

**MidAmerican Energy Company  
Response to Illinois Commerce Commission Data Request  
Docket No. 13-0423 – MidAmerican Energy Company: Verified Petition for  
Approval of its Energy Efficiency Plan pursuant to Section 8-408 of the Public  
Utilities Act.**

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**Requested Data:**

JLH 1.06 Please provide the most recently completed Process Evaluation of MEC's energy efficiency programs.

**Response:**

Please see the attached documents for the most recently completed evaluations of MEC's Iowa energy efficiency programs.

- MidAmerican Energy IA Report Cross Cutting\_15Feb2013\_V02
- MidAmerican Energy Nonresidential and Ag\_18Feb2013\_V03
- MidAmerican Energy Residential and Multisector\_06May2013\_V03



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# MidAmerican Energy

**Energy Efficiency Monitoring and  
Evaluation Portfolio Summary Report –  
Iowa (Final)**

**February 18, 2013**



SDS Associates, Inc.  
Engineers and Constructors



research/into/action™





# MidAmerican Energy

## Energy Efficiency Monitoring and Evaluation Portfolio Summary Report – Iowa (Final)

February 18, 2013

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## 1. ACKNOWLEDGEMENTS

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This project was conducted through collaboration with MidAmerican Energy staff, including regular meetings and frequent communication with the project managers, Chuck Rae and Naomi Czachura. Diane Munns and others also provided feedback on project direction.

Product managers, their staff, and program implementers were particularly gracious with their time.

The evaluation team included the following firms and respective focus areas: Tetra Tech (overall project coordination, main customer survey implementation, and residential programs process evaluations), GDS & Associates (residential and agriculture programs impact evaluations), Michaels Energy (nonresidential programs impact evaluations), and Research into Action (nonresidential and education programs process evaluations).

In addition, we would like to express our appreciation for feedback provided by customers, vendors, and others in this study.



## 2. GLOSSARY OF TERMS

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**Ex-ante gross savings.** These are the expected total savings based on installed measures under the program. This information comes from MidAmerican Energy's data tracking system.

**Ex-post gross savings.** These are the accepted program savings after verification by evaluators.

**Ex-post net MWh.** These are the accepted savings due to program influence.

**Free rider.** A *free rider* refers to a program participant who would have done some amount of the program-rebated energy-efficient improvement(s) if the program had not been offered.

- Pure free riders (100 percent) would have installed the exact same efficiency and quantity of the measure at that same time in the absence of the program.
- Partial free riders (1 to 99 percent) are those customers who would have installed some equipment on their own, but a lesser efficiency, or would not have installed it at that time.
- A program's free-ridership rate is the percentage of program savings attributed to free riders.

**Net-to-gross ratio.** The net-to-gross (NTG) ratio (also commonly referred to as NTG factor) is the ratio of net program-attributable savings over program gross savings. The ratio calculated includes estimates of program free riders. The NTG ratio may also include program-induced spillover. The NTG ratio is calculated as follows:

$$\text{NTG ratio} = (1 - \text{free-ridership rate}) + \text{spillover rate (if applicable)}$$

**Peak therms.** Peak therms represent the savings at the point of time when the gas throughput is at its maximum. It is the highest throughput day for the year, and is not an hourly calculation. Peak therms savings are calculated using factor against therms saved. MidAmerican Energy has supporting load shape data, as well as algorithms, which are used to calculate the peak therms factor.

**Program attribution.** The ratio of program-attributable net savings to program gross savings. Most commonly expressed as a net-to-gross ratio.

**Realization rate.** This represents the percentage of energy savings after verification by evaluators. This accounts for adjustments to savings based on a variety of reasons including adjustments to energy savings calculations, metering and on-site assessments, and in-service rates. For the purpose of this report, realization rates capture adjustments based on engineering algorithm reviews, and in the case of the larger nonresidential programs, on-site visits. In-service rates will be included in the factors at a later date.

**Self-report approach (SRA).** The self-report approach involves asking one or more key decision makers a series of closed- and open-ended questions about their motivations for installing the program-eligible equipment, about what they would have done in the absence of the program incentive and other services, as well as questions that attempt to rule out rival explanations for the installation. To improve the reliability of the estimate, we also ask



## 2. Glossary of Terms

questions that serve as consistency checks for previous responses. Finally, we ask about the influence of past participation in other MidAmerican Energy's efficiency programs.

**Snapback.** Snapback is often also referred to as the “rebound effect,” which surmises that as energy-efficiency equipment use goes up, using energy-consuming products becomes less expensive, which in turn leads to more energy use.

**Spillover.** Spillover refers to additional energy-efficient equipment installed by a customer due to program influences, but without any financial or technical assistance from the program.

- Participant like-spillover refers to situations where a customer installed equipment through the program in the past year and then installed additional efficient equipment of the same type due to program influences.
- Participant unlike-spillover refers to situations where a customer installs program-qualifying equipment unlike the equipment installed through the program due to program influences.

**Stipulated net-to-gross.** NTG values based on secondary research or assumptions that are not necessarily based on primary data collection activities by MidAmerican Energy. Stipulated values are used as placeholders until better research is available.

**Triangulation.** Triangulation refers to when we compare the results of two or more data gathering activities aimed at addressing the same issue to derive a “best” estimate from the analysis. We will use other results to compare against the customer SRA results and potentially adjust the point estimates based on that comparison if warranted and defensible.



### 3. EXECUTIVE SUMMARY

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On behalf of MidAmerican Energy (MidAmerican), the evaluation team conducted both impact and process evaluations of MidAmerican's residential and nonresidential programs. These evaluations, which were based on program year 2011 (PY2011), represented the first impact evaluations completed for the utility. The evaluations assessed the performance, processes, and verified program impacts, as well as provided input into the next energy efficiency programs planning cycle.

The evaluation kicked off in March 2012. This report represents the results of twelve of MidAmerican's residential, nonresidential, and multi-sector energy efficiency programs, as well as the non-resource education offering. The low-income program offering was excluded from the evaluation as there currently exists a statewide evaluation of this program and therefore this program was deemed lower priority for evaluation.

A wide range of data collection activities took place to assess the performance of these programs. Activities include: staff interviews; engineering review of established algorithms, reasonableness of key inputs and parameters, and accuracy of claimed impacts using the established algorithms; participating and nonparticipating customer surveys; trade ally and market actor interviews; and on-site data collection and metering. The evaluation team also assessed the prior and new Energy Efficiency Management Information System (EEMIS) for data quality, completeness, and accuracy.

This report represents the final evaluation results of program year 2011 activities. Preliminary results were shared with MidAmerican and other interested parties through two results presentations and the delivery of the draft program-specific chapters.

For most programs, the evaluation team found that MidAmerican's claimed savings were reasonable and, in the cases where on-sites were completed, fairly accurate. As a result, the energy and therms realization rates were 86 percent and 91 percent, respectively. The peak demand impacts' results were somewhat lower with a 62 percent realization rate. The methodology for calculating peak demand savings was the primary cause of the reduced realization rate for kW overall, as documented within the individual programs' sections. Programs' energy savings were adjusted for a variety of reasons, although the driver in most cases were baseline and hours of use assumptions.

MidAmerican relies heavily on contractors to implement their programs. MidAmerican product managers, who are responsible for managing the programs, meet with implementation contractors regularly to discuss program performance and progress.

Program planning, cost-effectiveness testing, and impact reporting resides within the Regulatory Strategic Analysis group. This group is also responsible for establishing energy savings targets.

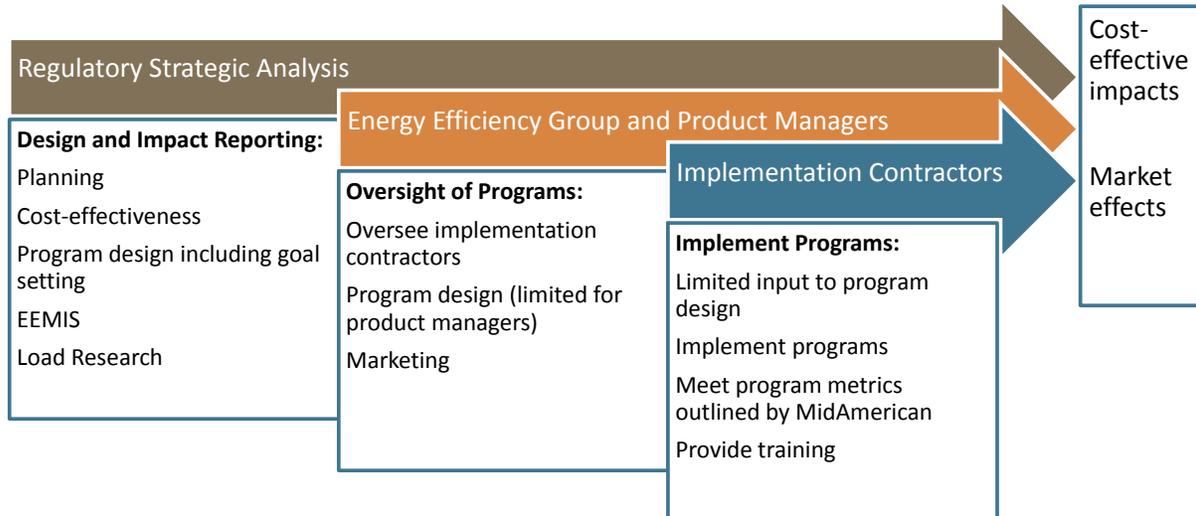
The Energy Efficiency Group, which includes Product Managers, oversees program operations, manages the implementation contractors, and coordinates with the Regulatory Strategic Analysis group to review program performance. There are four product managers overseeing the programs. Most program managers oversee three to four programs each. The evaluation team found that the level of engagement each product manager took within the program was varied, and oftentimes directly related to the considerable workload associated



### 3. Executive Summary

with managing multiple programs. This structure introduces risks to MidAmerican, which include potential inability to sufficiently oversee program performance and have unclear lines of accountability for that performance. Figure 3-1 illustrates the various groups involved in delivering programs for MidAmerican and their roles, with the objective of obtaining cost-effective impacts.

**Figure 3-1. MidAmerican Organizational Responsibility for Delivering Energy Efficiency Programs**



For the current program period (2009 – 2013), there was limited program staff involvement in establishing energy savings and budgetary goals. According to utility staff, a quick planning period limited the this type of coordination. MidAmerican’s process was considerably different when completing the planning for the next program cycle; implementation contractors and product managers were considerably more involved in the planning process.

The process evaluation found that customers were generally very satisfied with MidAmerican and its program offerings. However, program-specific evaluations found variations in satisfaction within specific program elements and, where notable, provided recommendations for improvements related to those areas. Other areas reviewed by the process evaluation include: program goals and metrics; marketing and source of awareness; interaction with trade allies and program staff; effectiveness of training, education, and information dissemination to trade allies; sufficiency and accuracy of tracking system data; and opportunities for improvement for consideration within the next program cycle. Although the findings vary considerably by program, the cross-cutting findings within Portfolio-level Key Results section (Section 5) document overarching themes within these areas.

Due to the number of programs evaluated, and resulting length, we divided the report into three volumes, including this portfolio summary report.

**Portfolio Summary Report.** This volume is intended to present a concise summary of MidAmerican’s programs, evaluation methods, and cross-cutting portfolio-level, as well as program-level results. This volume includes the following sections, in addition to this executive summary:



### 3. Executive Summary

- **Introduction:** Provides background information on the evaluation and the study approach and methodologies (Section 4)
- **Portfolio-level Key Results: Documents:** Documents ex-ante and ex-post summaries by program and overall, as well as cross-cutting process issues, such as program design and goals, risk mitigation, education and training, and marketing (Section 5)
- **Summary of Results by Program:** Highlights program-specific findings and recommendations (Section 6).

**Residential and Multi-sector Program Evaluation Report.** This report provides the key findings and recommendations for the residential and multi-sector programs (excluding Agriculture). One chapter is dedicated to an in-depth review of each program evaluated. It includes a program description; evaluation methods; program status and impact results; process evaluation findings including results from staff interviews, customer surveys, vendor interviews and other data collection activities; and final conclusions and recommendations. The following programs are included in the residential and multi-sector program evaluation report:

- Residential Existing Homes—HomeCheck® On-site
- Residential Equipment
- Residential New Construction
- Residential Load Management—SummerSaver<sup>SM</sup>
- Appliance Recycling
- Multifamily.

**Nonresidential and Agriculture Program Evaluation Report.** This report provides the key findings and recommendations for all the nonresidential and agriculture programs, following the same structure as the Residential and Multi-sector report. The following programs are included in the nonresidential and agriculture program evaluation report:

- Nonresidential Equipment
- Small Commercial Audit
- Nonresidential Custom
- Commercial New Construction
- Nonresidential Energy Analysis
- Agriculture.



## 4. INTRODUCTION

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This report presents impact and process evaluation results of MidAmerican's portfolio of energy efficiency programs delivered in their Iowa territory. The evaluation results are based on 2011 program activity. This evaluation represents the first portfolio-level process and impact evaluation efforts completed by MidAmerican for the 2009–2013 program cycle. The key objectives of this evaluation were to:

- Verify and document reported energy and demand savings associated with the individual programs and each portfolio of programs
- Provide additional due diligence to project savings in addition to what is being provided by implementation contractors
- Estimate net savings resulting from projects completed in 2011 for select programs.

At the time of this reporting, MidAmerican is in the process of assessing its portfolio of programs in preparation for the next program cycle, set to be filed in February 2013.

As background, MidAmerican has a mature portfolio of programs, having operated energy efficiency and demand response programs since the early 1990s. A number of the programs offered to customers today have been in existence for many years. MidAmerican's operations and offerings have changed over the last 20 years in response to changes in program goals and markets. For example:

- MidAmerican has responded to market conditions and has made some changes in their portfolio and operations. The portfolio includes new or significantly revised programs, such as the Agriculture program and the combination of residential and commercial offerings into a single multifamily program.
- In 2010, MidAmerican rebid contractor services for various programs in an effort to increase program cost-effectiveness and promote optimal program design and implementation. Several programs, such as Multifamily, switched implementation contractors at this time.
- MidAmerican transitioned to their new EEMIS database, which is replacing a data tracking system that has been in use since 1994 (Energy Efficiency Information System, or EEIS).

MidAmerican allocated nearly \$360 million across the five-year program cycle (2009–2013) to provide energy efficiency and demand response to their residential and nonresidential customers in Iowa. Per the Operating Plan submitted to the Iowa Utilities Board,<sup>1</sup> the total cumulative projected savings are to exceed 1.37 million MWh and 24 million therms by the end of 2013. This investment and projected savings represented an increase from the prior program cycle.

MidAmerican characterizes their programs by rate class, with several programs considered as multi-sector programs, given they have the opportunity of serving both residential and

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<sup>1</sup> *Energy Efficiency Operating Plan* submitted February 4, 2011. Docket No. EEP-08-2.



#### 4. Introduction

nonresidential rate classes. Table 4-1 documents the programs included in the portfolio. This evaluation assessed all programs with the exception of Critical Peak Pricing, Efficiency Bid, Low Income, and Trees. These programs were excluded per direction of MidAmerican or based on the prioritization process during the kickoff meeting.

**Table 4-1. Programs Approved in 2009–2013 MidAmerican Energy Efficiency Portfolio**

Residential	Nonresidential	Multi-sector
Residential Equipment	Nonresidential Equipment	Appliance Recycling
Residential Audit (HomeCheck)	Nonresidential Custom	Multifamily
Residential New Construction	Efficiency Bid	Agriculture
Residential Load Management	Small Commercial Energy Audit (BusinessCheck)	Education
Residential Load Management	Nonresidential Energy Audit	Low Income
Critical Peak Pricing	Commercial New Construction	Trees
	Nonresidential Load Management	

In addition, we evaluated cross-cutting areas (e.g., information technology, marketing) as part of this evaluation. Included in the cross-cutting evaluation are interviews with the trade and customer relations team, energy efficiency advertising and promotion team, and regulatory group.

#### 4.1 STUDY APPROACH AND METHODOLOGIES

The evaluation was kicked off on March 8, 2012, with an in-person meeting with MidAmerican’s Regulatory Strategic Analysis and Energy Efficiency Group. This two-day meeting included interviews with MidAmerican staff to address a variety of issues including evaluation priorities, program operations and status, tracking system status and structure, evaluation processes, and next steps.

The evaluation team used a combination of primary and secondary data collection activities to gather information regarding the programs, their implementation, goals, and impacts. The next step in the evaluation was to conduct additional interviews with product managers and implementation contractors. These interviews provided considerable insight into the program operations and researchable issues that should be investigated.

The evaluation team also presented to MidAmerican an extensive data request. In reaction to this request, MidAmerican provided to the team considerable information including savings and cost summaries by state and by program, program filings, contracts, program participant tracking data, supporting project documentation for custom-type programs including new construction, and other data as requested.

The evaluation team then developed a first-year evaluation plan for each program. The result of this meeting was a draft evaluation plan, distributed on May 4, 2012, and finalized June 11, 2012. Methods employed consisted of a combination of staff surveys, on-site data collection, modeling, engineering review, surveys, and program database and other information reviews. Table 4-2 outlines the process and impact activities for each energy efficiency program that



#### 4. Introduction

are the basis for results within this report. In addition to these activities, we completed 308 residential and 214 nonresidential general population surveys.

**Table 4-2. Overview of Evaluation Activities by Program**

Program	Impact	Process
Residential Existing Homes—HomeCheck® On-site (Residential HomeCheck®)	Program data and tracking system review; engineering algorithm assessment; in-service assessment. Desk review of a random sample of project files. Net-to-gross assessed.	Program staff interviews, 145 program participant surveys, and six participating energy specialist interviews.
Residential Equipment	Program data and tracking system review, engineering algorithm assessment, and in-service assessment. Net-to-gross also assessed.	Program staff interviews, 511 program participant surveys, 18 retailer interviews, and 38 HVAC contractor interviews.
Residential New Construction	Program data and tracking system review, engineering algorithm assessment, and desk review of HERS files and models.	Program staff interviews, 110 program participant surveys, four HERS rater interviews, 12 builder interviews, and benchmarking review.
Residential Load Management	Engineering review and assessment of Cadmus spreadsheet tool, MISO standards analysis, and tracking system review.	Program staff interviews, 101 program participant surveys, 70 drop-out surveys, nine contractor interviews, nonparticipating customer surveys, and benchmarking analysis.
Appliance Recycling	Program data and tracking system review, engineering algorithm assessment, and review of program planning documentation and contracts. Net-to-gross also assessed.	Program staff interviews and 248 program participant surveys.
Multifamily Housing	Program data and tracking system review, engineering algorithm assessment, and limited on-site visits	Program staff interviews, 44 participating building manager/owner surveys, secondary data analysis, participating auditor interview, and geocoding.
Nonresidential Equipment	Program data and tracking system review, engineering algorithm assessment, desk reviews, and on-site verification of 30 sites with metering and billing analysis as applicable. Net-to-gross also assessed.	Program staff interviews, 288 program participant surveys, and 123 participating trade ally surveys.



#### 4. Introduction

Program	Impact	Process
Small Commercial Energy Audit – Business Check (Small Commercial Audit)	Program data and tracking system review, engineering algorithm assessment, and desk reviews. Net-to-gross also assessed.	Program staff interviews, 153 program participant surveys, and 23 participating trade ally surveys.
Nonresidential Custom	Program data and tracking system review, engineering algorithm assessment, desk reviews, and on-site verification of 30 sites with metering and billing analysis as applicable.	Program staff interviews, 18 program participant surveys, and 24 participating trade ally surveys.
Commercial New Construction	Desk review of a sample of projects, review program documentation, on-site data collection and metering as applicable, and modelling of input and baseline assumptions in eQuest.	Program staff interviews, 11 program participant surveys, and 21 design team trade ally interviews.
Nonresidential Energy Analysis	Program data and tracking system review, desk review of a sample of 44 project files, and billing analysis of a sample of projects.	Program staff interviews, five key account manager interviews, 69 program participant surveys, and 24 Detailed Study Provider surveys.
Agriculture	Program data and tracking system review, engineering algorithm assessment, desk reviews, and on-site verification of 13 sites.	Program staff interviews, 12 program participant surveys, and participating trade ally interview.

Impact evaluation activities included varied by program. Below we describe the various impact evaluation techniques employed for this portfolio evaluation.

**Prescriptive measure engineering review and desk reviews.** The majority of the effort for this project consisted of prescriptive measures review, and all programs underwent this type of impact evaluation scrutiny. The prescriptive measure review began with secondary research using manuals and other reference sources used by utilities and states in recent years. References are documented throughout this report. Program and measure-specific engineering algorithm documentation served as a starting point for assessing key parameters such as input watts and efficiency, both for the baseline and the efficient cases. The analysis was compared with other sources for reasonableness and identification of potential future impacts due to differences in assumptions. A large portion of the impact evaluation work involved reviewing calculations by others and modifying those calculations to provide a more accurate estimate of the energy savings. Based on our experience and engineering judgment, we verified the methods and equations used in the analysis and verified assumptions regarding system parameters.

**On-site verification and interviews.** The evaluation team completed on-site interviews with a sample of Nonresidential Equipment, Commercial New Construction, NEA, Nonresidential Custom, and Multifamily participants. Each site visit included, at minimum, physical inspection of measures and a customer interview to gather information about the project for verification



#### 4. Introduction

purposes and to gather information about the program. A standard inspection and interview format was used so information gathered from one project to the next is consistent. For projects that operate mainly at a steady state, the impact evaluation recorded spot measurements of critical parameters such as amps, kW, temperatures, and flow rates. For projects that operate with significant fluctuations, data logging was used over a period of one week. These projects included variable frequency drives and controls projects.

**Billing and simulation modeling analysis.** The evaluation team completed billing analysis to verify savings for a sample of larger saving projects. The billing analysis data was used to triangulate claimed and evaluated savings and as another point of verification. Additionally the evaluation team developed simulation models for the new construction programs to further verify the impacts and/or determine impacts based on adjusted baseline assumptions.

**Assessment of realization rates.** Realization rates were determined as part of the ex-ante and ex-post analyses. Realization rates were broken down to the program and technology level. To calculate the realization rate for any segment, the sum of the best or the ex-post engineering estimate of savings is divided by the sum of the tracking system or ex-ante savings. We then applied these realization rates to the total of the tracking system estimates for each segment population. Multiplying the total tracking system energy savings for each segment by the corresponding realization rate determined ex-post energy savings. These savings may be further adjusted for factors such as in-service or removal rates. We used a combination of participant surveys, engineering desk reviews, and on-site data collection activities to calculate the realization rate.

**Net-to-gross assessment.** Iowa does not require net-to-gross be measured. In consideration program design issues, MidAmerican requested that we estimate net-to-gross for five programs—Residential Equipment, Nonresidential Equipment, Residential Audit, Nonresidential Audit, and Appliance Recycling. Net-to-gross encompasses a program's free-ridership and, potentially, spillover rate. The methodology estimates the extent of free-ridership for each customer. Pure free riders (100 percent) would have adopted exactly the same energy-efficient end use at the same quantity and the same time absent the program. Partial free riders (1–99 percent) are those customers who would have adopted some end use on their own, but of a lesser efficiency or a lesser quantity, or at a later time.

**Tracking system review.** A key function of the tracking system is to capture information required for reporting to the Iowa Utilities Board. Over the course of the past several years, MidAmerican has been developing an upgraded data tracking system. The utility began transitioning programs to the upgraded system in early 2011. As a result, some programs' data were still being entered into the older system, while other programs' data are being entered into the new system. Program implementation contractors directly input data into both data tracking systems, depending on which program they are working on. They also tend to maintain their own internal tracking systems and records.

Not only does the upgraded system capture customer and project-specific information, but it also calculates the energy savings. Algorithms that calculate the resulting electric or gas savings resulting from a measure installation are embedded within the code.

Due to the importance of the tracking system for reporting, as well as the relatively new nature of the upgraded system, the evaluation team completed an assessment of the



#### 4. Introduction

upgraded tracking system as part of this evaluation. Specifically, the evaluation addressed the following elements:

- Consistency of data being tracked
- Algorithms/protocols used to estimate savings
- Sufficiency of data being tracked for use in comprehensive program evaluations and reporting
- Accuracy of data tracking
- The evaluation team used the tracking system to review parameters collected through the program, estimate impacts, and inform the participant customer sample design.



## 5. PORTFOLIO-LEVEL KEY RESULTS

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This section presents the portfolio-level impact and cross-cutting process evaluation results. The results are followed by cross-cutting recommendations.

### 5.1 PORTFOLIO-LEVEL IMPACT RESULTS

This section presents the program-reported (ex-ante gross) savings, verified (ex-post gross) savings, and program attributable (ex-post net) savings. The analysis documents the benefits to Iowa's program participants resulting from program offerings, and documents that, for the most part, benefits claimed by the program are attributable to the incentives and services provided to participants and contractors.

The analysis also shows that the savings claimed through the programs are accurate overall, and even sometimes slightly understated. The evaluation team completed an assessment of the program tracking system in terms of its accuracy in calculating energy savings and quality of the data entered. We used a combination of desk reviews and primary data collection to assess the tracking system. The evaluation team found the data system to be flexible in capturing relevant data fields, which varied appropriately by program. The on-site verification efforts found consistency between reported and observed values with the exception of a few anomalies. Telephone surveys with customers also corroborated the finding that program data accurately captured customers' installations.

The MidAmerican program tracking systems reported 184,514,778 kWh of savings at the portfolio level for calendar year 2011 (CY2011), as shown in Table 5-1. Evaluation review of these ex-ante gross savings estimates on a program-by-program basis concluded that 86 percent of those estimated gross savings had been realized. The result of all the individual program reviews was an ex-post estimate of 159,348,374 kWh of verified (ex-post) savings at the portfolio level.

The Commercial New Construction and Agriculture programs resulted in the lowest electric realization rates. Commercial New Construction realization rates are, in part, reflective of adjustments made based on baselines and hours of lighting use assumptions. The Agriculture program adjustments are primarily a result of large variable frequency drive (VFD) savings claimed related to a single project. This project was a large outlier; therefore, the evaluation team does not believe that the low electric realization rate is indicative of overall program performance, although the finding did highlight the need for additional quality assurance for self-install projects. Although quality assurance for these self-install projects existed previously, MidAmerican reports that they are implementing a more systematic process for these types of projects.



5. Portfolio-level Key Results

**Table 5-1. Portfolio Results—Ex-ante and Ex-post kWh Savings**

Program	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Residential Existing Homes-HomeCheck On-site	3,760,424	2,542,798	68%
Residential Equipment	60,408,722	61,135,392	101%
Residential New Construction	6,022,854	5,981,306	99%
<b>Total Residential</b>	<b>70,192,000</b>	<b>69,659,496</b>	<b>99%</b>
Nonresidential Equipment	29,998,198	25,972,775	87%
Nonresidential BusinessCheck	8,089,335	7,983,641	99%
Commercial New Construction	25,315,484	10,804,544	43%
Nonresidential Energy Analysis	23,629,367	22,913,398	97%
Custom	9,178,022	8,902,432	97%
<b>Total Nonresidential</b>	<b>96,210,406</b>	<b>76,576,791</b>	<b>80%</b>
Appliance Recycling	4,188,667	4,697,027	112%
Multifamily Housing	13,413,257	8,269,713	62%
Agriculture	510,449	145,348	28%
<b>Total Multi-sector</b>	<b>18,112,373</b>	<b>13,112,088</b>	<b>72%</b>
<b>MidAmerican Energy Total (all programs evaluated)</b>	<b>184,514,778</b>	<b>159,348,374</b>	<b>86%</b>

Sources: EEIS and EEMIS Tracking data provided by MidAmerican and evaluation results

The MidAmerican program tracking systems reported 46,340 kW of savings at the portfolio level for calendar year CY2011 (Table 5-2) for the evaluated programs. Note that this total excludes the nonresidential load management and residential demand response programs. Evaluation review of these ex-ante gross savings estimates on a program-by-program basis concluded that 62 percent of those estimated gross savings had been realized. These savings were primarily reduced due to MidAmerican’s methodology for calculating peak demand savings. The result of all the individual program reviews was an ex-post estimate of 28,671 kW of verified (ex-post) savings at the portfolio level.



5. Portfolio-level Key Results

**Table 5-2. Portfolio Results—Ex-ante and Ex-post kW Savings**

Program	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Residential Existing Homes-HomeCheck On-site	1,063	655	62%
Residential Equipment	11,182	11,676	104%
Residential New Construction	3,922	3,583	91%
<b>Total Residential</b>	<b>16,166</b>	<b>15,914</b>	<b>98%</b>
Nonresidential Equipment	10,948	3,789	35%
Nonresidential BusinessCheck	4,945	1,499	30%
Commercial New Construction	6,162	1,651	27%
Nonresidential Energy Analysis	2,348	2,471	105%
Custom	1,110	1,009	91%
<b>Total Nonresidential</b>	<b>25,512</b>	<b>10,418</b>	<b>41%</b>
Appliance Recycling	2,100	793	38%
Multifamily Housing	2,475	1,524	62%
Agriculture	86	21	25%
<b>Total Multi-sector</b>	<b>4,662</b>	<b>2,339</b>	<b>50%</b>
<b>MidAmerican Energy Total (all programs evaluated)</b>	<b>46,340</b>	<b>28,671</b>	<b>62%</b>

Sources: EEIS and EEMIS Tracking data provided by MidAmerican and evaluation results

The MidAmerican program tracking systems reported 4,112,259 therms savings at the portfolio level for CY2011 (Table 5-3). Evaluation review of these ex-ante gross savings estimates on a program-by-program basis concluded that 91 percent of those estimated gross savings had been realized. The result of all the individual program reviews was an ex-post estimate of 3,760,216 therms of verified (ex-post) savings at the portfolio level.

Commercial New Construction and Custom programs reported the lowest realization rates. As discussed above, Commercial New Construction results are primarily driven by baseline assumptions. The Custom findings are a result of several high-saving outliers that reduced the overall realization rate. The evaluation team does not believe the 45 percent realization rate for the Custom program is indicative of systematic performance issues with this program as currently designed.



## 5. Portfolio-level Key Results

**Table 5-3. Portfolio Results—Ex-ante and Ex-post Therms Savings**

Program	Ex-ante Gross (therms)	Ex-post Gross (therms)	Therms Realization Rate
Residential Existing Homes-HomeCheck On-site	453,945	440,347	97%
Residential Equipment	1,351,296	1,158,492	86%
Residential New Construction	913,627	878,997	96%
<b>Total Residential</b>	<b>2,718,868</b>	<b>2,477,835</b>	<b>91%</b>
Nonresidential Equipment	189,600	279,006	147%
Nonresidential BusinessCheck	177,486	174,379	98%
Commercial New Construction	397,279	270,109	68%
Nonresidential Energy Analysis	50,607	58,249	115%
Custom	130,525	59,077	45%
<b>Total Nonresidential</b>	<b>945,497</b>	<b>840,819</b>	<b>89%</b>
Multifamily Housing	446,752	440,127	99%
Agriculture	1,142	1,435	126%
<b>Total Multi-sector</b>	<b>447,894</b>	<b>441,562</b>	<b>99%</b>
<b>MidAmerican Energy Total (all programs evaluated)</b>	<b>4,112,259</b>	<b>3,760,216</b>	<b>91%</b>

Sources: EEIS and EEMIS Tracking data provided by MidAmerican and evaluation results

## 5.2 CROSS-CUTTING PROCESS FINDINGS AND RECOMMENDATIONS

This section presents the cross-cutting process evaluation findings within four categories—program design and goals, risk mitigation strategies, education and training, and marketing. Individual program evaluation efforts, as well as general discussions with staff, contributed to the key findings presented within these sub-topics.

### 5.2.1 Program design and goals

MidAmerican's 2009–2013 Operating Plan (the Plan), most recently updated February 2, 2011, includes a comprehensive set of programs to meet customers' varied needs. While many of these programs continue and expand MidAmerican's successful energy efficiency programs, the Plan also included several new programs, new measures, and investment in infrastructure to help MidAmerican reach new markets and further capitalize on energy efficiency potential in Iowa. The programs offer services to:

- Electric and natural gas customers
- Residential, commercial, industrial, agricultural and governmental customers
- Large and small customers
- Homeowners, commercial building owners and tenants



## 5. Portfolio-level Key Results

- Customers in existing and new buildings
- Customers buying individual pieces of equipment
- Customers pursuing more comprehensive energy efficiency solutions.

MidAmerican proposed to invest nearly \$360 million in these programs over the 2009 to 2013 five-year period including:

- Almost \$117 million on natural gas programs and over \$243 million on electric programs
- Over \$182 million on residential programs and almost \$178 million on nonresidential programs.

MidAmerican's accounting systems ensure that costs for providing the programs are recovered from appropriate customers—electric program costs from electric customers and natural gas program costs from natural gas customers; residential program costs from residential customers and nonresidential program costs from nonresidential customers.

As a result of the investments in program implementation, MidAmerican expected to help customers install almost six million energy efficiency measures in homes and businesses. By 2013, the programs are projected to save 1.37 billion kWh per year and 24 million therms per year. In addition, MidAmerican projects that the measures will reduce their electric summer peak demand by over 500 MW.

Table 5-4, below, reflects the percentage of 2011 program year budget spent and energy saved for both kWh and therms. It is important, when reviewing percentage achieved relative to planned, that these figures are as indicative of the reasonableness of goals established as program performance. The Multifamily program results are an extreme example, reporting nearly 900 percent of budget spent and 1,000 percent kWh savings. Clearly, the goals established in the initial filing were too low relative to the opportunity within this market. The evaluation team recommended that MidAmerican reconsider these goals in light of prior program performance and knowledge of the market (including changing codes and standards) for the next program cycle.



5. Portfolio-level Key Results

**Table 5-4. Goals and Metrics—Progress (2011 Only)**

Sector	Program	% kWh Budget Spent	% kWh Saved	% Therms Budget Spent	% Therms Saved
Residential	Equipment	78%	99%	110%	87%
	Audit	102%	81%	89%	61%
	New Construction	65%	98%	57%	106%
Nonresidential	Equipment	65%	37%	118%	48%
	Audit	165%	201%	92%	93%
	New Construction	118%	55%	61%	48%
	Energy Analysis	170%	72%	312%	117%
	Custom	141%	121%	94%	209%
Multi-Sector	Low Income	86%	45%	214%	76%
	Multifamily	890%	1057%	232%	354%
	Appliance Recycling	77%	31%	N/A	N/A
	Agriculture	31%	75%	N/A	N/A
	Third Party*	32%	0%	24%	0%
	Education	80%	0%	81%	0%
All	Portfolio Level	99%	65%	101%	84%

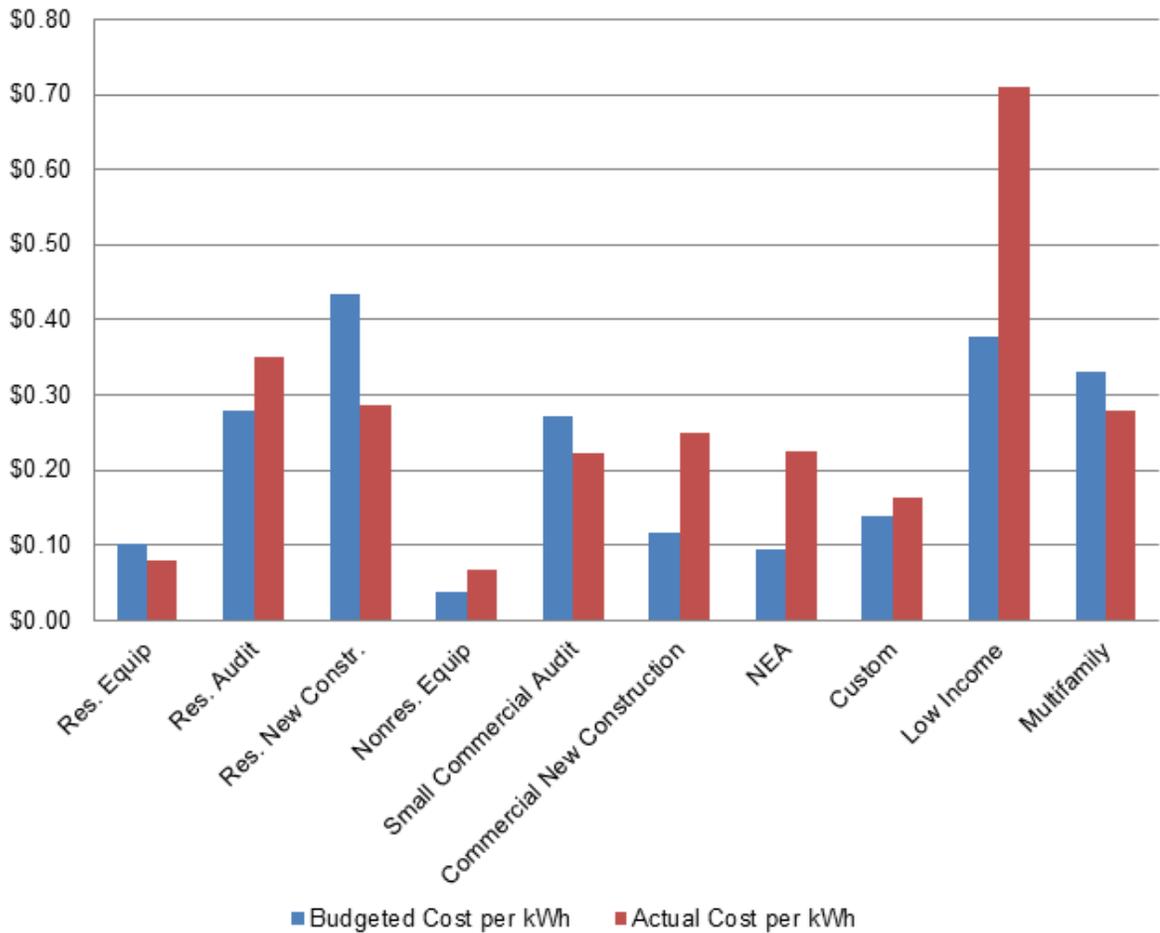
Source: 2011 EE monthly report – all states.xls  
 \*Not included in this evaluation

Another indicator of program performance is cost per unit of energy saved. One would expect that audit and information-driven type programs to result in somewhat higher costs per resulting kWh and therms. This is the case, as we see in the following figures. Figure 5-1 illustrates the budgeted and actual cost per kWh saved by program. The reader will note that in some cases the budgeted versus actual costs vary by program considerably with the greatest difference lying within the Low Income (not part of this evaluation) and Agriculture programs.



## 5. Portfolio-level Key Results

Figure 5-1. Budgeted and Actual Cost per kWh (2011)



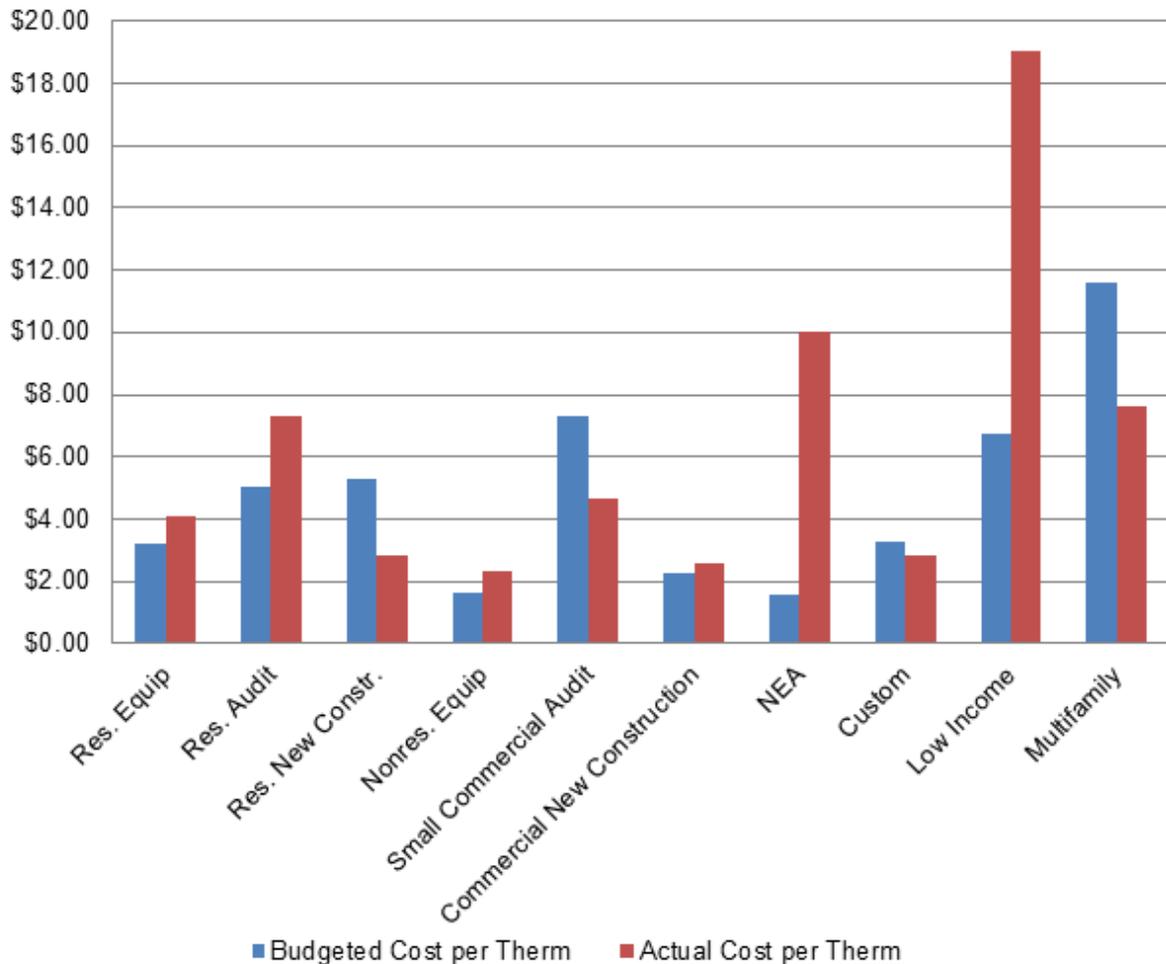
Source: 2011 EE monthly report – all states.xls

Figure 5-2 illustrates the budgeted and actual cost per therms saved by program. Again, the data show some significant differences from the budgeted costs within the therms programs, primarily within the Low Income, Agriculture, and also the NEA program. As with the energy savings goals, these differences are likely a result of insufficient or inaccurate data during the planning phase.



## 5. Portfolio-level Key Results

Figure 5-2. Progress—Budgeted and Actual Cost per Therm (2011)



Source: 2011 EE monthly report – all states.xls

MidAmerican has been making strides in their energy efficiency program planning processes. In particular, there has been increased involvement from the both the product managers and the implementation contractors. Additionally, MidAmerican is leveraging the evaluation results to inform future program designs. In particular, they prioritized process evaluation, and requested net-to-gross research for select programs for the purpose of assessing program design.

Program planning processes that are working well include:

- Program designs encompass a wide variety of measures (e.g., Nonresidential Equipment and Commercial New Construction) and target markets
- MidAmerican programs are moving toward comprehensive, whole-facility designs (e.g., NEA)
- Highlighting education and training as key components through audit offerings and implementation contractor defined roles



## 5. Portfolio-level Key Results

- Encouragement of multiple measure installations for some programs (e.g., Nonresidential Energy Analysis)
- Mid-cycle changes in program designs to improve performance (e.g., Multifamily, Commercial New Construction)
- Attempt to increase participation through increased incentives.

However, the evaluation identified a number of areas for improvement in the program design and documentation. Examples gathered from the program-specific evaluations include:

- There is some lack strategy around the measures included in the programs. Some programs, such as Nonresidential Equipment, rebate a very large variety of measure, including relatively low saving measures. While seen as a benefit, as stated above, the program would benefit from more strategic targeting in measures included in the program.
- The impact evaluation found that, for the most part, the resulting savings mapped to the engineering algorithms appropriately, although there were a few measures where the savings results and algorithms varied across program or within program but across the different data tracking systems. It would be beneficial to compare the projected impacts of like measures and document rationale behind the variations in inputs and resulting savings for those measures.
- There is confusion on some of the program implementers' part regarding what information should be tracked; because calculations are all performed by MidAmerican, implementers are not always aware of the algorithms, which leads to errors in data because the implications of incorrect data are not fully realized.

Recommendations for MidAmerican's consideration, related to program design and goals, are documented below. Program-specific chapters throughout the report further expand upon many of these goals.

**Assess program metrics and goals for the next program cycle.** Consider program design in the context of program and portfolio performance. Leverage implementation contractors' understanding of their market to establish more realistic goals.

**Review measure-level offerings.** MidAmerican offers considerable number of measures to customers; however, it may be beneficial to focus the measure offerings to optimize portfolio cost-effectiveness and performance. Additionally, it will be important to reassess measures and their savings in light of current and upcoming market changes.

**Consider strategies to encourage holistic measure implementation.** Continue to encourage facility system-wide approaches to energy efficiency, balancing the impacts against the additional costs associated with that approach. For most programs, measures are rebated on a per unit basis. For audit type programs in particular, one program strategy to increase savings per dollar saved is to encourage more comprehensive measure adoption through specific incentive strategies such as providing a bonus for multi-measure installations. Such approaches have been used effectively in other jurisdictions.

**Formalize the program design theory and metrics as a means of tracking performance and progress.** The programs have stated goals and means for meeting those goals. It is important to articulate metrics that relate to meeting those goals. In the next evaluation cycle,



## 5. Portfolio-level Key Results

the development of logic models to highlight how to meet program goals based on design would be beneficial.

**Consider additional market assessment.** It may be beneficial to complete a statewide or utility-wide market assessment based on primary data collection. The evaluation did include some activities that provided insight into the market (e.g., trade ally interviews and net-to-gross studies); these assessment activities should continue to inform barriers, performance, and future opportunities.

### 5.2.2 Risk mitigation strategies

There are many types of risk that must be accounted for in energy efficiency program portfolio design and management. To illustrate, Table 5-5 lists six potential risks, as well as the impacts of these risks, in delivering programs cost-effectively. Note that these risks are example and provided to illustrate how a number of internal process and procedural functions, when not managed, can negatively affect program design, delivery, and use of funds.

**Table 5-5. Potential Risks and Impacts to MidAmerican’s Programs**

Potential Risk	Impact
Poor tracking or documentation	Inaccurate reporting, insufficient information for verification
Inaccurate engineering algorithms or assumptions	Realization rates considerably above or below 100 percent
Insufficient contract language	No contractual protection for MidAmerican
Poorly designed programs	Increased spending, not meeting savings targets, low program attribution, and low cost-effectiveness
Lack of control over quality and installations	Low realization rate and/or dissatisfied customers
Insufficient quality assurance/quality control (QA/QC) and verification	Inability to make real-time corrections and improve resulting program impacts

The evaluation team identified four overarching areas where MidAmerican is either currently putting processes into place to mitigate risks, or where the evaluation found additional procedures would be beneficial to the utility: tracking systems; engineering algorithm documentation; contractor contracts; and QA/QC and verification processes. These are briefly discussed in turn below.

**Mitigating risk through tracking systems.** MidAmerican is mitigating risk through adoption of TrakSmart/EEMIS. We have seen improvement in data quality, and implementation contractors are recognizing the benefits, although there is a learning curve for them. However, certain program-level evaluations identified areas where MidAmerican should continue to review and improve within the tracking system. These include measure-level savings formulas built within the system and additional information to allow for more streamlined savings verifications. Also, the evaluation team found that backup documentation and project files were not stored within the program tracking system. These project files can be large, and it may be preferred that they are stored within the implementation contractors’ websites. However, this information should be provided to, or quickly accessed by, MidAmerican from implementation contractors. Additionally, where possible there should not



## 5. Portfolio-level Key Results

be separate tracking systems between different parties (e.g., Key Account Managers (KAMs), implementation contractors, and other staff).

**Mitigating risk through engineering documentation.** MidAmerican provided all documentation related to calculation of energy savings. While available, these algorithms were stored within different files and inconsistent in the level of documentation of key parameters, inputs, assumption sources, etc. Additionally, the evaluation team found inconsistencies in calculated savings for certain measures with no documented rationale (e.g., LED exit signs). Although evaluated savings generally agreed with the stated algorithm and correctly coded in TrakSmart for real-time calculations based on input data, there is still a need for greater transparency, consistency, and error checks. A central source documenting all algorithms and assumptions would be beneficial. Additionally, calculation of coincidence factors was highlighted as an issue for all programs. For the next program cycle, MidAmerican is referencing the Iowa statewide potential study. Absent a statewide Technical Reference Manual (TRM), all resources and references upon which the savings are calculated should be centrally stored and maintained by MidAmerican.

**Mitigating risk through implementation contractor contracts.** MidAmerican should consider fortifying both implementation contractors' and participating trade ally (e.g. Raters) contracts/participation agreements to ensure deliverables are defined as MidAmerican property. Through this evaluation effort, we learned that contractors are not providing MidAmerican all relevant program files as standard practice; the evaluation team had difficulty obtaining files necessary for evaluation, and assumptions in files are critical for verifying savings. Additionally, contract goals not clearly tied to outputs. For example, the Multifamily program implementer's contract includes goals that are based on the number of audits, which ultimately does not match up with the savings the program needs to achieve.

**Mitigating risk through quality assurance/quality control and verification.** MidAmerican's implementation contractors report that they provide QA/QC of approximately ten percent of their projects. We found that either the QA/QC is not being systematically implemented and/or MidAmerican is not always responding internally through savings adjustments. While useful for implementers to verify installation on a specified percentage of projects, for optimal risk management QA/QC ideally would be completed by the utility or an independent contractor. At a minimum, all self-installations should be independently verified (which is MidAmerican's policy). Measurement and verification (M&V) should also be incorporated in performance-based programs, such as the Commercial New Construction program. Strategically incorporating formal QA/QC would mitigate the risk of poor performance and catch systematic performance issues earlier in the program lifecycle.

### 5.2.3 Education and training

One of the four key components to MidAmerican's educational efforts includes educating, training, and supporting trade allies through advertising, meetings, recognition for outstanding performance, and formal and informal training. Trade ally networks are leveraged to promote public awareness of energy efficiency and MidAmerican's energy efficiency programs. All educational activities are non-resource activities, and, as such, have no energy savings goals associated with them.

Trade allies are a critical source of program awareness for customers, particularly for nonresidential programs and residential midstream programs where trade allies can be highly



## 5. Portfolio-level Key Results

influential in customers' decision-making processes. As such, it is important that trade allies have the support and tools that enable them to upsell high efficiency (as opposed to code-compliant) equipment through MidAmerican's programs. According to program staff, trade ally outreach for all programs—both residential and nonresidential—consists of occasional meetings across the state to describe changes to MidAmerican programs and to promote the programs. However, these meetings are not necessarily program specific, and often include both residential and nonresidential trade allies.

A dominant recurrent theme regarding training is the low level of program training and information provided to trade allies. Awareness of meetings and trainings was also low; however, about half of those who were aware of trainings reported either they or someone from their business attended one. This finding presents an opportunity to enhance program-marketing efforts through even greater trade ally understanding of programs and marketing to their customers. Trade allies' expressed desire for more program training and information underscores the importance of this offering.

These trade allies do not see concerns about availability or reliability of rebated equipment as barriers to program participation. However, a barrier that still exists among trade allies is the belief that the cost of high efficiency equipment is too high, even with rebates. This belief likely affects the promotion of such equipment by those trade allies.

There remain opportunities for greater effectiveness of trade ally outreach and marketing specifically within the nonresidential sector. Specific suggestions include:

- Cross-promote the nonresidential programs by including short descriptions of all nonresidential programs in each program-specific brochure and on the webpage of each program. Alternatively, pursue greater distribution of the general brochure that includes introductions to all of the nonresidential programs.
- Use additional media, such as posters for trade allies' lunchrooms and other common areas, to promote program benefits to trade ally staff.
- During trainings, continue to emphasize both energy and non-energy benefits of energy-efficient measures to counter the perception that equipment costs are too high, even with rebates.
- During trainings, provide suggestions that assist trade allies to describe program processes more clearly to their customers, especially program steps, such as inspections in which trade allies are not necessarily involved.

### 5.2.4 Marketing

Though not a primary focus for this evaluation cycle, the evaluation team did include evaluation activities that assessed marketing efforts. Marketing is a key component to MidAmerican's educational efforts, both to end users and to support trade allies. There are a number of groups involved in marketing MidAmerican's energy efficiency programs including corporate communications, product managers, key account managers, program implementers, and trade allies.

As discussed above, trade ally networks are a key marketing channel. According to program staff, trade ally outreach for all programs—both residential and nonresidential—consists of



## 5. Portfolio-level Key Results

occasional meetings across the state to describe changes to MidAmerican programs and to promote the programs. However, these meetings are not necessarily program-specific, and often include both residential and nonresidential trade allies.

Trade allies use and are satisfied with the program website. The effectiveness of media other than the website as a means of providing trade ally information is mixed. Almost all trade allies are aware of program brochures and generally find them useful, and many keep brochures for their own or their customers' reference. Those who read email considered MidAmerican's email informative, but the majority of surveyed trade allies indicated they never saw them. To reach trade allies more effectively, MidAmerican and program implementers should consider alternative ways to communicate with and reach out to trade allies. These may vary by the type of trade ally.

Contractors feel they have some influence on customers' decisions to purchase energy-efficient equipment—in addition, customers reported contractors are influential. Trade allies reported they see some effects of MidAmerican's program marketing and increased awareness by customers. However, most contractors suggested there could be more information about the programs available for customers coming directly from MidAmerican.

Participant surveys indicate that customers are hearing about the programs and benefits from expected sources. For example, customers participating in midstream driven programs (e.g., HVAC recipients) heard about the program from their contractor, whereas retailers were more prevalently mentioned by retail-driven programs. Several programs also had high referrals via word of mouth (e.g., Residential Audit).

KAMs are intended to serve as the primary channel for program awareness for assigned accounts. While they are the sales force for promoting energy efficiency to their assigned accounts, energy efficiency is only one part of their job. As a result, it is important to ensure KAMs can easily obtain marketing materials, up-to-date information, and process applications given their breadth of responsibilities.



## 6. SUMMARY OF RESULTS BY PROGRAM

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This section summarizes, by each evaluated program, the program design, impact and process findings, and a sample of key recommendations. Note that each program section within this volume represents a brief summary, and only highlights key findings and recommendations. The reader is referred to the program chapters to review all findings and recommendations.

### 6.1 RESIDENTIAL EXISTING HOMES—HOMECHECK<sup>®</sup> ON-SITE

Through the HomeCheck program, MidAmerican offers free in-home energy audits and cash rebates for installing select recommended efficiency measures. The program has been offered for over ten years in Iowa. The program itself has not changed substantially over the years, with the exception of rebate levels increasing, with no program changes during the 2011 program year.

The implementation contractor, A-TEC Energy Corporation (A-TEC), dispatches their in-house energy specialists to conduct a visual inspection of the home and its energy systems, paying special attention to the need for insulation and air sealing. Homes must be built before December 31, 2001, to participate in the program. Under the 2011 implementation approach, no diagnostic testing was performed as part of the audit process.

Energy specialists provide customers with a written report of the condition of their home's insulation, heating and cooling efficiency, water heating equipment, and windows. This report can then be used as a guide for implementing energy-efficient improvements. Additionally, the customer is provided with a folder that includes the list of approved contractors with whom they may work.

Energy-efficient light bulbs are available only to MidAmerican's electric customers. Water heating efficiency measures are available to those who receive gas and electric service from MidAmerican. The energy specialist examines the existing insulation and identifies the type of insulation and the amount of insulation in order to ascertain the effective existing R-value. If the home qualifies for insulation rebates, the specialist will recommend insulation for attic, sidewall, and foundation. The energy specialist can also install a programmable thermostat for \$30 plus tax.

This program operates fairly independently of the Home Performance with ENERGY STAR<sup>®</sup> comprehensive homes program being piloted by MidAmerican as of 2011. Although the Home Performance with ENERGY STAR pilot is included in the Residential Audit program umbrella, it was not evaluated within this program cycle.

#### 6.1.1 Evaluation methods

Table 6-1 documents the activities that were completed as part of the evaluation. The evaluation focused on assessing process issues, program implementation efficacy, and estimating and verifying program impacts. The evaluation also included an assessment of net-to-gross to inform program design.



## 6. Summary of Results by Program

**Table 6-1. Residential HomeCheck Program Evaluation Activities**

Residential Existing Homes Program (HomeCheck On-site) Program	
Impact Evaluation Approach <sup>2</sup>	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Conducted a desk review of 90 participants and 480 individual projects by reviewing audit reports and other data. Reviewed data inputs, assumptions, and engineering algorithms and calculations including the HomeCheck savings calculations.</li> <li>• <b>Tracking system analysis:</b> Conducted to determine if the participant took advantage of any rebates or participated in any other energy efficiency or load management programs.</li> <li>• <b>Verification:</b> Verified program participation through telephone surveys used for process evaluation.</li> </ul>
Other Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted several in-depth interviews with the product manager and A-TEC.</li> <li>• <b>Participant customer surveys:</b> Conducted surveys with a sample of the population of program participants in Iowa (145 stratified by audit only and audit and insulation).</li> <li>• <b>Nonparticipant customer surveys:</b> Completed 308 nonparticipant customer surveys as a cross-cutting activity across all residential programs.</li> <li>• <b>Participating trade ally interviews:</b> Interviewed six participating energy specialists that have conducted HomeCheck on-site audits.</li> </ul>

### 6.1.2 Impact findings and recommendations

The impact evaluation included reviews of the engineering algorithms documented by MidAmerican for reasonableness. The inputs were assessed, as well as the resulting savings accounting for the inputs. In some cases, alternative algorithms were used to develop savings estimates. A sample of paper files were reviewed to compare program database inputs with information collected by program implementers. We made adjustments to savings and data collection recommendations based on these findings.

Additionally, surveys were completed with customers to verify installation of measures claimed by the program. The participant surveys only provided evidence for minimal adjustment factors for in-service rates for CFLs (0.885).

The non-lighting measures are predominantly insulation; however, they also include window measures and faucet aerators. The majority of the ex-ante natural gas savings are due to insulation measures followed by faucet aerators and low-flow showerheads.

Table 6-2 presents the impact results of the HomeCheck program. The realization rate is 68 percent for electric, 63 percent for peak kW, and 97 percent for therms savings. The primary driver of the lower electricity related savings rate was direct install CFLs and the assumed hours of use and peak kW coincidence factor.

<sup>2</sup> Optional impact analyses activities not budgeted but could be considered in the future are billing analysis for select projects to determine accuracy of energy savings calculations.



6. Summary of Results by Program

**Table 6-2. Residential HomeCheck Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Insulation	595,689	533,164	90%
Lighting	2,973,272	1,776,264	60%
Water heating	170,695	218,242	128%
Thermostat	18,491	11,809	64%
Infiltration	2,278	3,320	146%
<b>Total kWh</b>	<b>3,760,425</b>	<b>2,542,799</b>	<b>68%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Insulation	465	373	80%
Lighting	554	202	36%
Water heating	19	63	332%
Thermostat	21	14	67%
Infiltration	2	13	650%
<b>Total kW</b>	<b>1,061</b>	<b>655</b>	<b>63%</b>
Measure Category	Ex-ante Gross (therms)	Ex-post Gross (therms)	Therms Realization Rate
Insulation	339,026	328,172	97%
Water heating	104,926	87,979	84%
Thermostat	7,697	21,884	284%
Infiltration	2,295	2,331	102%
<b>Total Therms</b>	<b>453,944</b>	<b>440,366</b>	<b>97%</b>

Based on the impact evaluation results it appears this program is operating as intended, though with a need for making some adjustments to data collection and greater specification for algorithms. These adjustments are as follows:

- Algorithms should be updated to reflect more detailed home or project data, such as wall area of a home.
- Adjust CFL hours of use assumptions which, based on secondary resources, the evaluation deemed too high.
- Validate or otherwise explain coincident peak factors and consider adding Midwest Independent Transmission System Operator (MISO) coincident factors.

**6.1.3 Process findings and recommendations**

In 2011, the HomeCheck program slightly exceeded its kWh budget goals, but fell short of its kWh and therms savings and therms budget targets. Program staff partially attributed not



## 6. Summary of Results by Program

meeting savings targets to the warmer winters. Implementation contractors were able to meet their audit goals; however, the audit goals were not sufficient to ensure energy savings targets were met through the higher saving insulation measures.

The educational element of the on-site energy audit is designed to identify potential for energy savings through the purchase and installation of higher efficiency equipment and behavioral changes. The program drives energy impacts through direct-installation measures (CFLs, faucet aerators, low-flow showerheads), and pipe wrap insulation. A small percentage of HomeCheck participants installed non-insulation measures that were rebated through the Residential Equipment program. These savings could potentially be attributable, but are not represented, in the HomeCheck program.

Customers and energy specialists voiced high satisfaction with all elements of the program. Energy specialists discussed only a few areas for potential improvements including changes to the insulation requirements and increasing the number of bulbs allowed through the program. Although the program is marketed primarily through direct mailings and contractors, a considerable portion of customers heard about the program via word of mouth. This, along with the high percentage of customers that report referring others to the program, also indicates high levels of satisfaction.

A number recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

**Establish metrics to ensure the program is providing intended benefits and outcomes, such as conversion rates, and establish contract goals based on those metrics.** The program implementer's contract goals are tied to number of audits, not resulting savings. As a result, there is no point of accountability to meet those impact targets from either the implementation contractor or product manager's perspective. To reach impact goals, and increase program cost effectiveness, we recommend staff develop specific metrics tied to energy saving goals.

**Target the insulation and HVAC contractor market for increased marketing for the program.** Interviews with program staff and energy specialists indicate that they primarily receive referrals into the program from insulation contractors. However, few customers mentioned contractors as a source of information. Given that customers oftentimes contact a contractor first for their retrofit needs, this finding indicates there is additional potential to direct customers into the program through this market.

**Review insulation and lighting requirements.** We identified differences in MidAmerican Energy's HomeCheck program requirements from other Iowa utilities, namely Alliant Energy. Specifically, the insulation requirements are more and the number of CFLs are lower for MidAmerican Energy's program. Energy specialists saw the insulation requirement in particular as a lost energy savings opportunity for the program. Although allowing for insulation for homes with insulation greater than R-24 could affect cost effectiveness, these changes would provide opportunity for additional savings and to reach a market that may currently be missed (e.g., homes within the 10- to 15-year age).

**Coordinate the HomeCheck program with the Home Performance with ENERGY STAR pilot if the pilot is to continue.** Home Performance with ENERGY STAR presents more intensive and comprehensive assessment opportunities for the program participant.



## 6. Summary of Results by Program

Additionally, the incentive structure is considerably different. However, the savings opportunities are considerable especially as the incentives are structured to influence and optimize the savings. From interviews with program staff and implementation contractors it is clear that while there is some coordination between the two programs there is opportunity for increased coordination.

### **Consider program design options to encourage more comprehensive home retrofits.**

The program currently does not include any bonus incentives for increased number of measures, or high-energy-intensity measures, to be installed. There are programs that have implemented designs such as this and found that the resulting energy savings is increased per participant, although participation is not always as high.

## 6.2 RESIDENTIAL EQUIPMENT

The Residential Equipment program consists of three primary components—Residential Lighting, Residential Appliance Rebates, and Residential HVAC Equipment Rebates. Included in the HVAC Equipment umbrella is the System Adjustment and Verification for Efficiency (SAVE) pilot. Below we provide brief descriptions of each program component.

**Residential Lighting.** MidAmerican is one of several Midwestern utilities involved in a large-scale buying club implemented by the Wisconsin Energy Conservation Corporation (WECC). Since 2004, WECC has worked to establish relationships with manufacturers and distributors of high-efficiency lighting, such as compact fluorescent lamps (CFLs). These relationships are leveraged to provide discounted lighting to utility customers through buy-downs, or discounts, which are taken off at the point of sale. Customers are typically notified of the program-funded price-reductions through in-store displays. At this time, lighting rebates comprise approximately 85 percent of the program's claimed savings.

**Residential Appliance Rebates.** The appliance rebate portion of the program is implemented by A-TEC. The program provides applicants with a monetary incentive for the installation of qualifying high-efficiency appliances. Rebate levels are dependent upon the installation costs of the eligible equipment. Appliance rebate application forms are typically completed by the customer with occasional assistance from the retailer selling the appliance. Upon receipt of an application, A-TEC collects and processes rebates and enters the data into MidAmerican's program database.

**Residential HVAC Equipment Rebates and System Adjustment and Verification for Efficiency (SAVE) Initiative.** The HVAC equipment rebate portion of the program is also implemented by A-TEC. The rebate component provides applicants with a monetary incentive for the installation of qualifying high-efficiency equipment to reduce the higher upfront costs associated with upgrading to eligible equipment. Rebate levels are dependent upon the efficiency levels of the equipment installed.

MidAmerican provides training opportunities for trade allies to ensure they are aware of program requirements and familiar with the program rebate application. As with appliances, A-TEC collects and processes rebates and enters the data into MidAmerican's program database.



## 6. Summary of Results by Program

MidAmerican is coordinating with MEEA to roll out the SAVE initiative. The SAVE initiative is based on National Comfort Institute (NCI) principles,<sup>3</sup> which strive to maximize a home's efficiency and comfort levels simultaneously<sup>4</sup> by focusing on duct work and duct leakage to improve HVAC airflow. As a rollout mechanism, MidAmerican is providing trade allies with \$50 spiff incentives as well as free training sessions.<sup>5</sup> The spiff offerings will be discontinued in 2014 when the initiative becomes mandatory.

The program is championed by MEEA; however, there are other players involved. NCI is responsible for the driving principles behind the program and designed the program training materials. ESI created the SAVE Initiative web application and, therefore, provides technical support and administers the two-day training provided to contractors. A-TEC implements the QA/QC activities for the program, typically auditing the first three jobs a contractor completes, followed by approximately ten percent of completed jobs to verify SAVE standards were met for the installation.

### 6.2.1 Evaluation methods

Table 6-3 documents the activities that were completed as part of the evaluation. The evaluation focused on estimating and verifying program impacts, including net-to-gross, and providing key feedback on the functionality of program processes.

For this report, the evaluation conducted reviews of the engineering algorithms documented by MidAmerican for reasonableness. Both the inputs and the resulting savings were assessed as part of this evaluation. The evaluation team also reviewed the Illinois TRM to assess potential variations in inputs and methods from those implemented in Iowa.

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<sup>3</sup> [www.mwalliance.org/save](http://www.mwalliance.org/save).

<sup>4</sup> [www.nationalcomfortinstitute.com](http://www.nationalcomfortinstitute.com).

<sup>5</sup> Half of the training costs are covered directly by MidAmerican; the other half is covered through a state-wide grant.



6. Summary of Results by Program

Table 6-3. Residential Equipment Program Evaluation Activities

Residential Equipment Program	
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Conducted a desk review of a sample of rebates from each equipment type using applications, calculators, and reported savings. Confirmed data inputs, stipulated assumptions, and engineering algorithms and calculations.</li> <li>• <b>Tracking system analysis:</b> Analyzed tracking databases to determine if the participant took advantage of any rebates or participated in any other energy efficiency or load management programs.</li> </ul>
Other Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted nine in-depth interviews with the product manager and program implementation contractors.</li> <li>• <b>Participant customer surveys:</b> Completed 511 customer surveys. The survey was conducted with a random sample of the population of program participants, stratified by measure type.</li> <li>• <b>Nonparticipant customer surveys:</b> Completed 308 nonparticipant surveys as a cross cutting activity across all programs.</li> <li>• <b>Participating retailer surveys:</b> Conducted 18 qualitative interviews with participating retailers to identify motivators and satisfaction with program participation.</li> <li>• <b>Participating HVAC contractor interviews:</b> Surveyed contractors stratified by those who received the SAVE initiative incentive and those who did not. Completed 38 qualitative surveys with contractors in Iowa, varying by participation level (non-participation, low participation, medium participation, and high participation levels).</li> </ul>

6.2.2 Impact findings and recommendations

The impact evaluation consisted primarily of a desk review of engineering algorithms and analysis of data captured in the tracking system and related impacts. The evaluation team found that the tracking system followed the algorithms with the exception of one measure—natural gas furnaces. The impact evaluation also reviewed the key inputs used to calculate the impacts and found most to be reasonable, although recommended additional points of hours of use and cooling degree day references for weather-sensitive measures.

Additionally, the impact evaluation verified receipt of measures and attributable savings (net-to-gross) through a telephone survey of program participants. Customers were randomly sampled for all program components with the exception of the upstream lighting<sup>6</sup>. Customers verified the receipt of measures documented in the tracking system, which also validated the completeness of general measure-level data entered into the system. No additional adjustments were made to the gross savings based on the verification surveys.

Table 6-4 presents the impact results of the Residential Equipment program. The realization rate is 101 percent for electric, 104 percent for peak kW, and 86 percent for therms savings. Note that the impacts documented in the table below exclude upstream CFLs. Upstream CFLs account for 49,201,209 kWh and 7,874 peak kW. We recommend the realization rate for this program component be set at 97.6 percent.

<sup>6</sup> Intercept surveys or a large scale general population survey would be necessary to speak directly with those customers—activities outside of the scope and timeline of this project.



6. Summary of Results by Program

**Table 6-4. Residential Equipment Ex-ante and Ex-post Impacts**

<b>Measure Category</b>	<b>Ex-ante Gross (kWh)</b>	<b>Ex-post Gross (kWh)</b>	<b>kWh Realization Rate</b>
Central air conditioner	1,085,058	1,513,011	139%
Air-source heat pump	917,081	1,646,966	180%
Ground-source heat pump	2,770,179	2,814,628	102%
CFL	49,201,209	48,020,380	98%
Desuperheater	255,135	253,890	100%
Electric water heater	21,672	21,670	100%
Solid door refrigerator	1,373,976	1,371,991	100%
Solid door freezer	35,008	34,898	100%
Clothes washer	2,375,194	3,085,930	130%
Dishwasher	590,112	588,327	100%
Furnace fan	1,713,345	1,712,821	100%
Heat pump water heater	32,422	32,422	100%
Programmable thermostat	1,642	1,641	100%
Window air conditioner	35,808	35,958	100%
Compact fluorescent hard wired	880	859	98%
<b>Total kWh</b>	<b>60,408,722</b>	<b>61,135,392</b>	<b>101%</b>



6. Summary of Results by Program

Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Central air conditioner	1,102	1,592	144%
Air-source heat pump	230	316	137%
Ground-source heat pump	1,316	1,332	101%
CFL	7,874	7,685	98%
Desuperheater	29	29	100%
Electric water heater	2.46	2.46	100%
Solid door refrigerator	189	190	100%
Solid door freezer	5	5	100%
Clothes washer	311	401	129%
Dishwasher	78	78	100%
Heat pump water heater	3.7	3.7	100%
Programmable thermostat	0.58	1.88	321%
Window air conditioner	41	40	98%
Compact fluorescent hard wired	0.1658	0.1618	98%
<b>Total kW</b>	<b>11,182</b>	<b>11,676</b>	<b>104%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Realization Rate
Boiler	26,349	22,820	87%
Furnace	1,052,238	810,796	77%
Clothes washer	172,337	224,718	130%
Dishwasher	36,535	36,424	100%
Water heater	63,738	63,636	100%
Programmable thermostat	99	99	100%
<b>Total Therms</b>	<b>1,351,296</b>	<b>1,158,492</b>	<b>86%</b>

Based on the impact evaluation results the evaluation team made specific recommendations around the calculations for the Residential Equipment program. These are organized by the three program groups: lighting, appliances, and HVAC and SAVE.

A. *Lighting*

- Ensure the year-end sales data provided by WECC and the savings reported within MidAmerican's program records match.
- Claim savings within the tracking system by specific lamp wattage, following the format that is provided by WECC.
- Adjust hours of use and peak kW savings factors.



## 6. Summary of Results by Program

- Evaluate assumptions regarding sector breakouts and document tracking system practices.
- Update algorithms and assumptions to reflect the 2007 Energy Independence and Security Act (EISA).
- Evaluate and incorporate additional factors into program algorithms.

### B. Appliances

- Update appliance algorithms to reflect the current federal standards for the equipment unless the Iowa market has significantly different appliance stock available for the new construction market.
- Include within the dishwasher savings calculation an upper limit allowance to be claimed to prevent the possibility of user errors that permit savings claims of greater than 160 annual therms saved for a single dishwasher.

### C. HVAC and SAVE

- Modify the  $EFLH_H$  and  $EFLH_C$  to be consistent with the ENERGY STAR Central AC and ASHP excel calculators and to calculate savings by zone.
- Modify the cooling and heating degree days (HDD/CDD) for the gas furnaces and gas boilers based from locations on the Iowa Environmental Mesonet.
- Correct the furnace calculations within the tracking system to follow the established algorithm.
- Document all baseline assumptions and calculations, by project, used to generate program savings values to ensure clarity and to illustrate agreement with stated algorithms.

## 6.2.3 Process findings and recommendations

MidAmerican has offered variations of the Residential Equipment program to their customers for over 15 years. In that time, the market has seen considerable shifts in baselines and codes, including shifts in the HVAC baselines, an influx of funding through the American Reinvestment and Recovery Act (ARRA), and more widespread adoption of ENERGY STAR rated products. Looking into the next program cycle, it is clear that the market will continue to shift, particularly given the changing environment in codes and standards that will be brought about through EISA. It will be important for the program to adapt to this changing market to optimize its cost effectiveness and its impact on moving customers to higher-efficiency equipment. The SAVE program is one such initiative to consider alternative savings opportunities in light of the market transitions.

The Residential Equipment program operates as two subprograms—upstream lighting, implemented by WECC, and non-lighting equipment, implemented by A-TEC. The non-lighting component can be further subdivided into two additional groups—downstream appliance rebates, which are pushed into the market primarily through retailers, and midstream HVAC rebates, which are primarily marketed to customers through the HVAC



## 6. Summary of Results by Program

contractor infrastructure. Water heaters are promoted through both retailers and contractors, although for the purposes of this analysis, they are grouped into the appliances category.

Although typically an impact-related activity, net-to-gross analysis was completed to support process and program design efforts. A high net-to-gross indicates low program attribution, and a low net-to-gross typically suggests there are other issues at play, such as market transformation, too low of an incentive, etc. The analysis showed varying levels of net-to-gross by measure. Customers who participated in 2012 generally reported higher levels of net-to-gross than those who participated in 2011, likely due to less recall bias and due to the reduction of other funding sources, such as ARRA investments and substantial tax credits.

The process evaluation found no significant administrative issues. Customers were satisfied with all elements of the program; however, customers were noticeably less satisfied with the SAVE initiative, particularly the level of rebate for that effort.

Retailers and contractors reported the value of the program in their ability to upsell equipment. On average, HVAC contractors projected that they sold 30 percent more high-efficiency equipment than they would absent the program.

SAVE is a new program initiative that will warrant further evaluation in the coming years. The program has enlisted over 600 trade allies, while only a few (about 35 trade allies) are active in the program. Contractors report internal barriers to participation, including upfront costs for the software and materials, with smaller trade allies being most vocal in their concerns.

Another key consideration is that SAVE protocols are provided only for new or replacement installations. Expanding the SAVE initiative to include HVAC tune-ups would likely be positively received by contractors, per interviews, as it would both bolster program achieved savings and contractors' bottom lines.

It is not unusual for new program components to be met with resistance and dissatisfaction from trade allies; however, given the importance of the trade infrastructure to this program, these findings could indicate a need for increased communication, training, and approaches for incentivizing trade allies appropriately to encourage participation.

A number recommendations were made related to program design and delivery. A sample of these recommendations are listed below. The recommendations are organized by overarching, lighting, appliances, HVAC, and SAVE.

### A. *Overarching*

**Separate the upstream lighting component into a unique program.** The successes of the lighting components are masking the performance of the other equipment offered through the Residential Equipment program. Essentially, the lighting program element is subsidizing the investments in other technologies available through the equipment program. While it is important to enable the distribution of less cost-effective measures, particularly new efficient technologies, it is also vital that the program fully understand the extent to which other technologies are successful. Furthermore, the delivery mechanism for the program is completely unique from the Appliances and HVAC components, as it uses an upstream program model. Separating the lighting component into its own program will enable program administration to better understand costs and savings associated with the program and to



## 6. Summary of Results by Program

better understand the possible shortcomings of the other rebate offerings as well as reflect how different the program operations are from other residential program offerings.

**Update and expand the Trade Ally Central website to provide key trade allies with program information.** Currently, MidAmerican Energy offers assistance for trade allies on their Trade Ally Central website. According to contractors/retailers, the only issue with this is that it is difficult to find and rather difficult to navigate. It is likely the program could leverage this site more effectively to keep trade allies up to date on program activities without having to invest additional funds into supplementary materials. Furthermore, using the Trade Ally Central tool to allow for retailers to print off additional materials or order additional materials will allow for a more targeted distribution of materials, with a limited impact on the program's budget.

### B. Lighting

**Consider adding additional technologies and increasing buy-downs of specialty bulbs to combat the changes in federal standards.** EISA established increased lighting efficiency standards that effectively increase the baseline against which savings can be achieved through energy efficiency lighting. These changes will decrease the standard efficiency by approximately 25 percent. Options to adapt include focusing buy-downs on lower wattages or including more specialty bulbs.

**Make marketing efforts more pronounced to increase awareness.** Customer awareness for the Lighting program component is low. Of those who were aware of MidAmerican's buy-down efforts, only 12 percent knew that they had purchased discounted CFLs. The primary motivation behind increasing customer awareness is that it reflects positively upon MidAmerican and the benefits they strive to provide to customers.

### C. Appliances

**Review equipment types rebated through the program based on free-ridership estimates and cost effectiveness.** Taking the free-ridership estimates and contractor feedback into consideration, it appears that the market has been transformed for lower efficiency equipment rebated through the program, and that the program is unnecessarily rebating certain efficiency levels. Depending on the cost effectiveness of the measures, it may not be beneficial to continue offering rebates for standard-efficiency offerings. Avenues the program should explore with regards to program design include multi-tiered programs, such as the Consortium for Energy Efficiency (CEE) Super-Efficient Home Appliances Initiative.

### D. HVAC

**Review equipment types rebated through program and rebate level settings to ensure the program is effectively promoting higher levels of efficiency with customers.** As with the appliances, 2011 and 2012 free-ridership estimates were calculated. The analysis indicated a noticeable trend towards lower-efficiency measures in 2012 which indicates the need for the incentives for these measures, particularly since ARRA funding is no longer available; customers are shifting back towards the lower end of the spectrum. However, the rebate is not a major selling point in the opinion of most contractors; it is considered a "bonus" for customers who would have installed the energy-efficient equipment anyway. Reassessing



## 6. Summary of Results by Program

qualifying efficiency levels and adjusting rebate levels, especially for top tier equipment, will likely begin to shift contractors' customers' perceptions of the role of the rebate in their decisions.

### E. SAVE

#### **Consider additional methods to reduce SAVE cost/time implications for contractors.**

The program needs to ensure that it is being cognizant of all the implied costs associated with the SAVE initiative. Contractors are very concerned about time and money implications and how their bottom lines are affected by the program. The program has two primary methods to help reduce costs on contractors—(1) the two-day training seminar<sup>7</sup> administered by the National Comfort Institute (NCI) and Energy Stewards International (ESI), which is rebated in part by the State of Iowa and by the contractor's primary utility, and (2) the \$50 spiff provided for each successfully completed measurement report. Even so, contractors are hesitant to fully participate in the program. The program could consider expanding the program to include existing HVAC tune-ups to provide more opportunities for contractors to implement the protocols. Furthermore, expanding the program to include a higher number of potential customers will result in a higher demand for the implementation of SAVE protocols. Another opportunity the program could explore to help reduce the time associated with the program is to reduce the inputs required for the submission of the measurements through the CommonCents software.<sup>8</sup>

**Document program protocols and savings assumptions.** The SAVE initiative is in a pilot stage, and no robust standards and protocols are documented. The program should define protocols in a centralized location.

#### **Implement marketing strategies for the SAVE initiative to stimulate market demand.**

The program has spent the last year or so focusing on the training of contractors in SAVE protocols. To date, over 600 contractors have been certified to perform SAVE installations for customers in MidAmerican's territory; however, interviews with contractors show that contractors are waiting for customer demand to begin rolling the program concepts out in their respective territories. It appears that the program has a sufficient number of contractors trained to implement SAVE protocols. According to many, the spiff offered to contractors for each successfully reported SAVE installation is not currently enough to motivate contractors to, in general, roll the program out to MidAmerican's Iowa customers. To initiate contractor buy-in, the program needs to move forward with marketing efforts targeting the education of the customer.

**Consider program design to include HVAC tune-up opportunities rather than only full replacement or new installs.** SAVE protocols are provided only for new or replacement installations. Expanding the SAVE initiative to include HVAC tune-ups would likely be positively received by contractors, as it would both bolster program achieved savings and contractors' bottom lines.

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<sup>7</sup> The two-day training seminar is listed at a cost of \$750.

<sup>8</sup> Per our conversation with staff from ESI, the software is reducing the number of data inputs so it no longer includes inputs outside of the measurement requirements. The additional inputs, previously used to help contractors identify additional sales opportunities for customers, will be available to contractors upon request.



## 6. Summary of Results by Program

### 6.3 RESIDENTIAL NEW CONSTRUCTION

Residential New Construction Program is available to new single-family home construction, and incentives are offered to homebuilders for constructing homes with greater energy efficiency. Homebuilders who wanted to participate in the Residential New Construction program during 2011 had two options. Option one is the Builder Option Package (a prescriptive approach), and option two is the ENERGY STAR Certified Homes version (a whole-house performance approach designed by the Environmental Protection Agency).

**Builder Option Package (BOP).** MidAmerican's program works directly with home builders adhering to program specifications. To participate in the 2011 BOP approach, the builder must have upgraded the home's heating and cooling system, insulation level, windows, doors, lighting, and appliances according to MidAmerican program specifications. In 2011, the BOP track was less stringent than the ENERGY STAR track (the 2011 BOP was similar to the 2005 ENERGY STAR BOP program requirements) and included a list of measures updated to code,<sup>9</sup> although some measures installed went beyond code. One-hundred percent of BOP homes are verified by A-TEC, the implementation contractor.

**ENERGY STAR Certified Homes Program.** ENERGY STAR requirements allow a builder to customize a home to account for unique features of a particular home design. Builders wishing to receive ENERGY STAR certification for their homes must work with a Residential Energy Services Network (RESNET)-certified home energy rater (HERS rater). HERS raters are qualified third parties hired (and paid by) the builder.

Either the builder or the HERS rater must pre-enroll each home with the program prior to drywall installation. Per the Environmental Protection Agency (EPA) requirements, in 2011 MidAmerican was implementing the ENERGY STAR Certified Homes Program Version 2.5, with an eye towards shifting to Version 3.0 in 2012. Every home certified via the ENERGY STAR program undergoes design review through the energy rating process. Each home is modeled in energy rating software, and improvements above and beyond the minimum ENERGY STAR thresholds can be recommended. Each participating home must undergo two site inspections by the builder's HERS rater. Additionally, MidAmerican employs a program-specific quality assurance protocol that entails A-TEC performing in-field QA/QC on a sample of homes.

#### 6.3.1 Evaluation methods

Table 6-5 documents the activities that were completed as part of this evaluation. The evaluation focused on estimating and verifying program impacts and providing key feedback on the functionality of program processes.

We conducted reviews of the engineering algorithms used by MidAmerican for reasonableness. Both the inputs and the resulting energy savings were assessed as part of this evaluation. We also reviewed the Illinois TRM to assess potential variations in inputs and methods from those implemented in Iowa.

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<sup>9</sup> Some measures installed through this track actually go beyond the minimum specification.



## 6. Summary of Results by Program

The evaluation team completed surveys with participating customers through Tetra Tech’s in-house survey lab. Surveys verified installation, assessed program awareness and satisfaction, as well as participant home characteristics. We also conducted 16 in-depth interviews with program builders and HERS raters to gather information from groups vital to program success, and to ensure a more complete market perspective.

**Table 6-5. Residential New Construction Program Evaluation Activities**

	Residential New Construction Program
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Conducted a desk review of a sample of new construction rebates using applications, calculators, and reported savings. Confirmed data inputs, stipulated assumptions, and engineering algorithms and calculations. A total of 80 desk reviews of participants were conducted.</li> <li>• <b>Tracking system analysis:</b> Analyzed tracking databases to determine if the participant took advantage of any rebates or participated in any other energy efficiency or load management programs.</li> </ul>
Other Primary Data Collection Supporting Process and Process Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted three in-depth interviews with product manager and program implementation contractor staff.</li> <li>• <b>Participant customer surveys:</b> Completed 110 customer surveys. The survey was conducted with a random sample of the population of Iowa program participants.</li> <li>• <b>Nonparticipant customer surveys:</b> Completed 308 nonparticipant customer surveys as a cross-cutting activity across all residential programs.</li> <li>• <b>HERS rater interviews:</b> Conducted four in-depth interviews with participating HERS raters across the Iowa territory.</li> <li>• <b>Builder surveys:</b> Completed 12 in-depth interviews with participating new construction program builders.</li> <li>• <b>Benchmarking review:</b> Conduct Internet research of similar programs to confirm data collected.</li> </ul>

### 6.3.2 Impact results and recommendations

ENERGY STAR and BOP approaches to the Residential New Construction program take two different approaches to estimating savings. The BOP measures are analyzed at the component level, with algorithms creating savings based on a measure-by-measure approach. In this regard, the BOP approach to savings is similar to most other MidAmerican programs. The ENERGY STAR approach, however, uses home energy raters that model the whole house, incorporating all the components to develop overall energy savings. As such, the impact analysis approach used by the evaluation differs between the BOP and ENERGY STAR methods and results are presented separate as well as together at a program level. Table 6-6 and Table 6-7 present the impact results of the Residential New Construction program. Table 6-6 presents the BOP verified gross results, while Table 6-7 presents the ENERGY STAR verified gross results. The overall program realization rates are presented in Table 6-8. The overall realization rate is 99 percent for electric, 91 percent for kW, 96 percent for therms savings, and 79 percent for peak therms savings. Most savings stemmed from building shell and heating and cooling equipment.



6. Summary of Results by Program

**Table 6-6. Residential New Construction BOP Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Heat pump/Central AC	417,486	338,886	81%
Insulation	58,351	66,215	113%
Water heating	37,691	69,970	185%
Appliance	41,199	38,302	93%
Infiltration	88,998	88,998	100%
<b>Total kWh</b>	<b>643,725</b>	<b>602,371</b>	<b>94%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Heat pump/Central AC	65.2	76.7	118%
Insulation	0.4	18.5	4,625%
Water heating	4.3	7.9	184%
Appliance	5.3	4.9	92%
Infiltration	5.8	5.8	100%
<b>Total kW</b>	<b>81.0</b>	<b>113.8</b>	<b>140%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
Furnace/Boiler	5,617	4,543	81%
Insulation	4,675	5,080	109%
Water heating	1,114	1,720	154%
Appliance	669	575	86%
Infiltration	3,314	3,314	100%
Thermostat	160	60	38%
<b>Total therms</b>	<b>15,549</b>	<b>15,292</b>	<b>98%</b>



6. Summary of Results by Program

**Table 6-7. Residential New Construction ENERGY STAR Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Heating	2,648,124	2,651,909	100%
Cooling	2,406,388	2,389,971	99%
Water heating	134,267	194,091	145%
Appliance	189,990	143,264	75%
<b>Total kWh</b>	<b>5,378,769</b>	<b>5,379,235</b>	<b>100%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Heating	288	-	0%
Cooling	3,515	3,435	98%
Water heating	13	22	169%
Appliance	25	12	48%
<b>Total kW</b>	<b>3,841</b>	<b>3,469</b>	<b>90%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
Heating	836,236	835,536	100%
Water heating	24,876	24,940	100%
Appliance	36,966	3,229	9%
<b>Total therms</b>	<b>898,078</b>	<b>863,705</b>	<b>96%</b>



## 6. Summary of Results by Program

**Table 6-8. Residential New Construction Combined Ex-ante and Ex-post Impacts**

Program Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Builder Option Package (BOP)	644,085	602,071	93%
Whole House (ENERGY STAR)	5,378,769	5,379,235	100%
<b>Total kWh</b>	<b>6,022,854</b>	<b>5,981,306</b>	<b>99%</b>
Program Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Builder Option Package (BOP)	81	114	141%
Whole House (ENERGY STAR)	3,841	3,469	90%
<b>Total kW</b>	<b>3,922</b>	<b>3,583</b>	<b>91%</b>
Program Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
Builder Option Package (BOP)	15,549	15,292	98%
Whole House (ENERGY STAR)	898,078	863,705	96%
<b>Total therms</b>	<b>913,627</b>	<b>878,997</b>	<b>96%</b>

Based on the impact evaluation results the evaluation team made the following recommendations around the calculations for HVAC measures, lighting measures, and documentation.

- All heating, cooling and water heating savings or penalties from the Fuel Summary report should be claimed.
- For ENERGY STAR homes that MidAmerican is currently claiming only electric or only gas savings MidAmerican should determine if it is possible to claim both the electric and natural gas savings.
- Geothermal specifications entered into the program database should reflect the REM/Rate claimed efficiency and capacity.
- The dishwasher savings calculation should include an upper limit allowance to be claimed. This is to prevent the possibility of user errors that permitted savings claims of greater than 160 annual therms saved for a single dishwasher.
- Fixed savings for multifamily natural gas water heating should be replaced with the Fuel Summary methodology.
- Appliance algorithms need to be updated to reflect the current federal standards for the equipment unless the Iowa market has significantly different appliance stock available for the new construction market.
- REM/Rate lighting and appliance values should be based on the as-built home not retaining the default values.
- For BOP participant homes, collect more complete data regarding the home's design.



## 6. Summary of Results by Program

- The algorithm for BOP infiltration savings should utilize an engineering approach and take advantage of existing blower door natural air changes per hour information.

### 6.3.3 Process findings and recommendations

Despite adverse market conditions, MidAmerican's Residential New Construction program has managed to meet or exceed both its kWh and therms energy savings goals, as well as maintain market penetration. Below, we offer our recommendations to MidAmerican program staff for continuing program gains. The recommendations are aimed toward proactively solving the issues facing future success of the Residential New Construction Program. The switch to HERS ratings as the basis for incentives and providing additional training to A-TEC could help to solve the problem of uncertainty which threatens to drive builders from the program. Raising rebates to a level commensurate with the requirements of higher-tier energy efficient homes will help to limit the damage to the trade ally pool resulting from builders leaving the program. Finally, the expansion of marketing and education campaigns to the buyer population will help to educate and motivate customers to request and purchase program-qualifying homes, while reinvigorating the term energy efficiency as an exception to the rule, rather than the norm.

A number recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

**Base incentives upon HERS scores to both ensure sound, whole house building practices, as well as help create a better understanding of what an energy efficient home means in the market place.** One of the major issues related to ensuring the future success of the Residential New Construction program is the prevalence of the term energy efficient as a marketing tool, rather than as an accurate description of the efficiency of a given home. Increasingly, homes are being sold that are claimed to be "energy efficient," but are in fact not a great deal more efficient than a home built to code. We heard from builders and HERS raters that this type of consumer thinking may stand in the way of program success because it potentially devalues the ENERGY STAR or BOP certifications. Additionally, homebuyers are beginning to consider every home to be energy efficient, thus there is no reason for them to pay extra for a program-qualifying home. Basing incentives on HERS scores, rather than on ENERGY STAR standards, would enable buyers to look critically at the term energy efficient in a way that the ENERGY STAR standard does not allow. Also, the consistency of the HERS ratings would help to make the program standards themselves more consistent.

**Provide additional training to A-TEC and document changes.** Per builders and HERS raters, a primary source of uncertainty in the program is the appearance of inconsistency from A-TEC's quality assurance group and program information. ENERGY STAR Version 2.5 and Version 3.0 changes caused a fair amount of uncertainty and required clarifications throughout the HERS rater community. Therefore, we suggest that MidAmerican Energy lead the training effort for the building community and A-TEC. Ensuring all stakeholders receive additional training will help to limit the occurrences of inconsistent quality assurance and help to make A-TEC's responses to builder inquiries more consistent. Along with additional training, we suggest the program engage directly with builders on a more frequent basis. Doing so would add another layer of consistent messaging. Last, all program changes, forms, etc. should be documented, with the most information available on MidAmerican Energy's website.



## 6. Summary of Results by Program

**Find ways to reduce the costs of participating in the program for the builders.** Cost is still a major issue and providing direct financial rewards to the builder will continue to be one way to address the problem. Because many of the participating builders cross utility service territories, MidAmerican should try to align program requirements and incentives with the other Iowa-based investor owned utilities to help make participation as easy as possible for builders and HERS raters. Currently, MidAmerican Energy's incentives are slightly below what Alliant Energy is offering.

**The REM/Rate files completed by the HERS raters to show program compliance should be provided to the program implementer as part of the final submission of program documentation.** The evaluation had a great deal of difficulty obtaining the 33 REM/Rate files from HERS raters. In our opinion, the REM/Rate file is a core program document that helps justify savings, serves as a reference for data entry checks, assists evaluation, and generally validates the home assigned incentives complies with program requirements.

### 6.4 RESIDENTIAL LOAD MANAGEMENT—SUMMERSAVER<sup>SM</sup>

MidAmerican's Residential Load Management program, promoted as SummerSaver, provides residential customers with financial incentives in exchange for allowing MidAmerican to control their central air conditioning when MidAmerican experiences high demand or when operational conditions require use of the program. Participating customers receive \$40 for taking part in all control events the first year and \$30 per year each season after their first.

Residential electric customers are eligible to participate if they are located in a geographic area currently serviced by the program; live in an owner-occupied, single-family home; and have central air conditioning or an air-source heat pump in good working condition, provided their energy usage indicates the customer uses their cooling equipment. Customers with certain models of central air conditioners that are not compatible with the load control receivers (LCR) technology are not eligible to participate. Also, customers with geothermal heat pumps are not eligible for the program.

Participants enrolled in the program agree to allow MidAmerican to control their air conditioning equipment during the months of June through September. MidAmerican manages cycling events throughout the summer season, when directed by the Midwest Independent System Operator (MISO), when expected high temperatures exceed 94 degrees or in response to MidAmerican specific reliability issues or very high locational marginal prices. Cycling events historically have averaged seven per season and have not typically exceeded 15 per season.

The program is delivered through a program contractor, A-TEC, under supervision of MidAmerican staff. A-TEC manages customer enrollment and some of the mailings, maintains a network of LCR installers, answers customer questions using a dedicated toll-free phone line, tracks program data, operates program software systems, and helps process prorated incentives when customers leave the program during the season. Additionally, A-TEC maintains a network of heating, cooling, and electrical subcontractors responsible for installing, maintaining, and removing LCRs.

Since the replacement started in 2008, there have been 15,000 receivers replaced, with 5,000 scheduled for replacement each coming year. The remaining FM signal receivers in



## 6. Summary of Results by Program

Iowa will be upgraded first, followed by the oldest pager receivers. This practice will continue on a rolling basis.

### 6.4.1 Evaluation methods

Table 6-9 documents the impact and process evaluation approach as well as the primary data collection activities that were used to address the key researchable issues. The evaluation team completed surveys through Tetra Tech's in-house survey lab. Surveys verified installation and collected household energy usage characteristics and demographics.

**Table 6-9. Residential Load Management Program Plan**

Residential Load Management Program	
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Conducted a review of Cadmus spreadsheet tool calculation algorithms and assumptions. Reviewed the 2011 program year cycling events and Cadmus spreadsheet inputs for accuracy of temperature data, appropriate control area inputs, and assumed LCR operational parameters. Assumptions regarding LCR operability and replacement practices were reviewed for consideration in claimed program impacts.</li> <li>• <b>Standards review:</b> Reviewed MISO expectations for load management program claimed capacity savings and program quality control standards.</li> <li>• <b>Tracking system review:</b> Reviewed system specifications of True Cycle equipment to determine full functionality and options for data logging of system operations and load shedding estimation. Developed options and recommendations for a design of quality control options in-line with MISO expectations and compared to other programs. Identified opportunities for utilizing the EEIS systems to record factors related to claimed baseline and savings, including recording customer air conditioner system sizing.</li> </ul>
Other Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted in-depth interviews with product managers, the program implementation contractor, and MISO staff.</li> <li>• <b>Participant customer surveys:</b> Conducted telephone surveys of a random sample of the IA population of program participants resulting in 101 completes (51 FM and 50 pager).</li> <li>• <b>Dropout customer surveys:</b> Conducted telephone surveys with a random sample of the Iowa dropout participants resulting in 70 completes. Dropout counts for Illinois and South Dakota were very low given the short time since launch and the small eligible populations.</li> <li>• <b>Contractor in-depth interviews:</b> Contacted nine of the 36 contractors that have provided installation, maintenance, and quality control for the program. Calling was coordinated with other programs such as Residential New Construction and Residential Equipment.</li> <li>• <b>Nonparticipant customer surveys:</b> Completed 308 nonparticipant surveys as a cross-cutting activity across all programs.</li> <li>• <b>Benchmarking of analysis:</b> Reviewed six residential load management programs to determine effective incentive levels, upgrade practices, quality control procedures, and interactions with grid operators. Conducted a review of evaluations of similar residential air conditioner load cycling programs and LCR operability to serve as a benchmark against which to compare MidAmerican's program.</li> </ul>



## 6. Summary of Results by Program

### 6.4.2 Impact findings and recommendations

The evaluation team does not recommend specific savings adjustments. However, we do have concerns regarding the following aspects of claimed savings.

- The lack of a standard and on-going LCR inspection process leads us to being uncertain regarding the impact of non-functioning LCRs.
- Demand reductions based on the load shape used in the MidAmerican SummerSaver Tool are undocumented and unverified.
- The measured impact of Cooper TrueCycle LCRs may indicate higher or lower performance.
- The net effect of our concerns is that while we believe that LCR operability issues may adjust savings downward, some of the apparently conservative assumptions of the MidAmerican SummerSaver Tool may offset the operability penalty. Determining the scale of each issue was beyond the scope of this evaluation and would require direct sampling and monitoring of MidAmerican's participants and nonparticipants to determine baseline and load reduction impacts.

### 6.4.3 Process findings and recommendations

MidAmerican has been successful in utilizing their Residential Load Management program to exceed kWh savings and peak kW targets while coming in below budget, all while maintaining or increasing customer satisfaction with MidAmerican. One common hurdle for all residential load management programs is the awareness of control events and the effect of numerous control events on program satisfaction. Given the broad notification process MidAmerican follows, participants still lack a good understanding of when cycling days occur.

Because the program goals included adding 772 new participants, there was constant outreach to customers. Eligible customers targeted were geographically located in an area with program availability, live in single-family homes, and have historical kWh usage indicating the home has central air conditioner that is used. In addition to outreach to nonparticipating customers, the program is attempting to keep participating households and owners engaged with the program by identifying changes in ownership status for homes with LCRs.

The main motivator behind participants' decision to leave the program was the uncomfortable temperature increases. Over half of those who dropped out of the program said there was nothing that could have been done to keep them in the program. Additionally, dropouts have concerns that receivers are affecting air conditioner operations.

One concern uncovered by both the participant survey and contractor interviews was the possible contractor interference with the program, either through disconnection of the load control receivers, or because they discouraged customers from participating in the program by suggesting there could be damage to the air conditioning equipment. MidAmerican is currently working with their contractors to mitigate this issue.



## 6. Summary of Results by Program

A number recommendations were made related to program design, delivery, and reporting. A sample of these recommendations are listed below.

**Validate learning algorithms of TrueCycle equipment.** MidAmerican Energy's practice is to cycle residential air conditioners when the temperature is expected to exceed 94 degrees during peak periods. There is some concern that with a temperature-based trigger, the TrueCycle LCRs do not experience sufficient learning at higher temperatures to determine the level of oversizing, which may lead to a reduction in the enhanced performance offered by the TrueCycle equipment. This is an issue for further research.

**Develop and conduct more frequent and systematic inspections of LCRs.** The current practice of updating older LCRs with TrueCycle equipment will help address operability of older LCRs. However, there is still a large population of old LCRs and the TrueCycle equipment will age, too. A periodic inspection of each LCR at five-year intervals appears to be a standard practice of other programs. At worst, an LCR would be inoperable for five years and not the current 15-year cycle.

**Evaluate participant and nonparticipant populations to determine baseline operations and impacts.** A sample of 250 participants and 250 nonparticipants would provide adequate stratification and statistical significance to develop deemed or more accurate estimates of savings. The MidAmerican Energy SummerSaver Tool may be useful for general planning, but as the tool ages, assumptions regarding equipment in later years may no longer hold. An updated tool that incorporates study results would improve the accuracy of savings estimates. On a periodic basis, the 250/250 study could be updated with smaller samples to ensure accurate impact estimates are made on an ongoing basis.

**Include education on the SummerSaver program during other education and outreach efforts with contractors.** As MidAmerican Energy staff meet with contractors regarding other DSM programs, include discussions about the SummerSaver program to educate contractors on the benefits of the program and help dispel the myths regarding adverse equipment interaction. It would also benefit the program to have a SummerSaver service contract flag in the contractor database to indicate those who are currently providing services through that program in order to facilitate cross-cutting marketing efforts with other programs. Comments from the participant survey suggest that there may be opportunities for contractors to cross-sell services or that customers who participate in the SummerSaver program may benefit from updating their air conditioning equipment or insulation levels.

### 6.5 APPLIANCE RECYCLING

MidAmerican's Appliance Recycling program seeks electricity savings and demand reduction by collecting and decommissioning older, inefficient refrigerators, freezers, and window air conditioners for Iowa customers. Residential and nonresidential participants receive \$50 for recycling refrigerator and freezer units, and \$25 for window air conditioners, with a limit of two of each appliance per participating household.<sup>10</sup> JACO Environmental (JACO) works with the Conservation Services Group (CSG) to implement the program.

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<sup>10</sup> [www.midamericanenergy.com/ee/ia\\_res\\_appliance\\_recycle.aspx](http://www.midamericanenergy.com/ee/ia_res_appliance_recycle.aspx).



## 6. Summary of Results by Program

### 6.5.1 Evaluation methods

This section describes the analytic methods and data collection activities implemented as part of the CY2011 impact and process evaluation of the Appliance Recycling program. Table 6-10 documents the activities that were completed as part of the Iowa evaluation.

**Table 6-10. Appliance Recycling Program Evaluation Activities**

Activity	Appliance Recycling Program
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Conducted a full review of all rebates from each equipment type using applications, calculators, and reported savings. Confirmed data inputs, stipulated assumptions (if appropriate), and engineering algorithms and calculations.</li> <li>• <b>Tracking system analysis:</b> Analyzed tracking databases to determine if the participant took advantage of any rebates or participated in any other energy efficiency or load management programs.</li> </ul>
Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted in-depth interviews with the product manager and program implementation contractor (JACO).</li> <li>• <b>Participant customer surveys:</b> Completed 248 customer surveys.</li> <li>• <b>Nonparticipant customer surveys:</b> Completed 308 nonparticipant surveys as a cross cutting activity across all programs.</li> </ul>

### 6.5.2 Impact findings and recommendations

MidAmerican's Appliance Recycling program has consistently been short of meeting the program goals. The deemed claimed values, which were claimed by the program, included a net-to-gross ratio which artificially understated the program impacts. The impact evaluation results reflect the removal of this net-to-gross ratio.

There are two evaluation components that were used to adjust the savings: comparison of MidAmerican's claimed savings against secondary literature and calculations per engineering algorithms, and in-service rates (percentage of time appliance was used and operating). Table 6-11 presents the impact results of the Appliance Recycling program, which incorporates both adjustment elements. Without the in-service rate, the realization rate would be 118 percent for electric and 41 percent for peak kW savings. The in-service rate reduced the ex-post gross savings marginally, for a final realization rate of 112 percent for electric and 38 percent for peak kW savings.



## 6. Summary of Results by Program

**Table 6-11. Appliance Recycling Program Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Recycled window AC	135,749	135,567	100%
Recycled freezer	764,424	855,184	112%
Recycled refrigerator	3,288,494	3,706,276	113%
<b>Total kWh</b>	<b>4,188,667</b>	<b>4,697,027</b>	<b>112%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Recycled window AC	247	163	66%
Recycled freezer	391	118	30%
Recycled refrigerator	1,456	512	35%
<b>Total kW</b>	<b>2,100</b>	<b>793</b>	<b>38%</b>

Based on the impact evaluation results, the evaluation team made the following recommendations related to the impacts of the Appliance Recycling program.

- Clearly document and maintain the source and/or algorithms for determining impacts related to the Appliance Recycling program.
- Modify the deemed gross kWh savings for all appliance types recycled to exclude net-to-gross factors.
- Modify the peak kW savings for each appliance by applying a coincidence factor.

### 6.5.3 Process findings and recommendations

The Appliance Recycling program is a newer addition to MidAmerican’s portfolio of programs, and was fully launched in 2010. From an administrative standpoint, the program has been operating fairly smoothly, although the cost per unit saved was higher than initially projected.

There were program implementation and design issues, though, that affected the perception of performance. Interviews with program staff, including the implementation contractor, identify room for improvement in terms of direct marketing to customers, which they believe will help to improve the participation rate and progress toward goals through this program. However, based on a review of the projected participation rates, as well as the assumed savings per unit from the initial program planning process, it is likely that the program will not meet the annual goals set within this program cycle.

A requirement of program participation is that the appliance must be working. According to the participant survey, a small percentage (less than five percent) of appliances were not working at the time they were recycled. It is not uncommon for a small percentage of participants to claim that the appliance was not in working order when recycled in their surveys. The low percentage indicates that the program is operating as designed and that JACO is primarily picking up appliances in working condition.



## 6. Summary of Results by Program

The in-service rate was over 95 percent for refrigerators and freezers, which means those appliances recycled were mostly used year-round. The in-service rate for room air conditioners was somewhat lower at 84 percent due to customers claiming they did not use the appliance in the prior year.

A number recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

**Revise the program goals for the next cycle.** The evaluation identified several substantive issues around the goals established for this program cycle. First, the total number of anticipated units recycled may be too aggressive. Second, the per-unit impact assumptions were too high, especially when taking into consideration the fact that the program is recycling freezers and window air conditions which have a lower per unit savings assumption than refrigerators. For the next program cycle, it will be important to model the potential impacts by appliance type removed.

**Continue to work with JACO to develop and implement targeted marketing strategies to increase participation.** Early interviews indicated raised concerns about amount and type of marketing for this program. JACO in particular discussed that they would like to be more integrated and work with MidAmerican on the marketing of the program as they have seen the positive impacts on participation from their marketing initiatives. Follow-up discussions indicate that MidAmerican and JACO are now working together on marketing strategies.

**Continue offering the Appliance Recycling program to nonresidential customers.** A small portion of the program savings is attributable to nonresidential customers. These MidAmerican Energy customers are taking their refrigerator, freezer, or window air conditioner off the grid, and the utility should be able to claim savings for these appliances. Some of the nonresidential appliances are being recycled from multifamily dwellings.

### 6.6 MULTIFAMILY HOUSING

The Multifamily Housing program provides a comprehensive set of services and financial incentives to serve the varied needs of multifamily property owners, property managers, landlords, and renters in existing buildings. In the past, the multifamily sector was served separately under the nonresidential and the residential programs. Common areas were served under the nonresidential program, and tenant units were served under the residential program. To better serve this market, these services were pulled together in 2009 into a unified program with aggressive incentives and increased market visibility to help overcome barriers associated with this customer segment. This program is currently being implemented by a third-party implementation firm, Franklin Energy, and participation is largely driven by contractors.

The Multifamily Housing program uses a two-pronged approach. First, Franklin Energy provides walk-through on-site energy audits to multifamily property owners/managers, which includes an in-unit direct install component of CFLs, faucet aerators, low-flow showerheads, and other measures. After a building assessment, auditors then provide property owners/managers with detailed reports, which recommend energy-efficient solutions.

Program materials indicate that property owners/managers may then choose a prescriptive or a performance track for implementing audit recommendations. The performance track differs



## 6. Summary of Results by Program

from the prescriptive track in that it provides a comprehensive, whole-building approach, with high-level customer support and more generous incentives for customers who take a holistic approach to implementing energy-saving opportunities at their properties.

### 6.6.1 Evaluation methods

Table 6-12 documents the activities that were completed as part of the Iowa process and impact evaluation, including the data sources and sample designs used as a base for the data collection activities. The impact evaluation focused specifically on estimating and verifying program impacts.

**Table 6-12. Multifamily Housing Program Evaluation Activities**

Multifamily Housing Program	
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Conducted a desk review of 40 sample rebates using applications, calculators, and reported savings. Conducted 20 on-site inspections confirming measures installed based on the program and database documentation. Confirmed data inputs, stipulated assumptions (if appropriate), and engineering algorithms and calculations. Confirmed EFLH for heating and cooling equipment using industry data from reliable sources in comparable climates for similar customers and equipment.</li> <li>• <b>Tracking system analysis:</b> Analyze tracking databases to determine if the participant took advantage of any rebates or participated in any other energy efficiency or load management programs.</li> <li>• <b>On-site visits:</b> Verify measure installation against tracking system records for 20 sites and 40 projects.</li> </ul>
Primary Data Collection Supporting Process Evaluation	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Four in-depth interviews were conducted with the product manager and program implementation contractor staff.</li> <li>• <b>Participant customer surveys:</b> After significant aggregation was conducted to collapse the 2011 participation population to a building owner/manager level, a census was taken and 44 surveys were completed of program participants (building owners and managers).</li> <li>• <b>Secondary data review:</b> Available data from MidAmerican and online (e.g., Census data) was reviewed to gather more information on the multifamily market in Iowa and the nation.</li> <li>• <b>Participating auditor interviews:</b> One interview was conducted with the program's main building auditor to assess training received, program operations, and interactions and perceptions of customers' decision-making processes.</li> </ul>

### 6.6.2 Impact findings and recommendations

Table 6-13 presents the impact results of the Multifamily Housing program. The realization rate is 62 percent for electric, 62 percent for peak kW, and 98 percent for therms savings.



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**Table 6-13. Residential and Nonresidential Multifamily Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Central air conditioner	171,065	177,574	103.8%
Aerator	280,689	275,524	98.2%
Clothes washer	14,356	10,663	74.3%
Doors and windows	98,698	96,446	97.7%
Energy management system	113,040	81,265	71.9%
Insulation	1,046,932	1,044,248	99.7%
HVAC	842	842	100.0%
Lighting	10,992,802	5,901,272	53.7%
Low-flow showerhead	692,974	679,082	98.0%
Refrigeration	1,858	2,797	150.5%
<b>Total kWh</b>	<b>13,413,257</b>	<b>8,269,713</b>	<b>61.7%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
HVAC	175.4	173.2	98.7%
Aerator	31.5	30.9	98.1%
Clothes washer	1.7	1.6	94.7%
Doors and windows	137.9	139.0	100.8%
Energy management system	6.5	4.8	73.6%
Insulation	24.7	24.0	96.9%
Lighting	2,019.4	1,074.2	53.2%
Low-flow showerhead	77.6	76.1	98.1%
Refrigeration	0.6	0.6	99.0%
<b>Total kW</b>	<b>2,475.2</b>	<b>1,524.3</b>	<b>61.6%</b>



## 6. Summary of Results by Program

Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
HVAC	26,517	21,680	81.8%
Aerator	57,657	57,657	100.0%
Clothes washer	7,092	9,372	132.1%
Doors and windows	34,601	34,601	100.0%
Energy management system	23,328	23,328	100.0%
Insulation	140,201	136,134	97.1%
Water heater	68	68	99.6%
Low flow showerhead	157,288	157,288	100.0%
<b>Total Therms</b>	<b>446,752</b>	<b>440,127</b>	<b>98.5%</b>

Based on the impact evaluation results, the evaluation team made specific recommendations around the calculations for HVAC measures, lighting measures, and documentation, as seen below.

- Modify the EFLHH and EFLHC to be consistent with the ENERGY STAR Central AC and ASHP Excel calculators.
- Modify the cooling and heating degree days (HDD/CDD) for the gas furnaces and gas boilers from locations on the Iowa Environmental Mesonet.
- Document all baseline assumptions and calculations, by project, used to generate program savings values to ensure clarity and to illustrate agreement with stated algorithms.
- Modify the hours of use for CFLs for measures located in the residential units; the analysis indicated that the hours of use were based on common areas rather than in-unit assumptions.

### 6.6.3 Process findings and recommendations

Overall, the evaluation found that Multifamily Housing program has faced several challenges since program inception, and continues to face challenges relating to goal management and program design. However, MidAmerican and the program implementer have made several program changes benefiting the program, and several issues have either already been resolved or are in the process of being resolved. Program staff are currently reassessing program goals and design for the next program cycle, and the program has taken steps to manage participation levels through reducing the attic insulation rebate levels. The program has also focused on implementing comprehensive audits aimed at increasing customer satisfaction and attaining cost-effective energy savings. The program appears to be effective in addressing the split incentive barrier, and program efforts should continue to provide energy efficient solutions to this often underserved market segment.

Much of the challenge ahead lies in defining the program design and implementing the program as designed. Close coordination between the program and implementation staff is imperative to ensure implementation remains aligned with design. In that vein, program goals



## 6. Summary of Results by Program

and metrics should be developed to encourage accountability and align with program impact goals. Encouragingly, all program actors reported general positive working relationships with one another; even trade allies who were unhappy with the recent rebate changes spoke positively about program and implementation staff.

Below, we provide a number of recommendations and corresponding key findings in addition to those discussed above.

**Continue to offer the Multifamily Housing program.** As the multifamily market in general is often underserved compared to single-family and nonresidential segments, the Multifamily Housing program is filling a distinct energy-efficiency need. Evaluation findings suggest the program has and is currently working well to address the split-incentive barrier.

**Agree on program objectives (e.g., prescriptive versus performance) and match to program design; set program goals in light of program objectives and measure mix.** Historically, it has been difficult for the program to match design to actual implementation and performance to goals. As the program matures, MidAmerican Energy staff should agree on what objectives make the most sense for the program based on lessons learned and match program marketing and implementation to this design to avoid confusion in the market. Using information from previous participation years, program staff should also set reasonable and achievable (but not underestimated) goals.

**Consider implementing a pilot multifamily performance program in order to assess demand for and interest in the component.** While program actors felt that a performance program could intimidate the multifamily market, participant findings indicate some interest in a more comprehensive program approach. Given these conflicting findings, and as the program has only implemented one performance project through the program to date, it is difficult to assess true demand for this component. If the program would like to consider a more robust performance option, implementing a pilot multifamily performance program may be a good way to assess the feasibility of including it in the prescriptive program as currently offered.

**Implement a more effective feedback loop to ensure the program implementer is aware of energy savings progress, and the utility is aware of audit backlog.** As is the case with many audit programs, it is often difficult to have a concrete understanding how the audit pipeline will translate into energy savings. MidAmerican Energy and program implementation staff should communicate closely in order to ensure both parties are aware of progress.

**Consider additional opportunities to cross-sell programs.** As an opportunity to cross-sell programs, the Multifamily Housing program could also consider teaming up with the Appliance Recycling program in order to recycle and replace inefficient refrigerators, freezers, and room air conditioners at once.

**Target previous participants for future marketing efforts, as they may benefit from a new audit and non-attic insulation measures.** Given extremely high participation numbers in 2011 and the focus on attic insulation, previous program participants are likely a good group for future program marketing.

**Consider ways to expand the program into smaller towns and more rural areas, as well as condominiums.** Discussions with trade allies and program implementation staff as well as



## 6. Summary of Results by Program

a limited review of tracking data indicates that while the program was very successful in 2011, there is likely still potential for the program, especially among these two groups.

**Review and monitor information captured in the paper reports and tracking system to better align recommendations with tracked information.** The impact evaluation activities found disagreement between the tracking system and paper report files. The on-sites also uncovered differences in reported installations to verified installations. Care should be taken to assess the information from these sources and the accuracy of what is accounted for in the program tracking system (this is an additional evaluation focus as recommended below).

**Additional evaluation research may benefit the program.** Due to several program changes that were made during the year, additional process information may be useful to gather from 2012/2013 participants to assess whether program changes are positively affecting participant participation and satisfaction. Additionally, a more robust market saturation study could be very useful for future program planning to understand (1) the current multifamily market in Iowa, (2) program saturation, and (3) additional sub-segments the program could target. Last, the impact evaluation was limited to an engineering review. The process and impact evaluation findings from this first-year evaluation highlighted the need for additional impact-related activities. These include on-site verification of a statistically selected sample to verify measure installation; metering of common area and in-unit lighting applications to verify hours of use operation documented in the audit reports and deemed in the engineering algorithms, respectively; and reevaluation of the tracking system data against program documents.

### 6.7 NONRESIDENTIAL EQUIPMENT

MidAmerican's Nonresidential Equipment program is a mature prescriptive-rebate program that offers nonresidential customers rebates for installing high-efficiency lighting, heating-and-cooling equipment, motors and variable speed drives, and other measures in new and existing facilities. Two implementation contractors support MidAmerican program staff.

In most cases, the participation process for customers simply involves purchasing qualifying equipment and submitting a rebate application with supporting documentation. Electronic application is not available. Projects with rebates that exceed \$10,000 require installation pre-approval from MidAmerican staff. MidAmerican issues a bill credit instead of a rebate check at a customer's request. On-site inspections occur for roughly 80 percent of projects with a rebate of more than \$10,000 and for all projects that are exclusively lighting upgrades or are self-installed HVAC projects.

Program changes during the past three years mostly addressed motors and variable speed drives but included a decrease in insulation rebates as well. For motors, required annual hours of operation for program qualification decreased from 3,000 to 2,000, and the incentive for new motors increased by \$10 per horsepower. Additionally, a new initiative for motors ("Money for Motors") includes new incentives for the early retirement of inefficient motors and for the trade allies who sell qualifying motors.

#### 6.7.1 Evaluation methods

This section describes the analytic methods and data collection activities implemented as part of the 2011 calendar year (CY2011) evaluation of the Nonresidential Equipment program.



## 6. Summary of Results by Program

Table 6-14 documents the activities that were completed as part of the evaluation. The evaluation focused on estimating and verifying program impacts, including net-to-gross, and providing key feedback on the functionality of program processes.

**Table 6-14. Nonresidential Equipment Program Evaluation Activities**

Nonresidential Equipment Program	
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Review measure algorithms, input assumptions, and the resulting savings values. Complete in-depth desk reviews if necessary (not currently planned).</li> <li>• <b>Tracking system analysis:</b> Confirm that the values in the tracking system are consistent with the expected values, based on the formula and input assumptions provided. The information from the documentation and the customer interview will be reinserted into the engineering algorithm to determine an adjusted savings value. All adjustments will be clearly described.</li> <li>• <b>On-site data collection:</b> The evaluation completed 30 field visits to confirm measure installation rates and to gather customer specific information to use as inputs in the engineering review.</li> </ul>
Other Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted in-depth interviews with the product manager and program implementation contractors.</li> <li>• <b>Participant customer surveys:</b> Completed customer surveys 288 program participants.</li> <li>• <b>Participating trade ally surveys:</b> Surveyed 123 participating trade allies.</li> <li>• <b>Nonparticipating customers:</b> Surveyed 214 nonparticipating nonresidential customers.</li> </ul>

### 6.7.2 Impact findings and recommendations

The evaluation of the Nonresidential Equipment program impacts first included a desk review. Through the desk review, the savings for each project were reviewed for consistency with the algorithms provided for the program as well as reasonableness. The inputs and resulting savings were compared against other TRMs, studies, and secondary documentation as another point of reference for reasonableness. Based on the review, the evaluation team found that the majority of the claimed savings values were reasonable, with few exceptions, which are noted in the following sections.

In addition to the desk review, the evaluation team conducted on-site inspections for 30 sites. Operational differences were identified for several projects, which resulted in adjusted ex-post savings. Table 6-15 presents the impact evaluation results by aggregated measure category. The realization rate is 87 percent for electric, 35 percent for peak kW, and 142 percent for therms savings. The energy and peak demand savings were primarily reduced due to incorrectly referenced baselines for HVAC measures and shell measure savings not accounting for interactive effects with other equipment.



6. Summary of Results by Program

**Table 6-15. Nonresidential Equipment Program Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Lighting	18,585,257	20,183,589	109%
Variable speed drives	9,664,051	4,677,401	48%
HVAC	1,145,777	591,221	52%
Shell	179,730	91,483	51%
Appliance and Other	423,383	429,083	101%
<b>Total kWh</b>	<b>29,998,198</b>	<b>25,972,775</b>	<b>87%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Lighting	3,523.2	2,684.7	76%
Variable speed drives	1,213.1	706.0	58%
HVAC	414.2	326.8	79%
Shell	39.7	13.1	33%
Appliance and Other	5,757.4	58.3	1%
<b>Total kW</b>	<b>10,947.6</b>	<b>3,788.9</b>	<b>35%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
HVAC	112,697	210,205	187%
Clothes washer	1,151	1,151	100%
Other	6,082	6,082	100%
Insulation	67,522	59,419	88%
Doors and windows	437	437	100%
Water Heating	1,712	1,712	100%
<b>Total therms</b>	<b>189,600</b>	<b>279,006</b>	<b>147%</b>

Based on the impact results, the evaluation team made the following recommendations in regards to calculating energy savings.

- Document measure inputs and sources in a central document including calculations and rationale for peak demand savings.
- Adjust lighting baseline savings to reflect current lighting standards for future planning efforts.
- Specify within application form and tracking system lighting hours of use of specific lighting measure installed.
- Modify the inputs for air and water cooled chillers to reflect current baseline and more accurate hours of use.



## 6. Summary of Results by Program

- Ensure the current tracking system is correctly calculating gas heat measures.

### 6.7.3 Process findings and recommendations

Consistent with program theory, the surveyed participants predominantly became aware of the Nonresidential Equipment program through trade allies. Most participating customers do not visit the program website, but those who do find it useful.

Once engaged in the program there are relatively few barriers to participation or claiming projects. Applications are not difficult for participants, and they are satisfied with all aspects of the program and their projects.

Most nonresidential customers are aware of the availability of equipment rebates from MidAmerican. Bill inserts were the most frequently reported source of nonparticipants' awareness of those opportunities; relatively few nonparticipants reported learning of MidAmerican rebates from a trade ally. A large minority of the nonparticipants either saw no barriers to their participation in a MidAmerican program or reported they did not know why they had not participated. The barriers to participation reported by the remaining nonparticipants can be addressed by reaching them with complete program information.

Almost all surveyed trade allies provide rebates through the Equipment program, even if they also work with other programs. However, most of these trade allies were engaged only in the Equipment program, and large minorities of them are not aware of MidAmerican's other nonresidential energy-efficiency programs, especially the new Agriculture program. This presents an opportunity to leverage their contact with customers to a greater extent than occurs now.

Most trade allies think the program increases their sales of high-efficiency equipment. They also think many customers buy high-efficiency equipment for occupant comfort. This perception suggests a marketing opportunity for program promoters.

These trade allies do not see concerns about availability or reliability of rebated equipment as barriers to program participation. However, a barrier that still exists among one third of these trade allies is the belief that the cost of high-efficiency equipment is too high, even with rebates. This belief likely affects the promotion of such equipment by those trade allies.

A number of recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

**Improve communication with, and training of, trade allies.** Trade ally interviews suggest that additional communication and information on MidAmerican programs and offerings would be beneficial. The full report documents specific recommendation for improving communication, training, and marketing support.

**Streamline the rebate application process.** More specifically: include more space on the forms for model and serial numbers, provide electronic applications, and consider giving trade allies a unique ID number so they do not have to repeat their full contact information on each rebate form (and to improve tracking data quality).



## 6. Summary of Results by Program

**Review measures rebated through the program to maximize program influence.** The net-to-gross analysis was completed to inform program design. In general, the net-to-gross results were healthy, particularly for electric measures, driven in part by lighting installations. There are measures, however, where the program may want to consider the value of their offerings in light of the net-to-gross analysis. Examples include dishwashers and freezers, which yielded the lowest ratios in this study (albeit with smaller sample sizes).

### 6.8 SMALL COMMERCIAL ENERGY AUDIT (BUSINESSCHECK)

The Small Commercial Energy Audit program, marketed and referred to in this report as BusinessCheck, offers a free, whole-facility, walk-through, energy audit for buildings up to 50,000 square feet, and free installation of low-cost energy-saving measures. Follow-up activities include formal reports with findings and recommendations for further energy-efficiency improvements, information on rebates available to help implement recommended efficiency projects, and customer check-ins. Since late 2010, a third-party contractor, Franklin Energy, has implemented the program under the direction of a MidAmerican product manager.

During walk-through energy audits, customers may receive immediate cost savings from the installation of water-pipe insulation, faucet aerators, CFLs, LED exit sign retrofits, refrigerated vending machine controllers, and pre-rinse power sprayers for nonresidential dishwashing. Implementation staff who conduct the audits, known as energy advisors, may also offer to install other sector-specific measures to demonstrate other energy-saving technologies.

MidAmerican rebates for efficient equipment can be as much as 70 percent of the installed cost of the improvements. The program offers enhanced rebates for insulation as well as a triple incentive when replacing T12 fluorescent lighting. All rebate options are available through the Nonresidential Equipment and Custom Systems programs, including increased rebates for the early retirement of less efficient motors, as well as rebates for implementing recommendations made during the audit.

#### 6.8.1 Evaluation methods

This section describes the analytic methods and data collection activities implemented as part of the 2011 calendar year evaluation of the BusinessCheck program. Table 6-16 documents the activities the evaluation team completed as part of the evaluation. The evaluation focused on estimating and verifying program impacts, including net-to-gross and providing key feedback on the functionality of program processes.



6. Summary of Results by Program

Table 6-16. Small Commercial Audit Program Evaluation Activities

	Small Commercial Energy Audit (BusinessCheck)
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Reviewed measure algorithms, input assumptions, and the resulting savings values</li> <li>• <b>Tracking system analysis:</b> Confirmed the values in the tracking system are consistent with the expected values based on the formula and input assumptions provided</li> </ul>
Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted in-depth interviews with the product manager and implementation contractors</li> <li>• <b>Participant customer surveys:</b> Completed customer surveys with 153 participants stratified by participation type</li> <li>• <b>Trade ally surveys:</b> Conducted surveys of 23 trade allies with BusinessCheck customers</li> </ul>

6.8.2 Impact findings and recommendations

The savings for the BusinessCheck program were verified through a desk review of the algorithms for consistency with the claimed values as well as reasonableness of the inputs used to determine the savings. Overall, the realization rate was high for kWh and therms savings (99 percent and 98 percent, respectively), and lower for demand savings.

The evaluation team reviewed MidAmerican’s stated algorithms, compared claimed savings against those algorithms, and developed independent calculations. The algorithm framework for each measure were reasonable and when the evaluation team inputted data collected by MidAmerican, the resulting electric impacts were consistent with those reported in the tracking system.

The evaluation did find inconsistencies with savings reported by specific measures where typically the saving do not vary by customer type (e.g., LED exit signs claimed by Nonresidential Equipment and BusinessCheck). Program documentation did not explain the rationale behind this difference, although discussions with MidAmerican staff indicate there should be no difference.



6. Summary of Results by Program

**Table 6-17. BusinessCheck Program Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Doors and windows	33,336	36,087	108.3%
Energy management System	79,226	79,226	100.0%
HVAC	104,708	97,601	93.2%
Insulation	468,351	468,506	100.0%
Lighting	7,205,139	7,037,922	97.7%
Motor	12,153	12,153	100.0%
Other	61,509	61,509	100.0%
Refrigeration	34,470	38,278	111.0%
Water heating	90,442	152,357	168.5%
<b>Total kWh</b>	<b>8,089,335</b>	<b>7,983,641</b>	<b>98.7%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Doors and windows	21.2	22.2	104.8%
Energy management System	8.6	8.6	100.0%
HVAC	49.6	45.8	92.4%
Insulation	37.1	37.1	100.0%
Lighting	1,390.8	1,368.5	98.4%
Motor	1.0	1.0	100.0%
Other	0.2	0.2	100.0%
Refrigeration	3,425.4	6.0	0.2%
Water heating	10.9	9.1	83.5%
<b>Total kW</b>	<b>4,944.8</b>	<b>1,498.6</b>	<b>30.3%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
Doors and windows	10,395	9,832	94.6%
Energy management System	2,117	2,117	100.0%
HVAC	30,993	33,418	107.8%
Insulation	92,719	92,719	100.0%
Other	106	106	100.0%
Water heating	41,155	36,187	87.9%
<b>Total Therms</b>	<b>177,486</b>	<b>174,379</b>	<b>98.2%</b>



## 6. Summary of Results by Program

Based on the impact results, the evaluation team made the following recommendations in regards to calculating energy savings.

- Document measure inputs and sources in a central document including calculations and rationale for peak demand savings; identify measures with different savings and document rationale for differences (e.g., sector-specific variations).
- Adjust lighting baseline savings to reflect current lighting standards for future planning efforts.

### 6.8.3 Process findings and recommendations

The BusinessCheck program experienced a change of implementation contractors at the beginning of 2011. A project backlog at that time, combined with a learning curve, resulted in some delays in data entry and reporting by the new contractor. Nonetheless, the program has worked through those difficulties, and, for 2011, it attained double its projected kWh and therms savings goals.

MidAmerican seeks to market BusinessCheck through trade allies as they promote their goods and services to their customers. Even so, MidAmerican's website was the predominant source of information about the program for the surveyed participants. Trade allies were the third most frequent source of participants' program information after word of mouth. While the website is an important source of information for participants, it is even more important for the surveyed trade allies. Nearly all of them used MidAmerican's website within the past two years, especially to print program rebate forms.

Program information was clear to most surveyed participants. The information clear to the fewest of them was how to apply for rebates. Most trade allies had brochures available for their reference and for their customers' reference.

Almost all of the participants entered the program out of a desire to save energy or money, a large majority participated for the return on investment, and a desire to improve the comfort of the work environment motivated half of them. These participation reasons suggest themes that will resonate with nonresidential customers if used in marketing messages. The responses of trade allies supported participants' reasons for participation. Most trade allies believe MidAmerican rebates increase their sales.

In spite of the project backlog, audits for most customers occur within four weeks of a customer's application, and most audit reports are delivered to customers within two weeks of the audit. Almost half of the surveyed participants reported they did not receive any free direct-install measures during their audits. This is surprising given the importance of direct-install measures to the attainment of the program's savings goals.

Half or more of the surveyed participants reported having implemented one or more of the low-cost, no-cost recommendations made by their auditor or in the audit report. The most common of these recommendations was to install compact fluorescent lighting. Lighting also led the recommendations for equipment upgrades, followed by weatherization recommendations, and those were the most commonly installed categories of measures reported by the surveyed participants.



## 6. Summary of Results by Program

Overall, participants are satisfied with their involvement with the BusinessCheck program. However, they were less satisfied with the time between scheduling and receiving an audit and the time it took to receive audit reports. This finding suggests an opportunity for clearer communication about the timeframes for program activities during initial conversations with customers.

The program is reaching the demographic, namely small businesses, that it is designed to reach. More than half of the surveyed participants' facilities were smaller than 10,000 square feet, and one-third of the participants reported occupying premises under 5,000 square feet. Roughly one-third of the participants were private-sector businesses with facilities used for retail, offices, or the provision of services.

A number recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

**Provide more outreach and training to trade allies.** Even though trade allies understand the program, additional training about customers' motivations for program participation can remind trade allies to emphasize related program benefits in their conversations with customers. Specifically, saving energy and money, their return on investment (which is improved by program rebates), and improved working environments are important motivators to customers. All of these messages can help to overcome the greatest barrier to customers' implementation of recommended energy-efficiency upgrades. That barrier is simply the cost of the upgrades. Also consider more frequent use of email to communicate with trade allies, especially to notify them of training opportunities.

**Find opportunities to communicate program information more effectively to customers.** Timeframes to conduct audits and to receive audit reports are two areas with lower customer satisfaction even though we did not find those timeframes to be unreasonably long. Continue describing anticipated timeframes to customers during initial conversations, perhaps erring on the side of over-estimation. Repeating this information to trade allies can take advantage of their position as an additional avenue to disseminate the information to customers.

### 6.9 NONRESIDENTIAL CUSTOM

Nonresidential Custom Systems (Custom) is a mature program offering financial incentives to nonresidential customers installing equipment or systems not covered by a prescriptive rebate in the Nonresidential Equipment program. The Custom program allows customers to implement new technologies and alternative energy-saving strategies, so it often serves as a testing ground for measures that are eventually incorporated into MidAmerican's prescriptive rebate programs.

A third-party contractor, The Energy Group, implements the Custom program. In addition to trade ally outreach, The Energy Group's specific activities include an initial review of customer applications, which must be signed by the customer, and generating project pre-approval letters and customer self-verification forms, which are sent to MidAmerican to forward to the customer. Customers return self-verification forms to A-TEC for processing rebate payments. All Custom projects require pre-approval. MidAmerican staff computes project payback, and a program fulfillment contractor, A-TEC, processes rebate applications and updates MidAmerican's database.



## 6. Summary of Results by Program

MidAmerican bases incentive levels on the equipment’s energy savings, peak-demand savings, usage profile, and incremental cost. Financial incentives are limited to the lesser of three years’ calculated bill savings or a two-year payback. Projects must have a payback of more than two years to be eligible for incentives through this program.

### 6.9.1 Evaluation methods

Table 6-18 documents the activities that were completed as part of the evaluation. The evaluation focused on estimating and verifying program impacts and providing key feedback on program processes.

**Table 6-18. Nonresidential Custom Equipment Program Evaluation Activities**

Nonresidential Custom Equipment Program	
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Desk and engineering review:</b> Review a sample of 30 project files to assess measure algorithms, input assumptions, baseline conditions, and the calculated savings values.</li> <li>• <b>On-site data collection:</b> Completed 30 on-site visits and metering.</li> </ul>
Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conduct in-depth interviews with the product manager and program implementation contractors.</li> <li>• <b>Participant customer surveys:</b> Completed customer surveys with 18 program participants.</li> <li>• <b>Participating trade ally surveys:</b> Surveyed 168 trade allies, 24 of which had customers that participated in the Custom program.</li> </ul>

### 6.9.2 Realization rates

The evaluation of the Nonresidential Custom program impacts first included a desk review. In the desk review, the savings for each project were verified for both technical accuracy and reasonableness of approach. In addition to the desk review, on-site inspections were completed for 30 sites. Based on the on-site visits, operational differences were identified in several projects, and adjusted savings values were developed.

Although the individual projects realization rates varied, overall the electric energy and demand program gross savings realization rates were 97 percent and 91 percent (Table 6-19). Nearly half of the projects were adjusted by 15 percent or less. This indicates a high degree of both technical accuracy and understanding of customer behaviors that would influence savings. Changes that were made were categorized as either specification or operational adjustments.

Two of the five gas projects with the largest adjustments to savings were EMS projects. In both cases, the claimed gas savings were not realized based on the billed data. The expected control strategies were found to be installed; however, it is likely that the customer was manually controlling equipment prior to the EMS installation, which reduced the energy savings potential.



## 6. Summary of Results by Program

**Table 6-19. Custom Program Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
All Projects	9,178,022	8,902,432	97%
<b>Total kWh</b>	<b>9,178,022</b>	<b>8,902,432</b>	<b>97%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
All Projects	1,110.2	1,009.4	91%
<b>Total kW</b>	<b>1,110.2</b>	<b>1,009.4</b>	<b>91%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
All Projects	130,535	59,077	45%
<b>Total therms</b>	<b>130,535</b>	<b>59,077</b>	<b>45%</b>

Based on the results from the impact evaluation, the Tetra Tech evaluation team makes the following recommendations regarding energy savings calculations and verification.

- Review existing system operation on EMS projects to ensure savings levels are reasonable and educate customers on the impact of manually controlling equipment.
- Compare expected savings to customer billed data.

### 6.9.3 Process findings and recommendations

All key findings indicate that the Custom program is operating efficiently and effectively. In fact, the program worked so well in 2011 that it exceeded its savings goals.

Customers and trade allies alike reported satisfaction with the program, its incentive levels, and rebate processes including the project design-review process. However, both participants and trade allies expressed dissatisfaction with the amount of time required for design review and project pre-approval. This also suggests an opportunity for trade ally and customer education.

Trade allies with customers who participate in the Custom program understand it and have the ability to guide their customers to and through the program. As with the Nonresidential Equipment program, most trade allies in the Custom program think the program increases their sales of high-efficiency equipment. They also believe many customers buy high-efficiency equipment to improve occupant comfort in their facilities. Participants' expressed reasons for program participation support those trade ally perceptions, and suggest a marketing opportunity for program promoters.

Program training sessions and meetings have also had limited use, typically once a year. Fewer than half of the surveyed trade ally firms reported attendance at one of those events. Nonetheless, trade allies whose customers participate in the Custom program understand the program either from the website information, or more likely, from trade ally outreach conducted by the program implementer and from previous program experience.



## 6. Summary of Results by Program

A number recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

- To strengthen trade ally marketing of the BusinessCheck program, provide more outreach and training to trade allies.
- To fill gaps in customers' understanding of the Custom program and to strengthen trade allies' ability to support their customers through program participation, consider using opportunities presented by trade-ally training and information to emphasize the program aspects that are least clear to customers.
- To build on a customer's reasons for program participation, emphasize those reasons in program marketing.

### 6.10 COMMERCIAL NEW CONSTRUCTION

MidAmerican's Commercial New Construction program is a mature program designed to increase adoption of energy-efficient strategies in new or substantially remodeled nonresidential buildings. Incentives are available to help offset higher initial costs associated with the design and installation of energy-efficient options. The program offers energy design assistance, design team participation incentives, construction incentives, and energy verification.

The program tailors its services and incentives differently, depending upon the size and complexity of a building, and upon the formality of the building-design process. Larger projects (typically 50,000 square feet or more) with more time to consider efficiency options receive extensive analyses of dozens of energy-efficiency strategies for the building as well as detailed design specifications for measures selected. Smaller projects (typically between 10,000 and 50,000 square feet) tend to have fewer decision-makers and to move faster, so design assistance, while complete, becomes more compressed. Building size, however, is not the main driver. The complexity of building design, depth of energy efficiency goals, and speed of design schedule, among other things are factors in determining the best approach.

Since 2009, the program design includes four specific tracks, each providing a different level of service or targeting a different type of participant:

- Custom Plus track targets customers who want to pursue nationally certified market-transformation standards such as Leadership in Energy and Environmental Design (LEED). These customers typically target energy savings of 40 percent or better.
- Custom track targets customers who want to pursue energy-efficiency strategies that could provide usage savings of at least 15 percent.
- Quick Energy Design track, the program's fast-track component, targets customers with simpler building designs and faster construction schedules.
- Volume Build track targets customers who want to construct identical facilities in multiple locations.



## 6. Summary of Results by Program

### 6.10.1 Evaluation methods

Table 6-20 documents the activities that were completed as part of the evaluation. The evaluation focused on estimating and verifying program impacts and providing key feedback on program processes.

**Table 6-20. Commercial New Construction Program Evaluation Activities**

	Nonresidential Custom Equipment Program
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Desk and engineering review:</b> Review a sample of 29 project files to assess measure algorithms, input assumptions, baseline conditions, and the calculated savings values. The desk reviews included eQuest modeling.</li> <li>• <b>On-site data collection:</b> Completed 21 on-site visits and metering.</li> </ul>
Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conduct in-depth interviews with the product manager and program implementation contractors.</li> <li>• <b>Participant customer surveys:</b> Completed customer surveys with 11 program participants.</li> <li>• <b>Participating design trade ally surveys:</b> Surveyed 21 design team trade allies.</li> </ul>

### 6.10.2 Impact findings and recommendations

The evaluation of the Commercial New Construction program impacts first included a desk review of 17 electric projects and 12 gas projects. The desk review included a review of all available information. It should be noted that all projects were completed in eQuest. Due to concerns about the proprietary nature of their modeling approach, the simulation input files were not provided, nor was access given to the models themselves. However, simulation output files were provided as well as a modeling approach summary document.

In addition to the desk review, on-site inspections were completed for all sites. During the on-site inspection, the installed equipment was inspected. Additionally, operation characteristics, such as schedules, temperature set points, occupancy patterns, and other parameters were collected through a combination of inspection, data collection from EMS or BMS systems, as well as customer interviews. Based on all information collected eQuest models were developed to determine the evaluation savings levels.

Table 6-21 documents the calculated realization rate which captures the impacts of these differences; the realization rates are 43 percent for kWh, 27 percent for kW, and 68 percent for therms savings reported by MidAmerican. Upon review of the original and the evaluation models, two primary issues resulted in the vast majority of the savings differential: baseline system selection and operation.



## 6. Summary of Results by Program

**Table 6-21. Commercial New Construction Program Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
All Projects	25,315,484	10,804,544	43%
<b>Total kWh</b>	<b>25,315,484</b>	<b>10,804,544</b>	<b>43%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
All Projects	6,162.0	1,650.5	27%
<b>Total kW</b>	<b>6,162.0</b>	<b>1,650.5</b>	<b>27%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
All Projects	397,279	270,109	68%
<b>Total therms</b>	<b>397,279</b>	<b>270,109</b>	<b>68%</b>

In regards to the baseline selection, based on discussions with the implementer, they determined that for the purpose of determining the program savings, the decision had been made to “set” the code used to determine savings for the duration of the project at the initial customer meeting. The intent of this was to provide stability for the customer and allow the customer to plan against established incentives and savings targets. However, due to the nature of new construction projects and the time associated with these projects, for approximately half of the projects reviewed, the building code that was referenced in the design phase was not the current code at the time of construction. Typically, this code-lag was limited to one code cycle; however, in some cases projects had delays of five years or more, resulting in multiple code changes.

Based on the impact evaluation findings, the team makes the following recommendations related to savings calculations and verification.

- Adjust baselines to match current building codes; develop parameters around the timeframe for which those building codes are applicable in the planning and verification process.
- Use ASHRAE 90.1 Appendix G to determine baseline HVAC system types.
- Ensure hours of operation are reasonable based on customer use of the equipment.
- Conduct quality QA/QC and M&V on completed projects.

### 6.10.3 Process findings and recommendations

The Commercial New Construction Program is a relatively mature program that is operating well. This statewide program, with a single implementer, The Weidt Group, who provides the program in multiple utility territories, reduces confusion in the market and likely benefits from an economy of scale. Program promotional efforts, where MidAmerican targets customers and the implementer focuses on the design community, also work well. The program’s four tracks are designed to meet different project needs. Participation in the Quick Design and



## 6. Summary of Results by Program

Custom Plus tracks is increasing. MidAmerican and The Weidt group are adjusting marketing to address identified sectors with higher potential savings.

Project completion rates remained roughly the same from 2009 through 2011. However, there was a shift during that time to more projects through the Custom Plus track and many more projects through the Quick Energy Design track. Both of those increases were at the expense of participation in the Custom track.

For the 2011 program year, the program overspent its budget yet fell substantially short of achieving its targeted savings in terms of both kWh and therms. Implementation staff provided an explanation for the program's under performance that year, namely, a record number of new participants in 2011, resulting in higher-than-anticipated enrollment expenses, a drop in average building size for new buildings that began in 2009, and a greater number of projects than expected that were "on hold" in 2010 remaining on hold in 2011. The decrease in building size and increase in project delays likely resulted from the economic recession. There is no reason to doubt the impact of those circumstances. Nonetheless, it is notable that most of the nonresidential programs had a similar experience in 2011, suggesting global factors such as misconceptions underlying the planning or budgeting assumptions for nonresidential energy efficiency programs.

Interviewed architects reported offering the program to all customers with eligible projects. Most of their customers are interested in the program. The customers who decline to participate in the program do so because they believe it will increase their project's timeline or costs.

Participants are generally satisfied with their program experiences. As one indication of their satisfaction, all interviewed participating customers would recommend the program to others.

Project designers are also satisfied with the program. They identified multiple features of the program they like, including the program's design and construction incentives, the additional energy-saving building-feature options brought to the attention of their clients through the project-design process, and the additional information the program provides to their clients about measure costs and benefits. The designers also find the program processes timely. Some interviewed architects expressed interest in additional program training to obtain better understanding of program offerings.

Iowa's adoption of a new energy code, likely to be effective in 2014, presents a challenge to the program's ability to maintain and increase cost-effective savings. Without changes in builders' standards, savings from new construction will drop approximately one to two years following that date. The implementer is approaching this challenge through a greater emphasis on integrated design and by staying current on the costs, benefits, and modeling of new technologies such as day-lighting controls.

A number of recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

**Provide additional outreach and training to trade allies.** Even though trade allies understand the program, additional training about customers' motivations for program participation can remind trade allies to emphasize related program benefits in their conversations with customers. Specifically, saving energy and money, their return on



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investment, which is improved by program rebates, and improved working environments are important motivators to customers. All of these messages can help to overcome the greatest barrier to customers' implementation of recommended energy-efficiency upgrades. That barrier is simply the cost of the upgrades. Also consider more frequent use of email to communicate with trade allies, especially to notify them of training opportunities.

**Emphasize program participation benefits in program marketing.** Among other reasons, customers make improvements to their facilities and equipment to improve occupant comfort and because the rebates bring the return on their investment to a more appealing level. Consider using these messages in program marketing efforts.

### 6.11 NONRESIDENTIAL ENERGY ANALYSIS

MidAmerican designed the Nonresidential Energy Analysis (NEA) program to encourage large commercial and industrial customers to complete comprehensive, facility, energy-efficiency improvements in a series of projects identified in an Energy Efficiency Action Plan (EEAP or Action Plan). Eligibility is limited to customers with facilities 50,000 square feet or larger, although exceptions occur for complex, smaller facilities. All cost-effective energy-efficiency projects potentially qualify for the program, which allows program flexibility to address unique situations.

A third party program implementation contractor, Nexant, implements the NEA program. Nexant conducts the program's walk-through energy audits, technical reviews, and all day-to-day project and program management activities. Once a customer's application is approved, Nexant conducts a free walk-through Energy Assessment (often referred to as walk-through audit) to identify energy-saving opportunities, both small and those that require capital investments. The audit report also identifies areas where a more Detailed Study is recommended to address an efficiency opportunity more thoroughly. KAMs deliver the written audit report to their customers. The program offers co-funding to participants for Detailed Studies, usually of specific energy-using systems or equipment.

Participants are encouraged to get a free Energy Management Assessment. This assessment addresses the organization's energy management practices. The resulting report summarizes methods to improve management of energy usage.

In response to an insufficient number of customers moving toward comprehensive upgrades, in early 2006 MidAmerican added an *EfficiencyPartners*<sup>®</sup> track to the program. Customers become *EfficiencyPartners* by developing and signing a commitment to complete a comprehensive Energy-Efficiency Action Plan (EEAP). *EfficiencyPartners* are eligible to receive technical assistance, in addition to project financial incentives. The technical assistance is targeted to activities (such as identifying vendors and reviewing bids) that will assist participants in completing projects in the Action Plan.

The NEA program provides financial incentives for energy efficiency projects identified by the Walk-through Audit and Detailed Studies. NEA incentives are calculated as four years of customer energy-cost savings, or the amount required for the customer to realize a one-year payback, whichever is lower. Some participants chose to complete NEA identified projects through the Equipment or Custom programs for smaller projects to expedite the process, despite lower incentives. Savings from these projects are credited to NEA.



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MidAmerican paid the full incentive for each project upon project verification (if required) for the NEA, Equipment, and Custom programs until 2011. Beginning in 2011, the NEA program changed its incentive structure to encourage greater implementation of multiple projects. In the new incentive structure, MidAmerican provides *EfficiencyPartners* an incentive equal to the incentive from the Equipment or Custom program upon project completion. When the *EfficiencyPartner* completes a subsequent project from their Action Plan, NEA provides a supplemental incentive so the total incentive amount for the prior project is equal to the full NEA incentive described above. For each subsequent project completed, the immediately prior project receives a supplemental incentive. The last project completed from the Action Plan receives the full incentive upon completion and verification.

Only *EfficiencyPartners* are eligible for these supplemental incentives, and only for projects identified in their Action Plan. NEA participants who are not *EfficiencyPartners* remain eligible for MidAmerican’s other nonresidential programs, such as Equipment and Custom. NEA claims savings from projects completed through these programs that were identified in the Walk-through Audit or a Detailed Study.

### 6.11.1 Evaluation methods

This section describes the analytic methods and data collection activities implemented as part of the 2011 calendar year evaluation of the Nonresidential Equipment program. Table 6-22 documents the activities we completed as part of the evaluation. The evaluation focused on estimating and verifying program impacts, including net-to-gross, and providing key feedback on the functionality of program processes.

**Table 6-22. Nonresidential Energy Analysis Program Evaluation Activities**

Nonresidential Energy Analysis Program	
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Tracking system analysis:</b> Confirmed that the values in the tracking system were consistent with the expected values.</li> <li>• <b>Desk and engineering review:</b> Reviewed a sample of 44 project files to assess measure algorithms, input assumptions, baseline conditions, and the calculated savings values. Completed additional follow-up interviews with Nexant and desk analysis to identify discrepancies with tracking data and project files.</li> </ul>
Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted in-depth interviews with the program staff (five interviews) and Nexant (three interviews).</li> <li>• <b>Key account manager (KAM) interviews:</b> Completed five in-depth interviews with KAMs.</li> <li>• <b>Participant customer surveys:</b> Completed 69 telephone and web surveys with participating customers.</li> <li>• <b>Study provider surveys:</b> Completed telephone and web surveys with 24 Detailed Study providers</li> </ul>



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### 6.11.2 Impact findings and recommendations

To complete the impact evaluation, the evaluation team requested project files from MidAmerican. The project files compared with the tracking system raised additional questions from the impact evaluation team and identified a need for further documentation. Subsequently, the team engaged in follow-up discussions with Nexant to receive further clarification on the issues identified.

The evaluation team verified the savings for the Nonresidential Energy Audit through a desk review of the project files for consistency with the claimed values, reasonableness of the inputs used to determine the savings, and calculation methodologies. As Table 6-23 shows, the realization rates for this program are high (97 percent for kWh, 105 percent for kW, and 116 percent for claimed therms savings).

**Table 6-23. Nonresidential Energy Analysis Program Ex-ante and Ex-post Impacts**

Measure Category	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
All Projects	23,629,367	22,913,398	97%
<b>Total kWh</b>	<b>23,629,367</b>	<b>22,913,398</b>	<b>97%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
All Projects	2,347.6	2,471.3	105%
<b>Total kW</b>	<b>2,448</b>	<b>2,471</b>	<b>105%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
All Projects	50,607	58,249	115%
<b>Total therms</b>	<b>50,607</b>	<b>58,249</b>	<b>115%</b>
Measure Category	Ex-ante Gross (Peak Therms)	Ex-post Gross (Peak Therms)	Peak Therms Realization Rate
All Projects	592.2	691.1	116%
<b>Total peak therms</b>	<b>592.2</b>	<b>691.1</b>	<b>116%</b>

As indicated by the relatively high realization rates, the evaluation team found the calculation methodologies were reasonable and supported by engineering standard practices and the provided documentation. Electrical energy and demand savings fell within five percent of the ex-ante values. Gas energy and demand savings increased 15 percent (this increase is largely due to one project). However, it should be noted that due to the nature of a desk review changes in operation differences will not be reflected. Additionally, projects with poor documentation may have insufficient information to accurately develop adjusted savings values. We recommend on-site data collection be completed for this program as a next evaluation activity.



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### 6.11.3 Process findings and recommendations

The NEA program is complex, with many steps, forms, processes, and people involved. The program's Operations Manual, although somewhat out of date, is exemplary in its detail and comprehensiveness. Program staff have stayed focused on the program's "whole facility" approach and have made multiple program modifications to meet that objective.

The program is not meeting goals while exceeding program budgets. Nexant and MidAmerican are actively pursuing approaches to increase project implementation and program participation in order to meet program goals. It is not clear these approaches will be sufficient to meet the program cycle goal by the end of 2013.

KAMs are essential to program marketing and delivery. This approach works well in that KAMs have existing relationships with customers and guiding customers through the program is a natural extension to KAMs' other responsibilities. Unfortunately, this responsibility is a small component of their job. They have no incentive, beyond customer satisfaction, to recruit participants, nor are they accountable for meeting program goals. In addition, they do not have direct access to the EEMIS database and rely on weekly status reports to view the status of their customer's action-plan progress.

KAMs are inconsistent in whom they target for program participation. The inconsistency is problematic in that individual KAMs decide whom to target, rather than based on program strategies. For example, some KAMs target customers with in-house staff who have the time to handle the program's demands. This targeting, however, may preclude participation by customers who need the financial and technical assistance provided to *EfficiencyPartners* to make wanted energy-efficiency improvements.

The program has many processes, with most requiring submission of paperwork subject to Nexant and MidAmerican review and approval. The number of forms (and required information), as well as the process, delays project implementation. Participants are completing much of the paperwork themselves and do not find it simple. They may be unaware of the technical assistance available to *EfficiencyPartners*.

Participants often wait for approval or respond to Requests for Information that feel burdensome and delay project implementation. These processes may hinder further project implementation; some believe customers do not want to repeat the participation process once they have completed a project, or will do so only to receive a supplemental payment.<sup>11</sup>

Detailed studies are one of the trouble spots in the program. Some stakeholders report inconsistent quality in the detailed studies, with lower quality studies subject to delays. Study providers are unclear about the expectations and want training to understand how the program works, and to obtain clarity on program expectations for the studies. The study providers have relatively low satisfaction with the program but appear motivated to stick with it because of the business opportunities it can provide them.

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<sup>11</sup> MidAmerican and Nexant have implemented some strategies to promote completion of NEA-identified projects, and they are working on other strategies. Any efforts to streamline program processes address this issue.



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The evaluation team examined extracts of the Nexant and EEMIS databases. We found the EEMIS to be missing links to data that would allow MidAmerican, for example, to independently assess program uptake and other project information. We believe that further review of these databases is needed to identify opportunities for improved communication, efficiency, and transparency.

A number recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

**Clarify in the Operations Manual who receives credit for savings when an NEA participant receives incentives through another MidAmerican program.** Impact-related evaluation activities and follow-up interviews with program staff identified that a customer is flagged as an NEA participant after they participate in the NEA program. The impact evaluation team identified flagged installations that did not have any related audit or detailed study documentation. These installations were completed through the Nonresidential Equipment or Custom program, and savings were claimed by NEA. MidAmerican staff report that the opposite has occurred, that NEA identified projects completed through the Nonresidential Equipment or Custom program were not credited to NEA. These misattributions of savings are due, in part, to the lack of a systematic way for other programs to identify NEA participants.<sup>12</sup> There were also no clear guidelines on how long NEA gets credit for project savings and whether it is for all customer projects at the NEA site or only identified projects. We recommend that the Operations Manual clearly delineate the criteria for NEA receiving savings credit. Two suggestions are that the project or installation be directly identified in the walk-through audit, detailed study, or Action Plan, and that the project be completed within a specified timeframe (e.g., five years).<sup>13</sup>

**Establish clear, written guidelines and examples of quality documents for Audit Reports, Action Plans, and Detailed Studies.** These documents are subject to technical review that can lead to project delays and program attrition. Inconsistency in these documents, as evidenced from interview responses and evaluation review, suggest a need for clearer documentation (and explanation) and explicit direction on what a final document must contain.

**Provide incentives for KAMs to increase customer participation and project completion.** Per program design, KAMs are the primary sales force for NEA, as well as other nonresidential programs offered by MidAmerican. Given the importance of KAMs to the NEA program, MidAmerican might consider including NEA program performance metrics (e.g., customers enrolled, projects completed) in KAM goals. This recommendation is also a cross-cutting issue and relevant Custom and Equipment.

**Increase participant and KAM awareness of technical services available to EfficiencyPartners.** The program offers technical assistance to *EfficiencyPartners*, as outlined in the Action Plan. There is some evidence that not all *EfficiencyPartners* are aware of the technical services available to them. Consider printing out the list of technical services

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<sup>12</sup> Starting in June 2012 the implementers of MidAmerican's other nonresidential programs (ATEC, Franklin Energy, and The Energy Group) were sent a list of NEA participants. This list is updated and provided quarterly.

<sup>13</sup> MidAmerican reports that as of mid-2012 they are using a five-year limit.



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available and providing them to the KAMs and to the participants to increase awareness. This may reduce some of the dissatisfaction associated with filling out forms and going through the process.

**Include performance metrics in Nexant's contract such as percentage of audits resulting in projects.** The program implementation contractor is responsible for delivering the NEA program. Nexant's contract, however, does not include any program performance metrics. Perhaps one of the most important metrics to be included in the program design, and potentially Nexant's contract, is the percent of participants that result in projects based on recommendations made through the audit and reporting process. The program goals and cost-effectiveness is based on those savings being realized. Because savings may be longer term and upcoming, the metrics could be recognized as well as actual savings.

**Use historical data to estimate per-energy-unit planning assumptions.** The program has collected much data during the past and current program cycles to better estimate the incentive costs-per-unit savings. Although the program may change incentive structures, historical data exist to estimate incentives' per-unit-savings even when incentives are tied to projects and savings.

**Continue to conduct targeted process and impact evaluations for this program.** NEA is a complex program. To meet MidAmerican's reporting and filing needs, the process evaluation focused on the most critical issues identified through the planning process and completed verification and desk review efforts in lieu of on-sites. Insufficient data were not readily available to complete on-site visits within the timeline. The evaluation approach addressed the majority of the research objectives and successfully identified program issues. In some cases, however, the research did not go deep enough to fully identify the root causes and develop specific recommendations. To fill these gaps we recommend further evaluation efforts include, to a greater extent, the following activities: longitudinal tracking data analysis, in-depth interviews with program participants, Study Providers, and program drop-outs, and on-site verification and metering.

### 6.12 AGRICULTURE

The MidAmerican Agriculture program is relatively new. Recognizing the unique requirements of agricultural facilities, in 2011 MidAmerican separated energy efficiency services and rebates for these facilities from other programs. As a separate program, Agriculture is intended to increase the number of energy efficiency rebates among agricultural customers and to expand agricultural trade ally involvement in MidAmerican's energy efficiency efforts. The Agriculture program provides for free on-site energy audits. Follow-up activities include formal reports with findings and recommendations for further energy-efficiency improvements, information on rebates available to help implement recommended energy efficiency projects, and follow-up contact with customers. A third-party contractor, Franklin Energy, implements the program under the direction of a MidAmerican product manager.

As with the BusinessCheck program, the Agriculture program offers all rebate options available through the Nonresidential Equipment and Custom Systems program, including increased rebates for the early retirement of less efficient motors, and rebates for implementing recommendations made during the energy audit.



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### 6.12.1 Evaluation methods

Table 6-24 documents the activities we completed as part of the evaluation. The evaluation focused on estimating and verifying program impacts and providing key feedback on the functionality of program processes.

The evaluation team conducted reviews of the engineering algorithms documented by MidAmerican for reasonableness. Both the inputs and the resulting savings were assessed as part of this evaluation. We also reviewed the Illinois TRM to assess potential variations in inputs and methods from those implemented in Iowa.

**Table 6-24. Agriculture Program Evaluation Activities**

Activity	Residential Equipment Program
Impact Evaluation Approach	<ul style="list-style-type: none"> <li>• <b>Engineering review:</b> Reviewed measure algorithms, input assumptions, and the resulting savings values. The input assumptions and resulting savings values were reviewed and compared to expected values based on the specific measures implemented under the Agriculture Program. The evaluation reviewed 100 percent of 2011 agriculture projects.</li> <li>• <b>Tracking system analysis:</b> Confirmed that the values in the tracking system are consistent with the expected values, based on the formula and input assumptions provided. The information from the documentation and the customer interviews were used to adjust savings values for the evaluation findings.</li> <li>• <b>On-site data collection:</b> Completed 13 field visits to confirm measure installation rates and to gather customer specific information to use as inputs in the engineering review.</li> </ul>
Other Primary Data Collection Supporting Process and Impact Evaluations	<ul style="list-style-type: none"> <li>• <b>Program staff interviews:</b> Conducted in-depth interviews with seven MidAmerican and program implementation staff.</li> <li>• <b>Participant customer surveys:</b> Completed 12 customer surveys across a random sample of the population of program participants, per measure or project type. Interviews were conducted over the phone, and collected process and impact-relevant information.</li> <li>• <b>Participating trade ally surveys:</b> Conducted one in-depth interview with a participating trade ally to identify motivators and satisfaction with program participation.</li> </ul>

### 6.12.2 Impact findings and recommendations

Algorithms, audits, and database information were reviewed to assess the underlying assumptions used by the program to develop savings estimates and to inform recommendations for potential changes for future program years. The evaluation team also conducted on-site visits to verify measure installation and baseline conditions.

Table 6-25 presents the impact results of the Agriculture program. The realization rate is 28 percent for electric, 25 percent for peak kW, and 126 percent for therms savings. The evaluation team identified a few areas that negatively impacted the verified gross results for 2011. The two measures that had the greatest impact on the verified savings were VSDs and lighting. In regard to the VSDs, the measures were rebated by one customer and found to be either in storage or not in use and installed on an application that resulted in no savings.



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As the 2011 year was essentially a pilot program year for the Agriculture program, and most reductions were related to one site, we recommend the evaluation review this program in-depth in subsequent years.

**Table 6-25. Agriculture Program Ex-ante and Ex-post Impacts**

Measure Category <sup>14</sup>	Ex-ante Gross (kWh)	Ex-post Gross (kWh)	kWh Realization Rate
Lighting	206,107	108,100	52%
Variable speed drives	247,654	0	0%
Grain drying	50,951	31,607	62%
Other	5,737	5,641	98%
<b>Total kWh</b>	<b>510,449</b>	<b>145,348</b>	<b>28%</b>
Measure Category	Ex-ante Gross (kW)	Ex-post Gross (kW)	kW Realization Rate
Lighting	39.3	20.5	52%
Variable speed drives	46.2	0	0%
Other	0.7	0.7	97%
<b>Total kW</b>	<b>86</b>	<b>21</b>	<b>25%</b>
Measure Category	Ex-ante Gross (Therms)	Ex-post Gross (Therms)	Therms Realization Rate
Other	1,142	1,435	126%
<b>Total therms</b>	<b>1,142</b>	<b>1,435</b>	<b>126%</b>

Based on the impact results, the evaluation team made the following recommendations in regards to calculating energy savings.

- Adjust lighting baseline savings to reflect current lighting standards.
- Use a deemed hours of use assumption for prescriptive lighting and/or develop a process to verify customer reported hours of use.
- Develop agriculture-specific algorithms for variable speed drives and verify applications particularly if they are self-installed measures.
- Develop algorithms or standard analysis specific to grain drying projects.

### 6.12.3 Process findings and recommendations

Because the Agriculture program is a relatively new program, there has been limited outreach to trade allies or customers, and insufficient customer participation and results to provide a

<sup>14</sup> The “other” category includes four projects—one wall insulation, one attic insulation, one residential refrigerator, and one dishwasher. The appliance projects’ savings are reflected in electric “other” measures, while the insulation projects’ savings are reflected in therm “other” measures.



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robust evaluation of the program's effectiveness. Nonetheless, it is noteworthy that all of the surveyed agricultural participants were satisfied with all aspects of the program. This likely reflects their satisfaction with the BusinessCheck program, from which the Agriculture program was separated at the end of 2010.

Implementation staff enters customer application data into their own proprietary database. At the time of our interviews, that database was not set up as a customer or project-tracking tool. In October 2011, MidAmerican's EEMIS database became available to the Agriculture program.

The implementer noted a customer data-access issue. The implementer cannot determine whether a customer qualifies for the program while speaking to the customer on the phone. Because customer data is remote and takes time to download, the implementer does not have that ability. Instant qualification would allow the implementer to direct a customer to the correct program at the time of the customer's call.

The implementer is working with MidAmerican to improve the interface between the implementer's data and MidAmerican's data for a given customer to provide more immediate direction to customers about appropriate program opportunities. The implementer is also working internally to improve its ability to identify customers whose projects appear to be stalled to allow appropriate follow-up.

A number of recommendations were made related to program design and delivery. A sample of these recommendations are listed below.

**To increase program participation, MidAmerican Energy and the implementation contractor should undertake a vigorous marketing effort targeted at agricultural customers.** Components of such an effort could include easier website access to Agriculture program-specific information, including case studies of successful agricultural energy efficiency upgrades. Consider periodically focusing marketing, and especially case studies, on particular customer types such as grain dryers, dairy farms, etc. Also consider creating an explicit definition of an agricultural operation or facility that might exclude otherwise residential facilities with only incidental animal husbandry or gardening activities.

**Continue efforts to expand and integrate data tracking.** Specifically, continue the efforts to allow the implementer access to customer account numbers to provide the opportunity for the implementer to give customers immediate references to appropriate programs and offerings. Also, continue the efforts to provide customer and project tracking capability to the databases.

**Provide timely feedback about the effectiveness of this new program and the efforts to improve its databases.** Consider conducting another process and impact evaluation early in 2014 that focuses on customers who enrolled in the program in 2011 through 2013.

**Develop a larger program with key market segmentation.** For 2011, the adjusted savings are low, but reflect a pilot program and the challenges that small populations of program participants can bring. A larger program will provide for a more diverse portfolio, and could ultimately reduce risk to the energy savings impacts as long as algorithms and program processes capture savings in a manner specific to agriculture markets. Agriculture energy loads are diverse, despite being lumped into a single program. By segmenting the market and



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trade ally relationships, the program would be able to design programs around the needs and market structure of each agriculture segment, targeting the best opportunities and evolving the program over time to market response and collecting data that allows for segment-specific calculations.