Evaluation of Illinois Energy Now Public Sector Natural Gas Boiler Tune-Up Incentives Program

June 2012 through May 2013

Prepared for:
Illinois Department of Commerce Economic Opportunity

Prepared by:

ADM Associates, Inc.
3239 Ramos Circle
Sacramento, CA 95827
916.363.8383

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Contact:

Donald Dohrmann, Ph.D., Principal
775.825.7079
dohrmann@admenergy.com

Prepared by:

Crystal Jewett
916.363.8383
crystal@admenergy.com

Jeremy Offenstein, Ph.D.
916.363.8383
jeremy@admenergy.com

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Executive Summary

This report presents the results of the impact and process evaluations of the custom and standard incentive components of the Public Sector Natural Gas Boiler Tune-Up (Boiler Tune-ups) Program that DCEO offers to its non-residential customers. This report presents results for activity during the period from June 2012 through May 2013, defined as natural gas program year 2 (GPY2).

Data for the study were collected through review of program materials, and interviews with DCEO staff members, program implementation contractor staff members, program participants, and contractors. The main features of the approach used for the evaluation are as follows:

- An analytical review of program measures was performed to verify gross savings estimates.
- The estimation of free ridership and net program savings was based on participant decision maker survey responses.
- Relevant DCEO and University of Illinois at Chicago Energy Resources Center (ERC) program implementation staff members were interviewed to obtain information for the process evaluation.

The realized gross energy savings of the Boiler Tune-ups Program during GPY2 are summarized in Table ES-1. During this period, realized gross energy savings totaled 851,487.89 therms, making the gross realization rate for the program 106%. The net-to-gross ratio for the program is 95%, and net realized natural gas energy savings totaled 809,345.12 therms.

Table ES-1. Summary of Gross Therm Savings for Boiler Tune-ups Program

Utility	*Expected Therm Savings*	*Realized Gross Therm Savings*	*Gross Realization Rate*	*Realized Net Therm Savings*	*Net to Gross Ratio*
Ameren	644,861.42	638,397.31	99%	614,558.94	96%
Nicor	87,634.08	100,219.82	114%	91,376.36	91%
Peoples	61,943.82	102,373.33	165%	93,536.65	91%
North Shore	9,283.79	10,497.43	113%	9,873.17	94%
Total	803,723.11	851,487.89	106%	809,345.12	95%

The following presents a selection of key findings from the program evaluation:

- **Modest Increase in Participation:** During GPY2, the number of program projects completed increased from 47 to 53. The size and scope of the projects, however, has decreased from GPY1. Consequently, realized therm savings were lower in GPY2 than in GPY1. Expected therm savings from GPY1 totaled 2,097,276.81, while GPY2 expected therm savings totaled 803,723.11.
- **Most Participants Satisfied with the Program:** The majority of survey respondents reported that they were satisfied with the program. Participants were most satisfied with the quality of the contractors' work and least satisfied with the time taken to receive rebates and

the effort required for the application process. The lower level of satisfaction with the elapsed time until rebates were received was likely due to issues with the program budget that resulted in delays in the processing of rebates. At one point during the program year, the program exceeded its budget and a request for additional funds was made. The time required to process the additional request resulted in delayed rebate payments.

Aside from the issues noted with receiving rebates, the program operated well from the participants' perspective. All of the respondents reported that the efficiency improvements met or exceeded their expectations. None of the participants reported that there were problems with the application process, the project implementation, or the work performed by their contractor.

- **Contractors are Satisfied with the Program:** Contractors were generally satisfied with the program. The application process was viewed as straightforward, and program staff members were considered to be helpful, knowledgeable, and responsive to questions. Contractors also noted that the program helped them to sell their services, which has had a positive effect on their businesses.

  Contractors did suggest a few potential improvements in program operations. These included more program promotion by program staff, faster project approval and incentive payments, an earlier release of the annual program guidelines, and an application in an electronic format to enable online submission.

- **Program Primarily Marketed by Staff and Contractors:** Program staff reported that they promote the program at conferences and events which are well-attended by potential participants and contractors. The importance of promoting the program at conferences and events is reflected in the participant survey responses, as learning of the program by attending a conference, workshop, or seminar was a common response.

  In terms of program marketing, contractors reported that they promoted the program with their existing customers and potential new customer leads. Contractors primarily promoted the program by meeting with customers to explain it. One contractor reported including fliers with invoices sent to customers.

  Overall, program marketing has been effective in generating program activity. However, schools, universities, and local governments largely dominate program activity in terms of realized savings. While this may reflect the large potential savings at these types of facilities, program staff noted a need to increase participation from other public facilities such as hospitals and nursing homes. Additionally, some measures, such as boiler reset controls and parallel positioning systems, did not experience any activity, which may suggest a greater need to promote these measures.

- **Incentives are Adequate and Important for Efficiency Decision-Making:** The incentives offered through the DCEO Boiler Tune-Up Program compare favorably with similar programs offered to private sector entities by natural gas utilities. Moreover, contractors stated that the incentives were adequate to encourage customers to complete boiler tune-up projects. Most participants reported that they were satisfied with the incentives.

Participant survey respondents highlighted the importance of financial incentives in their decisions to implement energy efficiency improvements. The majority of respondents indicated that financial incentives were very important to their decision-making, and that insufficient funding was a significant barrier to energy efficiency.

- **Financial Concerns Present Barriers to Program Participation:** Contractors consistently stated that financial concerns were the primary barrier to participating in the program. Despite the financial incentives and the potential financial payback from making the improvements, contractors noted that some organizations have difficulty acquiring initial funds to complete projects. Lack of awareness of the program and incentives was also noted as a barrier to participation. Despite these barriers, however, contractors stated that the demand for the program is strong and will remain strong as awareness of the program increases over time.

  Program staff has recognized that the upfront cost of the efficiency improvements may present a barrier to program participation. To help mitigate the impact of this barrier, a recent change was made that allows contractors to discount the cost of their service and then receive the incentive payment directly, rather than requiring that the payment go to the participant.

- **Potential Longer-Term Energy Impacts through Better Maintenance:** Interviews with program participants and contractors who completed projects through the program suggest that the program may be producing longer-term energy savings by encouraging better boiler maintenance practices. Eighty percent of survey respondents who did not previously have a regular maintenance schedule for their boilers reported that they have developed one since participating in the program. Most of these participants stated that their participation in the program influenced their decision to perform regular maintenance on their boilers. Contractors estimated that between 20% and 80% of their customers were maintaining their boilers efficiently before participating in the program, but that some of these customers were motivated to better maintain the efficiency of their boilers after participating in the program. Moreover, some participants signed up for regular maintenance plans while participating in the program.

- **Small Number of Projects Account for Large Share of Savings:** Less than 20% of the projects completed through the Boiler Tune-Up Program accounted for 80% of the GPY2 realized gross therm savings.

In the interest of further program improvement, the following recommendations are offered:

- **Consider Offering Incentives for Steam Trap Audits:** Program staff noted that many prospective participants are not aware of the operational condition of their steam traps. Staff also noted that the lack of incentives for the audit could be a disincentive to participate for some. Offering incentives for steam trap audits may provide an effective means of identifying potential energy savings and encouraging public entities to make improvements to their boiler systems. Although there is risk in offering audit incentives because the audit does not directly produce savings, this risk could be mitigated by making payment of audit incentives conditional on repairing or fixing failed steam traps.

- **Improvements to Program Marketing:** Overall, the program marketing has been effective in generating consistent program participation. However, program contractors asserted that many potential participants are not aware of the program, and suggested that there are opportunities for improvement in program promotion. Contractors suggested targeting professional contractor groups to ensure that these businesses were aware of the program and could market it to their customers. Additionally, program staff has identified potential areas for improvement such as better outreach to public sector facilities currently underrepresented in the program such as public hospitals. Program staff is taking steps to improve their outreach efforts to these sectors.
- **Consider Online Applications:** Some of the interviewed contractors expressed interest in application forms that could be filled out and submitted online. The current application form exists as a static PDF which requires applicants to either a) print out the document, fill it out by hand, and then scan/email it or send it through the postal service, or b) use the "Typewriter Tool" in Adobe Reader to overlay text on the form fields. In short, the application form is more difficult to fill out and submit than is necessary. The current application form would be enhanced if it had fillable form fields. With fillable form fields, applicants could download, fill out, and email the application form from their computers with minimal effort. In addition to considering usability issues, implementation staff is encouraged to consider making the application form more robust in its ability to process measure and project specific details, as well as to calculate potential incentives in real time.

  The current application form is capable of gathering granular measure detail, for example, ID information, linear feet of pipe installed, and pipe width, all of which is essential to accurate analyses of program activity. However, in its current state, the form is capable of capturing information for only one project location. If the applicant has more than one project location, the form is inadequate in gathering those additional project details. A more robust application form would be capable of obtaining all project location details, as well as the accompanying measure detail. A viable alternative to a downloadable application form would be a web portal which allows applicants to fill out and electronically submit applications using an internet browser.

1. Introduction

This report presents the results of the impact and process evaluation of the Public Sector Natural Gas Boiler Tune-Up Program (Tune-Up Program) offered by the Illinois Department of Commerce and Economic Opportunity (DCEO) during the period June 2012 through May 2013.

1.1 Description of Program

The Tune-Up Program generates natural gas savings through efficiency improvements to boilers (i.e., boiler tune-ups), installation of insulating pipe wrap, steam trap repair or replacement, boiler reset controls, and parallel positioning systems. The program is available to local governments, municipal corporations, public school districts, community college districts, public universities, and state and federal facilities. Applicants requesting grant funds for electricity and gas conservation measures must do so for sites serviced by the DCEO.

DCEO has partnered with the Energy Resources Center at the University of Illinois at Chicago to administer the Boiler Tune-Up Program. The Tune-Up Program was piloted during GPY1 and has since been included in DCEO's energy efficiency program portfolio. Incentives are available to encourage owners of natural gas boilers to invest in efficiency improvements made by a qualified contractor. Boilers must be larger than 200,000 Btu/h to qualify for the program. The incentives available during GPY2 are described as follows:

- Incentives based on boiler capacity were set at $0.75 per kBtu/h for boiler tune-ups. Tune-up incentives are available every 36 months.
- Incentives for steam trap repair or replacement for traps that are leaking. Leak detection can be performed using a pyrometer, ultrasound, or a visual inspection. The incentive levels range between $200 and $600 per steam trap. Steam trap replacements included under a scheduled maintenance program are not eligible for the incentives.
- Incentives for pipe insulation are available for missing or defective pipe insulation but new pipes are not eligible. The level of the incentives depend on the pipe size, specifically:
  - $8 per foot for pipes of less than 1 inch in diameter;
  - $10 per foot for pipes of 1 ¼ to 2 inches in diameter;
  - $16 per foot for pipes of 2 ½ to 5 inches in diameter; and
  - $20 per foot for pipes larger than 5 inches in diameter.
- Incentives based on boiler capacity were set at $0.75 per kBtu/h for boiler reset controls.
- Incentives of $3.00 per therm saved for parallel positioning systems.

Applicants for large projects are required to receive preapproval prior to beginning the project. Preapproval is required if any of the following conditions are met:

- Total requested incentives exceed $10,000;
- Total estimated number of failed steam traps exceeds 30; and

- Total estimated pipe insulation exceeds 300 linear feet.

Participants may also seek preapproval if they wish to confirm that they are eligible for the program or reserve incentive funds.

1.2 Expected Therm Savings

Expected therm savings by utility are shown in Table 1-1. There were 53 incentive projects during the period June 2012 through May 2013, which were expected to provide savings of 803,723.11 therms annually.

Table 1-1 Expected Therm Savings for Tune-Up Program

Utility	*Expected Therm Savings*
Ameren	644,861.42
Nicor	87,634.08
Peoples	61,943.82
North Shore	9,283.79
Total	803,723.11

1.3 Overview of Evaluation Approach

The overall objective for the impact evaluation of the Tune-Up Program was to determine the gross and net energy savings resulting from the program's custom and standard projects during the period June 2012 through May 2013.

The approach for the impact evaluation was based on the following features:

- Available documentation (e.g., audit reports, invoices, savings calculation work papers, etc.) was reviewed for projects, with particular attention given to the calculation procedures and documentation for savings estimates.
- Gross savings were verified through analytical desk review.
- A participant survey was conducted from a sample of program participants to gather information on their decision making, their likes and dislikes of the program, and factors determining net-to-gross savings ratios for the program.

1.4 Organization of Report

This report on the impact and process evaluation of the Tune-up Program for the period June 2012 through May 2013 is organized as follows:

- Chapter 2 presents and discusses the analytical methods and results of estimating gross savings for measures implemented under the program.

- Chapter 3 presents and discusses the analytical methods and results of estimating program net savings.
- Chapter 4 presents and discusses the analytical methods and results of the process evaluation of the program.
- Chapter 5 presents evaluation conclusions and recommendations resulting from the program evaluation.
- Appendix A provides a copy of the questionnaire used for the survey of participant decision makers.
- Appendix B presents the results of the survey of participant decision makers for participants that received incentives under the program.
- Appendix C presents the interview guide that was administered to participating contractors that performed the tune-ups and installed pipe wrap and/or steam traps.

2. Estimation of Gross Savings

This chapter addresses the estimation of gross therm savings resulting from measures installed in facilities of customers that obtained incentives under the Public Sector Natural Gas Boiler Tune-Up Program (Tune-Up Program) during the period June 2012 through May 2013. Section 2.1 describes the methodology used for estimating gross savings. Section 2.2 presents the program's gross realized natural gas energy savings.

2.1 Methodology for Estimating Gross Savings

The methodology used for estimating gross savings is described in this section.

2.1.1 Review of Documentation

The DCEO's program implementation contractor, University of Illinois at Chicago Energy Resources Center (ERC), provided documentation pertaining to the projects completed during the program year. The first step in the evaluation effort was to review this documentation and other relevant program materials.

For each project, the available documentation (e.g., audit reports, savings calculation work papers, etc.) for each rebated measure was reviewed, with particular attention given to the calculation procedures and savings estimates. Documentation that was reviewed for all projects included program forms, databases, reports, billing system data, weather data, and any other potentially useful data.

2.1.2 Analytical Desk Review

For projects with unclear or seemingly incomplete documentation, evaluation staff contacted ERC to seek further information. This ensured the development of accurate realized natural gas energy savings estimates.

Evaluation staff reviewed the natural gas energy savings algorithms to verify that the assumptions were reasonable, that the algorithm was correct for assigning ex ante gross therm savings per measure, and that the procedure aligned with the methodologies outlined in the Illinois Statewide Technical Reference Manual (TRM). ADM reviewed and verified the mathematical soundness of the savings calculations for each measure. Measure algorithm inputs were verified with the information provided by ERC. The calculations were then checked to ensure that the reported results could be replicated. Once the calculation methods were verified, the reasonableness of the calculation was assessed. The assessment of the savings estimates was based on a comparison of the expected savings against the Illinois Statewide TRM deemed savings tables for the given measures, as well as against ADM's own engineering calculators for similar measures.

ADM calculates annual energy savings for each boiler tune-up per the following formula that is given in the Illinois Statewide TRM:

$$\Delta therms = Ngi * SF * EFLH/(Effpre * 100)$$

Where,

Ngi	=	*Boiler gas input size (kBTU/hr)*
SF	=	*Savings factor. Savings factor is the percentage reduction in gas consumption as a result of the tune-up. ADM applies 1-(Eff_{Pre}/Eff_{Post}) as the SF.*
EFLH	=	*Equivalent full load hours for heating from TRM*[1]
Eff_{pre}	=	*Boiler Combustion Efficiency Before Tune-Up*
Eff_{post}	=	*Boiler Combustion Efficiency After Tune-Up*

ADM calculates annual energy savings for each steam trap replacement or retrofit per the following formula that is given in the Illinois Statewide TRM:

$$\Delta therms = S * (Hv/B) * Hours * A * L / 100{,}000$$

Where,

S	=	*Maximum theoretical steam loss per trap*[2]
HV	=	*Heat of vaporization of steam*[3]
B	=	*Boiler efficiency, 0.8 or custom*
Hours	=	*Custom hours or TRM hours*[4]
A	=	*Adjustment factor, 50%*
L	=	*Leakage and blow through (1 if one trap, or TRM value)*

ADM calculates annual energy savings for pipe insulation per linear foot installed with the following formula that is given in the Illinois Statewide TRM:

$$\Delta therms = t * (Qp - Qi)/100{,}000 * Eb$$

Where,

t	=	*annual operating time, in hours*
Qp	=	*Heat loss from bare pipe (Btu/hr/ft)*[5]
Qi	=	*Heat loss from insulated pipe (Btu/hr/ft)*[6]

[1] From the Illinois Statewide TRM, pg. 155. Equivalent full load hours for heating were developed using eQuest models for various building types averaged across each climate zone in Illinois for the following building types: office, healthcare/clinic, manufacturing, lodging, high school, hospital, elementary school, religious/assembly, restaurant, retail, college and warehouse.

[2] From the Illinois Statewide TRM, pg. 207

[3] Ibid., pg. 208.

[4] Ibid., pg. 209.

[5] From the Illinois Statewide TRM revision #2, pg. 15.

[6] Ibid.

Eb	=	*Efficiency, fraction from 0 to 1.0 (equivalent to 0% to 100% efficiency) of the boiler being used to generate the hot water or steam in the pipe, 0.8 or custom*
100,000	=	*Conversion factor (1 therm = 100,000 Btu)*

2.2 Results of Gross Savings Estimation

To estimate program gross therm savings, data were collected and analyzed for 53 projects. The data were analyzed using the methods described in Section 2.1 to determine project energy savings and to determine realization rates for the program. The results of that analysis are reported in this section.

2.2.1 Realized Gross Therm Savings

Ex post realized natural gas energy savings attributable to the Boiler Tune-Up Program are provided in Table 2-1. Savings are reported by utility and measure type.

Table 2-1 Realized Savings by Utility and Measure Type

Utility	*Boiler Tune-ups*	*Steam Traps*	*Pipe Insulation*	*Total*
Ameren	70,102.54	123,854.01	444,440.76	638,397.31
Nicor	75,540.02	21,480.79	3,199.01	100,219.82
Peoples	13,883.57	62,400.04	26,089.72	102,373.33
North Shore	7,284.42	n/a	3,213.01	10,497.43
Total	166,810.55	207,734.84	476,942.50	851,487.89

Table 2-2 displays the expected and realized therm savings for the Boiler Tune-Up Program by measure type. Realization rates for boiler tune-ups were significantly greater than for steam traps and pipe insulation.

Table 2-2 Expected and Realized Gross Savings by Measure Type

Measure Type	*Expected Therm Savings*	*Realized Gross Therm Savings*	*Realization Rate*
Boiler Tune-Ups	139,018.73	166,810.55	120%
Steam Traps	187,761.88	207,734.84	111%
Pipe Insulation	476,942.50	476,942.50	100%
Total	803,723.11	851,487.89	106%

2.2.2 Discussion of Gross Savings Analysis

ADM reviewed all project documentation in order to assess the reasonableness of ex ante therm savings. Ex ante savings figures for each measure were checked against the values and equations outlined in the Illinois Statewide TRM.

The difference between expected and realized gross natural gas energy savings of boiler tune-ups and steam traps is due to inconsistent calculation methodologies and errors in applying appropriate values from the TRM. ADM has communicated this issue to program staff.

3. Estimation of Net Savings

This chapter presents the results of estimating the net impacts of the Public Sector Natural Gas Boiler Tune-Up Program (Boiler Tune-Up Program) during the period June 2012 through May 2013, where net savings represents the portion of gross savings achieved by program participants that can be attributed to the effects of the program.

3.1 Procedures Used To Estimate Net Savings

Net savings are defined as the portion of gross savings that can be attributed to the effects of the program. Net savings may be less than gross savings as a result of free ridership. Free riders of a program are defined as those participants that would have implemented the same energy efficiency measures and achieved the observed energy changes, even in the absence of the program.

In general, net savings can be considered to be gross savings less the impact of free ridership. That is, because the energy savings realized by free riders are not induced by the program, these savings should not be included in the estimates of the program's actual (net) impacts. Without an adjustment for free ridership, some savings that would have occurred naturally would be incorrectly attributed to the program.

ADM performed a net savings analysis to estimate the impacts of the energy efficiency measures attributable to the Boiler Tune-Up Program that were net of free ridership. Information collected from a sample of program participants through a participant survey was used for the net savings analysis. Appendix A provides a copy of the survey instrument, and Appendix B presents tabulated responses for each survey question.

Based on a review of this information, the preponderance of evidence regarding free ridership inclinations was used to assess the likelihood of participant free ridership and, in turn, estimate net savings.

Several criteria were used for determining what portion, if any, of a participant's gross savings for a particular project should be attributed to free ridership. The first criterion was based on the response to the question: "Would your organization have been financially able to [implement the project] without the assistance from the Public Sector Natural Gas Boiler Tune-up Program?" If a participant answered "No" to this question, a free ridership score of 0 was assigned to the project. That is, if a participant required financial assistance from the Boiler Tune-Up Program to undertake a project, then that participant was not considered to be a free rider.

For decision makers that indicated that they were able to undertake implemented energy efficiency projects without financial assistance from the program, three factors were analyzed to determine what percentage of savings may be attributed to free ridership. The three factors are:

- Plans and intentions of a participant to implement a measure even without support from the program;

- Influence that the program had on the decision to implement a measure; and
- A participant's previous experience with a measure implemented under the program.

For each of these factors, rules were applied to develop binary variables indicating whether or not a participant's behavior showed free ridership. These rules made use of answers to questions on the decision maker survey questionnaire. A copy of the questionnaire is provided in Appendix A.

The first factor required determining if a participant stated that his or her intention was to implement an energy efficiency measure even without the program. The answers to a combination of several questions were used with a set of rules to determine whether a participant's behavior is indicative of free ridership. Two binary variables were constructed to account for participant plans and intentions: one, based on a more restrictive set of criteria that may describe a high likelihood of free ridership, and a second, based on a less restrictive set of criteria that may describe a relatively lower likelihood of free ridership.

The first, more restrictive criteria indicating participant plans and intentions that likely signify free ridership are as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to [implement the project] before finding out about the Public Sector Natural Gas Boiler Tune-up Program?" and "Would you have gone ahead with the [project implementation] even if you had not participated in the program?"
- The respondent answered "definitely would have" to the following question: "If the financial incentives from the Public Sector Natural Gas Boiler Tune-up Program had not been available, how likely is it that you would have [implemented the project] anyway?"
- The respondent answered "no" in response to the following question: "Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the timing of the [project implementation]?"

The second, less restrictive criteria indicating participant plans and intentions that likely signify free ridership are as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to [implement the project] before finding out about the Public Sector Natural Gas Boiler Tune-up Program?" and "Would you have gone ahead with the [project implementation] even if you had not participated in the program?"
- Either the respondent answered "definitely would have" or "probably would have" to the following question: "If the financial incentives from the Public Sector Natural Gas Boiler Tune-up Program had not been available, how likely is it that you would have [implemented the project] anyway?"

- Either the respondent answered "no" in response to the following question: "Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the timing of the [project implementation]?" or the respondent indicated that that while program information and financial incentives did affect the timing of equipment purchase and installation, in the absence of the program they would have purchased and installed the equipment within the next two years.

The second factor required determining if a participant reported that a recommendation from a Tune-up Program representative or past experience with the program was influential in the decision to implement a project.

The criterion indicating that program influence may signify a lower likelihood of free ridership is that either of the following conditions are true:

- The respondent answered "very important" to the following question: "How important was previous experience with the programs in making your decision to [implement the project]?
- The respondent answered "yes" to the following question: "Did a Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative recommend that you [implement the project]?" and "probably would not have" or "definitely would not have" to the question: "If the Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative had not recommended that you [implement the project], how likely is it that you would have done it anyway?"

The third factor required determining if a participant in the program indicated that he or she had previously implemented an energy efficiency measure similar to one that they implemented under the program without an energy efficiency program incentive during the last three years. A participant indicating that he or she had implemented a similar measure is considered to have a likelihood of free ridership.

The criteria indicating that previous experience may signify a higher likelihood of free ridership are as follows:

- The respondent answered "yes" to the following question: "Before participating in the Public Sector Natural Gas Boiler Tune-up Program, did you [implement the same measure as was implemented under the program]?"
- The respondent answered "yes" to the following question: "Has your organization completed any energy efficiency projects in the last three years for which you did not apply for a financial incentive through an energy efficiency program?"

The four sets of rules just described were used to construct four different indicator variables that address free ridership behavior. For each participant, a free ridership value was assigned based on the combination these variables. With the four indicator variables, there were 12 applicable combinations for assigning free ridership scores for each respondent, depending on the combination of answers to the questions creating the indicator variables. Table 3-1 shows these values.

Table 3-1 Free Ridership Scores for Combinations of Indicator Variable Responses

Indicator Variables				*Free Ridership Score*
Had Plans and Intentions to Install Measure without Tune-up Program? (Definition 1)	*Had Plans and Intentions to Install Measure without Tune-up Program? (Definition 2)*	*Tune-up Program had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	
Y	N/A	Y	Y	100%
Y	N/A	N	N	100%
Y	N/A	N	Y	100%
Y	N/A	Y	N	67%
N	Y	N	Y	67%
N	N	N	Y	33%
N	Y	N	N	33%
N	Y	Y	Y	33%
N	Y	Y	N	0%
N	N	N	N	0%
N	N	Y	N	0%
N	N	Y	Y	0%

3.2 Results of Net Savings Estimation

The procedures described in the preceding section were used to estimate free ridership rates and net-to-gross ratios for the Tune-Up Program for the period June 2012 through May 2013.

3.2.1 Realized Net Therm Savings

The data used to assign free ridership scores were collected through a participant survey of 26 participant decision makers for projects completed during the period June 2012 through May 2013. Individual free ridership rates were estimated for the program.

Table 3-2 shows the percentages of total realized gross natural gas energy savings that are associated with different combinations of free ridership indicator variable values. Ninety-seven percent of the savings are associated with respondents who indicated that their organization was financially unable to implement the project in the absence of the program incentive.

Table 3-2 Estimated Program Free Ridership

Had Plans and Intentions to Implement Measure without Tune-up Program? (Definition 1)	*Had Plans and Intentions to Implement Measure without Tune-up Program? (Definition 2)*	*Tune-up Program had influence on Decision to Implement Measure?*	*Had Previous Experience with Measure?*	*Percentage of Total Realized Gross Therm Savings*	*Free Ridership Score*
Y	N/A	Y	Y	0.5%	100%
Y	N/A	N	N	0.1%	100%
Y	N/A	N	Y	1.5%	100%
N	Y	N	Y	1.9%	67%
N	Y	N	N	0.1%	33%
N	N	N	N	3.0%	0%
N	N	Y	N	0.2%	0%
N	N	Y	Y	0.1%	0%
Required program incentive to implement measures.				96.5%	0%
Total				100.0%	

The realized natural gas energy savings of the Boiler Tune-Up Program during the period June 2012 through May 2013 are summarized in Table 3-3. During this period, realized net natural gas energy savings totaled 809,345.12 therms. The net to gross ratio is 95%.

Table 3-3 Summary of Therm Savings from Projects

Utility	*Expected Therm Savings*	*Realized Gross Therm Savings*	*Gross Realization Rate*	*Realized Net Therm Savings*	*Net to Gross Ratio*
Ameren	644,861.42	638,397.31	99%	614,558.94	96%
Nicor	87,634.08	100,219.82	114%	91,376.36	91%
Peoples	61,943.82	102,373.33	165%	93,536.65	91%
North Shore	9,283.79	10,497.43	113%	9,873.17	94%
Total	803,723.11	851,487.89	106%	809,345.12	95%

4. Process Evaluation

This chapter presents the results of the process evaluation for the Public Sector Boiler Tune-Up Program (Boiler Tune-Up Program) during natural gas program year two (GPY2). The process evaluation focuses on the effectiveness of program policies and organization, as well as the program delivery framework. The purpose of the process evaluation is to assess the design and recent results of the program in order to determine how effectively it is achieving its intended outcomes. This evaluation is based upon analysis of program structure, interviews and surveys of program participants, and a review of program tracking data.

The chapter begins with a discussion of the overall progress of the program. This is followed by an examination of certain issues that are critical to the future success of the program. This chapter also presents strategic planning and process recommendations, and highlights key findings from the interviews of participants and program staff. The information in this chapter provides insight into participant decision-making behaviors, and identifies any key issues that may be addressed for future program cycles. Conclusions, recommendations, and other findings from the process evaluation may be useful in comparing program years over time, and in conducting planning efforts for future program cycles.

4.1 Evaluation Objectives

The purpose of the process evaluation is to examine program operations and results throughout the program operating year, and to identify potential program improvements that may increase program efficiency or effectiveness in terms of participation and satisfaction levels. This process evaluation was designed to document the operations and delivery of the Boiler Tune-Up Program during the natural gas program year two (GPY2).

Key research questions to be addressed by this evaluation of GPY2 activity include:

- Is the Boiler Tune-Up Program effectively reaching participants and meeting their energy efficiency needs?
- Is the program incentive appropriately structured to encourage participants to make energy efficiency improvements?
- Did the Boiler Tune-Up Program reduce barriers to energy efficiency project implementation?

During the evaluation, data and information from numerous sources are analyzed to achieve the stated research objectives. A telephone survey was developed to gain insight into participant experience with the Boiler Tune-Up Program. Semi-structure, in-depth interviews with staff from DCEO and the Energy Resources Center (ERC) – DCEO's implementation partner – were used to assess the program operations perspective. In-depth interviews were also performed with contractors who implemented projects through the program during the program year.

4.2 Summary of Primary Data Collection

Participant surveys are the primary data source and foundation for understanding the participant perspective. The surveys provide participant feedback and insight into experiences with the Boiler Tune-Up Program. Respondents report on their satisfaction with the program, detail their motivations and the factors affecting their decision-making process, and provide recommendations for improving the program. Interviews with program staff gauge knowledge on how the program developed, who it is intended to reach, and challenges faced. A review of program tracking data provides insight into the accuracy, completeness, and organization of participant information, and can be used to characterize the participating customer base.

4.3 Summary of Conclusions and Recommendations

Interviews and surveys were conducted with participants, program staff, and participating contractors to better understand the effectiveness of program delivery.

The following presents a selection of key findings from the program evaluation:

- **Modest Increase in Participation:** During GPY2, the number of program projects completed increased from 47 to 53. The size and scope of the projects, however, has decreased from GPY1. Consequently, realized therm savings were lower in GPY2 than in GPY1. Expected therm savings from GPY1 totaled 2,097,276.81, while GPY2 expected therm savings totaled 803,723.11.
- **Most Participants Satisfied with the Program:** The majority of survey respondents reported that they were satisfied with the program. Participants were most satisfied with the quality of the contractors' work and least satisfied with the time taken to receive rebates and the effort required for the application process. The lower level of satisfaction with the elapsed time until rebates were received was likely due to issues with the program budget that resulted in delays in the processing of rebates. At one point during the program year, the program exceeded its budget and a request for additional funds was made. The time required to process the additional request resulted in delayed rebate payments.

  Aside from the issues noted with receiving rebates, the program operated well from the participants' perspective. All of the respondents reported that the efficiency improvements met or exceeded their expectations. None of the participants reported that there were problems with the application process, the project implementation, or the work performed by their contractor.
- **Contractors are Satisfied with the Program:** Contractors were generally satisfied with the program. The application process was viewed as straightforward, and program staff members were considered to be helpful, knowledgeable, and responsive to questions. Contractors also noted that the program helped them to sell their services, which has had a positive effect on their businesses.

  Contractors did suggest a few potential improvements in program operations. These included more program promotion by program staff, faster project approval and incentive payments,

an earlier release of the annual program guidelines, and an application in an electronic format to enable online submission.

- **Program Primarily Marketed by Staff and Contractors:** Program staff reported that they promote the program at conferences and events which are well-attended by potential participants and contractors. The importance of promoting the program at conferences and events is reflected in the participant survey responses, as learning of the program by attending a conference, workshop, or seminar was a common response.

  In terms of program marketing, contractors reported that they promoted the program with their existing customers and potential new customer leads. Contractors primarily promoted the program by meeting with customers to explain it. One contractor reported including fliers with invoices sent to customers.

  Overall, program marketing has been effective in generating program activity. However, schools, universities, and local governments largely dominate program activity in terms of realized savings. While this may reflect the large potential savings at these types of facilities, program staff noted a need to increase participation from other public facilities such as hospitals and nursing homes. Additionally, some measures, such as boiler reset controls and parallel positioning systems, did not experience any activity, which may suggest a greater need to promote these measures.

- **Incentives are Adequate and Important for Efficiency Decision-Making:** The incentives offered through the DCEO Boiler Tune-Up Program compare favorably with similar programs offered to private sector entities by natural gas utilities. Moreover, contractors stated that the incentives were adequate to encourage customers to complete boiler tune-up projects. Most participants reported that they were satisfied with the incentives.

  Participant survey respondents highlighted the importance of financial incentives in their decisions to implement energy efficiency improvements. The majority of respondents indicated that financial incentives were very important to their decision-making, and that insufficient funding was a significant barrier to energy efficiency.

- **Financial Concerns Present Barriers to Program Participation:** Contractors consistently stated that financial concerns were the primary barrier to participating in the program. Despite the financial incentives and the potential financial payback from making the improvements, contractors noted that some organizations have difficulty acquiring initial funds to complete projects. Lack of awareness of the program and incentives was also noted as a barrier to participation. Despite these barriers, however, contractors stated that the demand for the program is strong and will remain strong as awareness of the program increases over time.

  Program staff has recognized that the upfront cost of the efficiency improvements may present a barrier to program participation. To help mitigate the impact of this barrier, a recent change was made that allows contractors to discount the cost of their service and then receive the incentive payment directly, rather than requiring that the payment go to the participant.

- **Potential Longer-Term Energy Impacts through Better Maintenance:** Interviews with program participants and contractors who completed projects through the program suggest that the program may be producing longer-term energy savings by encouraging better boiler maintenance practices. Eighty percent of survey respondents who did not previously have a regular maintenance schedule for their boilers reported that they have developed one since participating in the program. Most of these participants stated that their participation in the program influenced their decision to perform regular maintenance on their boilers. Contractors estimated that between 20% and 80% of their customers were maintaining their boilers efficiently before participating in the program, but that some of these customers were motivated to better maintain the efficiency of their boilers after participating in the program. Moreover, some participants signed up for regular maintenance plans while participating in the program.
- **Small Number of Projects Account for Large Share of Savings:** Less than 20% of the projects completed through the Boiler Tune-Up Program accounted for 80% of the GPY2 realized gross therm savings.

In the interest of further program improvement, the following recommendations are offered:

- **Consider Offering Incentives for Steam Trap Audits:** Program staff noted that many prospective participants are not aware of the operational condition of their steam traps. Staff also noted that the lack of incentives for the audit could be a disincentive to participate for some. Offering incentives for steam trap audits may provide an effective means of identifying potential energy savings and encouraging public entities to make improvements to their boiler systems. Although there is risk in offering audit incentives because the audit does not directly produce savings, this risk could be mitigated by making payment of audit incentives conditional on repairing or fixing failed steam traps.
- **Improvements to Program Marketing:** Overall, the program marketing has been effective in generating consistent program participation. However, program contractors asserted that many potential participants are not aware of the program, and suggested that there are opportunities for improvement in program promotion. Contractors suggested targeting professional contractor groups to ensure that these businesses were aware of the program and could market it to their customers. Additionally, program staff has identified potential areas for improvement such as better outreach to public sector facilities currently underrepresented in the program such as public hospitals. Program staff is taking steps to improve their outreach efforts to these sectors.
- **Consider Online Applications:** Some of the interviewed contractors expressed interest in application forms that could be filled out and submitted online. The current application form exists as a static PDF which requires applicants to either a) print out the document, fill it out by hand, and then scan/email it or send it through the postal service, or b) use the "Typewriter Tool" in Adobe Reader to overlay text on the form fields. In short, the application form is more difficult to fill out and submit than is necessary. The current application form would be enhanced if it had fillable form fields. With fillable form fields, applicants could download, fill out, and email the application form from their computers with

minimal effort. In addition to considering usability issues, implementation staff is encouraged to consider making the application form more robust in its ability to process measure and project specific details, as well as to calculate potential incentives in real time.

The current application form is capable of gathering granular measure detail, for example, ID information, linear feet of pipe installed, and pipe width, all of which is essential to accurate analyses of program activity. However, in its current state, the form is capable of capturing information for only one project location. If the applicant has more than one project location, the form is inadequate in gathering those additional project details. A more robust application form would be capable of obtaining all project location details, as well as the accompanying measure detail. A viable alternative to a downloadable application form would be a web portal which allows applicants to fill out and electronically submit applications using an internet browser.

4.4 Public Sector Boiler Tune-Up Program Participant Profile

Table 4-1 presents the number of projects completed during GPY2. The largest number of projects, 43, involved boiler tune-ups. Smaller numbers of projects involved steam traps (6) or pipe insulation (10).

Table 4-1 Summary of Program Activity by Measure Type

Measure	*Number of Projects*
Boiler Tune-Up	43
Steam Traps	6
Pipe Insulation	10

The share of projects completed by different types of public sector organizations is shown in Figure 4-1. K-12 schools accounted for more than half of the projects (66%) completed, while universities accounted for another 6% of projects.

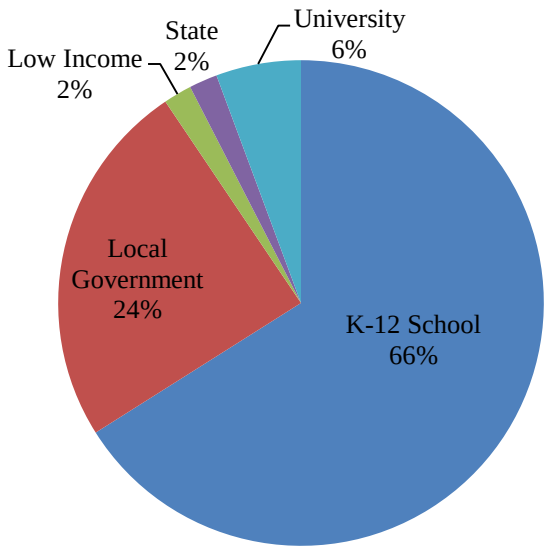

Figure 4-1 Number of Projects by Participant Type

Figure 4-2 displays the share of realized gross therm savings by participant type. Universities accounted for a disproportionately large share of the savings relative to the number of projects completed. Although universities accounted for 6% of the projects completed, they accounted for 53% of the realized savings. K-12 schools accounted for 27% of the realized savings. Local and state government accounted for 12% of realized savings.

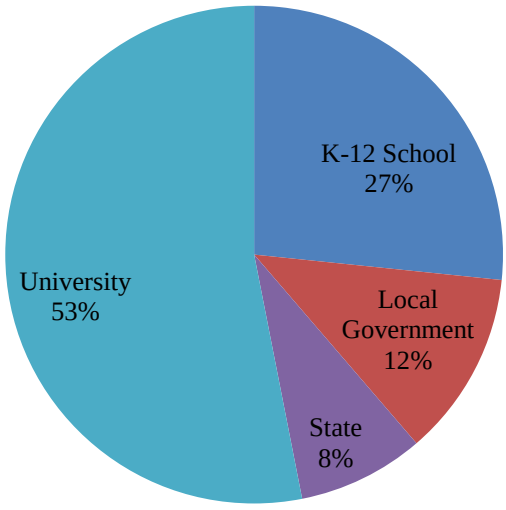

Figure 4-2 Distribution of Realized Gross Therm Savings by Participant Type

Figure 4-3 displays the cumulative realized gross therm savings for the projects completed during GPY2. As shown, one project accounted for nearly 40% of project savings and less than 20% of the projects accounted for 80% of project savings.

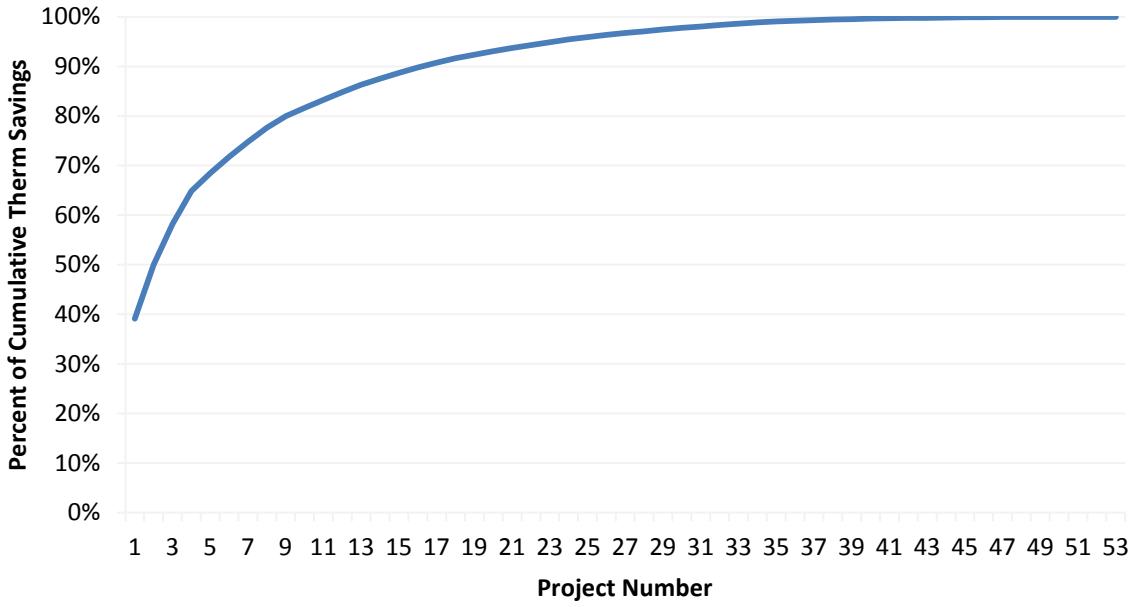

Figure 4-3 Cumulative Project Realized Gross Therm Savings

4.5 Participant Outcomes

An online survey was conducted to collect data about participant decision-making, preferences, and opinions of the Public Sector Boiler Tune-Up Program (Boiler Tune-Up Program). During GPY2, the program offered incentives for boiler tune-ups, steam trap replacement or repair, pipe insulation, boiler reset controls, and parallel positioning control systems. In total, twenty-four participants who implemented a project through the program were interviewed.

Information in this section is intended to characterize participant decision-making behaviors and identify notable trends within participant responses. Some of the comments and issues raised by participants are anecdotal in nature and may reflect individual participant opinions. The Conclusions and Recommendations section of the Process Evaluation chapter provides an overall distillation of key findings from the process evaluation activities that were performed for the Boiler Tune-Up Program.

It is important to note that, while the survey results discussed below are used as inputs for the calculation of estimated free ridership, participant responses to individual survey items do not, in isolation from additional factors, infer specific levels of free ridership. Chapter 3 details the methodology used to estimate free ridership based on survey response data, while this chapter provides a qualitative discussion of participant responses.

4.5.1 How Participants Learn About the Program

Table 4-2 displays the ways in which survey respondents reported learning about the Public Sector Boiler Tune-Up Program. Many respondents (38%) indicated that they learned about the program from equipment vendors or building contractors. The DCEO website as well as conferences, seminars, and workshops were the second most common means of hearing about the program.

Table 4-2 How Participant Decision Makers Learned about the Program

	Response	*Percentage of Respondents* (n=24)*
How did you learn of the Public Sector Natural Gas Boiler Tune-Up Program?	Equipment vendors or building contractors	38%
	The DCEO website	25%
	Attended a conference, workshop or seminar	25%
	Friends or colleagues	13%
	Past experience with the program	8%
	Other	17%

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

Survey respondents were asked when they heard about the program relative to their planning and completion of the boiler tune-up measures. As shown in Table 4-3, 75% of respondents learned about the program before planning their tune-up and 21% learned of it during the planning stage of the tune-up.

Table 4-3 When Participant Decision Makers Learned about the Program

	Response	*Percentage of Respondents* (n=24)*
When did you learn of the Public Sector Natural Gas Boiler Tune-Up Program?	Before planning the boiler project	75%
	During your planning for the boiler project	21%
	Once a plan to implement was established, but before it was completed	4%
	After completing the boiler project	-
	Some other time	-
	Don't know	-

4.5.2 Factors Affecting Participant Participation

Participants were asked about the influence of the Boiler Tune-Up Program on their decision to complete the tune-up projects. Participants were asked these questions for each type of Boiler Tune-Up Program project they completed, that is, for boiler tune-ups, steam trap replacement or repair and pipe insulation. Consequently, the number of responses to these questions exceeds the number of participants and the percentages displayed in this section are based on the number of projects rather than the number of participants.

Fifty-four percent of participants reported that they had plans to implement projects prior to participating in the program, and the participants with prior plans reported that they would have completed the projects had they not participated in the program. Although these respondents suggested that they would have completed the projects had they not participated in the program, the program may have still influenced the scope, timing, and level efficiency of the measures chosen. Consequently, these responses do not, in isolation, designate a specific level of free ridership. Responses to individual survey items may be used to characterize certain aspects of a decision maker's program perspective or implementation behavior, but it is necessary to analyze the full set of a respondent's survey responses in order to estimate an accurate and reliable net-to-gross percentage. In addition to gauging participants' preexisting plans and intentions, it is important to consider how the program affected factors such as the timing and overall efficiency level of the project. Chapter 3 outlines the full net-to-gross estimation methodology that is applied to survey results for this evaluation.

Respondents who indicated that they had plans to implement a project were asked how long they had those plans. As shown in Table 4-4, 42% of participants stated that they had plans for more than one year, suggesting that while they had prior plans to complete the projects, the availability of incentives may have made their implementation feasible.

Table 4-4 Length of Time for Which Respondents Had Plans to Implement Energy Efficiency Measures

	Response	*Percent of Respondents (n=14)*
How long before finding out about the Public Sector Natural Gas Boiler Tune-up Program did you have plans to tune up the boiler(s) / install pipe insulation / repair or replace steam traps?	Less than 6 months	43%
	6 months to less than 1 year	14%
	1 year to less than 2 years	14%
	2 years to less than 5 years	14%
	5 or more years	-
	Don't know	-

4.5.3 Energy Efficiency Attitudes and Decision Making

Survey respondents were asked to rate the importance of several factors in their decision-making process regarding energy efficiency improvements. Table 4-5 shows that all three factors were

predominantly rated as "very important" by survey respondents and none were rated as "not important at all." Eighty-three percent of the respondents stated that incentive payments from DCEO were "very important," while 71% rated their past experience with energy efficient measures and practices as "very important." When asked to rate the importance of advice or recommendations they had received from DCEO, fewer respondents indicated that this advice was very influential. The majority of respondents rated the advice as "very important" (67%), while the remaining respondents rated it "somewhat important" (33%).

Table 4-5 Factors Influencing the Decision to Participate

Energy Efficiency Decision Making Factor	*Very Important*	*Somewhat Important*	*Only Slightly Important*	*Not Important at All*	*Don't Know*	*n*
Financial incentive payments from DCEO	83%	17%	-	-	-	24
Past experience with energy efficient measures	71%	25%	4%	-	-	24
Advice or recommendations received from DCEO	67%	33%	-	-	-	24

Participants were asked what kinds of energy efficiency policies and activities their organizations have in place. Table 4-6 displays their responses. The largest share of respondents, 54%, stated that they did not have any energy efficiency policies in place. Additionally, 33% of respondents reported having a staff member responsible for energy efficiency improvements, and 29% reported having policies that incorporate energy efficiency in operations and procurement as a strategy to control energy consumption.

Table 4-6 Energy Efficiency Policies and Activities

	Response	*Percentage of Respondents* (n=24)*
Which of the following policies or resources does your organization have in place regarding energy efficiency improvements at this facility?	Do not have policies or procedures for energy efficiency improvements	54%
	A staff member responsible for energy and energy efficiency	33%
	Policies that incorporate energy efficiency in operations and procurement	29%
	An energy management plan	25%
	Active training of staff	21%
	Other	-

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

As shown in Table 4-7, most respondents indicated that they had completed energy efficiency projects in the last three years and about 58% of these respondents had not applied for an

incentive, while another 21% had completed those types of projects and did apply for incentives. Three respondents reported that their organization had not completed any energy efficiency projects over the last three years.

The fourteen respondents who had completed projects but did not apply for an incentive were asked why they did not apply: 43% did not know about financial incentives until after the project was paid for, 21% reported that they did not know whether the project qualified for any financial incentives, and 7% cited that they did not have time to complete paperwork for financial incentive application. Of the five respondents who had completed projects and applied for an incentive, three reported that they received all their incentives for these past projects, while two did not.

Table 4-7 Incentives for Previous Measures Purchased

	Response	*Percentage of Respondents (n=24)*
Has your organization completed any energy efficiency projects in the last three years for which you did not apply for a financial incentive through an energy efficiency program?	Yes, completed energy efficiency projects but did not apply for incentive.	58%
	No, an incentive was applied for.	21%
	No projects were completed by the organization	13%
	Don't know	8%

4.5.4 Barriers to Energy Efficiency Improvements and Purchasing Processes

The literature on public sector decision-making and procurement of energy efficient measures identifies a number of barriers to purchasing and implementing energy efficiency measures. These barriers include a lack of consideration of energy costs when making purchasing decisions, "least cost" purchasing rules that prevent the purchase of higher cost energy efficient measures, the perception that high efficiency equipment is a luxury (i.e. not essential), transparency of decision making, and a lack of technical expertise.[7]

Some of these barriers were identified by participants in the Public Sector Energy Efficiency Program, as shown in Table 4-8. By far the most frequently mentioned barrier was insufficient

[7] *Barnes, P. and Wisniewski, E. J. (2000). Making it happen: Incorporating energy efficiency into government purchasing. American Council for an Energy-Efficient Economy Summer Study Proceedings.*
Harris, J., Brown, M., Deakin, J., Jurovics, S. Khan, A., et al. (2004). Energy-efficient purchasing by state and local government: Triggering a landslide down the slippery slope to market transformation. American Council for an Energy-Efficient Economy Summer Study Proceedings.

Kunkle, R., Lutzenhizer, L. and Dethman, L. (2000). Influencing the purchase of energy-efficient products in public organizations: It's not as easy it looks. American Council for an Energy-Efficient Economy Summer Study Proceedings.

Rose, A., Stimmel, J., Oyhenart, J., and Ahrens, A. (2008). Breaking down silos: Bridging the communications and knowledge gap between departments to implement energy efficiency in the public sector. American Council for an Energy-Efficient Economy Summer Study Proceedings.

funding to make the improvements, which 75% of the respondents indicated was a barrier. Approval processes that slow down or make purchasing difficult was cited as a barrier by approximately one third of the respondents. Current equipment that is too new to replace, lack of information on energy efficiency improvements, schedules that dictate when equipment is to be replaced or maintained, and incentive program time requirements were also identified as barriers by survey respondents.

Table 4-8 Barriers to Making Energy Efficiency Improvements

	Response	*Percentage of Respondents* (n=24)*
What barriers does your organization face in making energy efficiency improvements?	Insufficient funding for improvements	75%
	Approval processes that are slow or make purchasing difficult	29%
	Current equipment is too new to be replaced with more efficient equipment	25%
	Schedules that dictate when equipment is to be replaced or maintained regardless of efficiency levels	21%
	Lack of information on energy efficient equipment and practices	17%
	Incentive program time requirements	17%
	Other	8%
	Don't know	-

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

When asked about their organization's approval process for equipment purchases, most participants (67%) stated that the process depends on the amount of the purchase, as shown in Table 4-9. Additionally, 42% stated that they follow procurement rules specific to their organization, and 42% also stated they were required to select the lowest bidder. Thirty-eight percent stated that there are state or federal procurement guidelines that they follow, and another 38% of respondents indicated that an open bid was required. The remaining 25% stated that they used a specific vendor.

Table 4-9 Respondent Approval Processes for Equipment Purchases

	Response	*Percent of Respondents* (n=24)*
What is the approval process for maintenance expenditures or equipment purchases in your organization?	Depends on the amount of purchase	67%
	Follow state or federal procurement guidelines	42%
	Required to select lowest bidder	42%
	Follow procurement rules specific to our organization	38%
	An open bid is required	38%
	Use a specific vendor	25%
	Other	-
	Don't know	4%

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

As seen in Table 4-10, nearly three quarters of respondents stated that funds for energy efficiency improvements are taken from the operation and maintenance budget, while approximately one third stated that the funds are obtained through a capital request.

Table 4-10 How Energy Efficiency Improvements are Funded

	Response	*Percent of Respondents* (n=24)*
How does your organization fund energy efficiency improvements?	Funds are taken from operation and maintenance budget	75%
	Through a capital request	29%
	Dedicated funding for energy efficient projects	21%
	Other	8%

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

Participants who indicated that they fund energy efficiency improvements through a capital request were asked if there was a specific dollar threshold that would require a capital request. Of the four respondents, the average dollar threshold required for a capital request was $23,750. The average amount of time to receive approval for a capital request was 136 days.

As seen in Table 4-11, survey respondents were asked whether or not they are able to utilize incentive payments to fund additional energy efficiency improvements or other facility improvements. Approximately 54% of respondents stated that they were able to use the incentive payments to fund additional facility improvements. Another 25% stated that the payments return to the facility general operating fund and 4% stated that the incentive payments go into the state general revenue fund. Regardless of how incentive payments are used, most respondents (83%)

indicated that incentives were very important to their decisions about making energy efficiency improvements.

Table 4-11 Utilization of Incentive Payments

	Response	*Percent of Respondents (n=24)*
Is your organization able to utilize incentive or grant payments you receive for energy efficiency improvements, or are the payments placed in a general fund?	We are able to use the incentive payments for additional facility improvements including additional energy efficiency improvements	54%
	Incentive payments return to the facility general operating fund	25%
	Incentive payments go into the state general revenue fund	4%
	Other	8%
	Don't know	8%

4.5.5 The Decision Makers

Table 4-12 below shows that the majority of survey respondents (38%) reported that one or two key people in their organization decide how to make energy efficient improvements at their facility. Approximately one-third of respondents indicated that these decisions are made by a group or committee, and 21% indicated that they are based on staff recommendations to a decision maker.

Table 4-12 Decision Maker Characteristics

	Response	*Percent of Respondents (n=24)*
How does your organization decide to make energy efficiency improvements for this facility?	Made by one or two key people	38%
	Made by a group or committee	33%
	Based on staff recommendations to a decision maker	21%
	Made in some other way	8%

4.5.6 Where Decision Makers Get Their Information

Respondents were asked whom they rely on for information about energy efficient equipment, materials, practices, and design features. Table 4-13 below shows that respondents most often cited an architect, engineer, or energy consultant as a source of information (38% of respondents). Other frequently reported sources for information were equipment vendors or building contractors (33%), friends and colleagues (21%), and trade journals or magazines (21%). These results suggest that respondents count on multiple sources to obtain energy

efficiency information, but that engineers, energy consultants, vendors and contactors are key sources.

It is noteworthy that 17% of participants reported relying upon the Smart Energy Design Assistance Center (SEDAC) for information about energy efficiency improvements. This finding suggests that program plans to improve promotion of the program by increasing ties with SEDAC may pay off in additional program activity.

Table 4-13 Who Respondents Rely on for Information

	Response	*Percentage of Respondents* (n=24)*
What are the main sources your organization relies on for information about energy efficient equipment, materials, practices, and design features?	An architect, engineer, or energy consultant	38%
	Equipment vendors or building contractors	33%
	Friends and colleagues	21%
	Trade journals or magazines	21%
	The DCEO website	17%
	The Smart Energy Design Assistance Center (SEDAC)	17%
	A DCEO representative	13%
	Trade associations or business groups you belong to	13%
	The Energy Resource Center (ERC)	-
	Brochures or advertisements	-
	A utility representative	-
	Other	38%

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

4.5.7 Financial Methods Used By Decision Makers

Survey respondents were asked about the financial methods used by their organization to determine the economic feasibility of energy efficiency improvements at their facilities. Table 4-14 shows that respondents reported using the initial cost of the equipment (54%), internal rate of return (46%), life cycle cost (46%), and simple payback (38%) to evaluate energy efficiency improvements. The participants who reported using an internal rate of return to determine project feasibility were asked what the required rate of return was to proceed with an energy efficiency project. Three of the eleven respondents that used internal rate of return provided this information, and the average required rate of return was 23%. The respondents who reported using simple payback were asked what payback period of time they require in order to proceed with an energy efficiency project. Seven of the nine respondents that used simple payback to evaluate efficiency projects provided further information on their required payback length, and the average period was 6.1 years.

Table 4-14 Financial Methods Used to Evaluate Efficiency Improvements

	Response	*Percentage of Respondents (n=24)*
Which financial methods does your organization typically use to evaluate energy efficiency improvements for this facility?	Initial Cost	54%
	Internal rate of return	46%
	Life cycle cost	46%
	Simple payback	38%
	None of these	4%

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

The financial methods used to evaluate energy efficiency projects emphasize the relatively short-term and long-term financial concerns and objectives of program participants. Some participants used short-term criteria, such as initial cost. However, others reported that their organizations use a longer-term criterion such as life cycle cost, which considers costs relative to the savings over the lifetime of the improvement.

4.5.8 Participant Satisfaction with the Program

Survey respondents were asked to rate their levels of satisfaction with the program. Table 4-15 shows that respondents were satisfied with all aspects of the program. Satisfaction levels were highest for the performance of the energy efficiency improvements made through the program, the work performed by their contractor, and information provided by the DCEO.

Approximately half of the participants stated that they were satisfied with the incentive amount and the effort required for the application process. However, participants were relatively less satisfied with the length of time required to receive incentive payments, the effort required for the application process, and the incentive amount.

Table 4-15 Decision Maker Satisfaction with Selected Aspects of Program Experience

Element of Program Experience	*Very satisfied*	*Satisfied*	*Neither Satisfied nor Dissatisfied*	*Dissatisfied*	*Very Dissatisfied*	*Don't Know*	*n*
Performance of the [boiler tune-up/ pipe insulation/ steam trap repair or replacement] since the project was completed	67%	33%	-	-	-	-	24
Quality of the contractor's work	79%	17%	-	-	-	4%	24
Savings on your monthly bill	33%	46%	-	-	-	21%	24
Incentive amount	50%	29%	4%	8%	-	8%	24
The effort required for the application process	46%	42%	8%	-	4%	-	24
Information provided by the DCEO	71%	29%	-	-	-	-	24
Information provided by SEDAC	54%	29%	-	-	-	17%	24
Information provided by the ERC	38%	29%	-	-	-	33%	24
The elapsed time until you received the incentive	46%	21%	-	8%	13%	13%	24
Overall program experience	67%	25%	4%	-	-	4%	24

Respondents were also asked whether or not the boiler tune-up project met their expectations. As shown in Table 4-16, all of the participants stated that the project either met or exceeded their expectations.

Table 4-16 Respondent Expectations of Program

	Response	*Percentage of Respondents (n=24)*
Did the [boiler tune-up/ pipe insulation/ steam trap repair or replacement] meet your expectations?	My expectations were exceeded	33%
	My expectations were met	67%
	My expectations were mostly met	-
	My expectations were not met	-
	Don't know	-

4.5.9 Incentives and Project Implementation

Survey respondents were asked questions regarding the receipt of incentive payments and the application process for the program. Table 4-17 below shows the percentage of respondents that responded "Yes" to each question. Seventy-five percent of respondents reported that the incentive amount they received was what they had expected. Twenty-five percent of respondents cited issues with receiving the program incentive. These respondents primarily stated that they had not received the incentive in a timely manner, and several reported waiting as long as six months to receive the incentive. None of the respondents reported any problems with the application process.

Table 4-17 Experience with Application and Incentive Processes

Question	*Percentage of Respondents Saying Yes*	*n*
Was the incentive amount what you expected?	75%	24
Any issues receiving the program incentive?	25%	24
Any problems with the application process?	-	24

Respondent experience with project implementation is summarized in Table 4-18. All respondents stated that the project implementation went smoothly. Twenty-three of the twenty-four respondents indicated that the contractor did a good job and one respondent reported not knowing if the contractor did a good job. Seventy-one percent of the respondents indicated that the incentive they received met their expectations and 21% stated that it did not. Those participants who responded that the incentive did not meet their expectations were referring to the fact they did not receive the incentive in a timely manner. However, one participant stated that the incentive was lower than they had expected. Overall, respondent feedback about project implementation was very positive.

Table 4-18 Experience with Project Implementation

Question	*Yes*	*For the most part*	*No*	*Don't know*	*n*
Did the [boiler tune-up/ pipe insulation/ steam trap repair or replacement] go smoothly?	100%	-	-	-	24
Do you feel that the contractor did a good job?	96%	-	-	4%	24
Did the incentive that you received meet your expectations?	71%	-	21%	8%	24

4.5.10 Boiler Tune-Up Maintenance Practices

Participants were asked about their maintenance schedule for performing boiler tune-ups. Those responses are displayed below in Table 4-19. Fifty-eight percent of the participants reported that they had a schedule for completing boiler tune-ups prior to participating in the program. Approximately half of the participants with plans for regular maintenance indicated that will perform maintenance annually, while the other half indicated that they will perform maintenance every three years. Moreover, when asked how much their experience with the program influenced their decision to perform regular maintenance, 88% stated "somewhat" or "a lot", while one respondent did not know how influential the program was to his or her maintenance decision.

Table 4-19 Maintenance Practices

Question	*Percentage of Respondents Saying Yes*	*n*
Did you have a regular maintenance schedule for performing boiler tune-ups prior to participating in the program?	58%	24
Since participating in the program, have you developed plans to have the boilers tuned-up on a regular basis?	80%	10

4.5.11 Future Energy Efficiency Plans

Table 4-20 shows participant responses to questions about how the program may have influenced their decision-making about additional energy efficiency improvements.

Four survey respondents reported that since participating in the program they had implemented additional energy efficiency projects for which they did not apply or receive an incentive. Although these responses suggest that participation in the program is encouraging participants to adopt additional energy efficiency measures, these responses, in isolation, do not suggest a specific level of spillover attributable to the program. Determining participant spillover would require verification of the measures implemented and the quantification of the savings as well as the portion of the savings attributable to the program.

Additionally, 63% of respondents stated that given their experience with the program, they would implement energy efficiency improvements in the future even if financial incentives were not available. These findings suggest that participants' participation in the Boiler Tune-Up Program may effectively inform them of the benefits of making energy efficiency improvements in the future.

Table 4-20 Non-Incentivized Project Implementation

Question	*Percent of Respondents Saying Yes*	*n*
Since participating in the program, have you implemented any additional energy efficiency projects for which you did not apply or receive an incentive?	17%	24
Given your experience with the program, would you [tune-up boilers / install pipe insulation / repair or replace steam traps] in the future even if financial incentives for such projects were not being offered through a DCEO program?	63%	24

4.5.12 Participant Recommendations and Overall Impressions

At various points in the survey, respondents provided open-ended feedback about their experience with the Boiler Tune-Up Program and made recommendations for improving the program. Five participants stated that there was too long of a delay until they received the incentive payment, or that it was not received in full. Some respondents had been waiting for approximately five to six months and they still had not received the incentive payment.

In general, the respondents stated that correspondence and communication with the DCEO was sufficient, and that DCEO and SEDAC employees have been prompt and responsive. Participants stated that they were always able to obtain answers to their questions and assistance with completing the application.

However, one individual stated that DCEO employees were often uncoordinated with one another. This participant had worked with various DCEO agents, and stated that one agent asked for additional pieces of information that were not listed as requirements on the application. This respondent explained that each employee seemed to add additional requirements that they came up with individually, which increased the burden and frustration of completing the application.

4.6 Contractor Outcomes

Ten telephone interviews were completed with contractors who provide boiler tune-up services to public sector entities under the auspices of DCEO's Boiler Tune-Up Program. The interviews were conducted in July 2013, and respondents were chosen from contractors who completed projects through the program during the June 2012 to May 2013 program year. The contractors were asked questions about:

- How customers learned of the program and any training they may have participated in.
- The level of program awareness among customers and barriers to their participation.

- Their interactions with program staff.
- How they market the program to their customers and assessment of program marketing by program staff.
- The effect the program has had on their business.
- The adequacy of the incentives and the comprehensiveness of measures covered.
- Program satisfaction and suggestions for improvement.

4.6.1 Contractor Awareness and Training

Several of the contractors reported having first learned about the Boiler Tune-Up Program from utility companies, such as Nicor or Ameren, or from other contractors. Only one contractor recalled having been contacted directly by DCEO. Others noted that they learned about the program from searching for incentive and rebate programs online or through similar programs offered by the utilities. Some examples of these comments include:

> *I think it was through an email that I got from the DECO, if I remember right.*

> *Ameren Act on Energy Program. The opposite of the DCEO program for the private sector. I applied for some public sector funds through Ameren, and they told me I had to go through DCEO.*

> *I did some research online and I was looking for energy incentives. Sometimes we work with Ameren with energy incentives for our customers and I found the DCEO.*

Contractors were asked if they received any training when they began participating in the Boiler Tune-Up Program. Many of the contractors were not aware that training is available and even fewer reported having participated. The training that contractors reported attending was primarily related to training about the program, such as changes for a new program year or how the program works, rather than more technical aspects of tuning-up boilers. All of the contractors who had completed training stated that it had been useful.

> *Couple of webinars, basically on the program itself. I have done no education as far as equipment or building performance. Both times it was useful.*

Contractors who had not received any training indicated that such training would be useful. Interest in both technical and program training was expressed. Examples of these types of comments include:

> *No, I have not [attended training]. Something I would like to do. Training on the program or technical training on boiler tune-ups would be appealing to me."*

> *I personally have not. I'm not really aware of it. Obviously being educated on this program fully is a benefit for anybody involved in the program and surely would help your customers.*

4.6.2 Customer Awareness and Barriers to Participation

Boiler Tune-Up contractors reported that their customers are generally not aware of the Boiler Tune-Up Program until the contractors bring it to their attention. These responses suggest that the contractors are critical for driving activity in the program because they help to inform their customers of the incentives available. This is consistent with participant responses, where participants most commonly stated that they learned of the program from equipment vendors or contractors.

> *The majority of the customers that we've done, especially through DCEO, have only received the incentive because we told them about the program, not because they approached us and said hey I hear there's money out there. The majority of the DCEO customers that we've dealt with were not aware of the program, as compared to the Nicor and Peoples Gas private programs.*

> *Multiple customers have been aware, some have not been interested. I think more and more are getting educated on it, more and more will take advantage of it as their budget allows.*

In general, contractors had worked with the participants on other projects prior to participating in the Boiler Tune-Up Program. In these cases, the contractor recommended a tune-up and advised the customer that incentives and rebates were available to offset the cost of the tune-up. For other customers, the tune-up was the first work the contractor performed for the customer. Some of this boiler tune-up work has resulted from the contractors being identified on the DCEO website.

> *Most of them have been current customers that we've done additional work for. Some have been new customers that we've gotten an opportunity through the program and through being on their website as far as being a qualified contractor.*

According to interviewed contractors, the main barriers to participation are a lack of funds/tight budgets and a lack of knowledge about the need and benefit of making efficiency improvements. In this sense, both public sector organizations and private sector companies have the same barriers. However, funding is an ongoing problem for public sector entities and presents a barrier that is not easily solved. Even though the Boiler Tune-Up Program reimburses for the expenditures, and the decreased operating costs over the next several years provide an excellent payback on the investment, the organization must still come up with the initial funds to pay for the improvements. The other barrier, a lack of knowledge about the program and its services, is something that DCEO could impact favorably by promoting both the benefits of operating efficient boilers and the existence of the program.

> *Probably just lack of knowledge more than anything. Sometimes funding. School districts aren't receiving money that they used to. So that's definitely been an issue over the past couple of years.*

> *Money, time, resources. Public entities have fewer resources and funding is more of an issue. Everything is more reactive. At a private company, they are more pro-active, they focus on long-term costs instead of up-front costs plus they look at return on investment.*

They are a little more business oriented, and they typically have more staff and more resources.

It's a lot of money. Money is the main factor. They would like to do it but they just don't have the funds available. Sometimes there are customers that are set in their ways as well. They feel that they do not need the benefits I guess.

Contractors characterized the demand for participation in the Boiler Tune-Up Program as strong and as growing. Moreover, demand is expected to continue to grow as awareness of the program increases.

Every year we have grown tremendously and the program was an added incentive to help us reach that goal. I see nothing but positive things happening and I see business continuing to grow as long as these incentives are available.

I would believe the trend would be that as long as it's funded, it's going to continually increase. I think at first nobody knew about it. Now people do.

I would say strong and I would think it would remain stable, especially given the state the Illinois public schools are in and funding being cut and staff being cut.

4.6.3 Program Marketing

Generally, contractors actively market the program only to existing customers or to potential customers that they have specifically identified. The program is used as part of the information provided to existing customers and as part of the presentation to potential customers. Contractors reported that they emphasize the available incentives and that they offer to complete the application paperwork. Contractors also reported including program flyers with their invoices to customers.

[We market the program] informally. We kind of see ourselves as consultants to our customers. So if we can get work done for them and help them pay for it, that's a win-win for everybody. We do all the calculations, we submit the application, we do everything for them.

I just explain to them [that] the DCEO is currently offering the Boiler Tune-Up Program and previously it paid up to 75% [of the costs]. I invite them to look it up online. I plan on hopefully targeting a lot of schools this year [and] to fill out a lot more applications this year.

With our original customers, we want to make them aware of all the potential that's out there with the incentive money, so when we send invoices out, we'll send a flyer in there. From time to time, we meet with existing customers and introduce the program. DCEO people will make joint calls. We know a lot about boiler safety and incentives and what needs to be done, so normally I don't use them.

Contractors reported that they were only aware of limited program marketing by program staff, but contractors who were aware of this marketing viewed it favorably. Moreover, contractors

suggested that more could and should be done by program administrators to promote the program and that the DCEO Boiler Tune-Up Program uses less promotion than the utility run programs. .

> *There's not a whole lot of marketing for the program. Marketing it is really kind of left up to us, the contractors, as far as trying to get the word out there. Not a lot of people really know about the program.*

> *I don't think they go out and promote it as well as your utility companies do.*

One contractor noted that the program staff was effective in keeping contractors informed about program changes by email.

> *I think they do a pretty good job. Our staff gets emails quite often as far as improvements that they are doing on the program. They do offer the training session.*

4.6.4 Incentive Application Completion and Interactions with Program Staff

The number of applications completed under the Boiler Tune-Up Program ranges from two to as many as thirty or forty. Contractors stated that the application process itself is fairly straightforward, noting only a few difficulties with the process.

All of the contractors reported having completed similar projects through Nicor, Ameren and/or ComEd. DCEO's Boiler Tune-Up program compares quite favorably with the utility programs offered to private sector entities. Contractors noted that the DCEO's application is simpler, that DCEO staff responds to questions more quickly, and that turnaround time on rebates is often less than the turnaround time for the utility programs.

> *[DCEO's] program is a lot easier to understand than Ameren's and Nicor. You have simplified a lot of it where Ameren and Nicor require a lot more detail and sometimes un-needed detail. On the custom projects, if there was a question, it will be a week or two weeks before Ameren and Nicor will get back to you with someone who can answer the question or help you with the application. That isn't the case with DCEO; it's a very simplified application.*

> *Their turnaround time is sometimes worse than DCEO.*

Most of the contractors report having little interaction with program staff, but several contractors stated that they communicate with staff during the application process in order to have questions answered. The contractors often initially seek information on the DCEO website, and then email or call DCEO staff members if needed.

Program staff members are uniformly described as helpful, knowledgeable, and almost always responsive. The only criticism is that an occasional inquiry may take longer to get a response than the contractor would like.

> *I have questions from time to time on the application and just to make sure I'm doing all the paperwork right. I try the website first and if I can get my question answered through*

that, fine. Then I call one of those two guys. They are very responsive. I've had nothing but good dealings with them.

Maybe talk to one of the guys once every other week or so. I would usually call either [names of program staff]. Starting out they were pretty good about answering all the questions I had. Helpful, yes. Responsive, takes some time. I understand that here they are mildly understaffed. The length of time it takes to get a response is sometimes frustrating. But overall they've done a pretty good job of answering all my questions, eventually.

I do not have a whole lot of interaction. I usually go to the website. Program staff has been very responsive, very helpful. I usually get a response within a couple of hours.

4.6.5 Effect of the Boiler Tune-Up Program on Business

Contractors generally stated that DCEO's Boiler Tune-up Program helps them sell services. The program provides direct savings to customers who improve their boiler efficiency, which translates to a useful sales tool. Furthermore, contractors noted that their customers benefit from ongoing savings resulting from the improvements and that this helps convince them of the value of the project.

Right now schools are hurting for money. The state is anywhere from six months to eight months behind paying the bills so when you can get reduction in energy and it's very little out of pocket expense and then the payback is within that year, that's a no brainer. I know the incentive is good.

We consult our customers on how to be more energy efficient so this falls right into the energy efficiency realm as well as good preventative maintenance, and we give them a vehicle to help supplement the funding.

When I can save people money, they are more likely to go with a maintenance agreement and do the tune-up that's necessary but not have to pay full price.

Few contractors reported that the program affected the services or products that they offered, as most of them already provided boiler tune-up services prior to the program. The DCEO Program has made these tune-ups more attractive to public sector organizations and contractors reported seeing an increase in their business as a result of the program.

Business has been a lot better. With the incentive money, we've at least increased sales on tune-ups and related services by maybe least 30-35%.

I could see where it may lead to further analysis of maybe equipment that is coming to the end of its useful life or if there are other things that they discover while they are doing this tune-up [that are brought] to the customer's attention.

Contractors stated that prior to the tune-up, between 20% and 80% of their customers were already maintaining their boilers for optimal efficiency. After the tune up, however, those

estimates increase, especially if the contractor is able to place the customer on a maintenance program. The main reasons cited for not maintaining the boiler for optimal efficiency are a lack of knowledge about what is needed and the efficiencies that can be achieved, although a lack of money to pay for the improvements was also noted.

> *Lack of internal capability or manpower, lack of money to contract it out. Most budgets have gotten extremely tight in the public sector. Most have cut staff and cut spending on outside contracting.*
>
> *Money. Absolutely. I think in some cases it's just the lack of knowledge by the staff. Lack of knowledge. They're not always well educated.*
>
> *They typically will just do it depending on their budget. If they have enough money in the budget for the year, then they will do the tune-up.*

4.6.6 Incentives and Comprehensiveness of Measures

Contractors stated that the current incentive levels are adequate to encourage customers to make improvements. DCEO incentives compare favorably to incentives offered by the utility companies, although some contractors noted that the incentives had recently been capped.

> *[The incentives] are very reasonable compared to everybody else's incentives. It's probably one of the better programs out there.*
>
> *Most of the time, almost 100% of the time, it's going to cover up to the maximum cap which I think is 75% of the cost. For the most part what I've seen is they'll cover at least half the cost which is huge in most cases.*
>
> *I know it was up to 75% previously and now there's a cap of $1,600. I would like the tune-up program to cover up to 75% again.*

Most contractors had no suggestions for additional measures to be included. However, it appears that utility programs cover some equipment that the DCEO Program does not, namely trap rebuilds and steam condensate systems. Some contractors would like to see these items included.

> *They are covering most of it. They are on the leading edge. They are always looking and asking and I think that's good.*
>
> *Most of the measures that aren't in the program are found in their other program, which is their custom prescriptive program.*
>
> *Something that needs to be looked at as standard is the economizers. Ameren and DCEO both talk about traps with steam systems. I know trap re-builds are important. Need to spend some time talking about condensate systems and recovering some energy there. Maybe a stronger look at steam condensate systems.*

Contractors are aware that reset control and parallel positioning systems are now included in the Program. It appears that reset controls are a fairly standard recommendation, with many boilers

having had these controls installed already. Parallel positioning seems to be more expensive and installation is often recommended but not implemented. Lack of funding keeps many entities from implementing this measure.

> *I've only put two parallel positioning systems in. I have a couple more pending. Most of the customers have done reset a long time ago. Cost. Upfront cost [is why they are not implemented often].*

> *We haven't done any for any public facilities yet as far as the parallel positioning controls but with the incentive as big as it is, the rebate is very attractive. The project cost for something like that is pretty large, so they do get a lot of money back.*

4.6.7 Program Satisfaction and Areas of Improvement

Contractors were asked if they had received any feedback from their customers about the Boiler Tune-Up Program, and most indicated that customer feedback has generally been positive. Not surprisingly, customers like the idea of having a third party offset the cost of making their boiler operate more efficiently. The only negative feedback cited by contractors was the amount of time it takes to actually get the rebate check, which can vary from a very acceptable three to four weeks to many months, with no apparent reason for the difference. Contractors also expressed a need for training or conferences to be held closer to where the public sector organizations are located, rather than having the majority of them in Chicago.

> *Most of the feedback has been real good as far as getting boilers tuned up and everything. The only negative feedback that I've had, once again, is the delay in getting their incentive money.*

> *Yes, they were very happy. I think the payback was phenomenal, that this program pays for much of the cost to implement it, so they were really, really happy with the payback. On a negative side, just the turnaround because you do have to watch that.*

> *Limited educational conferences. Nothing in my geographical area.*

Overall, contractors are quite satisfied with the program. Several contractors would like to see additional measures included for reimbursement, and others would like the DCEO to be more responsive. Greater responsiveness may allow contractors to inform customers about when they will receive the incentive payment. Although the incentive turnaround time frame may not decrease, contractors would benefit from being able to provide customers with a specific time frame.

> *Very satisfied. Just on occasion it takes too long to get a response.*

> *Everything but the timing. DCEO, I think there's some educated people there, but getting in front of them is difficult.*

The primary suggestion for improving the program was to increase the marketing. Increased awareness would increase demand for boiler tune-up services, which would benefit contractors

and improve the efficiency of boilers, thus reducing energy demand. Some suggestions for improving the marketing included marketing the program to contractors associations and providing a service where potential participants could register for email tips on how to save energy or receive information about changes to the DCEO incentive programs. Some examples of these types of comments are:

> *I think it needs to be better known. I think they do less marketing than what Ameren or Nicor would do.*

> *Maybe better marketing so more people know. The more people that know about it, the more people would take advantage of it. Market it to contractors associations so they can offer it to their customers. Come up with fresh and new ideas where they can apply energy savings.*

> *I think possibly having a place people can register and sending out periodic emails to those customers and giving a reminder or a tip. Or especially if something has changed. Offer incentives for condensers and chillers and possibly incentives for replacement. A lot of schools that need a boiler tune-up or something don't realize that this is out there. I just got an email today letting me know the new program is out and there is actually a webinar that I can register for.*

Some contractors stated concerns about spending money to scope out a project and then potentially losing that project to another contractor once the participant organization places the project out for bid. If the contractor has spent the money to develop the project but they do not win the contract, they cannot recover those costs of preparation. It was suggested that DCEO prepare the project description for the organization, which would be followed by the bidding process. However, this would likely require program staff resources that are not available.

> *If I put a project together, and it exceeds a dollar amount, for example, for some of the local governments it's $10,000, and I put the project together and get it approved, procurement has a requirement that those jobs go out and be competitively bid. That needs to be addressed, because I put this project together and my competitor comes in and does the project. I don't get any reward out of putting it together. So I would almost suggest that DCEO, in places where that is going to take place, DCEO put the project together, put the packet out, send it out and contractors could bid on it.*

Most contractors interviewed had no suggestions regarding how to change or improve the application process. Two contractors, however, prefer to complete the application online rather than printing it out and completing a paper copy for submission.

> *If the application was in electronic form where we could put numbers in electronically versus handwriting because we end up sending it out to the field and they are writing all these numbers down and percentages and then it gets pretty messy and that's what we end up handing in.*

Other suggestions for changes include more timely approval and payment of incentives, earlier release of the program guidelines, and timely information about program changes. An example of these comments includes the following:

> *A lot of times when the new program starts, I believe it's the first of June, a lot of times they don't have the rules out until a few weeks later and it sure would be nice if you had the new rules out at the time the new season starts.*

4.7 Program Operations Perspective

This section summarizes the core findings of interviews conducted with the Energy Resources Center (ERC) Boiler Tune-Up Program staff, DCEO's implementation partner. ERC is primarily responsible for the administration and development of the Boiler Tune-Up Program.

In order to gather information regarding the operational efficiency and program delivery process for the Boiler Tune-Up Program, in-depth interviews were conducted by telephone with key ERC and DCEO program staff. The purpose of the interviews was to better understand how the program sets goals, administers program offerings, manages data, and facilitates partnerships.

Respondents discussed their perspective on program structure, operations, and marketing. The key findings from these discussions are summarized below:

- **Program Activity Lower than Expected**: Although program staff stated that the savings achieved during the program year were adequate, they were not as high as staff had initially hoped for. In particular, one large project for a school district fell through due to financial constraints.

  Additionally, GPY2 marked the first time that the program had offered incentives for parallel positioning systems and boiler reset controls, but no projects involving these measures were implemented during the program year. Program staff did note, however, that there had been a number of inquiries about the measures and the potential savings that could be realized through implementing them. The staff's perspective is that there is currently a lack of understanding about what these measures do and how they generate savings, but that the program will increase the uptake of these measures by educating the customer base over time.

- **Additional Program Objectives:** In addition to savings realized through incentivized measures, the program also seeks to encourage contractors to identify other potential savings projects while performing work on boiler equipment. Contractors can direct participants to implement other savings opportunities that can be funded through other DCEO incentive programs. Additionally, the Energy Resources Center has begun to administer a program that distributes low-flow pre-rinse spray valves, and contractors are encouraged to suggest that their customers acquire and implement these valves as appropriate.

The program also seeks to encourage better maintenance practices that improve energy efficiency and equipment reliability, measures that also reduce risks posed by carbon monoxide leaks.

- **Program Awareness:** Program staff noted that the level of awareness of the benefits of boiler maintenance varies among the employees within an organization. Maintenance staff and building operators tend to have greater awareness of the benefits than the administrators who allocate funds for maintenance budgets. In order to address this discrepancy between those who know of the benefits and those who make decisions about funding maintenance, program staff has taken steps to get more of these decision makers involved. For example, they have begun hosting webinars and attending meetings of park district, school, and municipal associations.

  Program staff has also sought to promote awareness of the program by encouraging satisfied participants to promote the program amongst their peers. Public sector organizations tend to collaborate with one another and share information about best practices. As an example of this strategy, a correctional facility staff member who frequently speaks with staff at other correctional facilities has been recruited to help promote the program to colleagues at these locations. This approach has enabled the program to get entry into facilities that would have otherwise been difficult to reach.

  The Boiler Tune-Up Program is also heavily promoted by contractors. In order to assist contractors with program promotion, program staff provides them with a marketing kit containing information about the program. Program staff noted that contractors have been particularly effective in promoting the program with schools. One of the noted reasons for this is that different schools have similar boiler equipment that contractors are comfortable working with. Program staff indicated that contractors' success with schools was particularly important because schools are a segment of the market that program staff has had difficulty reaching.

  Program staff also engages in a number of activities to promote the program, such as speaking at conferences and meetings of various professional groups in addition to directly marketing to specific potential participants. Staff indicated that they are particularly effective at reaching park districts and university campuses.

  To increase awareness, the program has begun to increase efforts to target prospective participants in market segments where they are seeing relatively less activity. Public hospitals and nursing homes are two types of public sector entities that are underrepresented in program participation. Program staff is attempting to increase participation from these organizations, but the limited number of past participants at these types of facilities has made this process difficult. Additionally, program staff is considering methods to target geographic areas that are also underrepresented in the program.

- **Facility Staff Typically Not Aware of Steam Trap Operational Conditions:** A potential barrier to participation is that facility staff members are not aware of the operational conditions of their steam traps. Program staff has considered offering an incentive to offset

the cost of a steam trap audit. However, concerns over whether or not a sufficient share of the audits would result in energy efficiency improvements have prevented the development of such an incentive. An alternative strategy pursued by the program staff has been to offer higher incentives on steam traps in order to offset the cost of the audit. Additionally, when discussing the program with interested parties, program staff members ask about various problems they have experienced with their boiler systems. These questions are used to gauge whether or not a problem exists with the steam traps.

- **Rebate Processing Delays Due to Funding Issues:** Program staff reported that the rebate processing contractor, Utilivate, typically processes the rebates fairly quickly. However, some rebates were processed late because program funding was depleted. The rebates could not be processed until a contract amendment had been completed to provide additional funding. Program staff encourages contactors to apply for pre-approval to ensure that there are sufficient funds available for projects so that this can be avoided in the future.
- **Changes to Incentives in Forthcoming Program Year:** Incentives for boiler tune-ups were decreased for the upcoming program year, GPY3, because the realized savings were less than expected from calculations using the Illinois Statewide Technical Reference Manual. Program staff decreased the incentives in order to ensure that they were not overpaying for energy savings.

  Another forthcoming change to program incentives is that program staff will allow the incentive to be paid directly to contractors. This will allow the contractor to reduce the price charged to their customers for the service, and may encourage contractors to further promote the program. This structure is particularly beneficial to schools because they typically pay the cost of the boiler service, but do not directly receive the incentive payment. In most cases, the incentive is sent to the school district rather than to the school that incurred the project cost.

5. Conclusions and Recommendations

The interviews that were conducted over the course of the program cycle provided a year-to-year perspective on program operations and effectiveness. As the program developed over the course of the three years, key stakeholders provided commentary that depicted the Tune-Up Program as a continually improving process that was gaining momentum. While program participation was relatively low in the first program year, the substantial increases in completed projects during each subsequent year illustrate this momentum and suggest that changes related to program operations and awareness have taken effect. Customers and trade allies who participated in the current program year indicated that they are looking forward to future program years and to participating in additional measure offerings. It is clear that the Tune-Up Program has taken hold as an important factor for energy efficiency in the DCEO service territory, and that there is strong potential for continued program awareness, acceptance, and participation in future years.

5.1 Key Conclusions

The following presents a selection of key findings from the program evaluation:

- **Modest Increase in Participation:** During GPY2, the number of program projects completed increased from 47 to 53. The size and scope of the projects, however, has decreased from GPY1. Consequently, realized therm savings were lower in GPY2 than in GPY1. Expected therm savings from GPY1 totaled 2,097,276.81, while GPY2 expected therm savings totaled 803,723.11.
- **Most Participants Satisfied with the Program:** The majority of survey respondents reported that they were satisfied with the program. Participants were most satisfied with the quality of the contractors' work and least satisfied with the time taken to receive rebates and the effort required for the application process. The lower level of satisfaction with the elapsed time until rebates were received was likely due to issues with the program budget that resulted in delays in the processing of rebates. At one point during the program year, the program exceeded its budget and a request for additional funds was made. The time required to process the additional request resulted in delayed rebate payments.

  Aside from the issues noted with receiving rebates, the program operated well from the participants' perspective. All of the respondents reported that the efficiency improvements met or exceeded their expectations. None of the participants reported that there were problems with the application process, the project implementation, or the work performed by their contractor.
- **Contractors are Satisfied with the Program:** Contractors were generally satisfied with the program. The application process was viewed as straightforward, and program staff members were considered to be helpful, knowledgeable, and responsive to questions. Contractors also noted that the program helped them to sell their services, which has had a positive effect on their businesses.

Contractors did suggest a few potential improvements in program operations. These included more program promotion by program staff, faster project approval and incentive payments, an earlier release of the annual program guidelines, and an application in an electronic format to enable online submission.

- **Program Primarily Marketed by Staff and Contractors:** Program staff reported that they promote the program at conferences and events which are well-attended by potential participants and contractors. The importance of promoting the program at conferences and events is reflected in the participant survey responses, as learning of the program by attending a conference, workshop, or seminar was a common response.

  In terms of program marketing, contractors reported that they promoted the program with their existing customers and potential new customer leads. Contractors primarily promoted the program by meeting with customers to explain it. One contractor reported including fliers with invoices sent to customers.

  Overall, program marketing has been effective in generating program activity. However, schools, universities, and local governments largely dominate program activity in terms of realized savings. While this may reflect the large potential savings at these types of facilities, program staff noted a need to increase participation from other public facilities such as hospitals and nursing homes. Additionally, some measures, such as boiler reset controls and parallel positioning systems, did not experience any activity, which may suggest a greater need to promote these measures.

- **Incentives are Adequate and Important for Efficiency Decision-Making:** The incentives offered through the DCEO Boiler Tune-Up Program compare favorably with similar programs offered to private sector entities by natural gas utilities. Moreover, contractors stated that the incentives were adequate to encourage customers to complete boiler tune-up projects. Most participants reported that they were satisfied with the incentives.

  Participant survey respondents highlighted the importance of financial incentives in their decisions to implement energy efficiency improvements. The majority of respondents indicated that financial incentives were very important to their decision-making, and that insufficient funding was a significant barrier to energy efficiency.

- **Financial Concerns Present Barriers to Program Participation:** Contractors consistently stated that financial concerns were the primary barrier to participating in the program. Despite the financial incentives and the potential financial payback from making the improvements, contractors noted that some organizations have difficulty acquiring initial funds to complete projects. Lack of awareness of the program and incentives was also noted as a barrier to participation. Despite these barriers, however, contractors stated that the demand for the program is strong and will remain strong as awareness of the program increases over time.

  Program staff has recognized that the upfront cost of the efficiency improvements may present a barrier to program participation. To help mitigate the impact of this barrier, a recent

change was made that allows contractors to discount the cost of their service and then receive the incentive payment directly, rather than requiring that the payment go to the participant.

- **Potential Longer-Term Energy Impacts through Better Maintenance:** Interviews with program participants and contractors who completed projects through the program suggest that the program may be producing longer-term energy savings by encouraging better boiler maintenance practices. Eighty percent of survey respondents who did not previously have a regular maintenance schedule for their boilers reported that they have developed one since participating in the program. Most of these participants stated that their participation in the program influenced their decision to perform regular maintenance on their boilers. Contractors estimated that between 20% and 80% of their customers were maintaining their boilers efficiently before participating in the program, but that some of these customers were motivated to better maintain the efficiency of their boilers after participating in the program. Moreover, some participants signed up for regular maintenance plans while participating in the program.
- **Small Number of Projects Account for Large Share of Savings:** Less than 20% of the projects completed through the Boiler Tune-Up Program accounted for 80% of the GPY2 realized gross therm savings.

5.2 Recommendations

In the interest of further program improvement, the following recommendations are offered:

- **Consider Offering Incentives for Steam Trap Audits:** Program staff noted that many prospective participants are not aware of the operational condition of their steam traps. Staff also noted that the lack of incentives for the audit could be a disincentive to participate for some. Offering incentives for steam trap audits may provide an effective means of identifying potential energy savings and encouraging public entities to make improvements to their boiler systems. Although there is risk in offering audit incentives because the audit does not directly produce savings, this risk could be mitigated by making payment of audit incentives conditional on repairing or fixing failed steam traps.
- **Improvements to Program Marketing:** Overall, the program marketing has been effective in generating consistent program participation. However, program contractors asserted that many potential participants are not aware of the program, and suggested that there are opportunities for improvement in program promotion. Contractors suggested targeting professional contractor groups to ensure that these businesses were aware of the program and could market it to their customers. Additionally, program staff has identified potential areas for improvement such as better outreach to public sector facilities currently underrepresented in the program such as public hospitals. Program staff is taking steps to improve their outreach efforts to these sectors.
- **Consider Online Applications:** Some of the interviewed contractors expressed interest in application forms that could be filled out and submitted online. The current application form exists as a static PDF which requires applicants to either a) print out the document, fill it out

by hand, and then scan/email it or send it through the postal service, or b) use the "Typewriter Tool" in Adobe Reader to overlay text on the form fields. In short, the application form is more difficult to fill out and submit than is necessary. The current application form would be enhanced if it had fillable form fields. With fillable form fields, applicants could download, fill out, and email the application form from their computers with minimal effort. In addition to considering usability issues, implementation staff is encouraged to consider making the application form more robust in its ability to process measure and project specific details, as well as to calculate potential incentives in real time.

The current application form is capable of gathering granular measure detail, for example, ID information, linear feet of pipe installed, and pipe width, all of which is essential to accurate analyses of program activity. However, in its current state, the form is capable of capturing information for only one project location. If the applicant has more than one project location, the form is inadequate in gathering those additional project details. A more robust application form would be capable of obtaining all project location details, as well as the accompanying measure detail. A viable alternative to a downloadable application form would be a web portal which allows applicants to fill out and electronically submit applications using an internet browser.

Appendix A: Questionnaire for Decision Maker Survey

1. Name of public entity

2. Your name (please correct if necessary)

3. What was your role in the decision to (Project Description) through the program?
   ( ) Main decision maker
   ( ) Assisted with the decision
   ( ) Was not part of the decision making process (If checked, ask 3A)

3A. Who was the main decision maker? If multiple people were responsible for the decision, please provide the name of the person you think is most knowledgeable about the decision making process regarding the (Project Description).

3B. What is this person's telephone number?

3C. What is this person's email address?

4. What are the main sources your organization relies on for information about energy efficient equipment, materials, practices, and design features? (check all that apply)
   ( ) A DCEO representative
   ( ) The DCEO website
   ( ) The Smart Energy Design Assistance Center (SEDAC)
   ( ) The Energy Resource Center (ERC)
   ( ) A utility representative
   ( ) Brochures or advertisements
   ( ) Trade associations or business groups you belong to
   ( ) Trade journals or magazines
   ( ) Friends and colleagues
   ( ) An architect, engineer, or energy consultant
   ( ) Equipment vendors or building contractors
   ( ) Other (please specify)

5. Which of the following policies or resources does your organization have in place regarding energy efficiency improvements at this facility? (check all that apply)
   ( ) An energy management plan (If checked, go to 5A)
   ( ) A staff member responsible for energy and energy efficiency
   ( ) Policies that incorporate energy efficiency in operations and procurement
   ( ) Active training of staff
   ( ) Other (please specify)
   ( ) Do not have policies or procedures for energy efficiency improvements

5A. Does your energy management plan include goals for energy savings?
- ( ) Yes (If checked, go to 5B)
- ( ) No
- ( ) Don't know

5B. Can you describe the goals specified in your energy management plan?

6. How does your organization decide to make energy efficiency improvements for this facility? Is the decision:
   - ( ) Made by one or two key people
   - ( ) Made by a group or committee
   - ( ) Based on staff recommendations to a decision maker
   - ( ) Made in some other way
   - ( ) Don't know

7. How does your organization fund energy efficiency improvements? (select all that apply)
   - ( ) Through a capital request (If checked, go to 7A)
   - ( ) Funds are taken from operation and maintenance budget
   - ( ) Dedicated funding for energy efficient projects
   - ( ) Other (please specify)
   - ( ) Don't know

7A. Is there a dollar threshold for when a project requires a capital request? If so, what is it?

7B. How long does it take to receive approval for the capital request?

8. In your organization, how long does it typically take to get approval for maintenance expenditures or equipment purchases?

9. What is the approval process for maintenance expenditures or equipment purchases in your organization? (select all that apply)
   - ( ) An open bid is required
   - ( ) Required to select lowest bidder
   - ( ) Use a specific vendor
   - ( ) Depends on the amount of purchase
   - ( ) Follow state or federal procurement guidelines
   - ( ) Follow procurement rules specific to our organization
   - ( ) Other (please specify)
   - ( ) Don't know

10. What barriers does your organization face in making energy efficiency improvements? (select all that apply)
    - ( ) Insufficient funding for improvements
    - ( ) Lack of information on energy efficient equipment and practices
    - ( ) Approval processes that are slow or make purchasing difficult
    - ( ) Schedules that dictate when equipment is to be replaced or maintained regardless of efficiency levels
    - ( ) Incentive program time requirements
    - ( ) Current equipment is too new to be replaced with more efficient equipment
    - ( ) Other (please specify)
    - ( ) Don't know

11. Is your organization able to utilize incentive or grant payments you receive for energy efficiency improvements, or are the payments placed in a general fund?
    - ( ) We are able to use the incentive payments for additional facility improvements including additional energy efficiency improvements
    - ( ) Incentive payments return to the facility general operating fund
    - ( ) Incentive payments go into the state general revenue fund
    - ( ) Other (please specify)
    - ( ) Don't know

12. How important are financial incentive payments from DCEO for your decision making regarding energy efficiency improvements?
    - ( ) Very important
    - ( ) Somewhat important
    - ( ) Only slightly important
    - ( ) Not important at all
    - ( ) Don't know

13. How important is past experience with energy efficient equipment or practices for your decision making regarding energy efficiency improvements?
    - ( ) Very important
    - ( ) Somewhat important
    - ( ) Only slightly important
    - ( ) Not important at all
    - ( ) Don't know

14. How important is advice and/or recommendations received from DCEO for your decision making regarding energy efficiency improvements?
    - ( ) Very important
    - ( ) Somewhat important
    - ( ) Only slightly important
    - ( ) Not important at all
    - ( ) Don't know

15. Which financial methods does your organization typically use to evaluate energy efficiency improvements for this facility? (Select all that apply)
    ( ) Initial Cost
    ( ) Simple payback (If checked, go to 15A)
    ( ) Internal rate of return (If checked, go to 15B)
    ( ) Life cycle cost (If checked, go to 15C)
    ( ) None of these
    ( ) Don't know

15A. What payback length of time do you normally require in order to proceed with an energy efficiency project? Please provide either a specific value or an estimated range.

15B. What rate of return do you normally require in order to proceed with an energy efficiency project? Please provide either a specific value or an estimated range.

15C. What discount rate do you normally apply when determining life cycle costs? Please provide either a specific value or an estimated range.

16. Has your organization completed any energy efficiency projects in the last three years for which you did not apply for a financial incentive through an energy efficiency program?
    ( ) Yes, completed energy efficiency projects but did not apply for incentive. (If checked, go to 16A)
    ( ) No projects were completed by the organization.
    ( ) No, an incentive was applied for. (If checked, go to 16B)
    ( ) Don't know

16A. Why didn't you apply for a financial incentive for that project?
    ( ) Didn't know whether project qualified for financial incentives
    ( ) Financial incentive was insufficient
    ( ) Didn't have time to complete paperwork for financial incentive application
    ( ) Too much paperwork for the financial incentive application
    ( ) Didn't know about financial incentives until after project was paid for
    ( ) Other (please specify)
    ( ) Don't know

16B. Did you receive all of your incentives for these past energy efficiency projects?
    ( ) Yes
    ( ) No
    ( ) Don't know

17. How did you learn of the Public Sector Natural Gas Boiler Tune-up Program? (select all that apply)
    - ( ) Approached directly by a representative of the Public Sector Natural Gas Boiler Tune-up Program
    - ( ) Received an information brochure on the Public Sector Natural Gas Boiler Tune-up Program
    - ( ) A DCEO representative mentioned it
    - ( ) The DCEO website
    - ( ) From a Smart Energy Design Assistance Center (SEDAC) representative
    - ( ) From an Energy Resource Center (ERC) representative
    - ( ) A utility representative
    - ( ) Friends or colleagues
    - ( ) An architect, engineer, or energy consultant
    - ( ) Attended a conference, workshop or seminar
    - ( ) An energy service company
    - ( ) Past experience with the program
    - ( ) Equipment vendors or building contractors
    - ( ) Other (please specify)
    - ( ) Don't know

18. When did you learn of the Public Sector Natural Gas Boiler Tune-up Program?
    - ( ) Before planning the (Project Description)
    - ( ) During your planning for the (Project Description)
    - ( ) Once a plan to (Project Description) was established, but before it was completed
    - ( ) After completing the (Project Description)
    - ( ) Don't know
    - ( ) Some other time (please explain)

19. Did you have a regular schedule for performing boiler maintenance prior to participating in the program?
    - ( ) Yes (If checked, go to 19A)
    - ( ) No (If checked, go to 19B)
    - ( ) Don't know

19A. What was the maintenance schedule?

19B. Since participating in the program, have you developed plans to perform regular boiler maintenance?
    - ( ) Yes (If checked, go to 19B1)
    - ( ) No
    - ( ) Don't know

19B1. How frequently do you plan on performing boiler tune ups in the future?

19B2. How much did your experience with the Boiler Tune-Up program influence your decision to develop plans to have the boilers tuned up on a regular basis?

( ) A lot
( ) Somewhat
( ) Not very much
( ) Not at all
( ) Don't know

(Ask if implemented boiler tune-ups)

20. Before participating in the Public Sector Natural Gas Boiler Tune-up Program, did you tune up any boilers?

( ) Yes
( ) No
( ) Don't know

21. Did you have plans to perform the boiler tune-up(s) before finding out about the Public Sector Natural Gas Boiler Tune-up Program?

( ) Yes (If checked, go to 21A)
( ) No
( ) Don't know

21A. How long before finding out about the Public Sector Natural Gas Boiler Tune-up Program did you have plans to tune up the boiler(s)? Did you have plans for…

( ) Less than 6 months
( ) 6 months to less than 1 year
( ) 1 year to less than 2 years
( ) 2 years to less than 5 years
( ) 5 or more years
( ) Don't know

21B. Would you have gone ahead with the boiler tune-ups even if you had not participated in the program?

( ) Yes
( ) No
( ) Don't know

22. How important was your previous experience with the DCEO programs in making your decision to tune up the boilers?

( ) Did not have previous experience with DCEO programs
( ) Very important
( ) Somewhat important
( ) Only slightly important
( ) Not at all important
( ) Don't know

23. Did a Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative recommend that you perform the boiler tune up(s)?
    ( ) Yes (If checked, go to 23A)
    ( ) No
    ( ) Don't know

23A. If the Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative had not recommended that you perform the boiler tune-up(s), how likely is it that you would have done it anyway?
    ( ) Definitely would have
    ( ) Probably would have
    ( ) Probably would not have
    ( ) Definitely would not have
    ( ) Don't know

24. Did a representative of the Smart Energy Design Assistance Center (SEDAC) recommend that you perform the boiler tune-up(s)?
    ( ) Yes (If checked, go to 24A)
    ( ) No
    ( ) Don't know

24A. If the SEDAC representative had not recommended that you perform the boiler tune-up(s), how likely is it that you would have done it anyway?
    ( ) Definitely would have
    ( ) Probably would have
    ( ) Probably would not have
    ( ) Definitely would not have
    ( ) Don't know

25. Would your organization have been financially able to perform the boiler tune-up(s) without the assistance from the Public Sector Natural Gas Boiler Tune-up Program?
    ( ) Yes
    ( ) No
    ( ) Don't know

26. If the financial incentives from the Public Sector Natural Gas Boiler Tune-up Program had not been available, how likely is it that you would have performed the boiler tune-ups anyway?
    ( ) Definitely would have
    ( ) Probably would have
    ( ) Probably would not have
    ( ) Definitely would not have
    ( ) Don't know

27. Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the quantity of boiler tune-up(s) that you performed? Did you tune-up more boilers than you otherwise would have without the program?
    ( ) Yes (If checked, go to 27A)
    ( ) No
    ( ) Don't know

27A. How many more tune-ups were performed because of the program?

28. Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the timing of the boiler tune-ups? Did you tune up the boilers sooner than you would have without the program?
    ( ) Yes (If checked, go to 28A)
    ( ) No
    ( ) Don't know

28A. When would you otherwise have tuned up the boiler(s)? Would you have done it in…
    ( ) Less than 6 months
    ( ) 6 months to less than 1 year
    ( ) 1 year to less than 2 years
    ( ) 2 years to less than 5 years
    ( ) 5 or more years
    ( ) Don't know

(Ask if installed pipe insulation)

29. Before participating in the Public Sector Natural Gas Boiler Tune-up Program, did you install any pipe insulation?
    ( ) Yes
    ( ) No
    ( ) Don't know

30. Did you have plans to install the pipe insulation before finding out about the Public Sector Natural Gas Boiler Tune-up Program?
    ( ) Yes (If checked, go to 30A)
    ( ) No
    ( ) Don't know

30A. How long before finding out about the Public Sector Natural Gas Boiler Tune-up Program did you have plans to install the pipe insulation? Did you have plans for…
    ( ) Less than 6 months
    ( ) 6 months to less than 1 year
    ( ) 1 year to less than 2 years
    ( ) 2 years to less than 5 years
    ( ) 5 or more years
    ( ) Don't know

30B. Would you have gone ahead with the installation of pipe insulation even if you had not participated in the program?
( ) Yes
( ) No
( ) Don't know

31. How important was your previous experience with the DCEO programs in making your decision to install the pipe insulation?
( ) Did not have previous experience with the DCEO programs
( ) Very important
( ) Somewhat important
( ) Only slightly important
( ) Not at all important
( ) Don't know

32. Did a Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative recommend that you install the pipe insulation?
( ) Yes (If checked, go to 32A)
( ) No
( ) Don't know

32A. If the Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative had not recommended that you install pipe insulation, how likely is it that you would have done it anyway?
( ) Definitely would have
( ) Probably would have
( ) Probably would not have
( ) Definitely would not have
( ) Don't know

33. Did a representative of the Smart Energy Design Assistance Center (SEDAC) recommend that you install the pipe insulation?
( ) Yes (If checked, go to 33A)
( ) No
( ) Don't know

33A. If the SEDAC representative had not recommended that you install the pipe insulation, how likely is it that you would have done it anyway?
( ) Definitely would have
( ) Probably would have
( ) Probably would not have
( ) Definitely would not have
( ) Don't know

34. Would your organization have been financially able to install the pipe insulation without the assistance from the Public Sector Natural Gas Boiler Tune-up Program?
    ( ) Yes
    ( ) No
    ( ) Don't know

35. If the financial incentives from the Public Sector Natural Gas Boiler Tune-up Program had not been available, how likely is it that you would have installed the pipe insulation anyway?
    ( ) Definitely would have
    ( ) Probably would have
    ( ) Probably would not have
    ( ) Definitely would not have
    ( ) Don't know

36. Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the quantity of pipe insulation that you installed? Did you install more pipe insulation than you otherwise would have without the program?
    ( ) Yes (If checked, go to 36A)
    ( ) No
    ( ) Don't know

36A. How much more pipe insulation was installed because of the program?

37. Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the timing of the installation of pipe insulation? Did you install the pipe insulation sooner than you would have without the program?
    ( ) Yes (If checked, go to 37A)
    ( ) No
    ( ) Don't know

37A. When would you otherwise have installed the pipe insulation? Would you have done it in…
    ( ) Less than 6 months
    ( ) 6 months to less than 1 year
    ( ) 1 year to less than 2 years
    ( ) 2 years to less than 5 years
    ( ) 5 or more years
    ( ) Don't know

(Ask if installed steam traps)

38. Before participating in the Public Sector Natural Gas Boiler Tune-up Program, did you repair or replace any malfunctioning steam traps?
    ( ) Yes
    ( ) No
    ( ) Don't know

39. Did you have plans to repair or replace the steam trap(s) before finding out about the Public Sector Natural Gas Boiler Tune-up Program?
    ( ) Yes (If checked, go to 39A)
    ( ) No
    ( ) Don't know

39A. How long before finding out about the Public Sector Natural Gas Boiler Tune-up Program did you have plans to repair or replace the steam trap(s)? Did you have plans for…
    ( ) Less than 6 months
    ( ) 6 months to less than 1 year
    ( ) 1 year to less than 2 years
    ( ) 2 years to less than 5 years
    ( ) 5 or more years
    ( ) Don't know

39B. Would you have gone ahead with the steam trap repair or replacement(s) even if you had not participated in the program?
    ( ) Yes
    ( ) No
    ( ) Don't know

40. How important was your previous experience with the DCEO programs in making your decision to repair or replace the steam trap(s)?
    ( ) Did not have previous experience with DCEO programs
    ( ) Very important
    ( ) Somewhat important
    ( ) Only slightly important
    ( ) Not at all important
    ( ) Don't know

41. Did a Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative recommend that you repair or replace the steam trap(s)?
    ( ) Yes (If checked, go to 41A)
    ( ) No
    ( ) Don't know

41A. If the Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative had not recommended that you repair or replace the steam trap(s), how likely is it that you would have done it anyway?
    ( ) Definitely would have
    ( ) Probably would have
    ( ) Probably would not have
    ( ) Definitely would not have
    ( ) Don't know

42. Did a representative of the Smart Energy Design Assistance Center (SEDAC) recommend that you repair or replace the steam trap(s)?
    ( ) Yes (If checked, go to 42A)
    ( ) No
    ( ) Don't know

42A. If the SEDAC representative had not recommended that you repair or replace the steam trap(s), how likely is it that you would have done it anyway?
    ( ) Definitely would have
    ( ) Probably would have
    ( ) Probably would not have
    ( ) Definitely would not have
    ( ) Don't know

43. Would your organization have been financially able to repair or replace the steam trap(s) without the assistance from the Public Sector Natural Gas Boiler Tune-up Program?
    ( ) Yes
    ( ) No
    ( ) Don't know

44. If the financial incentives from the Public Sector Natural Gas Boiler Tune-up Program had not been available, how likely is it that you would have repaired or replaced the steam trap(s) anyway?
    ( ) Definitely would have
    ( ) Probably would have
    ( ) Probably would not have
    ( ) Definitely would not have
    ( ) Don't know

45. Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the quantity of steam traps that you repaired or replaced? Did you repair or replace more steam traps than you otherwise would have without the program?
    ( ) Yes (If checked, go to 45A)
    ( ) No
    ( ) Don't know

45A. How many more steam traps were repaired or replaced because of the program?

46. Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the timing of the repair or replacement of the stream trap(s)? Did you repair or replace the steam trap(s) sooner than you would have without the program?
    ( ) Yes (If checked, go to 46A)
    ( ) No
    ( ) Don't know

46A. When would you otherwise have repaired or replaced the steam trap(s)? Would you have done it in…

( ) Less than 6 months
( ) 6 months to less than 1 year
( ) 1 year to less than 2 years
( ) 2 years to less than 5 years
( ) 5 or more years
( ) Don't know

47. Did you have any problems with the application process?

( ) Yes (If checked, go to 47A)
( ) No
( ) Don't know

47A. What problems did you have?

48. Did the (Project Description) go smoothly?

( ) Yes
( ) For the most part (If checked, go to 48A)
( ) No (If checked, go to 48A)
( ) Don't know

48A. Please explain in what ways the project did not go smoothly.

49. Did the (Project Description) meet your expectations?

( ) My expectations were exceeded
( ) My expectations were met
( ) My expectations were mostly met (If checked, go to 49A)
( ) My expectations were not met (If checked, go to 49A)
( ) Don't know

49A. Please explain in what ways the (Project Description) did not meet your expectations.

50. Do you feel that the contractor did a good job?

( ) Yes
( ) For the most part (If checked, go to 50A)
( ) No (If checked, go to 50A)
( ) Did not use a contractor
( ) Don't know

50A. Please explain in what ways you do not feel that the contractor did a good job.

51. Did the incentive that you received meet your expectations?

( ) Yes
( ) No (If checked, go to 51A)
( ) Don't know

51A. Please explain in what ways the incentive you received did not meet your expectations.

52. Were there any issues receiving the Public Sector Natural Gas Boiler Tune-up Program incentive?
- ( ) Yes (If checked, go to 52A)
- ( ) No
- ( ) Don't know

52A. Please describe the issues you had with receiving the Public Sector Natural Gas Boiler Tune-up Program incentive.

53. Was the incentive amount what you expected?
- ( ) Yes
- ( ) No (If checked, go to 53A)
- ( ) Don't know

53A. Please explain how the incentive amount differed from what you expected.

54. Since participating in the program, have you implemented any additional energy efficiency projects for which you did not apply or receive an incentive?
- ( ) Yes (If checked, go to 54A)
- ( ) No
- ( ) Don't know

54A. Please describe this energy efficiency project?

54B. Was this project implemented at the same facility (or facilities) as the (Project Description)?
- ( ) Yes
- ( ) No
- ( ) Don't know

54C. Did a recommendation from Public Sector Natural Gas Boiler Tune-up Program or DCEO staff member, or from a contractor influence your decision to implement the additional project?
- ( ) Yes (If checked, go to 54C1)
- ( ) No
- ( ) Don't know

54C1. How important was this recommendation to your decision to implement the additional energy efficiency project?
- ( ) Very important
- ( ) Somewhat important
- ( ) Neither important or unimportant
- ( ) Somewhat unimportant
- ( ) Unimportant
- ( ) Don't know

54D. How important was your experience with the Public Sector Natural Gas Boiler Tune-up Program to your decision to implement the additional energy efficiency project?

( ) Very important
( ) Somewhat important
( ) Neither important or unimportant
( ) Somewhat unimportant
( ) Unimportant
( ) Don't know

54E. How important was any past experience with energy efficiency programs to your decision to implement the additional energy efficiency project?

( ) Did not participate in any other programs in the past
( ) Very important
( ) Somewhat important
( ) Neither important or unimportant
( ) Somewhat unimportant
( ) Unimportant
( ) Don't know

54F. Why didn't you apply for or receive financial assistance or incentives for this project? (Check all that apply)

( ) Didn't know about financial incentives
( ) Didn't know whether the project qualified for financial incentives
( ) Financial incentive was insufficient
( ) No financial incentive was offered
( ) Too much paperwork for the financial incentive application
( ) Other reason (please describe)
( ) Don't know

55. Given your experience with the Public Sector Natural Gas Boiler Tune-up Program, would you have (Project Description) in the future even if financial incentives for such projects were not being offered through a DCEO program?

( ) Yes
( ) No
( ) Don't know

56. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied?

- Performance of the (project description) since the project was completed
- Savings on your monthly bill
- Incentive amount
- The effort required for the application process
- Quality of the contractor's work
- Information provided by the DCEO
- Information provided by the Smart Energy Design Assistance Center (SEDAC)
- Information provided by the Energy Resource Center (ERC)
- The elapsed time until you received the incentive
- Overall program experience

56A. (If dissatisfied or very dissatisfied for any) Please explain in what ways you were not satisfied with the program.

57. Do you have any other comments that you would like to relay to DCEO about energy efficiency in public entities or about its programs?

Appendix B: Decision Maker Survey Responses

As part of the evaluation work effort, a survey was conducted for a sample of decision makers representing facilities that received incentives under the Tune-up Program. This survey provided the information used in Chapter 3 to estimate free ridership for projects in the Tune-up Program. Additionally, the survey also provided more general information pertaining to the making of decisions to improve energy efficiency by program participants.

Each participant was interviewed using the survey instrument provided in Appendix A. The interviews were conducted by telephone or internet. During the interview, a participant was asked questions about (1) his or her general decision making regarding purchasing and installing energy efficient equipment, (2) his or her knowledge of and satisfaction with the Tune-Up Program, and (3) the influence that the Tune-Up Program had on his or her decision to make the energy efficiency improvements. The following tabulations summarize DCEO customer survey responses. Three columns of data are presented. The first column presents the number of survey respondents (*n)*. The second column presents the percentage of survey respondents.

3. What was your role in the decision to perform boiler tune-ups / install pipe insulation / repair or replace steam traps through the program?	*Response*	*(n=26)*	*Percent of Respondents*
	Main decision maker	13	50%
	Assisted with the decision	11	42%
	Was not part of the decision making process	2	8%

4. What are the main sources your organization relies on for information about energy efficient equipment, materials, practices, and design features? (check all that apply)	*Response*	*(n=24)*	*Percent of Respondents**
	A DCEO representative	3	13%
	The DCEO website	4	17%
	The Smart Energy Design Assistance Center (SEDAC)	4	17%
	The Energy Resource Center (ERC)	0	0%
	A utility representative	0	0%
	Brochures or advertisements	0	0%
	Trade associations or business groups you belong to	3	13%
	Trade journals or magazines	5	21%
	Friends and colleagues	5	21%
	An architect, engineer, or energy consultant	9	38%
	Equipment vendors or building contractors	8	33%
	Other (please describe)	9	38%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

5. Which of the following policies or resources does your organization have in place regarding energy efficiency improvements at this facility? (check all that apply)	*Response*	*(n=24)*	*Percent of Respondents**
	An energy management plan	6	25%
	A staff member responsible for energy and energy efficiency	8	33%
	Policies that incorporate energy efficiency in operations and procurement	7	29%
	Active training of staff	5	21%
	Other (please specify)	0	0%
	Do not have policies or procedures for energy efficiency improvements	13	54%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

5a. Does your energy management plan include goals for energy savings?	*Response*	*(n=6)*	*Percent of Respondents*
	Yes	5	83%
	No	1	17%
	Don't Know	0	0%

	Response	*(n=24)*	*Percent of Respondents*
6. How does your organization decide to make energy efficiency improvements for this facility? Is the decision:	Made by one or two key people	9	38%
	Made in some other way	2	8%
	Based on staff recommendations to a decision maker	5	21%
	Made by a group or committee	8	33%
	Don't know	0	0%

	Response	*(n=24)*	*Percent of Respondents**
7. How does your organization fund energy efficiency improvements? (select all that apply)	Through a capital request	7	29%
	Funds are taken from operation and maintenance budget	18	75%
	Dedicated funding for energy efficient projects	5	21%
	Other (please specify)	2	8%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

	Response	*(n=4)*	*Percent of Respondents*
7a. Is there a dollar threshold for when a project requires a capital request? If so, what is it?	Yes	4	100%
	Average Threshold if "Yes" (in Dollars)	$23,750	

	Average Number of Days, (n=4)	
7b. How long does it take to receive approval for the capital request?	Average	136.0

	Average Number of Days, (n=22)	
8. In your organization, how long does it typically take to get approval for maintenance expenditures or equipment purchases?	Average	49.2

	Response	*(n=24)*	*Percent of Respondents**
9. What is the approval process for maintenance expenditures or equipment purchases in your organization? (select all that apply)	An open bid is required	9	38%
	Required to select lowest bidder	10	42%
	Use a specific vendor	6	25%
	Depends on the amount of purchase	16	67%
	Follow state or federal procurement guidelines	10	42%
	Follow procurement rules specific to our organization	9	38%
	Other (please specify)	1	4%
	Don't know	0	0%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

	Response	*(n=24)*	*Percent of Respondents**
10. What barriers does your organization face in making energy efficiency improvements? (select all that apply)	Insufficient funding for improvements	18	75%
	Lack of information on energy efficient equipment and practices	4	17%
	Approval processes that are slow or make purchasing difficult	7	29%
	Schedules that dictate when equipment is to be replaced or maintained regardless of efficiency levels	5	21%
	Incentive program time requirements	4	17%
	Current equipment is too new to be replaced with more efficient equipment	6	25%
	Other (please specify)	2	8%
	Don't know	0	0%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

	Response	*(n=24)*	*Percent of Respondents*
11. Is your organization able to utilize incentive or grant payments you receive for energy efficiency improvements, or are the payments placed in a general fund?	We are able to use the incentive payments for additional facility improvements including additional energy efficiency improvements	13	54%
	Incentive payments return to the facility general operating fund	6	25%
	Incentive payments go into the state general revenue fund	1	4%
	Don't know	2	8%
	Other (please specify)	2	8%

	Response	*(n=24)*	*Percent of Respondents*
12. How important are financial incentive payments from DCEO for your decision making regarding energy efficiency improvements?	Very important	20	83%
	Somewhat important	4	17%
	Only slightly important	0	0%
	Not important at all	0	0%
	Don't know	0	0%

	Response	*(n=24)*	*Percent of Respondents*
13. How important is past experience with energy efficient equipment or practices for your decision making regarding energy efficiency improvements?	Very important	17	71%
	Somewhat important	6	25%
	Only slightly important	1	4%
	Not important at all	0	0%
	Don't know	0	0%

	Response	*(n=24)*	*Percent of Respondents*
14. How important is advice and/or recommendations received from DCEO for your decision making regarding energy efficiency improvements?	Very important	16	67%
	Somewhat important	8	33%
	Only slightly important	0	0%
	Not important at all	0	0%
	Don't know	0	0%

	Response	*(n=24)*	*Percent of Respondents**
15. Which financial methods does your organization typically use to evaluate energy efficiency improvements for this facility? (Select all that apply)	Initial Cost	13	54%
	Simple payback	9	38%
	Internal rate of return	11	46%
	Life cycle cost	11	46%
	None of these	1	4%
	Don't know	0	0%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

15a. What payback length of time do you normally require in order to proceed with an energy efficiency project? Please provide either a specific value or an estimated range.	*Average Number of Years, (n=7)*	
	Average	6.1

15b. What rate of return do you normally require in order to proceed with an energy efficiency project? Please provide either a specific value or an estimated range.	*Average Rate of Return, (n=3)*	
	Average	23%

15c. What discount rate do you normally apply when determining life cycle costs? Please provide either a specific value or an estimated range.	*Average Discount Rate, (n=4)*	
	Average	0.4

	Response	*(n=24)*	*Percent of Respondents*
16. Has your organization completed any energy efficiency projects in the last three years for which you did not apply for a financial incentive through an energy efficiency program?	Yes, completed energy efficiency projects but did not apply for incentive.	14	58%
	No projects were completed the by organization.	3	13%
	No, an incentive was applied for.	5	21%
	Don't know	2	8%

	Response	*(n=14)*	*Percent of Respondents**
16a. Why didn't you apply for a financial incentive for that project?	Didn't know whether project qualified for financial incentives	3	21%
	Financial incentive was insufficient	0	0%
	Didn't have time to complete paperwork for financial incentive application	1	7%
	Too much paperwork for the financial incentive application	0	0%
	Didn't know about financial incentives until after project was paid for	6	43%
	Other (please specify)	3	21%
	Don't know	1	7%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

	Response	*(n=5)*	*Percent of Respondents*
16b. Did you receive all of your incentives for these past energy efficiency projects?	Yes	3	60%
	No	2	40%
	Don't Know	0	0%

	Response	*(n=24)*	*Percent of Respondents**
17. How did you learn of the Public Sector Natural Gas Boiler Tune-up Program? (select all that apply)	Approached directly by a representative of the Public Sector Natural Gas Boiler Tune-up Program: How did you learn of the Public Sector Natural Gas Boiler Tune-up Program? (Do not read list. Check all that apply)	0	0%
	Received an information brochure on the Public Sector Natural Gas Boiler Tune-up Program	0	0%
	A DCEO representative mentioned it	0	0%
	The DCEO website	6	25%
	From a Smart Energy Design Assistance Center (SEDAC) representative	1	4%
	From an Energy Resource Center (ERC) representative	0	0%
	A utility representative	0	0%
	Friends or colleagues	3	13%
	An architect, engineer, or energy consultant	1	4%
	Attended a conference, workshop or seminar	6	25%
	An energy service company	0	0%
	Past experience with the program	2	8%
	Equipment vendors or building contractors	9	38%
	Other (please specify)	4	17%
	Don't know	1	4%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

	Response	*(n=24)*	*Percent of Respondents*
18. When did you learn of the Public Sector Natural Gas Boiler Tune-up Program?	Before planning the boiler project	18	75%
	During your planning for the boiler project	5	21%
	Once a plan to implement was established, but before it was completed	1	4%
	After completing the boiler project	0	0%
	Some other time (please explain)	0	0%
	Don't know	0	0%

	Response	*(n=24)*	*Percent of Respondents*
19. Did you have a schedule for performing boiler maintenance prior to participating in the program?	Yes	14	58%
	No	10	42%
	Don't Know	0	0%

	Response	*(n=10)*	*Percent of Respondents*
19B. Since participating in the program, have you developed plans to perform regular boiler maintenance?	Yes	8	80%
	No	2	20%
	Don't Know	0	0%

	Future Frequency of Tune-ups, (n=8)	
19B1. How frequently do you plan on performing boiler tune ups in the future?	Average	0.7

	Response	*(n=8)*	*Percent of Respondents*
19B2. How much did your experience with the Boiler Tune-Up program influence your decision to develop plans to have the boilers tuned up on a regular basis?	A lot	6	75%
	Somewhat	1	13%
	Not very much	0	0%
	Not at all	0	0%
	Don't know	1	13%

	Response	*(n=26)*	*Percent of Respondents**
20, 29, & 38. Before participating in the Public Sector Natural Gas Boiler Tune-up Program, did you tune up any boilers / install pipe insulation / repair or replace steam traps?	Yes	17	65%
	No	6	23%
	Don't Know	3	12%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

	Response	*(n=26)*	*Percent of Respondents**
21, 30, & 39. Did you have plans to perform the boiler tune-up(s)/ install pipe insulation / repair or replace steam traps before finding out about the Public Sector Natural Gas Boiler Tune-up Program?	Yes	14	54%
	No	12	46%
	Don't Know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

21a, 30a, & 39a. How long before finding out about the Public Sector Natural Gas Boiler Tune-up Program did you have plans to tune up the boiler(s) / install pipe insulation / repair or replace steam traps? Did you have plans for…	*Response*	*(n=14)*	*Percent of Respondents**
	Less than 6 months	6	43%
	6 months to less than 1 year	3	21%
	1 year to less than 2 years	3	21%
	2 years to less than 5 years	2	14%
	5 or more years	0	0%
	Don't know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

21b, 30b, & 39b. Would you have gone ahead with the boiler tune-ups / installation or pipe insulation / repair or replace steam traps even if you had not participated in the program?	*Response*	*(n=17)*	*Percent of Respondents**
	Yes	11	65%
	No	4	24%
	Don't Know	2	12%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

22, 31, & 40. How important was your previous experience with the DCEO programs in making your decision to tune up the boilers / install pipe insulation / repair or replace steam traps?	*Response*	*(n=26)*	*Percent of Respondents**
	Very important	11	42%
	Somewhat important	5	19%
	Only slightly important	1	4%
	Did not have previous experience with DCEO programs	8	31%
	Not important at all	1	4%
	Don't know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

23, 32, & 41. Did a Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative recommend that you perform the boiler tune up(s) / install pipe insulation / repair or replace steam traps?	*Response*	*(n=26)*	*Percent of Respondents**
	Yes	9	35%
	No	16	62%
	Don't Know	1	4%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

23a, 32a, & 41a. If the Public Sector Natural Gas Boiler Tune-up Program or other DCEO representative had not recommended that you perform the boiler tune-up(s) / install pipe insulation / repair or replace steam traps, how likely is it that you would have done it anyway?	*Response*	*(n=9)*	*Percent of Respondents**
	Definitely would have	3	33%
	Probably would have	2	22%
	Probably would not have	3	33%
	Definitely would not have	1	11%
	Don't know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

24, 33, & 42. Did a representative of the Smart Energy Design Assistance Center (SEDAC) recommend that you perform the boiler tune-up(s) / install pipe insulation / repair or replace steam traps?	*Response*	*(n=26)*	*Percent of Respondents**
	Yes	6	23%
	No	17	65%
	Don't Know	3	12%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

24a, 33a, & 42a. If the SEDAC representative had not recommended that you perform the boiler tune-up(s) / install pipe insulation / repair or replace steam traps, how likely is it that you would have done it anyway?	*Response*	*(n=6)*	*Percent of Respondents**
	Definitely would have	2	33%
	Probably would have	2	33%
	Probably would not have	1	17%
	Definitely would not have	1	17%
	Don't know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

25, 34, & 43. Would your organization have been financially able to perform the boiler tune-up (s) / install pipe insulation / repair or replace steam traps without the assistance from the Public Sector Natural Gas Boiler Tune-up Program?	*Response*	*(n=26)*	*Percent of Respondents**
	Yes	13	50%
	No	11	42%
	Don't Know	2	8%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

26, 35, & 44. If the financial incentives from the Public Sector Natural Gas Boiler Tune-up Program had not been available, how likely is it that you would have performed the boiler tune-up (s) / install pipe insulation / repair or replace steam trapsanyway?	*Response*	*(n=26)*	*Percent of Respondents**
	Definitely would have	6	23%
	Probably would have	8	31%
	Probably would not have	10	38%
	Definitely would not have	2	8%
	Don't know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

27, 36, & 45. Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the quantity of measures installed? Did you install more than you otherwise would have without the program?	*Response*	*(n=26)*	*Percent of Respondents**
	Yes	15	58%
	No	11	42%
	Don't Know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

28, 37, & 46. Did the availability of information and financial incentives through the Public Sector Natural Gas Boiler Tune-up Program affect the timing of the measures installed? Did you complete the project sooner than you would have without the program?	*Response*	*(n=22)*	*Percent of Respondents**
	Yes	15	68%
	No	7	32%
	Don't Know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

28a., 37a, & 46a When would you otherwise tuned up the boiler(s) / installed pipe insulation / repaired or replaced steam traps?	*Response*	*(n=17)*	*Percent of Respondents**
	Less than 6 months	2	12%
	6 months to less than 1 year	5	29%
	1 year to less than 2 years	7	41%
	2 years to less than 5 years	1	6%
	5 or more years	2	12%
	Don't know	0	0%

*Each decision maker may have answered more than one time. Questions may have been repeated for each measure type implemented.

47. Did you have any problems with the application process?	*Response*	*(n=24)*	*Percent of Respondents*
	Yes	0	0%
	No	24	100%
	Don't Know	0	0%

48. Did the project go smoothly?	*Response*	*(n=24)*	*Percent of Respondents*
	Yes	24	100%
	No	0	0%
	For the most part	0	0%
	Don't Know	0	0%

49. Did the project meet your expectations?	*Response*	*(n=24)*	*Percent of Respondents*
	My expectations were exceeded	8	33%
	My expectations were met	16	67%
	My expectations were mostly met	0	0%
	My expectations were not met	0	0%
	Don't know	0	0%

50. Do you feel that the contractor did a good job?	*Response*	*(n=24)*	*Percent of Respondents*
	Yes	23	96%
	For the most part	0	0%
	No	0	0%
	Don't know	1	4%
	Did not use a contractor	0	0%

51. Did the incentive that you received meet your expectations?	*Response*	*(n=24)*	*Percent of Respondents*
	Yes	17	71%
	No	5	21%
	Don't Know	2	8%

52. Were there any issues receiving the Public Sector Natural Gas Boiler Tune-up Program incentive?	*Response*	*(n=24)*	*Percent of Respondents*
	Yes	6	25%
	No	16	67%
	Don't Know	2	8%

53. Was the incentive amount what you expected?	*Response*	*(n=24)*	*Percent of Respondents*
	Yes	18	75%
	No	5	21%
	Don't Know	1	4%

54. Since participating in the program, have you implemented any additional energy efficiency projects for which you did not apply or receive an incentive?	*Response*	*(n=24)*	*Percent of Respondents*
	Yes	4	17%
	No	20	83%
	Don't Know	0	0%

54b. Was this project implemented at the same facility (or facilities) as the [Project Description]?	*Response*	*(n=4)*	*Percent of Respondents*
	Yes	3	75%
	No	1	25%
	Don't Know	0	0%

54c. Did a recommendation from Public Sector Natural Gas Boiler Tune-up Program or DCEO staff member, or from a contractor influence your decision to implement the additional project?	*Response*	*(n=4)*	*Percent of Respondents*
	Yes	1	25%
	No	3	75%
	Don't Know	0	0%

54c1. How important was this recommendation to your decision to implement the additional energy efficiency project?	*Response*	*(n=1)*	*Percent of Respondents*
	Very important	0	0%
	Somewhat important	1	100%
	Neither important or unimportant	0	0%
	Somewhat unimportant	0	0%
	Unimportant	0	0%
	Don't know	0	0%

	Response	*(n=4)*	*Percent of Respondents*
54d. How important was your experience with the Public Sector Natural Gas Boiler Tune-up Program to your decision to implement the additional energy efficiency project?	Very important	0	0%
	Somewhat important	2	50%
	Neither important or unimportant	2	50%
	Somewhat unimportant	0	0%
	Unimportant	0	0%
	Don't know	0	0%

	Response	*(n=4)*	*Percent of Respondents*
54E. How important was any past experience with energy efficiency programs to your decision to implement the additional energy efficiency project?	Very important	3	75%
	Somewhat important	1	25%
	Neither important or unimportant	0	0%
	Somewhat unimportant	0	0%
	Unimportant	0	0%
	Don't know	0	0%

	Response	*(n=4)*	*Percent of Respondents**
54f. Why didn't you apply for or receive financial assistance or incentives for this project? [Check all that apply]	Didn't know about financial incentives	0	0%
	Didn't know whether the project qualified for financial incentives	0	0%
	Financial incentive was insufficient	0	0%
	No financial incentive was offered	2	50%
	Too much paperwork for the financial incentive application	1	25%
	Other reason (please describe)	1	25%
	Don't know	0	0%

*Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.

	Response	*(n=24)*	*Percent of Respondents*
55. Given your experience with the Public Sector Natural Gas Boiler Tune-up Program, would you implement the measures in the future even if financial incentives for such projects were not being offered through a DCEO program?	Yes	15	63%
	No	5	21%
	Don't Know	4	17%

56a. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - Performance of the [boiler tune-up(s)/ install pipe insulation / repair or replacement of steam traps] since the project was completed?	*Response*	*(n=24)*	*Percent of Respondents**
	5	16	67%
	4	8	33%
	3	0	0%
	2	0	0%
	1	0	0%
	Don't know / Not Applicable	0	0%
	Average		4.7

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

56b. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - Savings on your monthly bill?	*Response*	*(n=24)*	*Percent of Respondents**
	5	8	33%
	4	11	46%
	3	0	0%
	2	0	0%
	1	0	0%
	Don't know / Not Applicable	5	21%
	Average		4.4

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

56c. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - Incentive amount?	*Response*	*(n=24)*	*Percent of Respondents**
	5	12	50%
	4	7	29%
	3	1	4%
	2	2	8%
	1	0	0%
	Don't know / Not Applicable	2	8%
	Average		4.3

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

56d. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - The effort required for the application process?	*Response*	*(n=24)*	*Percent of Respondents**
	5	11	46%
	4	10	42%
	3	2	8%
	2	0	0%
	1	0	0%
	Don't know / Not Applicable	1	4%
	Average		4.4

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

	Response	*(n=24)*	*Percent of Respondents**
56e. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - Quality of the contractor's work?	5	19	79%
	4	4	17%
	3	0	0%
	2	0	0%
	1	0	0%
	Don't know / Not Applicable	1	4%
	Average		4.8

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

	Response	*(n=24)*	*Percent of Respondents**
56f. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - Information provided by DCEO?	5	17	71%
	4	7	29%
	3	0	0%
	2	0	0%
	1	0	0%
	Don't know / Not Applicable	0	0%
	Average		4.7

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

	Response	*(n=24)*	*Percent of Respondents**
56g. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - Information provided by the Smart Energy Design Assistance Center (SEDAC)?	5	13	54%
	4	7	29%
	3	0	0%
	2	0	0%
	1	0	0%
	Don't know / Not Applicable	4	17%
	Average		4.7

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

	Response	*(n=24)*	*Percent of Respondents**
56h. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - Information provided by the Energy Resource Center?	5	9	38%
	4	7	29%
	3	0	0%
	2	0	0%
	1	0	0%
	Don't know / Not Applicable	8	33%
	Average		4.6

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

	Response	*(n=24)*	*Percent of Respondents**
56i. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - The elapsed time until you received the incentive?	5	11	46%
	4	5	21%
	3	0	0%
	2	2	8%
	1	3	13%
	Don't know / Not Applicable	3	13%
	Average		3.9

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

	Response	*(n=24)*	*Percent of Respondents**
56j. How would you rate your satisfaction with the following - Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied - Overall program experience?	5	16	67%
	4	6	25%
	3	1	4%
	2	0	0%
	1	0	0%
	Don't know / Not Applicable	1	4%
	Average		4.7

*Each response was assigned a numerical value from one to five (5=Very Satisfied, 4=Satisfied, 3=Neither Satisfied nor Dissatisfied, 2=Dissatisfied, 1=Very Dissatisfied)

Appendix C: Contractor Interview Guide

1. What share of your customers are public sector organizations?

2. How did you learn about the DCEO Boiler Tune-Up Program?

3. How much interaction do you have with program staff?

   3A. With whom do you interact?

   3B. If you have a question about the program, where do you go to find the information?

   3C. How responsive and helpful are program staff?

4. How many incentive applications has your firm assisted in the completion of or actually completed yourself?

   4A. Are there any aspects of the Boiler Tune-Up incentive application process that you would recommend be modified?

   4B. In what ways would you recommend the application process be changed?

5. Are there any other aspects of the program participation process that you would recommend be modified? [Planning phase, implementation phase, verification phase]

   5A. What works well?

   5B. What are challenges with the process?

6. Have you received any feedback from participants about the program?

   6A. If so, what?

7. Have you completed any projects through programs offered by the gas utilities (i.e., Nicor, Ameren Gas, Peoples Gas, North Shore)?

   7A. Do you think there is anything DCEO could learn from those programs to improve the Boiler Tune-Up program? What would that be?

8. Did you have a prior working relationship with the customers for whom you have performed boiler tune-up services in the past year?

   8A. Please explain.

9. Does the Boiler Tune-Up Program help you to sell your services or products?

9A. In what ways does the Boiler Tune-Up Program help you to see your services or products?

10. Has your involvement in the Boiler Tune-Up Program affected the types of equipment or services that you provide?

10A. In what ways has your involvement in the Boiler Tune-Up Program affected the types of equipment or services that you provide?

11. About what percentage of your customers adequately maintain their boiler equipment for optimal efficiency?

11A. Why don't customers maintain their equipment for optimal efficiency? [Possible prompts: insufficient staff resources, insufficient financial resources, lack of awareness of energy efficiency benefits, lack of awareness of how to improve efficiency through maintenance?]

12. Do you find that customers are generally aware of the Boiler Tune-Up Program, or is it more frequently something that you bring to their attention?

13. Have you participated in any training provided by the program?

13A. If so, was this training about how the program works or about technical aspects of completing boiler tune-up projects?

13B. How useful was the training?

14. What do you think are the main barriers faced by your clients to making energy efficiency improvements to their boiler equipment?

14A. Are the barriers different for different kinds of organizations?

14B. What could be done to overcome these barriers?

15. What do you view as the main barriers to participating in the boiler tune-up program?

15A. Are the barriers different for different kinds of organizations?

15B. What could be done to overcome these barriers?

16. What do you perceive to be the demand for the services provided by the program?

17. Do you actively market or promote the Boiler Tune-Up Program to your customers?

17A. Through what means do you actively market the Boiler Tune-Up Program to your customers?

18. How well do program staff promote the Boiler Tune-Up Program?

    18A. How could the Boiler Tune-Up Program be marketed more effectively?

19. Are the incentive levels adequate to encourage customers to make improvements to their boiler equipment?

    19A. Are there specific measures offered through the boiler-tune up program for which incentives should be higher?

    19B. For which measures should customers receive higher incentives?

20. Are there additional boiler efficiency measures that you think should be included in the Boiler Tune-Up program? What are they?

21. Were you aware that the Boiler Tune-Up program now offers incentives for boiler reset controls and parallel positioning control systems?

    21A. Have you recommended these measures to your customers?

    21Ai. [If has recommended] How frequently do your customers install reset controls and parallel positioning systems?

    21Aii. What reason do customers give for not installing the recommended reset controls and parallel positioning systems?

    21B. [If has not recommended] Why have you not recommended these measures to your customers?

22. Based on your experience this year, approximately what percentage of the projects that you sell or install do you estimate will apply for project incentives?

23. How satisfied are you with your experiences in working with the program?

    23A. Please describe in what ways you were not satisfied with the program.

24. How do you think the program can be improved?

25. What changes need to be made to the role that contractors play in the program?

26. Is there anything else you would like to tell us about your experience with the Boiler Tune-Up Program?