, water heater wraps, HVAC cleaning, HVAC filters, and energy efficiency education. The program is offered through a partnership with People Working Cooperatively (PWC) and specifically targets elderly customers.

Appliance Recycling

Target Market: Low Income, Renters and Homeowners, Small/Medium Businesses

Type of Program: Prescriptive

Measures Included: Inefficient refrigerator or freezer

Program Description: Appliance Recycling programs promote the early retirement of operable but inefficient appliance by removing and recycling inefficient appliances. Products typically considered for these programs include second refrigerators and standalone freezers.

Pros: Appliance Recycling programs tend to have excellent cost effectiveness because older, inefficient appliances are being removed from the secondary market, and have been effective with incentives as little as \$35-\$50. These programs are relatively easy to administer as multiple companies specialize specifically in this, such as ARCA and Reclaim. Also, there are few barriers to customer participation because no cash investment is required. These factors make this program a good fit for a start-up energy efficiency program with limited funding. Also, if funding is limited, it is possible to ensure that the oldest, most inefficient units are being incentivized for removal by setting a minimum age or in-service date.

Cons: Offering to pick up and remove the appliance is typically not enough to drive participation. Therefore, some level of incentive is necessary to encourage people to give up their extra refrigerator or freezer.

Implementation Timetable: Because of the ease of administration, Appliance Recycling programs are usually able to implement within the first 3 - 6 months of program launch assuming cooperation from companies that specialize in this. The first few months after launching the program will be spent coordinating with the appliance recycling company chosen and executing a contract.

Annual Participation: Low, but can be higher with aggressive marketing campaigns. Appliance recycling programs represent a fairly small proportion of a typical energy efficiency portfolio participation. For Efficiency Smart, an annual average of 217 recycled appliances are recorded however in a given year this number is much higher since the average include years when this program was not offered due to the bankruptcy of the current program implementer, Jaco; the East Kentucky Power Cooperative (EKPC) reported 1,686 incentives provided in 2016.

Cost Effectiveness: Moderate, due to low incentive costs but typically moderate subcontracting fees. This programs cost effectiveness improves with scale. For 2016, EKPC reported a TRC of 2.01 for their Appliance Recycling program.

Savings: Low, but can be higher with aggressive marketing campaigns. Appliance Recycling programs represent a fairly small proportion of a typical energy efficiency portfolio participation, and similarly, represent a small proportion of savings. EKPC reported annual savings of 1,176 MWh and lifetime savings of 8,214 MWh for 2016.

Examples of other Kentucky utilities or municipal utilities implementing Appliance Recycling programs:

- EKPC member coops participate in this program offering \$50 to pick up a refrigerator or freezer through ARCA, the program administrator.
- KU and LG&E offer a Fridge and Freezer Recycling Program until 11/2018 when they will be discontinuing the program. Currently customers receive \$50 per appliance. The website states that, "Since inception customers have already recycled nearly 50,000 appliances which has prevented more than 7 million pounds of materials from being tossed in a landfill."
- Efficiency Smart member municipal utilities participate in this program offering \$50 per appliance to pick up and recycle a refrigerator or freezer through ReCleim, the program administrator.
- Cedar Falls Utility in IO, offers residents an appliance recycling program managed in collaboration with the city. This program offers incentives to residents that take the appliance to the City Transfer Station or contact the City Refuse Services 629 to request curbside pick-up. Small disposal fees are collected but also incentives up to \$50 per appliance is offered.

Product Rebates

Target Market: Low Income, Renters and Homeowners, Small/Medium Businesses

Type of Program: Prescriptive

Measures Included: ENERGY STAR® certified products such as refrigerators, clothes washers and dryers, dishwashers, heat pump water heaters, air source heat pumps, central air conditioners, select ceiling fans with lights, select furnace fan motors, and select pool pumps

Program Description: Providing rebates to incentivize the purchase of efficient products, especially expensive products that are purchased infrequently, is one of the most commonly offered energy efficiency programs. Support can be provided based on product tiers (ENERGY STAR® Most Efficient, CEE tiers, and others), and incentives should be scaled to the level of savings captured. Rebates can also be provided for broad product offerings, including products that are numerous in homes, but may have lower per-unit savings. Having a prescriptive list of energy efficiency products can help provide guidance to customers on most efficient products. One effective program design element is to pair product rebates with customer support to answer application and product questions. Additionally, education, training, and market support for a qualified installation contractor network can increase the benefits of these programs.

Pros: These programs have clear benefits as rebate amounts are transparent and upfront. They require minimal interactions directly with the utility on the part of the consumer, which is important for busy residents and business owners. Because product rebates are often associated with large purchases, these programs provide a great public relations opportunity to demonstrate support for the residents and the community.

Cons: Product rebate programs can be relatively labor intensive for program implementers since applications are processed and checks are issued for relatively small amounts. Also, applications can be perceived as difficult to navigate and understand. Product rebate programs don't tend to drive a large amount of savings, and incentive costs are high relative to the savings yield. These programs are highly reliant on effective marketing channels, which can be challenging on a municipal level.

Implementation Timetable: Form-based programs, such as Product Rebate programs, can be made available immediately. Offering Product Rebates on day one is most feasible if working through a third-party implementer that already has forms developed and rebate processing established. If implementing in-house, some time may be needed to develop forms and determine how form processing will be handled.

Annual Participation: Low. For Efficiency Smart, an annual average of 407 product rebates are recorded; the East Kentucky Power Cooperative (EKPC) reported 10,636 incentives provided in 2016. For EKPC this was a 79% participation increase with 75% coming from clothes washers, dishwashers and refrigerators.

Cost Effectiveness: Low. For each program they implement, EKPC reports a Total Resource Cost (TRC), representing the ratio of overall program benefits to costs. For 2016, they reported a TRC of 1.49 for their Product Rebates program in aggregate, meaning across all ENERGY STAR appliances.

Savings: Low. For Efficiency Smart, annual average savings of 84 MWh are recorded for lifetime savings of 1,251 MWh through their Product Rebate program; the EKPC reported annual savings of 2,970 MWh and lifetime savings of 38,936 MWh for 2016 in theirs.

Examples of other Kentucky utilities or municipal utilities implementing Product Rebate programs:

- EKPC's member coops in Kentucky participate in this program offering incentives for ENERGY STAR® Appliances with the following rebate amounts: refrigerator \$100; freezer \$50; dishwasher \$50; clothes washer \$75; heat pump water heater \$300; heat pump \$300; and central air conditioning \$300.
- Efficiency Smart offers a product rebate program with predetermined incentives, eligibility requirements for quantities purchased, and eligible models. Products include: advanced power strips, clothes washers, clothes dryers, refrigerators, dehumidifiers, ceiling fans, pool pumps, heat pump water heater, furnace fans with ECM, and smart thermostats.
- LG&E/ KU offered rebates for A/C air source heat pumps (\$100-\$750), clothes washers (\$75), freezer and refrigerator (\$50-\$100), and heat pump water heater (\$300) but have discontinued the program.
- Sacramento Municipal Utility District offers prescriptive product rebates through an online energy store.
- Columbia Gas offers a furnace free replacement program to low income customers that meet the weatherization programs income qualification criteria.
- Columbia Gas also offers a product rebate program on gas HVAC, dual fuel furnaces, on demand water heaters, tank water heaters, power vent water heaters, space heaters, and gas fireplaces.

Online Store for Products

Target Market: Low Income, Renters and Homeowners, Small/Medium Businesses

Type of Program: Prescriptive

Measures Included: Smart thermostats, LED lighting, water saving devices, and advanced power strips

Program Description: Rebates for energy efficient products that can be easily shipped and installed by the customer can be set up and provided through online product portals. Companies such as EFI and Simple Energy provide this service and support utilities with branding and incentive amounts. Like Product Rebate programs, incentives can be provided based on product tiers (ENERGY STAR® Most Efficient, CEE tiers, and others) and should be scaled to the level of savings captured.

Pros: One significant benefit of programs that provide energy efficient product rebates through online stores is that the rebate amount is factored into the price of the product, eliminating the need for incentive payment checks. The companies specialize in this service take care of all the details. Like Product Rebate programs, Online Store programs require minimal interactions directly with the utility on the part of the consumer, which is important for busy residents and business owners, and information on the energy efficiency of products and guidance can easily be provided. These programs are valued by customers who often make purchases online, and they can also be used to complement in-store offerings for deeper outreach and savings potential.

Cons: The primary downside of offering programs for products through online stores is that they can compete with other programs, such as the LED in-store discount program, and detract from local economic activity.

Implementation Timetable: If hiring a third party implementer, establishing an online store can occur almost immediately. If implementing in-house, a bit more time will be needed to select a vendor and sign a contract.

Annual Participation: Variable, depending on the presence of in-store programs. Often by design this is low with in-store programs to avoid detracting from local economic development but high if no in-store programs exist. Online product store programs typically represent a small proportion of an energy efficiency portfolio participation. For Efficiency Smart, an annual average of 167 online products are recorded.

Cost Effectiveness: High, due to low labor and low incentives.

Savings: Variable, depending on the presence of in-store programs. Very low with in-store programs, moderate if no in-store programs exist. Online product store programs typically account for a small proportion of participation, as noted above, as well as a small proportion of savings. For Efficiency Smart, annual average savings of 129 MWh are recorded for lifetime savings of 1,514 MWh.

Examples of other Kentucky utilities or municipal utilities implementing product rebates through online store programs:

- Efficiency Smart offers an online store through EFI that discounts LED bulbs, smart thermostats and advanced power strips.

- Sacramento Municipal Utility District (SMUD) offers prescriptive product rebates through an online energy store.

Commercial, Institutional, and Industrial

Energy Advising and Technical Assistance

Target Market: All Commercial, Industrial, and Institutional, Largest Energy Users

Type of Program: Audit / Technical Support / Education

Measures Included: None

Program Description: Through providing energy management and technical assistance for large energy users, energy advisors assess a facility's energy costs and energy efficiency. This can be done through bill analysis and facility walk-through survey. An energy advisor will have prior energy efficiency project knowledge and expertise and partner with the customer to comprehensively understand their business, including objectives and long-term capital plans. Energy advisors identify low and no cost measures and ways to reduce peak demand charges, and also develop a list of potential capital improvements that merit further consideration along with their potential costs and savings. Energy advisors can also help large energy users with energy management strategies. These programs are a good fit for a start-up energy efficiency program with limited funding, and can focus on largest energy users tying to a custom incentive program.

Pros: One significant benefit of programs providing energy advising and technical assistance is that they address education, which is one of two primary barriers for energy efficiency (cost is the other major barrier). They help customers: prioritize projects; examines impacts on peak demand and rates; understand vendor quotes for equipment; and can help facility managers sell projects throughout an organization. Behavior change techniques can be utilized, and general education is provided.

Cons: The primary downside to energy advising and technical assistance programs is finding the skilled labor and ensuring there is enough work to keep them busy. This can be alleviated with third party implementers that had this skilled labor shared throughout multiple utilities.

Implementation Timetable: Service-based programs, such as Energy Advising and Technical Assistance, can start immediately but may take 3 – 6 months to get fully up and running. Time must be spent building relationships and building a network before a pipeline is fully established and savings are realized.

Annual Participation: Low, due to relatively small number of C&I customers in the total customer pool. Participation rate within the C&I pool is moderate.

Cost Effectiveness: Not applicable. However, anecdotally these programs provide very high value to business customers.

Savings: None. Savings would be attributed to either prescriptive or custom programs below.

Examples of other Kentucky utilities or municipal utilities implementing Energy Advising and Technical Assistance programs:

- Efficiency Smart offer consultative services through the custom incentive program for large businesses that use more than 500,000 kWh (approximately \$50,000 in annual electric costs) across all locations. Energy engineers offer technical assistance to help determine the most cost-effective upgrades while ensuring optimal savings. Key services include: energy savings and cost-benefit analysis; project opportunity identification and prioritization; product and control strategy recommendations; site energy usage evaluations; equipment electrical usage metering; incentive application assistance; and project savings and scope verification.
- Platte River Power Authority (PRPA) provides free energy advising to customers of the four municipal utilities it supports with energy efficiency programs (Fort Collins, Estes Power and Light, Longmont Power, and Loveland) under the Efficiency Works program umbrella. Advisors can discuss potential opportunities and benefits that energy efficiency upgrades can provide to a business, review project bids, and discuss ways to plan future projects after receiving an assessment.

Prescriptive Rebates

Target Market: All Commercial, Industrial, and Institutional, Small/Medium Businesses

Type of Program: Prescriptive

Measures Included: Lighting and lighting controls, refrigeration, heating, ventilation, and air conditioning (HVAC), compressed air systems, variable frequency drives (VFDs)

Program Description: In Prescriptive Rebates programs, a list or form details eligible energy efficient products and rebate amounts per product. A program typically starts with products that are often selected by many customers (including the SMB market). This list can then grow at each phase of implementation, and will likely include measures such as: lighting and controls including LED street lighting; smart thermostats; HVAC systems; motors; refrigeration; pumps and compressed air. Bundles of products can be created for specific market segments, and bonuses can be offered for comprehensiveness to increase the depth of savings and promote less popular products and measures. It is important that the list stay up-to-date with eligible products and rebate amounts adjusted to reflect changing costs, codes, and market trends. This is a common and standard program offered by utilities, and many C&I customers and energy efficiency contractors will expect it to be offered.

Pros: One significant benefit of Prescriptive Rebate programs are that rebate amounts are transparent and clearly identified upfront. Having a prescriptive list of energy efficient products can help provide guidance to businesses on maximizing energy efficiency. These programs require minimal interactions directly with the utility which is often important for vendors and busy C&I customers. These programs can provide incentives directly to energy efficiency contractors and are available to all C&I customers, including the largest users, helping to increase support for the measures.

Cons: Prescriptive Rebate programs can be labor intensive as applications are processed and checks are issued for small amounts. Also, applications can be perceived as difficult to navigate and understand. Another potential downside of Prescriptive Rebate programs is that large incentive payments can be created if appropriate governance isn't implemented.

Implementation Timetable: Form-based programs, such as Prescriptive Rebate programs, can be made available immediately. Offering Prescriptive Rebate programs on day one is most feasible if working through a third-party implementer that already has forms developed and rebate processing established. If implementing in-house, some time may be needed to develop forms and determine how form processing will be handled.

Annual Participation: Variable, based on measures included and customer eligibility. For example, because Efficiency Smart has very few products available in the prescriptive program, many C & I & I customers choose to submit custom incentive applications. Also since only small and medium businesses are eligible for this program, Efficiency Smart reports an annual average of 49 participants.

Cost Effectiveness: Moderate, due to moderate incentives and low to moderate labor requirements.

Savings: Variable, based on measures included and customer eligibility. While participation makes up a small proportion of an energy efficiency portfolio, as noted above, savings from Prescriptive Rebate programs make up a slightly larger proportion of savings. For Efficiency Smart, annual average savings of 804 MWh are recorded for lifetime savings of 10,994 MWh.

Examples of other Kentucky utilities or municipal utilities implementing Prescriptive Rebate programs:

- KU and LGE have a single Commercial Rebate Program that helps commercial customers earn cash rebates for making energy-saving improvements to their existing facilities or building new facilities above state building code. They include a list of measures that have a specific rebate amount as well as a custom option, similar to a custom incentive program, for project based energy efficiency incentives.
- PRPA, under the Efficiency Works for Business program, offers this type program and takes a similar approach to KU and LGE.
- Efficiency Smart offers incentives for a small group of common energy efficiency products to businesses that use less than 500,000 kWh annually (or have less than approximately \$50,000 in annual electric costs) across all locations.

Custom Incentives

Target Market: Large Commercial, Industrial, and Institutional

Type of Program: Custom

Measures Included: Multiple measures, depending on what each customer includes in their custom project

Program Description: In Custom Incentives programs, incentives are provided to customers for measures installed in qualified projects that are less common or more complex than those typically included in Prescriptive Rebate programs. As with Prescriptive Rebate programs, custom incentive payment occurs after the equipment is installed and operational at the customer's location. The objective of Custom Incentive programs is to encourage C&I&I customers to install innovative and unique energy efficiency equipment and controls that decrease the consumption of electricity or gas. This program is most successful when energy advising and technical support is also available. Custom Incentive programs require project-specific savings calculations and

incentives. Programs inspire the customer to deeply engage in energy efficiency by offering account management and technical assistance services in close coordination with this program, and customers achieve deeper savings as a result.

Pros: One of the most significant benefits of Custom Incentive programs are that incentives are focused and based directly on the product and service needs of the client. More flexibility is provided for customers to receive incentives and utilities to claim savings. Program administrators can control incentive amounts based on budgets and specific needs. Custom Incentive programs for large C&I customers are the largest contributor to savings and help utilities meet savings goals.

Cons: Custom Incentive programs can be labor intensive and often require a large program incentive budget, due to the focus on large energy users and large savings opportunities for the projects.

Implementation Timetable: Service-based programs, such as Custom Incentives, typically take 3 – 6 months to get fully up and running. Time must be spent building relationships and building a network before a pipeline is fully established and savings are realized. Expect 6-12 months to elapse before significant savings are realized.

Annual Participation: Low, due to relatively small number of large C&I customers in the total customer pool. Participation rate within the C&I pool is moderate. Because Custom Incentive programs are very time and labor intensive, the number of participants make up a small proportion of an energy efficiency portfolio participation. For Efficiency Smart, an annual average of 165 participants are recorded.

Cost Effectiveness: Variable, due to the project-specific nature. Typically, high, due to large project size.

Savings: Typically high due to large project size. While Custom Incentive programs typically account for a small proportion of overall participation in energy efficiency program portfolios, they contribute a much more significant proportion of savings. For Efficiency Smart, annual average savings of 16,529 MWh are recorded for lifetime savings of 222,611 MWh.

Examples of other Kentucky utilities or municipal utilities implementing Custom Incentives programs:

- Efficiency Smart's Custom Incentive program offers a consultative and tailored approach to providing expert technical assistance and financial incentives for a variety of energy efficiency projects. Whether a business is installing new equipment, upgrading current systems, constructing a new facility, or expanding a current one, a dedicated program liaison serves as the point of contact and works together with a business through the process.
- Columbia Water & Light's custom incentive program looks at the overall load reduction of a total project and requires a minimum of 30% increase in total energy efficiency. The amount of the rebate is \$300 per kW reduced, up to 50% of the project cost. Projects must have a minimum reduction of 1 kW and rebates will be offered up to a maximum of 75 kW of load reduction for a maximum rebate of \$22,500.

5.4. Appendix D: Case Studies: Energy Efficiency Success Stories

[Starting on the next page]

AKRO-MILS



WADSWORTH, OHIO Multiple Energy Efficiency Technologies

Since 1947, Akro-Mils (a division of Myers Industries) has been an industry leader in providing plastic and metal products to solve storage and organization challenges. The company provides products for the industrial, healthcare, custom, and home industries. Akro-Mils is based in Akron, Ohio, and has nationwide manufacturing facilities and distribution centers.

PROJECT GOALS:

Improve energy efficiency and increase production speed.

SOLUTION:

Incorporate efficient lighting into the construction of a new warehouse and replace existing equipment with energy-efficient products.

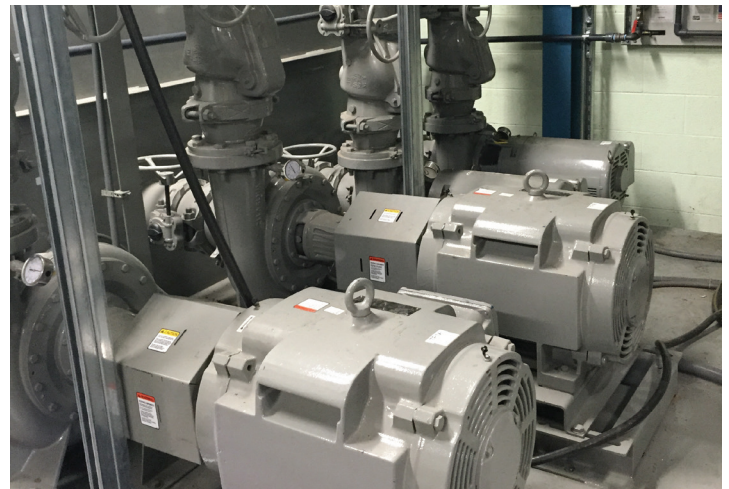
PROJECT SUMMARY:

Since 2011, Akro-Mils has worked with Efficiency Smart to complete energy efficiency improvements at its facility in Wadsworth, Ohio. The company has partnered with Efficiency Smart to install LED exit signs, injection molding machines, occupancy sensors and fluorescent T5 and T8 lights, LED flood lights and wall-packs, and new cooling towers with variable frequency drives (VFDs). In addition, the company also replaced cooling tower pumps with VFDs and installed an interior lighting system with less power density than the energy code standard in its new warehouse.

An Efficiency Smart energy consultant worked with Akro-Mils to review the project and to validate its energy savings. As a result of the upgrades, the company now consumes less electricity, and the new injection molding machines have increased the speed of production.

“We had a great experience working with Efficiency Smart for our efficiency upgrades. Its technical staff measured our energy use and verified the amount of energy and money we are saving. They handled most of the work, and were quick to answer any questions we had during the process.”

–Jay Campbell
Maintenance Manager, Akro-Mils



PROJECT FACTS AT A GLANCE

- Annual kWh Savings:**
2,348,500
- Annual Cost Savings:**
\$188,100
- Lifetime Cost Savings:**
\$2,601,500
- Simple Payback:**
1.81 years
- Annual CO₂ Reduction:**
4,361,600 pounds

PROJECT PARTNERS

- Jim Daw
Plant Manager
Akro-Mils
- Jay Campbell
Maintenance Manager
Akro-Mils
- Robin Laubaugh
Mayor
City of Wadsworth
- Robert Patrick
Director of Public Service
City of Wadsworth
- Harry Stark
Assistant Director of Public Service
City of Wadsworth

THE FEVE



OBERLIN, OHIO

Efficient Lighting and Refrigeration Project

The Feve is a two-story restaurant and bar located in Oberlin, Ohio. The restaurant provides a dining experience for any mood, offering table service on its main floor and a more casual environment on the top floor. Since opening in 1992, the Feve has become a popular place in the community to enjoy a meal with friends and family.

PROJECT GOALS:

Reduce the energy consumption and operating expenses of the restaurant.

SOLUTION:

Install efficient refrigeration units and fixtures that use light-emitting diodes (LEDs).

PROJECT SUMMARY:

In 2013, the Feve utilized Efficiency Smart's Business Energy Rebates (BER) program to complete an efficient lighting and refrigeration project. Selecting energy-efficient technology recommended through the rebate application, the restaurant replaced its existing incandescent light bulbs with LEDs, and also replaced its walk-in refrigeration unit with three upright reach-in refrigerators.

Efficiency Smart provided a rebate for the project, helping reduce the payback period on the efficient upgrades. The Feve was able to install LED lights that not only saved on electric and maintenance costs, but also accentuated the presentation of its food offerings. In addition, the newly installed refrigeration units met the needs of the restaurant while successfully cutting its expenses.

“Working with Efficiency Smart on our efficient upgrades was easy. The team’s advice and communication ensured that we got the most energy savings out of the project, and we received our rebate check in a timely manner. After realizing the benefits of the efficient upgrades at the restaurant, I also took advantage of Efficiency Smart’s residential rebates for my home.”

–Matt Adelman

Co-owner, The Feve



PROJECT FACTS AT A GLANCE

Annual kWh Savings:

73,400

Annual Cost Savings:

\$6,600

Lifetime Cost Savings:

\$27,600

Simple Payback:

1.43 years

Annual CO₂ Reduction:

142,900 pounds

PROJECT PARTNERS

Matt Adelman

Co-owner

The Feve

Steve Dupee

Utility Director

City of Oberlin

Doug McMillan

Energy Services & Sustainability Manager

City of Oberlin