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**Energy
Conservation
and
Efficiency
Plan**

February 1

2016

A synopsis on the status of implementing energy conservation and efficiency programs in Liberty Utilities' Iowa territory.

**February 1, 2016 –
December 31, 2019**

Liberty Utilities' Energy Efficiency Plan 2016 - 2019

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Liberty Utilities' Energy Efficiency Plan 2016 - 2019

Executive Summary

Liberty Utilities (Midstates Natural Gas) Corp. d/b/a Liberty Utilities ("Liberty Utilities" or "Company") is pleased to present this Energy Efficiency Plan (Plan) update pursuant to the code of Iowa S 476.6(17), (19), (20) and (21), (2001) and 199 IAC 35. Energy Efficiency has been a long-time component of the Liberty Utilities operations in Iowa. Liberty Utilities was formerly known as Atmos Energy.

Liberty Utilities focuses on four main programs targeting Energy Efficiency, (1) Low-Income Weatherization (2) School Based Energy Education (3) Small Commercial Audit Program and (4) Appliance Rebate Program. The Company has broken down each of the four programs to provide a brief update on the current status and propose changes to be implemented going forward.

Customers can learn more about these programs through calling the Company's call center; annual bill insert mailed each year¹ or the Company's website².

Low-Income Weatherization Program

The Company's Low Income Weatherization Program has continued to be successful with an average of at least ten homes weatherized per year. The annual number of homes weatherized is viewed more as a function of geographical location of the homes needing the weatherization service than any lack of desire for the program. SEICAO, who implements this program for Liberty Utilities, performs weatherization work both inside and outside of Liberty Utilities' service territory. Their selection of homes to be weatherized is based on need, therefore the homes with the most need for the weatherization services are addressed first regardless of location. Liberty Utilities has increased the amount of dollars paid for each home to be weatherized because SEICAO has experienced cost increases of material and labor. This enables them to maintain the effectiveness of the weatherization compared to previous years.

Liberty Utilities has started to work with Green Iowa Americorps (GIAC), in the communities in which GIAC operates, to develop a supplemental weatherization program for customers on Community Action Program (CAP) agency waiting lists in those communities.

The Company has entered into an agreement with Green Iowa AmeriCorps, attached as Appendix 3, to perform weatherization services in the Company's service area. The one year Memorandum of Understanding was entered into in October 2015 and set an initial year budget of \$4,000. GIAC estimates to provide weatherization and audit services to 25 homes with an estimated therm savings of 245 during its first year, although actual results could deviate due to being the first year of the program.

¹ A copy is included as Appendix 4

² http://www.libertyutilities.com/central/saving/save_on_energy_bills.html or http://www.libertyutilities.com/central/saving/ee_incentives.html

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School-Based Energy Education Program

The School-Based Energy Education Program has achieved good results in past years. The program, currently administered by Resource Action Programs, provides energy education lessons and materials to over 100 participants each year. To continue the success of this program, the Company proposes to supplement Resource Action Programs work by engaging the EarthWays Center of the Missouri Botanical Garden to provide three professional development workshops for up to 75 teachers starting in 2016. The Company has utilized the Botanical Garden in its Missouri Energy Efficiency program with great success.

Liberty Utilities is examining a plan to supplement the company's School-Based Energy Education Program with a program the company is working on in our Missouri territories. We have been expanding our Energy Education program by partnering with the EarthWays Center of the Missouri Botanical Garden. The overall goal of the Liberty Utilities professional development workshops was to empower educators to create greener, healthier schools and incorporate the best practices of sustainability; particularly in the field of energy efficiency and conservation. The company has attached a copy of the year-end report from the first year of this program. There was very positive feedback from the teachers that attended these workshops and are anticipating higher turnouts in future workshops. Liberty Utilities plans to implement this program with 1 program each year to service our geographical territory.

Small Commercial Audit Program

The Small Commercial Audit Program has not had any program participants since the program began in 2004 and the Company plans to stop offering this program and focus resources on other programs. The Company will still offer appliance rebates to small commercial customers.

Appliance Rebate Program

Liberty Utilities Appliance Rebate program has been very successful and the Company proposes to remove the "Pilot" designation and remove two of the lower efficiency measures. A summary of the Appliance Rebates are attached in Appendix 5.

Cost Effectiveness Internal Study and Future Requirements

The cost effectiveness of the Appliance Rebate Program and Residential Low Income Weatherization Assistance Program is further supported by an Energy-Efficiency Program Portfolio Three-Year Plan that was completed by The Cadmus Group for the Company's Missouri operations back in 2011. The Company proposes using this third party analysis in lieu of completing a separate analysis for several reasons. First, a separate analysis could be cost prohibitive, especially due to the small customer base of Liberty Utilities Iowa operations. Second, the geographic service territories are generally similar so the

Liberty Utilities' Energy Efficiency Plan 2016 - 2019

results are expected to be similar, primarily rural in nature for Missouri and Iowa. A copy of the study is attached as Appendix 1 of this report.

While the Company is utilizing the Cadmus Group study for estimated therm savings for this update, for future Energy Efficiency Plans the Company plans to incorporate the therm savings included in the Technical Reference Manual that is being developed as part of the joint collaborative established in Docket Nos. EEP-2012-0001, EEP-2012-0002 and EEEP-2013-0001.

A separate cost effectiveness analysis specific to the School Based Energy Program is included as Appendix 2.

Iowa Energy Center and Center for Global and Regional Environmental Research

In addition to the separate program components, the Company also plans to include payments to the Iowa Energy Center and Center for Global and Regional Environmental Research to continue funding energy efficiency related research.

Conclusion

Liberty Utilities has been working to make adjustments to our Energy Efficiency programs to better fit the needs of customers. To recap the above plan, the Company is focusing on implementing four revisions to current Energy Efficiency offerings. A revised budget for these programs is included as Appendix 6.

1. Partner with Green Iowa Americorps (GIAC) to add supplemental weatherization programs.
2. Incorporate additional School-Based Energy Education Program through a partnership with the EarthWays Center of the Missouri Botanical Gardens to “teach the teachers”.
3. Discontinue the Small Commercial Audit Program.
4. After conducting an internal audit of Appliance Rebate programs, we will offer appliance rebate measures that are in-line with rebate measures provided by other Iowa utilities.

APPENDIX 1



Energy-Efficiency Program Portfolio Three-Year Plan

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March 21, 2011

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1. Introduction

Atmos Energy Corporation (Atmos Energy) has approximately 60,000 natural gas customers in mostly rural areas of Missouri. Since the original energy efficiency programs' inception in 2007, Atmos Energy has offered demand-side management (DSM) programs focused on energy-efficient equipment replacements, efficiency education, and low-income weatherization. Participation rates have increased each year, and participants have seen a significant increase in the average efficiency of equipment replacements and home performance. Although the High Efficiency Equipment Rebate program has yet to meet its full participation and expenditure goals, the Low Income Home Weatherization Program reached full capacity during its second program year.

Having restructured the energy efficiency program in the context of its most recent Missouri general rate case proceeding in 2010, this document outlines Atmos Energy's plans for a 2011 to 2013 DSM program portfolio, which includes continuing its existing Low Income Weatherization program, adjusting its residential High Efficiency Equipment Rebate program to increase its effectiveness, continuing and expanding its education program, and implementing a new residential program, Energize Atmos Energy Homes, focused on improving whole home performance.

For its 2011 to 2013 Plan, Atmos Energy reviewed successful utility DSM programs around the United States and evaluated local conditions and its own service territory to select technologies and set appropriate incentive levels for its programs. Much of its service territory is located in very rural parts of Missouri where the majority of customers are residential and economic conditions are not currently favorable for customers to make significant additional investments in nonessential equipment.

To address these conditions, Atmos Energy adjusted its prescriptive incentive structure to include tiered rebates that compensate customers for the purchase of higher efficiency equipment and set its prescriptive rebates to approximately 30 percent of the incremental measure cost across the board. Atmos Energy believes the conditions in its service territory warrant higher incentive levels than may be available in more urban areas and this structure is consistent with successful utility programs in rural areas in other parts of the country.

Atmos Energy's new program, Energize Atmos Energy Homes, encourages customers to take a whole-home approach to energy efficiency, which may involve substantial investment in multiple energy efficiency measures. This program is designed to offset a larger percentage of project installed costs and includes rules to ensure customers install the most cost effective measures first. Atmos Energy believes this approach puts an appropriate emphasis on compensating customers for more significant investments, while ensuring customers prioritize cost effective measures that yield greater energy savings.

1.1. Atmos Energy Portfolio Overview

Atmos Energy's DSM Plan complies with the requirements of the Public Service Commission of the state of Missouri (PSC). Atmos Energy's 2011 to 2013 natural gas efficiency program portfolio includes:

- **High-Efficiency Equipment Rebate program:** This existing program offers fixed customer rebates for the purchase and installation of high-efficiency natural gas heating and hot water heating equipment. For the 2011 to 2013 program cycle, Atmos Energy's will explore the use of a tiered rebate structure to encourage customers to install eligible equipment with the highest possible efficiency ratings.
- **Low Income Weatherization Assistance Program:** Atmos Energy's low-income targeted program is administered by the Missouri Department of Natural Resources (DNR) and delivered through local Community Action Agencies (CAAs), which provide home energy audits and full weatherization services at no cost to eligible customers.
- **Energy Efficiency Education:** Through this program, Atmos Energy provides energy efficiency educational presentations and materials for fourth and fifth grade students and adults.
- **Energize Atmos Energy Homes Program:** This is a new program, expected to launch in early 2011. Program incentives, equipment and installation standards, and delivery are designed to be consistent with DNR's *Energize Missouri Homes* initiative.

Atmos Energy's energy-efficiency portfolio is cost-effective, provides its customers with options to increase the energy efficiency of their homes and commercial buildings, and will contribute to the environmental and clean energy efforts being led by the DNR.

Atmos Energy's program year runs from September 1 through August 31 of the following year. The existing Low Income Weatherization Assistance program and Energy Efficiency Education program will carry over operations and implementation from the previous program year with no changes. Changes to the High Efficiency Equipment Rebate programs will be incorporated into the existing program year, beginning in March 2011. The new Energize Atmos Energy Homes program is planned for launch in March 2011. Atmos Energy has set an internal target to ramp up its DSM funding allocations to approximately 0.5 percent of its total gross revenues annually over the 2011-2013 program period.

The DNR received American Reinvestment and Recovery Act (Recovery Act) funding through the U.S. Department of Energy's State Energy Program and Weatherization Assistance Program, which supports several residential and low-income, energy-efficiency programs. Atmos Energy's programs are designed to integrate with these existing DNR efforts and leverage consumer interest stemming from Recovery Act-funded programs, and provide a more sustainable funding source for energy-efficiency activities after Recovery Act funding has been fully allocated.

1.2. Program Goals and Objectives

Specific objectives associated with the programs include:

- Reduce end-use natural gas consumption in a cost-effective manner to save money for consumers without impacting their comfort or lifestyle.

- Ramp up to annual funding equivalent to 0.5 percent of gross revenues for the implementation of demand-side energy-efficiency strategies over the 2011–2013 program period.
- Protect the environment by encouraging installation of efficiency measures that help reduce air pollutants and conserve resources.
- Increase customer awareness of energy savings opportunities and programs available through Atmos Energy to support their energy-efficiency objectives.
- Improve relationships with customers, trade allies, and stakeholders by providing value-added energy-efficiency services, information, and support.
- Support a more robust local and state economy by using local labor (when possible), and helping Missouri residents reduce monthly energy expenses.

1.3. Cost-Effectiveness Methodology

Assessment of cost-effectiveness begins with a valuation of each program’s gross total-resource benefits, as measured by gas avoided costs and an accounting of the program’s total delivered costs. The program’s cost-effectiveness is calculated in terms of the expected net present value of its benefits. A program is generally considered cost-effective if its net total resource benefits are positive. In other words:

$$\frac{\text{Total Resource Benefits}}{\text{Total Resource Costs}} \geq 1$$

where,

$$\text{Total Resource Benefits} = \text{NPV} \left(\sum_{\text{year}=1}^{\text{measurelife}} \left(\sum_i^{i=8760} (\text{impact}_i \times \text{avoidedcost}_i) \right) \right)$$

and,

$$\text{Total Resource Cost} = \text{NPV} (\text{Incremental Measure Costs} + \text{Utility Costs not including participant incentives})$$

1.3.1. Program Benefit Components

Benefits used in the total resource test calculation include: the full value of time- and seasonally-differentiated commodity, distribution, and capacity costs; the participants’ avoided operating and maintenance costs (where applicable); and total resource cost (TRC), for the modified TRC, valuation of non-energy benefits of avoided emissions and societal benefits.

1.3.2. Program Cost Components

Cost components considered in the analysis include incremental measure costs and direct utility costs. Incremental costs are the difference in expenses associated with installation of energy-efficiency measures versus standard equipment, and ongoing operation and maintenance costs, where applicable. Utility costs are expenses associated with development, marketing, delivery and operation, and

evaluation, measurement, and verification (EM&V) of each program. These costs fall into seven categories:

- Planning and design costs;
- Administrative and DSM program delivery costs;
- Advertising and promotional costs, including DSM education;
- Customer incentive costs;
- Equipment and installation costs;
- EM&V costs; and
- Miscellaneous costs.

The table below presents a summary of savings and costs for the portfolio.

Table 1. Portfolio Savings and Costs

Year	2010	2011	2012	2013	Total
Savings (dekatherms)	1,193	4,166	5,127	6,200	15,493
High Efficiency Equipment	54	2,307	3,103	3,975	9,385
Low Income Weatherization Assistance	1,139	1,139	1,139	1,139	3,417
Energize Atmos Energy Homes	NA	720	885	1,086	2,691
Total Resource Cost		\$398,348	\$469,403	\$539,210	\$1,406,960
Total Direct Utility Costs		\$257,675	\$288,840	\$321,430	\$867,945
Incentives	\$179,591	\$200,675	\$231,840	\$264,430	\$696,945
High Efficiency Equipment	\$12,516	\$45,675	\$66,250	\$85,650	\$197,575
Low Income Weatherization Assistance	\$167,075	\$105,000	\$105,000	\$105,000	\$315,000
Energize Atmos Energy Homes	NA	\$50,000	\$60,590	\$73,780	\$184,370
Utility Administration Costs	\$50,000	\$57,000	\$57,000	\$57,000	\$171,000
Program Planning & Administration	\$25,000	\$12,000	\$12,000	\$12,000	\$36,000
Program Implementation	\$5,000	\$15,000	\$15,000	\$15,000	\$45,000
Program Marketing & Trade Ally	\$15,000	\$15,000	\$15,000	\$15,000	\$45,000
Evaluation	\$5,000	\$15,000	\$15,000	\$15,000	\$45,000

1.3.3. Additional Assumptions for Cost-Effectiveness

Table 2 presents a number of other assumptions used in cost-effectiveness tests, including: avoided costs, externality factor, line loss, discount rate, and inflation.

Table 2. Key Assumptions Used in Cost-Effectiveness Calculations

Category	Value
Avoided Energy Costs (2011, \$/therm)	\$0.6847 ^a
TRC and RIM Discount Rate	8.34% ^b
Participant Discount Rate	10%

^a U.S. Energy Information Administration Annual Energy Outlook
^b Weighted average for the Atmos Energy service territory

Table 3 shows the results of four cost-effectiveness tests conducted at the program and portfolio levels. The portfolio passes the TRC test, with a benefit-to-cost ratio of 1.14.

Table 3. Portfolio Benefit-to-Cost Ratios

TRC	UCT	PCT	RIM
1.14	1.85	1.84	0.61

Measure level cost effectiveness test results are provided in Appendix A.

2. High-Efficiency Equipment Rebate Program

2.1. Program Description

Atmos Energy's High-Efficiency Equipment Rebate program promotes energy-efficient natural gas heating and water heating equipment in existing homes and businesses. Atmos Energy offers fixed rebates for customers purchasing high-efficiency furnaces, boilers, hot water heating equipment, and programmable thermostats. Atmos Energy staff provide overall strategic direction, program management, and administration. Rebate processing and fulfillment are managed by a third-party contractor.

Beginning in March 2011, Atmos Energy will make the following changes to the existing High-Efficiency Equipment Rebate program.

- Offer tiered rebates, in which equipment with a higher-efficiency level will be eligible for a higher incremental rebate.
- Adjust rebate levels to reflect a better understanding of market conditions, based on program participation to date.
- Expand radio advertising and direct marketing to trade allies to increase program awareness among customers and HVAC and water heater contractors and dealers.
- Provide trade allies with useful tools to help them promote the program to their customers.
- Implement an EM&V plan to quantify program impacts and identify areas for improvement.

2.1.1. Customer Targets

This program is available to all residential and small commercial customers in existing homes and small businesses, located in Missouri, who purchase natural gas directly from Atmos Energy. To be as cost-effective as possible, the program targets customers seeking to replace space or water heating equipment.

Customers in rental housing must have approval from the homeowner to participate in the program.

Table 4. Customer Eligibility Parameters

Eligibility Parameters	
Fuel	Gas customer
Building type	Residential, commercial
Building vintage	Existing structure
Building ownership	All
Rate schedule	Residential firm service rate, small firm general service rate

2.1.2. Operations

This program relies primarily on equipment dealers and installers for delivery. These trade allies promote the program, help customers understand the features and benefits of high-efficiency equipment, specify and install equipment, and help customers fill out program applications.

Atmos Energy lists dealers of ENERGY STAR natural gas heating and water heating equipment on its Website to assist customers finding qualified equipment dealers and installers.

Following installation of eligible equipment, customers must submit the following to Energy Federation Incorporated, Atmos Energy's rebate processing contractor: a completed program installation verification form; a copy of a recent Atmos Energy utility bill; a dated purchase receipt for the eligible equipment; and proof of installation. Participants receive their rebate check within eight to 10 weeks.

2.1.3. Qualifying Measures and Incentive Amounts

Atmos Energy provides a financial incentive in the form of a prescriptive rebate to customers that purchase qualifying, high-efficiency natural gas heating and water heating equipment, as identified in Table 5. These are common, market-ready technologies, offered in other successful utility energy-efficiency programs. Incentive levels are set to offset approximately 30 percent of the incremental measure cost. Cost estimates were developed for each measure through research on the local market characteristics of the proposed measure, and energy savings were determined through engineering calculations and secondary research for identical measures in geographic areas with heating degree days (HDD) equivalent to those in Atmos Energy's Missouri service territory. Incremental costs include additional installation costs, where applicable. While technical interactions may slightly alter savings if multiple measures are installed together, our analysis treats measure savings independently.¹

The following table identifies eligible natural gas equipment and efficiency qualifications, and Atmos Energy's current and proposed new incentive levels.

Table 5. Eligible Measures

Measure	Efficiency Level	Proposed Incentive	Current Incentive
Forced Air Furnace	AFUE \geq 92% and $<$ 94%	\$200	
	AFUE \geq 94% and $<$ 96%	\$250	\$250
	AFUE \geq 96%	\$300	
Boiler	AFUE \geq 85% and $<$ 90%	\$200	\$250
	AFUE \geq 90%	\$300	
Water Heater	EF \geq 0.62 and $<$ 0.67	\$50	\$50
	EF \geq 0.67 and $<$ 0.82	\$125	
	EF \geq 0.82	\$200	\$200
Combination Water and Space Heating	EF \geq 0.62	\$450	\$450
Programmable Thermostat	NA	\$25	\$25

¹ For example, if an efficient furnace and programmable thermostat are installed at the same time, energy savings from the thermostat will be less than those experienced in a home with an inefficient furnace.

Rebates are offered as funds remain available. The program is operated on a recurring annual cycle, beginning September 1, and running through August 31 the following year. If program funds are exhausted in a single year, Atmos Energy will hold customer applications as reservations for funds becoming available in the forthcoming year.

Atmos Energy will perform periodic reviews of its programs, and may adjust measures, rebate levels, performance criteria and/or eligibility requirements in the future to manage program participation or as market conditions and equipment standards change.

2.1. Technical Program Data

Participation levels were developed using program tracking data, market saturation data, and results of similar successful programs. Table 8 shows the expected number of participants, the value of incentives expected to be issued under this program, and anticipated savings.

Table 6. Projected Participation, Rebates, and Savings

Year	Participants	Incentives	Savings (dekatherms)
2011	254	\$45,675	2,307
2012	397	\$66,250	3,103
2013	579	\$85,650	3,975

As shown in the table below, this program passes the TRC with a 1.45 benefit-to-cost ratio.

Table 7. Cost-Effectiveness Results

TRC	UCT	PCT	RIM
1.45	4.59	1.76	0.76

2.2. Marketing Channels

Atmos Energy's marketing strategy for the High Efficiency Equipment Rebate program relies on traditional marketing channels, including: mass mailing, utility bill inserts, targeted radio advertising, and promotion through trade allies (such as equipment dealers and installers). Atmos Energy's experience with this program over the past two years has shown that promoting the program through targeted trade allies is the most effective approach, as it leverages direct, one-on-one communication with customers at the time they are purchasing eligible equipment. Targeted radio advertising has also been effective for increasing program activity.

For the 2011 to 2013 program period, Atmos Energy intends to implement the following changes and additions to its current marketing strategy:

- Expand marketing efforts to (and through) trade allies, including HVAC and water heater dealers and contractors, plumbing and mechanical contractors, and remodeling contractors through:

- Offering co-marketing opportunities.
- Direct mail targeted to trade allies, outlining how Atmos Energy's programs can be used as a trust-building and sales tool, and promoting its ENERGY STAR dealer list.
- Hosting lunch-and-learn meetings and contractor presentations, focused on advanced technologies and installation techniques, the benefits of higher-efficiency equipment, program participation details, and how to use Atmos Energy programs to enhance trade allies' business offerings.
- Developing brochures or information (outlining program features, benefits, eligibility requirements, and financial incentives), which trade allies can provide to customers for program promotion.
- Participating in targeted trade ally conferences and trade fairs.
- Continue the use of traditional marketing approaches such as radio advertising and bill inserts.
- Increase visibility on the Atmos Energy Website, including links to program information on the commercial service Web page.
- Create end-user marketing, targeted to capturing customers whose equipment may be at or near the end of its useful life.
- Co-marketing with the new Energize Atmos Energy Homes program.
- Develop point-of-purchase materials around programmable thermostats for in-store display at home improvement centers.

2.3. Evaluation Plan

2.3.1. General Evaluation Approach

The High Efficiency Equipment Rebate Program is designed to generate energy cost savings for residential and commercial customers. The program is structured to achieve immediate savings through rebates and long-term savings through lower utility bills.

The evaluation's primary goal is to document energy savings attributable to the program, assess cost effectiveness, and ensure reliability and persistence of expected impacts.

2.3.2. Data Collection and Impact Reporting

Atmos Energy's rebate processing contractor collects customer data submitted via program applications. Applications include customer information (name, address, account number, etc.) and technical data (manufacturer, serial and model numbers, efficiency rating) on the equipment being replaced and the new installed equipment as well as installer name and address. This information is compiled and reported to Atmos Energy monthly.

The impact evaluation will focus on estimating actual energy savings. Individual measure savings will be estimated using deemed savings values which were determined through a weather-normalized pre-post billing analysis of program-year one customers. Because the results of this billing analysis are equivalent to deemed savings values used in Atmos Energy's Kentucky territory, these are reliable values for calculating achieved savings.

3. Residential Low Income Weatherization Assistance Program

3.1. Program Description

Atmos Energy’s Residential Low Income Weatherization Assistance Program promotes energy efficiency for income-qualified residential customers in existing homes. The program offers free weatherization, home efficiency upgrades, and energy education to help customers reduce their natural gas utility bills. Energy-efficiency upgrades may include: air sealing; insulation installed in walls, attics, floors and/or foundations; and heating system tune-ups, repairs, or replacements.

Atmos Energy funds the program through an annual distribution to the Environmental Improvement and Energy Resource Authority (EIERA), the financial arm of the Missouri DNR. The DNR administers the program, and local Community Action Agencies (CAAs) deliver program services to end users. The DNR combines Atmos Energy funds for natural gas efficiency upgrades with Federal and electric utility funds to deliver comprehensive weatherization services for each customer. Efficiency upgrades are determined based on a pre-inspection of the home, conducted by a qualified weatherization professional under contract to the CAAs.

For the 2011 to 2013 program period, no changes to this program are planned.

3.1.1. Customer Targets

The program is available to Atmos Energy Missouri customers with incomes that meet the qualifying requirements of the DNR’s approved plan with the DOE and who purchase natural gas directly from Atmos Energy. The program particularly targets the elderly, physically disadvantaged customers, and families with children. Customers in rental housing must provide a signed landlord agreement to participate in the program.

Table 8. Customer Eligibility Parameters

Eligibility Parameters	
Fuel	Gas customer
Building type	Residential single-family home
Building vintage	Existing structure
Building ownership	All
Customer Status	Income qualified residential homeowner or tenant
Rate schedule	Residential firm service rate

3.1.2. Operations

Atmos Energy’s Low Income Weatherization Assistance Program is one of several such programs throughout the state, all of which are managed and delivered through a central agency, the DNR. Atmos Energy provides an annual funding allocation to the DNR, which combines funds from multiple utilities, state agencies, and the U.S. Department of Energy’s Low Income Weatherization Assistance Program. Atmos Energy’s 2010-11 program allocation is \$105,000.

The DNR provides turn-key administration of the program. The DNR works with regional CAAs, covering three geographical areas of Atmos Energy’s Missouri service territory. These agencies qualify participants, conduct marketing and recruit participants, procure materials, manage pre-inspection and equipment installation staff and subcontractors, and track results. The DNR is responsible for monitoring each CAA’s performance.

Energy auditors and equipment installers serving the program are required to comply with service and technical standards, and best practices described in the U.S. Department of Energy’s State Master Plan and Missouri Weatherization Program Operational Manual. Home pre-inspections (energy audits) consist of advanced diagnostic and assessment techniques, visual inspections, client interviews, and data collection. Auditors use a computer-based modeling tool—the National Energy Audit Tool (NEAT)—to help select the most cost-effective measures for installation. Following installation of all weatherization measures, the CAA performs a final inspection to certify the work has been completed in accordance with program standards.

The DNR provides quarterly reports to Atmos Energy, documenting the number of homes addressed and funding allocated.

3.1.3. Qualifying Measures and Incentives

All equipment and services provided under the Low-Income Weatherization Assistance program are free to qualifying participants. Specific measure needs are determined following a pre-inspection of the home by a qualified energy auditor to identify the most cost-effective improvements. The average cost of services and upgrades funded by Atmos Energy per participating home is approximately \$1,500. Typical measures are shown in Table 9.

Table 9. Eligible Measures and Standards

Measure Category	Measure
Building Envelope	Wall insulation
	Attic insulation
	Floor insulation
	Foundation insulation
	Air sealing
	Minor repairs
Heating system	Tune up
	Repair
	Replacement
Water Heater	Tank upgrade
	Pipe insulation

3.2. Marketing Channels

CAAs lead the marketing for this program, which primarily is conducted through newspaper, radio, and television advertising, and Atmos Energy utility bill inserts. Atmos Energy refers customer inquiries to the appropriate CAA.

3.3. Evaluation Plan

In its final inspection of program participants' homes, the DNR verifies measure installation and quality; however, measurement is not conducted.

As Atmos Energy does not have access to data from the DNR that would allow evaluation of program impacts, the company relies on general assumptions to calculate program impacts. Atmos Energy uses U.S. Department of Energy average natural gas usage per single-family home, and Energy Information Administration estimates (30 percent average savings per household) to estimate program impacts.

4. Energy Efficiency Education Program

4.1. Program Description

The Energy Efficiency Education Program is a school-based program targeted to fourth and fifth grade students in Atmos Energy's Missouri Territory. The goal of the program is to educate students on simple energy saving behaviors, natural gas safety, and opportunities for saving energy by installing energy-efficiency measures in their homes. The program features in-school presentations by Atmos Energy personnel and educational materials, which students can then share with their families.

Atmos Energy provides the Energy Efficiency Education Program strictly as a benefit to its customers. There is no cost to participate and Atmos Energy does not claim savings from program-related activities. In each of the past two years, Atmos Energy has presented the program to approximately 1,200 students.

The Energy Efficiency Education Program is an existing initiative and will continue throughout the plan period. Beginning in March 2011, Atmos Energy will expand the Energy Efficiency Education Program to include adults, who will be offered the program through civic and community organizations.

4.1.1. Customer Targets

The program targets fourth and fifth grade students and adults in Atmos Energy's Missouri service territory. Atmos Energy assumes that the majority of participants exposed to the program live in homes where heating fuel is provided directly by the Company; however, no verification of customer status is conducted.

4.1.2. Operations

Atmos Energy's program representative provides classroom presentations to groups of up to 50 students. Beginning in 2011, Atmos Energy will also provide presentations to adults through civic and community organizations. During the presentations, participants are shown an educational video, which explains the efficiency features in a home and the corresponding role in energy consumption. Following the DVD, Atmos Energy's representative leads a discussion about the video and answers any questions.

Following the presentation, each participant is given a copy of the DVD along with other items promoting energy efficiency (refrigerator magnets, stickers, pencils), which they are encouraged to share with their families.

Atmos Energy provides a poster to each teacher or civic organization sponsor for display. The poster features the same house from the video and reinforces the lessons from the video with tips and energy-efficiency information.

4.1.3. Qualifying Measures and Incentives

Atmos Energy's Energy Efficiency Education Program consists of the following components. All energy-efficiency educational activities and materials are provided for free to participants.

- Interactive presentations
- One DVD copy of the educational video for each participant
- Additional items promoting efficiency
- Posters for display in each classroom or community organization

4.2. Marketing Channels

At the beginning of each school year, Atmos Energy mails letters to every elementary school principal in its service area (approximately 50 public schools plus several private schools). In 2011, Atmos Energy will also send a letter to civic and community organizations in its service area. The letter describes the program, outlines the features and benefits, explains that the program is free, and provides contact information for schools to sign up. Those principals who wish to participate can call or e-mail to learn more about the program and to schedule a presentation.

5. Energize Atmos Energy Homes

5.1. Program Description

The Energize Atmos Energy Homes Program is a new initiative, expected to launch in March 2011, which will promote energy efficiency for existing residential customers. The program will offer free direct installation of low-cost energy conservation measures and financial incentives for energy audits and the installation of natural gas energy-efficiency measures that improve home energy performance.

Program incentives are structured using a performance model. Participants are eligible to receive rebates covering 100 percent of the cost of an energy audit, up to \$500, as well as additional incentives to offset the cost of eligible building shell upgrades and equipment, if modeled energy savings resulting from the installed upgrades meet the program's energy savings performance levels.

The program is designed to be consistent with the DNR's *Energize Missouri Homes* program. The launch of Atmos Energy's program is expected to roughly coincide with the completion of the DNR's program, which will create a seamless transition for customers in Atmos Energy's service territory. The advantages of replicating the DNR's program include:

- Leveraging existing delivery infrastructure, including the use of program aggregators, marketing activities, trained energy auditors and equipment installation contractors, and data collection and reporting protocols.
- Avoiding possible customer confusion that may result from offering similar programs with different rules.
- Leveraging existing consumer awareness and program momentum.
- Extending economic and job creation benefits by sustaining the program beyond the full allocation of Recovery Act funds.

5.1.1. Target customers

This program will be available to residential owner-occupants of existing, single-family homes located in Missouri who purchase natural gas directly from Atmos Energy. Participants are not eligible to receive incentives under both the Energize Atmos Energy Homes Program and Atmos Energy's High Efficiency Equipment Rebate Program, or the DNR's *Energize Missouri Homes* program. Table 10 outlines customer eligibility parameters.

Table 10. Customer Eligibility Parameters

Eligibility Parameters	
Fuel	Gas customer
Building type	Residential, single-family (≤ 4 units ²) home
Building vintage	Existing structure
Building ownership	Homeowner
Customer status	Home is primary residence
Rate schedule	Residential firm service rate

5.1.2. Operations

The Energize Atmos Energy Homes program will be administered by local program aggregators, who have met the DNR's requirements and have been awarded contracts through a competitive application process. The aggregators' roles will include: serving as regional program contacts; administering program funds; leading marketing and outreach activities; managing program delivery; and providing technical assistance to homeowners and auditors. In Atmos Energy's service territory, these services will be provided by the Metropolitan Energy Center and the EarthWays Center. Atmos Energy's existing rebate processing center will be responsible for verifying that customer applications meet program requirements and processing customer rebates.

Program delivery will be provided by qualified auditors and equipment installers selected, hired, and managed by homeowners. Participating energy auditors must attend a one-day training workshop on eligibility requirements, procedures, and all applicable program terms and conditions, and be qualified by the DNR as to their technical and field capabilities.

Auditors will conduct an energy audit that includes a blower-door test, combustion safety testing, and energy modeling to determine the home's baseline energy use, estimate energy savings potential, and generate program reports. All auditors must use the REM/Design software tool for energy modeling. Audit reports will: document the auditor's findings, including baseline energy usage; provide a list of recommended energy efficiency upgrades prioritized in order of their cost-effectiveness, with estimates of costs and energy savings; and recommend strategies for achieving the performance levels necessary to meet the program's incentive requirements. First priority for installation recommendations and incentive allocation shall be given to building shell measures, including insulation and air sealing where they are recommended, followed by the most cost effective heating and water heating measures. Auditors will also work with homeowners to plan upgrades and complete program documentation.

Homeowners will be able to choose any of the recommended energy-efficiency measures that result in modeled gas energy savings of at least 10 percent to qualify for Tier I incentives and 20 percent to qualify for Tier II. For Tier II incentives, participants must first install cost effective building shell measures before natural gas appliance installation can be counted toward the 20 percent savings threshold. Prior to measure installation, participants must submit required documentation to the

² Applicants must own the entire building and occupy at least one dwelling unit in the building.

program aggregator for review and pre-approval. If the project proves eligible, incentive funds will be held in reserve, and the homeowner will identify a qualified contractor and schedule installation work to be completed within six months. Selected contractors must meet program requirements for current licenses, permits, and insurance. The homeowner will be required to install the entire project, as listed in the pre-approved program documents, or reapply with an adjusted work scope.

Following installation of eligible equipment, customers will submit documentation indicating the project is complete, along with a copy of a recent Atmos Energy utility bill, dated purchase receipts for all eligible equipment, and other documentation to the rebate processing center for verification and processing.

5.1.3. Qualifying Measures and Incentive Amounts

This program will promote building envelope upgrades and other natural gas energy-efficiency measures that best meet customers’ individual needs and objectives, providing their project work scope and modeled energy savings meet program eligibility requirements. Wherever possible, energy auditors will directly install natural gas saving measures in the customer’s residence at the time of the audit. Where they are recommended, customers will be required to install building envelope upgrades as a first step before investing in larger equipment measures. Typical measures include:

- Direct installation measures: low-flow showerheads, faucet aerators, hot water heater blankets, and programmable thermostats
- Insulation: attic, wall, foundation, crawl space, ducts
- Infiltration reduction/air sealing
- High-efficiency heating equipment
- High-efficiency water heating equipment
- ENERGY STAR windows

Table 11 outlines the program incentive structure.

Table 11. Incentive Levels

Incentive Category	Program Requirement	Incentive	Cap
Audit	Implement recommended upgrades to meet minimum Tier I requirements	100% of audit cost	\$500
Direct Installation	All audit participants; where measures are deemed appropriate	100% of measure cost	NA
Tier I	Achieve 10% natural gas savings through recommended building shell measures only	35% of eligible project costs	\$2,000
Tier 2	Achieve 20% natural gas savings. Recommended building shell measures must be installed before equipment measures.	50% of eligible project costs	\$5,000

Atmos Energy will perform periodic reviews of its programs, and may adjust measures, rebate levels, performance criteria and/or eligibility requirements in the future to manage program participation or as market conditions and equipment standards change.

5.2. Technical Program Data

Participation levels were developed using market saturation data and the results of similar successful programs. Table 12 shows expected participation, the total value of rebates expected to be issued under this program, and anticipated savings.

Table 12. Projected Participation, Rebates, and Savings

Year	Participants	Rebates	Savings (dekatherms)
2011	40	\$50,000	720
2012	50	\$60,590	885
2013	60	\$73,780	1,086

As shown in Table 13, this program passes the Utility and Participant tests with benefit-to-cost ratios of 1.53 and 1.54, respectively.

Table 13. Cost-Effectiveness Results

TRC	UCT	PCT	RIM
0.95	1.53	1.54	0.57

5.3. Marketing Channels

Atmos Energy will work with the DNR and its program aggregators to leverage current marketing activities, and will seek to create co-marketing opportunities. The company will conduct outreach to local audit contractors and other trade allies—particularly those already active in the DNR program—to ensure they are aware of the Atmos Energy program, understand how to participate, and promote the program to their customers. Atmos Energy will emphasize the program’s free direct installation measures to increase consumer interest and serve as a promotional tool for trade allies.

Additionally, Atmos Energy will use traditional marketing channels to promote the Energize Atmos Energy Homes program, including:

- Utility bill inserts
- Radio advertising
- Program Website

5.4. Evaluation Plan

5.4.1. General Evaluation Approach

The Energize Atmos Energy Homes program is designed to address residential customer needs for improved efficiency and lower bills. The program is intended to achieve immediate savings through direct installation of low-cost measures and to generate sustained energy savings through the application of building envelope and equipment upgrades.

The evaluation's primary goal is to document energy savings attributable to the Energize Atmos Energy Homes program, assess the program's cost-effectiveness, and to ensure reliability and persistence of the expected impacts. These savings may begin instantaneously (as a result of direct installation measures) or may occur over time (as a result of adopting recommended measures).

5.4.2. Verification

The DNR conducts verification of installed measures on a sample of participants in the *Energize Missouri Homes Program*. Atmos Energy will work with its program aggregators to implement verification activities that are consistent with the DNR approach and ensure all evaluation activities are integrated with those being conducted under the *Energize Missouri Homes program*.

5.4.3. Data Collection and Impact Reporting

Data necessary for impact assessment is collected by energy auditors and input into the energy modeling tool, including baseline natural gas usage, demographic information, dwelling unit characteristics, and specifications on existing equipment and appliances. The modeling tool uses algorithms that account for local weather conditions and applies deemed savings estimates for direct installation measures and recommended equipment and building shell upgrades to estimate site-specific energy savings for each participant.

Savings results for each participant will be reported to the program aggregators in participants' program documentation. The program aggregators will consolidate reported program savings data and provide quarterly reports of total program impacts to Atmos Energy.

Atmos Energy will work with the program aggregators to ensure appropriate and sufficient data are collected and tracked to support program evaluation.

Appendix A: Measure Level Cost-Effectiveness Test Results

Program	Measure	Measure Detail	Savings (Therms)	Source	Measure Life	Source	Incremental Cost	Source	TRC	UCT	PCT	RIM
Equipment Rebates	Furnace	AFUE = 92% (Condensing Furnace)	142	Engineering Calculation	18	DEER database	\$891.00	Calls to contractors for 90% AFUE; added \$70 for each % increase in efficiency based on extrapolated DEER information	1.57	6.99	1.78	0.80
Equipment Rebates	Furnace	AFUE = 94% (Condensing Furnace)	159	Engineering Calculation	18	DEER database	\$1,031.00	Calls to contractors for 90% AFUE; added \$70 for each % increase in efficiency based on extrapolated DEER information	1.52	6.26	1.75	0.79
Equipment Rebates	Furnace	AFUE = 96% (Condensing Furnace)	175	Engineering Calculation	18	DEER database	\$1,171.00	Calls to contractors for 90% AFUE; added \$70 for each % increase in efficiency based on extrapolated DEER information	1.47	5.75	1.72	0.78
Equipment Rebates	Tankless Water Heater		55	Engineering Calculation	20	DEER database	\$486.00	Calls to contractors.	0.97	2.35	1.38	0.65
Equipment Rebates	Programmable Thermostat		30	Engineering Calculation	15	DEER database	\$25.00	Retailer research	10.45	10.45	11.57	0.83
Equipment Rebates	Tank Water Heater	62% EF	8	Engineering Calculation	13	DEER database	\$151.00	Retailer research	0.34	1.02	0.69	0.47
Equipment Rebates	Tank Water Heater	67% EF	23	Engineering Calculation	13	DEER database	\$400.00	Retailer research	0.37	1.17	0.70	0.50
Equipment Rebates	Boiler	Gas Boiler AFUE=85%	61	Engineering Calculation	18	DEER database	\$751.00	Calls to contractors	0.80	3.00	1.06	0.70
Equipment Rebates	Boiler	Gas Boiler AFUE=90%	115	Engineering Calculation	18	DEER database	\$751.00	Calls to contractors	1.51	3.78	1.90	0.73
Equipment Rebates	Combined Water & Space Heat		180	Engineering Calculation	18	Based on measure life for furnaces and boilers	\$2,550.00	Cadmus proprietary data	0.70	3.94	0.87	0.74
Low Income Weatherization	Weatherization		170	Estimated savings from Kentucky program	25	DEER database	\$1,567.16	Based on average project cost in PY3	1.30	1.30	2.24	0.54
Energize Atmos Energy Homes	Audit						\$500.00	Capped cost of audit	NA			
Energize Atmos Energy Homes	Faucet Aerator (0.5 GPM)		8	Engineering Calculation	9	DEER database	\$2.27	Retailer research	16.99	19.29	19.26	0.84
Energize Atmos Energy Homes	Faucet Aerator (1.5 GPM)		5	Engineering Calculation	9	DEER database	\$2.25	Retailer research	10.71	12.05	12.48	0.82
Energize Atmos Energy Homes	Showerhead		35	Engineering research	10	Engineering research	\$12.00	Engineering research	15.27	15.27	17.39	0.83

Atmos Energy

Energy-Efficiency Portfolio

Program	Measure	Measure Detail	Savings (Therms)	Source	Measure Life	Source	Incremental Cost	Source	TRC	UCT	PCT	RIM
Energize Atmos Energy Homes	Water Heater Tank Blanket/Insulation (R-5)		16	http://www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13070	10	DEER database	\$6.00	Retailer research	13.96	13.96	15.98	0.83
Energize Atmos Energy Homes	Tier I		73	Based on % of consumption	25	DEER database	\$800.00	Cadmus proprietary data	1.09	3.11	1.39	0.71
Energize Atmos Energy Homes	Tier II		145	Based on % of consumption	25	DEER database	\$1,600.00	Cadmus proprietary data	1.08	2.16	1.53	0.64

APPENDIX 2



Liberty Energy School- Based Energy Education

September 2013

Resource Action Programs

The Cadmus Group, Inc.

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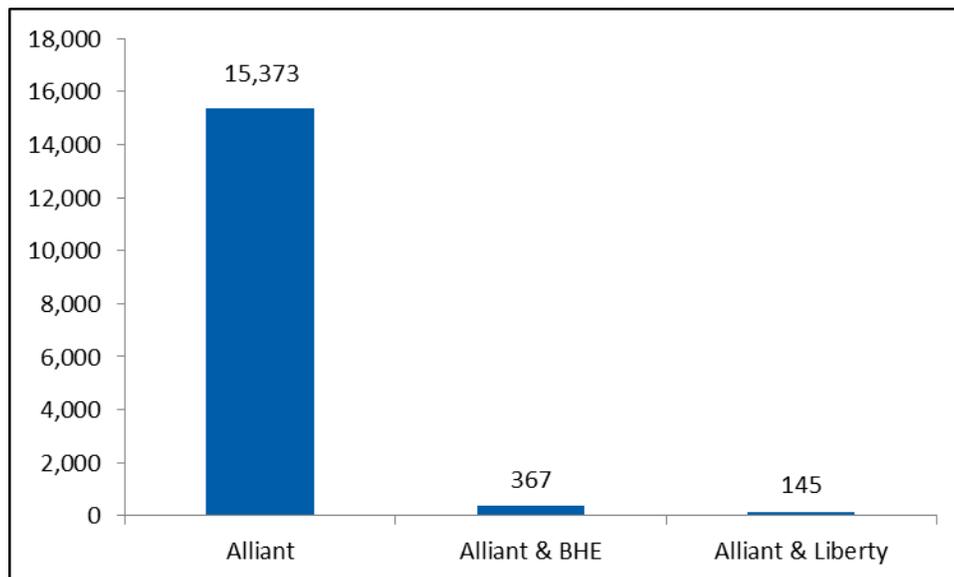
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Introduction

This report presents results for the Liberty Energy Iowa 2012–2013 LivingWise Program (LivingWise), sponsored by Liberty Energy, Alliant Energy, and Black Hills Energy. During the 2012–2013 program year, 15,885 students participated in this school-based, energy-education initiative.

Figure 1 shows the number of participants from each utility service area.

Figure 1. LivingWise Participants



This report presents the following details from Cadmus’ evaluation and results for the 2012–2013 program year:

- An overview of the program
- Teacher and student participation
- Teacher, parent, and student program feedback
- Details regarding program processes in 2012–2013
- Energy and cost savings achieved for the average participant and for the overall program



Program Implementation

LivingWise targeted 6th grade teachers and students. Each participating student received a LivingWise Kit, containing easy-to-install, energy-efficient items.

Spring term¹ kits included the following:

- Three 13-watt compact fluorescent lamps (CFLs)
- High-efficiency, three-way showerhead (1.75 GPM)
- Kitchen faucet aerator (1.5 GPM)
- Flow rate survey bag
- Teflon tape
- Digital thermometer
- Natural Resource Fact Chart
- Energy brochure
- Installation DVD
- Quick Start Guide

Participating teachers guided students through a series of in-class and at-home assignments, designed to accomplish the following:

- Increase students' knowledge and awareness of energy production and use
- Promote adoption of resource-saving actions
- Familiarize students with the contents of the LivingWise Kit
- Encourage installation of the items in the students' homes

Cadmus measured the program's general impact on students' understanding of energy efficiency through surveys, applied before and after program delivery (pre and post). The surveys included questions regarding:

- Energy concepts
- Students' experience and success with installing the kit items
- Basic household characteristics affecting energy consumption, such as appliances, cooling sources, and the number of people living in the household

LivingWise participants returned approximately 8,550 surveys for 2012–2013, including 137 returned by students from the spring program co-sponsored by Liberty Energy. Cadmus used these surveys to determine installation rates for each measure included in the LivingWise kits and to estimate energy savings resulting from energy-saving behaviors reported by participants.

¹ Liberty Energy co-sponsored classes occurring in the spring only.

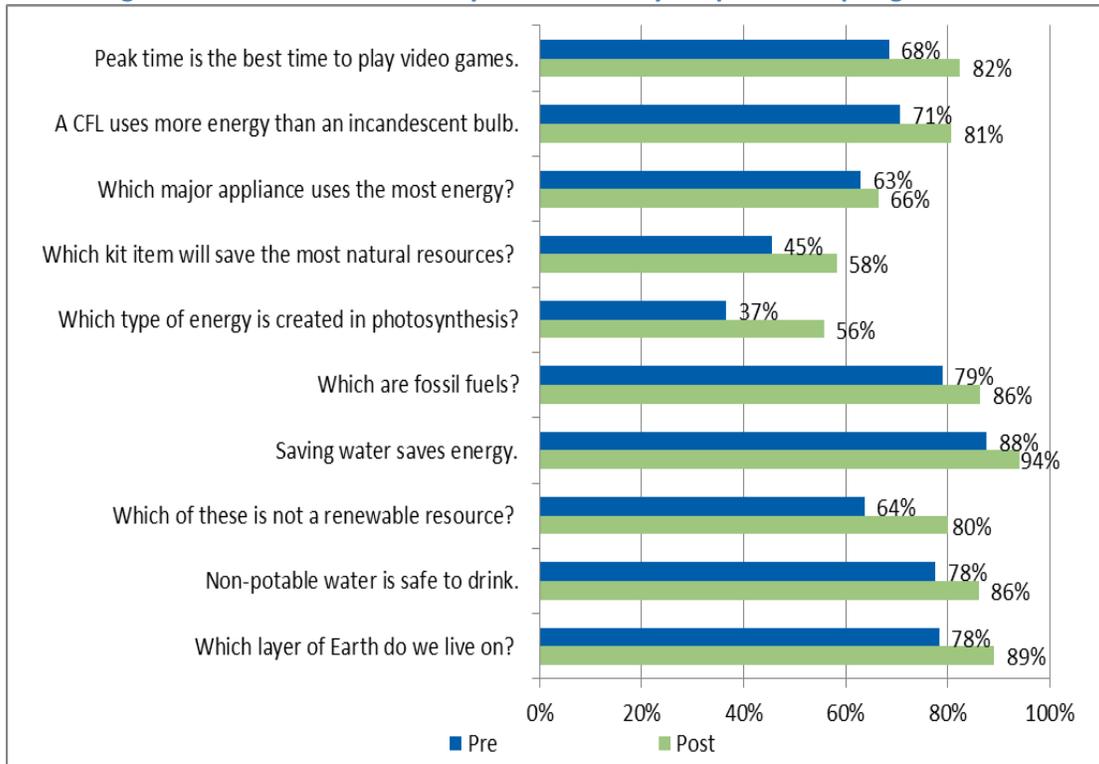
In addition to student-returned surveys, participating teachers and parents of participating students provided feedback using evaluation forms and comment cards supplied by the program: 66 participating spring teachers completed a program evaluation form; and 337 parents completed and returned comment cards, designed to provide feedback on the program. To encourage teachers to return program materials and forms, those returning forms before a deadline could receive a \$50 “mini grant.”



Student Learning and Program Satisfaction

Students completing pre- and post-delivery surveys demonstrated increases in their understanding of energy-efficiency concepts. On average, the number of correct answers increased 19% across the various areas of inquiry. Figure 2 shows spring students’ pre- and post-delivery survey results.

Figure 2. Pre- and Post-Delivery Correct Survey Responses—Spring Students

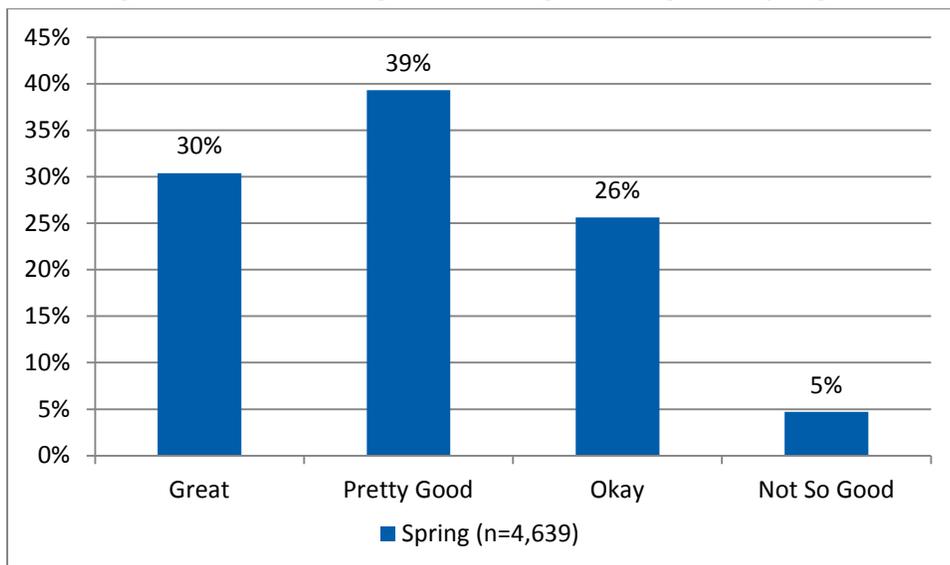


As a whole, LivingWise scored well on satisfaction levels among participants. Figure 3, below, shows student ratings for the program, with 70% of students ranking it “great” or “pretty good.”

Results also indicated:

- 65% of responding spring students said they involved their families in the program
- 49% of responding spring students indicated the program helped them change the way they used water
- 56% of responding spring students stated the program helped them change the way they used energy in their homes

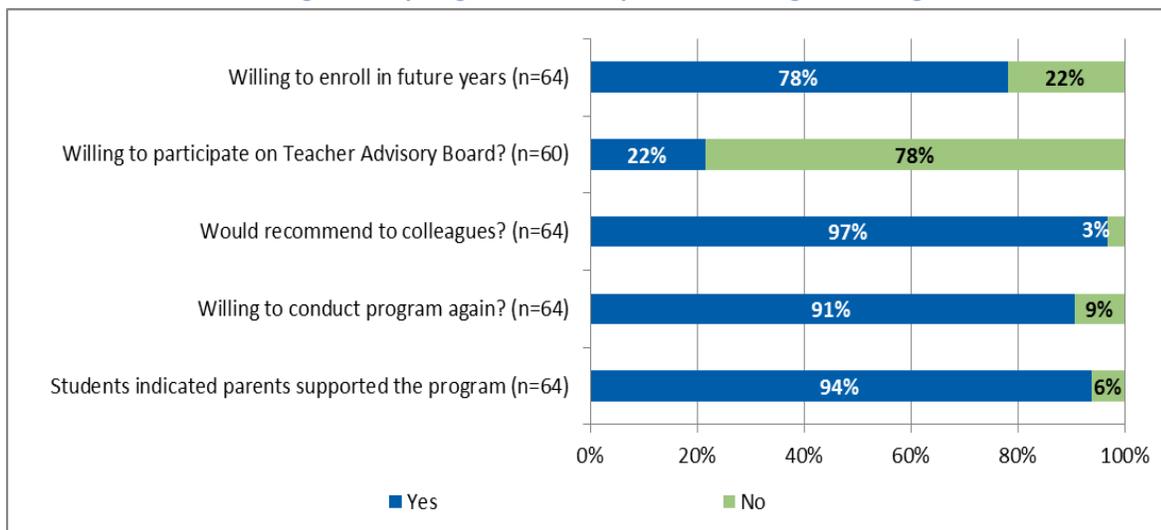
Figure 3. Student Ratings of the LivingWise Program—Spring



Teacher Responses to Program

Teachers provided feedback on the program by completing and returning the evaluation forms they received with program materials. Sixty-six spring teachers from 52 schools returned evaluations. Spring teachers answered “yes” or “no” in response to five statements and questions regarding the program and their participation. Figure 4 shows spring teacher responses.

Figure 4. Spring Teacher Response to LivingWise Program



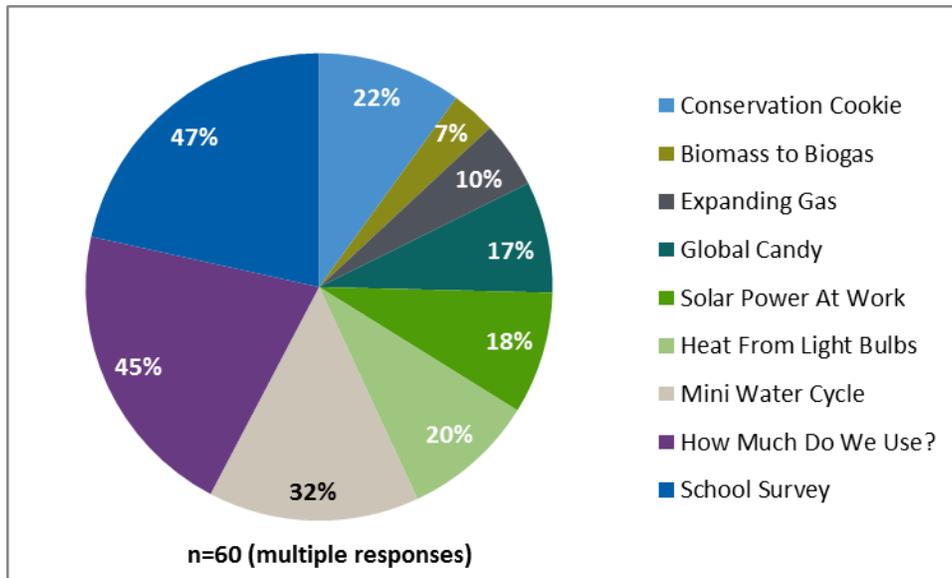
When asked to rate how strongly they agreed (“strongly disagree,” “disagree,” “agree,” and “strongly agree”) with two statements about the kit and materials, teachers responded favorably: 98% of responding teachers indicated they agreed or strongly agreed that kit materials were clearly written and



well organized; and 97% of responding teachers indicated they agreed or strongly agreed that students found products in the kit easy to use.

Spring teachers also responded about their participation in nine possible classroom activities. As shown in Figure 5, teachers used multiple classroom activities to teach energy awareness.

Figure 5. Spring Teacher Classroom Activities

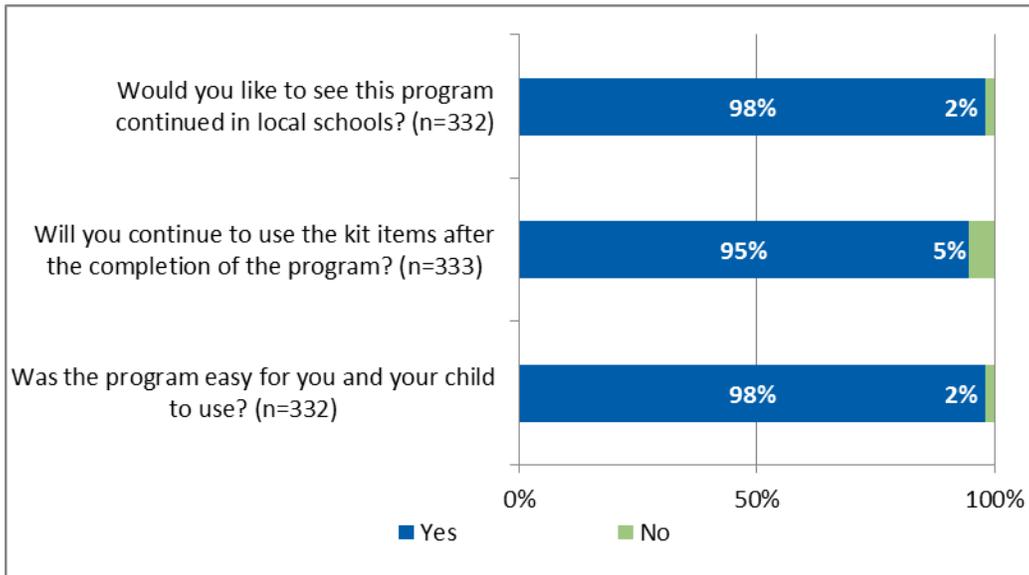


Parent Response to Program

Parents provided feedback on the LivingWise program by completing and returning the comment cards provided to them with program materials. A total of 337 parents returned comment cards. As shown in Figure 6 (below):

- 98% of responding parents wanted the program in local schools
- 95% of parents would continue to use the items in the kits
- 98% found the program easy to use

Figure 6. LivingWise Program Parent Feedback





Impact Evaluation

For each measure and energy-saving behavior, Cadmus calculated the impacts indicated from data on student-reported installation rates, energy-saving actions, and additional baseline information provided through the surveys. This section describes these calculations and shows the impacts generated by an average participant.

All gas savings resulting from fall student participation are attributed to Alliant Energy. In the spring, gas savings resulting from students who participated in the Alliant-only sponsored program are attributed to Alliant Energy; gas savings resulting from students who participated in programs co-sponsored with Liberty Energy and Black Hills Energy are not attributed to Alliant Energy.

Participant Characteristics and Program Statistics

Cadmus calculated energy savings based on surveys in which participants answered questions about installing kit measures and engaging in energy-saving behaviors. Calculations included deemed savings values and engineering algorithms.

Cadmus also collected the following household data participant characteristics and baseline energy consumption:

- Resident occupancy
- Types of space and water heating equipment
- Types of fuels used for space and water heating
- Appliance and cooling equipment saturations
- LivingWise kit measure installation rates

Table 1 shows participating households' characteristics.

Table 1. LivingWise Program Student Household Characteristics

Characteristic Information		Average Value
Occupancy	Number of people in household	4.9
Type of space heating	Electric furnaces	27.8%
	Natural gas furnaces	44.6%
	Oil	0.5%
	Other	27.1%
Type of water heating	Electric	37.2%
	Natural Gas	46.9%
	Other	15.9%

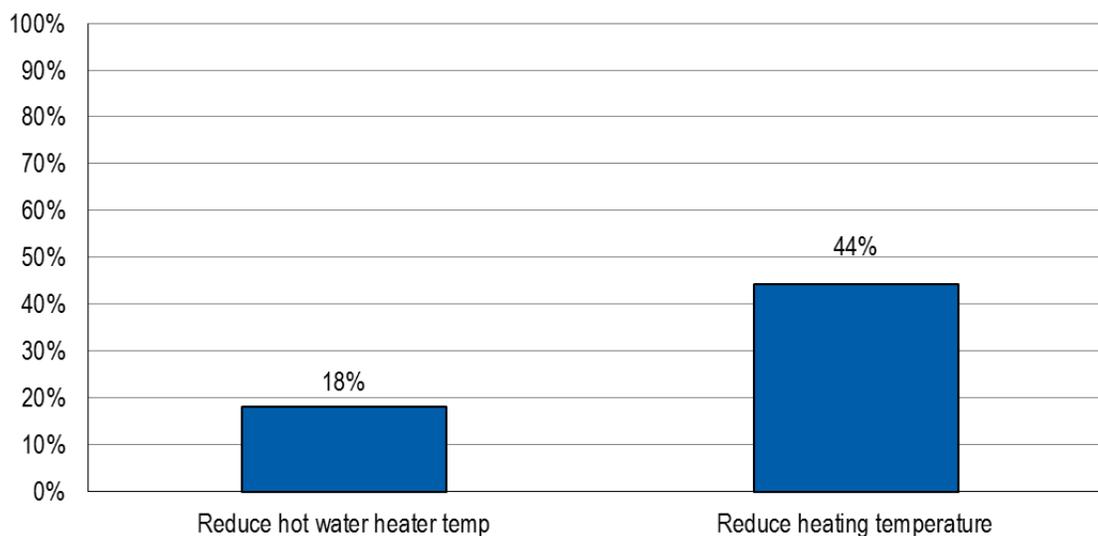
Characteristic Information		Average Value
Type of air conditioning	Central air conditioning	78.7%
	Evaporative cooler	1.9%
	Window or room air conditioning	14.9%
	Other/no cooling	4.5%
Appliance	Dishwashers	73.7%

Students completed a survey addressing the installation of efficiency measures included in the kit and the adoption of energy-saving behaviors. Surveys indicated: 43% of students installed the high-efficiency showerhead; and 36% installed the kitchen faucet aerator.

Teachers encouraged students to work with their parents and other family members to install the measures and to adopt the recommended temperature settings. They also encouraged participating families to adjust thermostats and temperature settings to energy-saving levels.

Figure 7 shows the percentage of students making temperature adjustments.

Figure 7. Temperature Adjustment Rates



Cadmus estimated savings per average participant and for the overall program, based on the reported measure installation rates.²

² The study extrapolated average savings per responding participant to the entire population of respondents—an approach supported by findings of the 2013 evaluation report Navigant prepared for Commonwealth Edison Company and Nicor Gas Company: *Elementary Energy Education Program*.

Program Impacts

For each measure, Cadmus calculated the impacts of the student-reported installation rates and on additional baseline information provided through the surveys. Descriptions follow of the calculations used, showing installation rates and impacts generated by an average participant.

High-Efficiency Showerhead

Installation of high-efficiency showerheads resulted in water and natural gas savings for program participants. Cadmus calculated program savings from showerheads using the following two steps.

Step 1. Program participants provided flow rates, in GPM, for their existing showerhead and for the high-efficiency showerhead. Cadmus calculated annual water savings per participant from installation of the high-efficiency showerhead as:³

$$\left[\begin{array}{l} \text{Average reported pre water flow (GPM)} - \\ \text{average reported post water flow (GPM)} \end{array} \right] * \left[\begin{array}{l} \text{No. showers/week * minutes} \\ \text{per shower * weeks} \end{array} \right]$$

Spring student showerheads exhibited average pre-installation water flow rates of 2.2 GPM, with average post-installation water flow rate was 1.6 GPM.

Step 2. Cadmus calculated program therm savings from the showerhead measure as:⁴

$$\left[\begin{array}{l} \text{Installation rate *} \\ \text{percent w/ natural} \\ \text{gas water heat} \end{array} \right] * \begin{array}{l} \text{Annual water} \\ \text{savings/} \\ \text{participant} \\ \text{(gallons)} \end{array} * \left[\begin{array}{l} 8.33 \text{ lbs./gallon * } 45^\circ\text{F}\Delta T \\ \hline 100,000 * \text{water} \\ \text{heater efficiency} \\ (0.60) \end{array} \right]$$

The high-efficiency showerhead produced average participant savings of 7.8 therms for spring students.

Faucet Aerator

Cadmus calculated savings from faucet aerators in a manner similar to that used for showerheads,⁵ basing savings from the kitchen faucet aerator on an estimated use of 10 minutes per day and reductions in flow rates of 0.5 GPM.⁶ Spring students experienced 1.5 therms in savings.

³ Lawrence Berkeley National Laboratories calculated the average number of showers per day, per household member, as 0.7; the average length of showers was calculated at 28.1 minutes per day for spring households.

⁴ Assuming a 45°F temperature increase from groundwater temperature for showers, a Btu = the energy required to raise 1 lb. of water 1°F.

Temperature Adjustments

Table 2 summarizes the percentage of participants making water and space heating temperature adjustments, the average adjustments, and the resulting energy savings.

Table 2. Equipment/Appliance Setting Adjustments

Adjustment	Adjustment Rate	Reduction in Temp °F	Percent Savings per °F*	Saturation (Gas)	Average Therm Savings (unit/year)
Water Heating Temperature					
Spring Students	18%	6.0	0.4%	47%	0.4
Heating Temperature					
Spring Students	44%	3.9	2.0%	45%	8.7

*The U.S. Department of Energy, Energy Efficiency and Renewable Energy Division, estimates 3% in energy-savings for every one-degree reduction in heating temperature.

For the program as a whole, 8,500 of the 15,885 participants completed surveys (54%), an increase from the previous year’s 51% response rate. However, 137 of the 145 spring students participating in the program co-sponsored by Liberty Energy returned surveys, for a response rate of 94%. Cadmus extrapolated the installation rate from the responding students to the non-respondents. Table 3 details an average of student-generated savings.

Table 3. Average Participant Annual Savings

Measure	Gas (therms)	Water (gallons)
High-efficiency showerhead	7.8	2,693
Kitchen faucet aerator	1.5	673
Reduce hot water heater temperature	0.4	–
Reduce heating temperature	8.7	–
Total	18.4	3,366
Cost savings	\$21.71	\$11.48
Total per participant savings	\$33.19	

Based on average participant savings, Cadmus calculated the Liberty Energy co-sponsored program-generated savings, shown in Table 4.

⁵ The evaluation assumed a 35°F temperature increase for sink use.

⁶ For households with dishwashers, the evaluation assumed a baseline faucet use of three minutes per day, plus 0.5 minutes for each household member. For households without dishwashers, the evaluation assumed baseline faucet use at 15 minutes per day, plus two minutes for each household member. These baseline assumptions remain consistent with the American Water Works Association Research Foundation’s 1999 *Residential End Uses of Water* report by Mayer.



Table 4. Program Annual Savings⁷

Measure	Gas (therms)	Water (gallons)
High-efficiency showerhead	1,131	156,182
Kitchen faucet aerator	218	39,046
Reduce hot water heater temperature	58	–
Reduce heating temperature	1,262	–
Total	2,668	195,228
Cost savings	\$3,148	\$666
Total first year program savings	\$3,814	

Lifetime Savings

Cadmus calculated the program’s long-term value, based on lifetimes of each installed kit measure. Table 5 shows lifetimes for each measure, based on manufacturer information.

Table 5. Lifetime of LivingWise Kit Measures

Measure	Lifetime (Years)
High-efficiency showerhead	8
Kitchen faucet aerator	5
Behavior measures	2

Based on lifetime estimates and average participant savings, Cadmus calculated the present value of savings for each kit measure and each type of resource, as shown in Table 6.

Table 6. Present Value* of LivingWise Program for Participants*

Energy-Efficient Kit Measure	Gas Bill	Water Bill
High-efficiency showerhead	\$9,403	\$3,751
Kitchen faucet aerator	\$1,178	\$611
Behavior measures	\$2,983	–
Utility bill reduction	\$13,564	\$4,362
Program total	\$17,926	

*Cadmus calculated the present value using reported measure lives and a 2.91% discount rate, derived from the 10-year value U.S. Treasury Note from January 2, 2013, to August 30, 2013. U.S. Department of the Treasury website: <http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=longtermrateYear&year=2013>.

⁷ Annual program savings reflects portion of average participant savings attributed to Liberty Energy.

Conclusions and Recommendations

The LivingWise Program teaches future utility customers about energy-efficient behaviors and tools, while providing immediate savings for families. Participating households experienced annual bill savings of approximately \$33.

Liberty Energy may consider changing some program components and adding other evaluation activities to further increase program savings.

Consider Conducting Process Evaluation

A process evaluation of the LivingWise Program could help Liberty Energy identify possibilities for improving program delivery, adding educational opportunities, and increasing survey responses—all of which could improve program effectiveness and savings.

A process evaluation could help assess the following:

- Opportunities to support additional energy-efficient behaviors in the home, such as increased heating and cooling temperature changes
- Why participants reported satisfaction below 100%
- Why students returned fewer than 100% of the surveys
- Opportunities to increase installation of energy-efficient items

Consider Providing Additional Instruction on How to Install Energy-Efficient Items

Additional instruction on how to install the energy-efficient items provided in the program kits may increase participant installation of these items.

Consider Following up with Parents on Measure Installations

Student surveys may be completed before items have been installed. A follow-up survey with parents may capture installations occurring after students return their surveys, and could provide data on the persistence of these items in the home over the longer term.

Consider Including Additional Items in Kits

Liberty Energy could consider incorporating new kit measures, such as a filter-tone alarm, to achieve additional energy savings. The program could also consider offering air-infiltration measures, such as window wrap and rope caulk. These items would educate families about the importance of reducing air infiltration into their homes.

APPENDIX 3

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into by and between **Liberty Utilities (MidStates Natural Gas) Corp., 2751 N. High St., Jackson, MO 63755** (hereinafter referred to as "Partner"), (**Community Action of Southeast Iowa, 2850 Mount Pleasant Street, Suite 108, Burlington, Iowa 52601**) (hereinafter referred to as "Host", and the **University of Northern Iowa, Office of Sponsored Programs, 213 SSC-East Bartlett Hall, Cedar Falls, IA 50614-0394** (hereinafter referred to as the "University"). Work will be performed by the University's **Center for Energy & Environmental Education's Green Iowa AmeriCorps Program**. Partner, Host and University may be collectively referred to as "Parties" or individually as a "Party" in the MOU below.

WHEREAS, the project or activity contemplated by this Agreement is of mutual interest and benefit to University and to Partner and will further instructional, research, or public service objectives of University in a manner consistent with its status as a non-profit, tax-exempt educational institution.

NOW, THEREFORE, the Parties covenant and agree as follows:

1. **STATEMENT OF WORK.** The University agrees to use its best efforts to perform the project entitled, "**Green Iowa AmeriCorps**, including the Scope of Work set forth on Appendix A hereof (the "Project").
2. **PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR.** The Project will be directed by **Ashley Craft**. If, for any reason, (s)he is unable to continue to serve as principal investigator/project director, University staff will conduct a selection and placement process for an equally qualified project director. Partner organizations may be contacted regarding input on the selection process but all final decisions will be made by the University selection committee.
3. **PERIOD OF PERFORMANCE.** The Project shall be conducted during the period of **October 1, 2015 through September 30th, 2016**.
4. **PROJECT COSTS AND PAYMENT.** In consideration of the foregoing, Partner will provide the University with support as outlined in the Scope of Work attached as Appendix A to help carry out program operations. Cash support for the Project will be provided by Liberty Utilities (Mid-States Natural Gas) Corp., 2751 N. High Street, Jackson, MO, 63755. Partner's payments shall not exceed the total estimated cost of **(\$4,000.00)**. Funds cannot be from federal sources, unless approved to be used as match for federal grants. A general budget for Partner's payments is outlined in attached Appendix B. University reserves the right to allocate funds between budget line items that support program operation and member costs as it sees fit.

Partner shall remit payment within thirty (30) days of receipt of an invoice from the University and/or Host. The amount of funding required to University is not determined on any specific outcomes including a specific

number of homes reached. As a pilot project, no specific metrics are required for the University to receive payment in full.

5. **INSURANCE.** University represents that it has adequate liability insurance, such protection being applicable to officers, employees, AmeriCorps members, and agents while acting within the scope of their employment by University. The University has no liability insurance policy as such that can extend protection to any other person. University and Host understand and agree that Partner is not responsible or liable for performance of University's and Host's Scope of Work set forth on attached Appendix A. University and Host shall be solely and exclusively responsible for performing their Scope of Work set forth on Appendix A, including the method and means of performing such work. University and Host also shall be solely and exclusively responsible for Project safety in performance of the Scope of Work set forth on Appendix A.
6. **MODIFICATION.** Any agreement to change the terms of this Agreement in any way shall be valid when the change is made in writing and approved by authorized representatives of the parties hereto.
7. **REPORTING.** University will provide Partner with reporting upon request from Partner. Reporting will include the client name, address, contact information, blower door pre and post testing results, and efficiency and air infiltration reduction measures installed.
8. **TERMINATION.** In its sole discretion and at any time, Partner may terminate this MOU for any reason upon 30-days notice to University and Host.

7. REPRESENTATIVES. Designated representatives for the parties are:

Liberty Utilities (MidStates Natural Gas) Corp.	Community Action of Southeast Iowa	University of Northern Iowa
Matt Huber 2751 N. High St. Jackson, MO 63755 Phone: 573-755-0106	Dennis Ostrander 2850 Mount Pleasant Street Suite 108 Burlington, Iowa 52601 Phone: 319-753-0193 ext. 259	Ashley Craft CEEE Room 109 University of Northern Iowa Cedar Falls, IA 50614-0293 Phone: 319-273-7273

IN WITNESS WHEREOF, the parties have caused these presents to be executed in duplicate as of the date of the last signature below written.

PARTNER:

Mike Beatty President, Liberty Utilities - MidStates
 10.19.15
 Signature Date

HOST:

Sharon L. Ford Executive Director, Community Action of Southeast
 10-16-15
 Signature Date

UNIVERSITY:

Ashley L. Craft Program Director, Green Iowa AmeriCorps
 10.19.15
 Signature Date

SCOPE-OF-WORK

A. University Responsibilities

- Provide financial management of pilot operation
- Provide program director to manage pilot operations
- Obtain a written signature from the customer acknowledging the work to be performed on the premise
- Provide the participating customer's name and address to the Agency.
- Perform a complete energy audit, in accordance with the Building Performance Institute Technical Standards for the Building Analyst Professional, on each premise for a participating customer, where safe and practical to do so
 - Safety and practicality for a given premise are at the discretion of Green Iowa AmeriCorps.
 - Combustion safety testing and an analogous pass/fail score for all premises are required
- Sealing air infiltration issues identified in blower door test:
 - Sealing bypasses with caulk, spray foam, rigid foam, etc.
 - Caulking window trim to reduce air infiltration
 - Installing outlet insulators
 - Weather-stripping installation
 - Door sweep installation
 - Attic access insulation
 - Basement/Rim joist insulation
 - Seasonal air infiltration reduction measures including window kit installation and rope caulk installation
- Directly install Energy Efficiency Measures (EEMs) for the participating customers:
 - Low flow shower heads
 - Faucet aerators
 - Water pipe insulation
 - Compact fluorescent lights
- Provide data to the utilities on the number and type of air infiltration reduction and EEMs that are installed in a given premise

B. Host Responsibilities

- Provide clients with information including referral forms and Green Iowa AmeriCorps information
- Inform staff of project and proper training to carry out Host responsibilities
- Collaborate with University to support target marketing efforts to clients
- Invoice Partner for costs associated with project relating to administrative costs, travel, postage and printing.

C. Partner Responsibilities

- Provide financial support to University for costs associated with the project, not to exceed \$4,000.00
- Provide reporting requests to Program Director
- Provide financial support to Host for costs associated with the project, not to exceed \$1,000.00
- Designate a staff available to respond to questions and needed communication as it relates to the project.

Appendix B

SECTION I.						Cash Provided to University	Cash Provided to Host
A.	PERSONNEL		Base Rate				
	1.	Program Director	\$40,700	2.0%		\$815	
		SUBTOTAL				\$815	
B.	TRAVEL						
	1.	Travel to and from project location				\$400	
	2.	Vehicle rental associated with travel to and from project location				\$100	
		SUBTOTAL				\$500	\$0
C.	OVERNIGHT ACCOMMODATIONS						
	1.	Overnight stay associated with project				\$1,000	\$0
		SUBTOTAL				\$1,000	\$0
D.	MATERIALS & SUPPLIES (itemize tangible items)						
	1.	Weatherization Supplies & Materials				\$1,285	\$0
		SUBTOTAL				\$1,285	\$0
E.	OTHER DIRECT COSTS						
	1.	Marketing Costs				\$100	
	2.	Printing Costs					
	3.	Postage					
		SUBTOTAL				\$0	\$0
	TOTAL DIRECT COSTS (A. thru E.)					\$3,600	\$0
SECTION II.							
A.	INDIRECT COSTS*						
	1.	Foundation Rate for Processing (10% of total)				\$400	
	2.	CAP Agency Admin. Costs					\$1,000
		SUBTOTAL				\$400	\$1,000
SECTION I & SECTION II TOTAL						\$4,000	\$1,000
TOTAL BUDGET						\$4,000	\$1,000
TOTAL PROJECT BUDGET						\$5,000	

APPENDIX 4

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TANKLESS WATER HEATER EFFICIENCY LEVEL 0.82 EF OR GREATER	BTU INPUT N/A	REBATE AMOUNT \$300.00
FORCED AIR FURNACE EFFICIENCY LEVEL 92% - 93% AFUE	BTU INPUT 30,000 OR GREATER	REBATE AMOUNT \$250.00
94% - 95% AFUE	30,000 OR GREATER	\$325.00
96% AFUE OR GREATER	30,000 OR GREATER	\$400.00



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Liberty Utilities Iowa Rebate Offer
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Westborough, MA 01581-1088*

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APPENDIX 5

Liberty Utilities High-Efficiency Gas Space Heating Requirements and Rebate Amount:

Forced Air Furnace

Efficiency Level	BTU Input	Rebate Amount
92% - 93% AFUE	30,000 or greater	\$250.00 (remove)
94% - 95% AFUE	30,000 or greater	\$325.00 remain same
96% AFUE or greater	30,000 or greater	\$400.00 remain same

Boiler

Efficiency Level	BTU Input	Rebate Amount
85% - 89% AFUE	30,000 or greater	\$150.00 (remove)
90% AFUE or greater	30,000 or greater	\$400.00 remain same

Condensing Water Heater

Efficiency Level	BTU Input	Rebate Amount
0.90 EF or greater	40 gallon or greater	\$300.00 (remain same)

Tank Water Heater

Efficiency Level	BTU Input	Rebate Amount
0.62 EF or greater	40 gallon or greater	\$75.00 (remain same)

Tankless Water Heater

Efficiency Level	BTU Input	Rebate Amount
0.82 EF or greater	N/A	\$300.00 (remain same)

APPENDIX 6

Liberty Utilities (Midstates Natural Gas) Corp. d/b/a Liberty Utilities
Iowa Energy Efficiency Forecast 2016-2019

Low-Income Weatherization Program with SEICO

Year	2019	2018	2017	2016
Planned Participation Homes	13	13	13	13
Cost Per Weatherization	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
Planned Expense	\$ 52,000	\$ 52,000	\$ 52,000	\$ 52,000
Planned Capacity Savings per Weatherization [1]	170	170	170	170
Planned Capacity Savings Total	2,210	2,210	2,210	2,210
\$ per MMTBU	\$ 23.53	\$ 23.53	\$ 23.53	\$ 23.53

Supplemental Low-Income Weatherization Program with GIAC

Year	2019	2018	2017	2016
Planned Participation Homes	25	25	25	25
Cost Per Weatherization	\$ 65	\$ 65	\$ 65	\$ 65
Planned Expense	\$ 1,625	\$ 1,625	\$ 1,625	\$ 1,625
Planned Capacity Savings per Weatherization [2]	1	1	1	1
Planned Capacity Savings Total	24	24	24	24
\$ per MMTBU	\$ 66.67	\$ 66.67	\$ 66.67	\$ 66.67

School-Based Energy Education through Resource Action Programs

Year	2019	2018	2017	2016
Planned Participation Homes	170	170	170	170
Cost Per Energy Education Kit	\$ 28	\$ 28	\$ 28	\$ 28
Planned Expense	\$ 4,804	\$ 4,804	\$ 4,804	\$ 4,804
Planned Capacity Savings Therms [4]	18	18	18	18
Planned Capacity Savings Total	3,128	3,128	3,128	3,128
\$ per MMTBU	\$ 1.54	\$ 1.54	\$ 1.54	\$ 1.54

School-Based Energy Education Teacher Workshops through EarthWays Center

Year	2019	2018	2017	2016
Planned Expense (flat fee)	\$ 4,360	\$ 4,360	\$ 4,360	\$ 4,360
Planned # of Teachers Attend	20	20	20	20
Planned Capacity Savings Therms [5]	0	0	0	0

Appliance Rebate Program

Year	2019	2018	2017	2016
Planned Participation Commercial	5	5	5	5
Planned Participation Residential	60	60	60	60
Average Cost Per Rebate	\$ 350	\$ 350	\$ 350	\$ 350
Planned Expense	\$ 22,750	\$ 22,750	\$ 22,750	\$ 22,750
Planned Capacity Savings per Rebate [3]	167	167	167	167
Planned Capacity Savings Total	10,855	10,855	10,855	10,855
\$ per MMTBU	\$ 2.10	\$ 2.10	\$ 2.10	\$ 2.10

Iowa Energy Center and Center for Global and Regional Environmental Research

Year	2019	2018	2017	2016
Planned Expense	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Total	\$ 90,539	\$ 90,539	\$ 90,539	\$ 90,539