PA Consulting Group

State of Wisconsin Public Service Commission of Wisconsin

Focus on Energy Evaluation

Business Programs: Measure Life Study

Final Report: August 25, 2009

Evaluation Contractor: PA Consulting Group Inc.

Prepared by: Miriam L. Goldberg, J. Ryan Barry, Brian Dunn, Mary Ackley, Jeremiah Robinson, and Darcy Deangelo-Woolsey, KEMA

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KEMA

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1. EXECUTIVE SUMMARY

1.1 OVERVIEW OF STUDY OBJECTIVES

The principal objective of this study was to update the current measure life estimates used by the Focus Evaluation Team and the Focus Program. The evaluation team's approach to this study consisted entirely of secondary research; the team did not conduct primary research, fieldwork, or produce a savings persistence study.

Measure life is an estimate of the median length of time an energy efficiency measure is installed before it is replaced or upgraded. It is an important component of the benefit-cost analysis and the life cycle net savings (LCNS) alternative attribution analysis methodology[1]. The energy savings benefits obtained as a result of a given program are limited by the length of time an energy efficiency measure is installed and operating. Measure life estimates currently being used by the Business Program (BP) portion of the benefit-cost analysis are potentially outdated, lacking source documentation, and could be defined at a more detailed level for some technologies or groups of technologies. Given the importance of measure life as an input to the benefit-cost analysis and LCNS method, KEMA updated the current measure life estimates to contribute to improved accuracy of these analyses and appropriate representation of program benefits.

As a secondary objective, KEMA outlined the quality of information that could potentially be gathered through an exploratory phone survey with past Focus on Energy participants. This outline included the recommended measure groups for further study, information that could be gathered, and the potential increase in the quality of the final result.

1.2 UPDATES TO MEASURE LIFE ESTIMATES

The primary objective of the study was to update the measure life estimates. Measure life estimates currently being used by the Business Program portion of the benefit-cost analysis are based on a previous Energy Center of Wisconsin (ECW) technical potential study[2] and information collected during the FY07 program year from the California Database for Energy Efficient Resources (DEER). For this study, we reviewed existing studies, databases, and other sources to estimate measure life for equipment by end-use and when possible by WISeerts group description and tech code level. The estimates currently being used vary by end-use and by program sector. Table 1-1 summarizes the current measure life estimates.

[1] The Focus on Energy Evaluation Team. *State of Wisconsin Public Service Commission, Focus on Energy Evaluation, Evaluation Calendar Year 2009, Detailed Evaluation Plan.* April 21, 2009.

[2] Energy Center of Wisconsin. *Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2006–2015.* November 2005.

Table 1-1. Current Measure Life Estimates[3]

End-use Category	Sector			
	Agricultural	Commercial	Industrial	Schools and Government
Building Shell	10	10	10	10
HVAC	15	15	15	15
Lighting	15	15	15	15
Manufacturing Process	12	12	12	12
Other	17	19	28	10
CFL	6	6	6	6
Motors	16	16	16	16

The current measure life estimates do not differentiate between life for equipment or technology measure and life of service measures. Savings for equipment or technology measure are related to the design or implementation of a device, control, or system. In contrast, savings for service measures are obtained through tuning equipment for optimal performance. Service measures generally need to be performed several times over the life of the equipment to maintain the savings. These could include boiler tune-ups, chiller tune-ups, compressed air leakage repair, and steam trap maintenance. As a result, equipment or technology measure life tends to be much longer than service measure life. If a weighted average measure life estimate is calculated based on the current mix of measure savings, bias will be introduced into life cycle net savings and benefit cost analysis if the mix of measure savings changes in the future. To minimize this potential, we found measure life estimates for both types of measures.

1.2.1 Methods

To update the measure life estimates, a team of KEMA engineers reviewed secondary sources to find current data on measure life. We reviewed existing studies, workpapers, and technical guides to obtain relevant data. To find as many relevant sources as possible, we encouraged the Public Service Commission of Wisconsin (PSCW) and the Focus Program to provide sources or leads to sources. When possible, we also reviewed the underlying sources and empirical data to understand the strength of the source.

KEMA gathered data at the technology code level then aggregated the data into end-use categories and WISeerts group descriptions.[4] Some sources (e.g., DEER) provide data for very specific measures. The aggregation into WISeerts group descriptions and end-use

[3] The Focus on Energy Evaluation Team. *State of Wisconsin Public Service Commission, Focus on Energy Evaluation, Semiannual Report (18-month Contract Period).* April 8, 2009.

[4] Focus on Energy measures are tracked in the WISeerts database at a technology code level. There are over 700 technology codes currently in use. These technology codes are further classified by end-use categories and WISeerts group descriptions. Appendix B lists the measures by technology code and indicates the associated WISeerts group description.

categories was done using the historical program savings from the period of January 2008 to September 2008 as weights for individual measures. The end-use categories and WISeerts group descriptions are used by the Focus Program for program planning and by the evaluation team for analyses such as impact evaluation, benefit cost, and LCNS.

The measure life estimates reported in the secondary sources were determined through a number of methods such as field research, secondary research based on field research, lab study, and professional collaboration and estimation. KEMA assessed the validity and applicability of each measure life estimate by reviewing the underlying sources or supporting research. Where a measure life estimate was not applicable to Focus on Energy measures, we excluded the finding from our results. For measure life estimates that were applicable to Focus measures, KEMA assigned a rating to define the basis of the estimate. The rating shows if the source of the estimate was primary research, secondary research, or professional judgment. The rating helped to determine which estimate(s) would provide the most value to updating the existing BP measure life estimate.

Following the assessment of the secondary sources, KEMA estimated a measure life for each measure based on the sources with the best ratings. We looked for estimates that were consistent between sources. When estimates from different sources were substantially different, we used the estimate with the best source rating. When there were multiple sources with the same best rating, we used the average of the associated ratings. The measure level estimates of measure life were then aggregated to end-use and WISeerts group description. The end-use and WISeerts group description measure life estimates were calculated separately for service measures and technology/equipment measures. The service measures include, but are not limited to, boiler tune-ups, chiller tune-ups, compressed air leakage repair and steam trap maintenance. The aggregated estimates are weighted averages of the measure life by individual tech code. The weights are based on avoided cost of generation of the savings from January 1, 2008, to September 30, 2008, of the 18-month Contract Period (18MCP).

1.2.2 Results

The secondary research showed a lack of primary research on measure life for many technologies. In addition, the primary research supporting measure life estimates is generally limited to a few studies. The challenges and costs of performing primary research on measure life relative to the quality of the potential results limited the scope of this research effort. The findings of this study are based on the best available measure life data currently available. If future primary research finds substantial differences in measure life estimates, the findings of this study should be reevaluated.

Table 1-2 shows our recommendations for measure life by WISeerts group description. These estimates provide a more focused perspective than the estimates by end-use previously used. We separated the equipment or technology measures from the service measures. Several group description categories do not currently have service measures. However, we have included a service category in the table for each group description and indicate the category as not applicable (i.e., “NA”). We believe this will provide clarity if future service measures are added to these categories.

Table 1-2. Recommended Measure Life by WISeerts Group Description

Group Description	Measure Type	Sector				Weighted Average Source Rating*
		Agricultural	Commercial	Industrial	Schools and Government	
Boilers & Burners	Equip or Tech	18	18	18	18	2
	Service	1	1	1	1	2
Lighting	Equip or Tech	11	10	10	10	2
	Service	NA	NA	NA	NA	NA
Refrigeration	Equip or Tech	9	9	9	9	3
	Service	NA	NA	NA	NA	NA
HVAC	Equip or Tech	15	15	15	15	2
	Service	5	5	5	5	3
Process	Equip or Tech	10	10	10	10	2
	Service	NA	NA	NA	NA	NA
Domestic Hot Water	Equip or Tech	15	15	15	15	3
	Service	NA	NA	NA	NA	NA
Building Shell	Equip or Tech	20	20	20	20	3
	Service	NA	NA	NA	NA	NA
Laundry	Equip or Tech	12	12	12	12	3
	Service	NA	NA	NA	NA	NA
Compressed Air, Vacuum Pumps	Equip or Tech	13	13	13	13	3
	Service	2	2	2	2	1
Agriculture	Equip or Tech	13	13	13	13	2
	Service	NA	NA	NA	NA	NA
Wastewater Treatment	Equip or Tech	11	11	11	11	2
	Service	NA	NA	NA	NA	NA
Industrial Ovens & Furnaces	Equip or Tech	13	13	13	13	3
	Service	NA	NA	NA	NA	NA
Pools	Equip or Tech	5	5	5	5	3
	Service	NA	NA	NA	NA	NA
Food Service	Equip or Tech	11	11	11	11	2
	Service	NA	NA	NA	NA	NA
Information Technology	Equip or Tech	2	2	2	2	2
	Service	NA	NA	NA	NA	NA
Plug Loads	Equip or Tech	10	10	10	10	3
	Service	NA	NA	NA	NA	NA
Motors	Equip or Tech	16	16	16	16	2
	Service	NA	NA	NA	NA	NA
New Construction	Equip or Tech	18	18	18	18	NA
	Service	NA	NA	NA	NA	NA

* A “1” indicates the source used primary research; a “2” indicates the source researched reports that were originally based on primary research; and a “3” indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

Table 1-3 shows KEMA's recommended measure life estimates by end-use.

Table 1-3. Recommended Measure Life by End-Use

End-use Category	Measure Type	Sector				Weighted Average Source Rating*
		Agricultural	Commercial	Industrial	Schools and Government	
Building Shell	Equip or Tech	19	19	19	19	3
	Service	NA	NA	NA	NA	NA
HVAC	Equip or Tech	15	15	15	15	2
	Service	5	5	5	5	3
Lighting	Equip or Tech	12	12	12	12	2
	Service	NA	NA	NA	NA	NA
Manufacturing Process	Equip or Tech	11	11	11	11	2
	Service	2	2	2	2	1
Other	Equip or Tech	12	12	12	12	3
	Service	NA	NA	NA	NA	NA
CFL	Equip or Tech	7	5	4	5	2
	Service	NA	NA	NA	NA	NA
Motors	Equip or Tech	16	16	16	16	2
	Service	NA	NA	NA	NA	NA

* A "1" indicates the source used primary research; a "2" indicates the source researched reports that were originally based on primary research; and a "3" indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

1.2.3 Recommendations

Based on the research findings, KEMA makes the following recommendations for the PSCW to consider:

1. Use the measure life estimates based on WISeerts group description categories for program analysis whenever possible. These categories are more focused and can provide a clearer understanding of the impact specific equipment has on potential lifetime savings.
2. Use the updated measure life estimates based on end-use categories for program analysis when the data do not allow for disaggregating to the WISeerts group description level.
3. We recommend aggregating measure life data into group description or end-use categories for the purpose of program planning and evaluation (Recommendations 1 and 2). However, there are situations where the use of a measure specific life estimate may be more appropriate; for example, when the Program is considering additions or revisions to specific measures. The measure specific estimates are provided in Appendix B.
4. Use of separate service measure life estimates in both the end-use and group description categorizations. We could calculate a weighted average measure life estimate based on the current mix of measure savings. However, bias will be

introduced into life cycle net savings and benefit cost analysis if the mix of measure savings changes in the future. To minimize this potential, we recommend separate measure life estimates for service and equipment or technology measures.

1.3 MEASURE LIFE PHONE SURVEY SCOPING STUDY

As a secondary objective, KEMA conducted a scoping study to investigate the quality of data that could potentially be gathered from an exploratory phone survey with past Focus participants. The purpose of the scoping study was to discern whether or not this is a viable method for Focus on Energy and for which measures or groups of measures. KEMA's previous experience suggested that this type of survey may not provide enough data for a broad-based savings persistence study and that there are challenges for data collection. However, focused efforts have the potential to inform the estimate provided as part of the *Updates to Measure Life Estimates* task of this study.

The exploratory phone survey is not intended to collect data for a statistically based persistence study. Savings persistence studies are very expensive, require large samples, and still result in high levels of uncertainty. KEMA's proposed survey would collect Wisconsin specific information that would enable KEMA engineers to improve the quality of the existing measure life estimates. Such an effort could prove to be particularly valuable for measure life estimates that are not based on primary research.

KEMA assessed the results of the *Updates to Measure Life Estimates* task and determined which measure life estimates could benefit from additional data. We evaluated the likelihood of obtaining additional data through phone interviews based on our experience and interviews with Focus on Energy advisors.

1.3.1 Methods

To determine the viability of the phone survey, we reviewed historical savings and available measure life data at a technology code level. We then interviewed Focus on Energy energy advisors. Based on this information and our experience we estimated the quality of the data that could be collected and the potential increase these data could have on the quality of the measure life estimates calculated as part of the *Updates to Measure Life Estimates* task.

To determine the possible quality of data available by phone, we asked the Focus on Energy energy advisors general questions such as:

- What percentage of participants would be able to answer questions about efficiency of equipment when it was installed and the current efficiency of equipment?
- What percentage of participants would know about equipment installed through the program five years ago (specifically is it still installed, what was the efficiency at installation, and what is the current efficiency)?

Using the opinions provided by the Focus advisors and our experience, we estimated the quality of measure life data that we could obtain through phone interviews. We estimated the possible quality of data based on the percentage of participants who are likely to be able to answer a question on the measure. The ability of participants to answer questions accurately is further dependent on finding a person within the company who has technical knowledge of the system in question.

1.3.2 Findings

Table 1-4 summarizes the assessment (by end-use) of possible increases in measure life data quality through a phone survey. The greatest potential for improvements to the quality of the measure life estimates via a phone survey with past program participant was found with building shell and HVAC service end-uses. We believe there would be a reasonable increase in measure life data quality for these end-uses.

Table 1-4. Assessment of Data Quality Increase through Phone Survey by End-Use

End-use Category	Measure Type	Weighted Average Source Rating*	Possible Quality of Data by Phone	Possible Increase in Quality of Data	Include in Phone Survey?
Building Shell	Equip or Tech	3	Medium	Some	Yes
	Service	NA			
HVAC	Equip or Tech	2	Medium	Minimal	No
	Service	3	Medium	Some	Yes
Lighting	Equip or Tech	2	High	Some	No
	Service	NA			
Manufacturing Process	Equip or Tech	2	Medium	Minimal	No
	Service	1	Medium	Minimal	No
Other	Equip or Tech	3	Low	Minimal	No
	Service	NA			
CFL	Equip or Tech	2	High	Some	No
	Service	NA			
Motors	Equip or Tech	2	Low	Minimal	No
	Service	NA			

* The "weighted average source rating" is from the *Updates to Measure Life Estimates* task. A “1” indicates the source used primary research; a “2” indicates the source researched reports that were originally based on primary research; and a “3” indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

Table 1-5 summarizes the assessment (by WISeerts group descriptions) of possible increases in measure life data quality through a phone survey. Based on the scoping study, we recommend a phone survey with past Focus participants that installed measures classified in the HVAC service, building shell, compressed air, and new construction WISeerts group descriptions. We believe there would be a reasonable increase in measure life data quality for these WISeerts group descriptions.

Table 1-5. Assessment of Data Quality Increase through Phone Survey by WISeerts Group Description

Group Description	Measure Type	Weighted Average Source Rating*	Possible Quality of Data by Phone	Possible Increase in Quality	Include in Phone Survey?
Boilers & Burners	Equip or Tech	2	Medium	Minimal	No
	Service	2	Medium	Minimal	No
Lighting	Equip or Tech	2	High	Some	No
	Service	NA			
Refrigeration	Equip or Tech	3	Low	Minimal	No
	Service	NA			
HVAC	Equip or Tech	2	Medium	Minimal	No
	Service	3	Medium	Some	Yes
Process	Equip or Tech	2	Medium	Minimal	No
	Service	NA			
Domestic Hot Water	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Building Shell	Equip or Tech	3	Medium	Some	Yes
	Service	NA			
Laundry	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Compressed Air, Vacuum Pumps	Equip or Tech	3	Medium	Some	Yes
	Service	1	Medium	Minimal	No
Agriculture	Equip or Tech	2	Low	Minimal	No
	Service	NA			
Wastewater Treatment	Equip or Tech	2	Medium	Minimal	No
	Service	NA			
Industrial Ovens & Furnaces	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Pools	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Food Service	Equip or Tech	2	Low	Minimal	No
	Service	NA			
Information Technology	Equip or Tech	2	Low	Minimal	No
	Service	NA			
Plug Loads	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Motors	Equip or Tech	2	Low	Minimal	No
	Service	NA			
New Construction	Equip or Tech	NA	Medium	Some	Yes
	Service	NA			

* The "weighted average source rating" is from the *Updates to Measure Life Estimates* task. A “1” indicates the source used primary research; a “2” indicates the source researched reports that were originally based on primary research; and a “3” indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

In either the end-use or group description categorization, lighting measures show a high possibility of quality data by phone, but we do not recommend including these in the phone surveys. This is because the measure life estimates for lighting measures are generally based on secondary research of actual field studies. The phone survey is unlikely to provide a reasonable increase in the data quality relative to the cost of the research effort.

1.3.3 Recommendations

KEMA recommends the PSCW consider a phone survey with past Focus participants that installed measures classified in the HVAC service, building shell, compressed air, and new construction WISeerts group descriptions. KEMA did not find empirical research during the *Updates to Measure Life Estimates* task for these WISeerts group descriptions; however based on the scoping study we believe the existing estimates can be improved with information that could be collected from past Focus participants.

We are not recommending a statistically based savings persistence study. A savings persistence study would be very expensive, require large samples, and still result in high levels of uncertainty. KEMA's proposed exploratory survey would collect Wisconsin specific information that would enable KEMA engineers to improve the quality of the existing measure life estimates. Such an effort could prove to be particularly valuable for measure life estimates that are not based on primary research. If the PSCW decides to pursue the additional research, KEMA recommends the research plan and budget is included in the next detailed evaluation plan.

2. INTRODUCTION

The principal objective of this study was to update the current measure life estimates used by the Focus Evaluation Team and the Focus Program. The evaluation team's approach to this study consisted entirely of secondary research; the team did not conduct primary research, fieldwork, or produce a persistence study.

Measure life is an estimate of the median length of time an energy efficiency measure is installed before it is replaced or upgraded. It is an important component of the benefit-cost analysis and the life cycle net savings (LCNS) alternative attribution analysis methodology[5]. The energy savings benefits obtained as a result of a given program are limited by the length of time an energy efficiency measure is installed and operating. Measure life estimates currently being used by the Business Program (BP) portion of the benefit-cost analysis are potentially outdated, lacking source documentation, and could be defined at a more disaggregate level for some technologies or groups of technologies. Given the importance of measure life as an input to the benefit-cost analysis and LCNS method, KEMA found new measure life estimates to contribute to improved accuracy of these analyses and appropriate representation of program benefits.

As a secondary objective, KEMA outlined the quality of information that could potentially be gathered through an exploratory phone survey with past Focus on Energy participants. This outline included the recommended measure groups for further study, information that could be gathered, and the potential increase in the quality of the final result. The study would include questions that would help define the measure life of installed measures. In some of these questions, we would be looking at savings persistence while others would be focused only on how long the equipment was installed and operating (i.e., measure life).

2.1 UPDATES TO MEASURE LIFE ESTIMATES

The primary objective of the study was to update the measure life estimates. Measure life estimates currently being used by the Business Program portion of the benefit-cost analysis are based on a previous Energy Center of Wisconsin (ECW) technical potential study[6] and information collected during the FY07 program year from the California Database for Energy Efficient Resources (DEER). For this study, we reviewed existing studies, databases, and other sources to estimate measure life for equipment by end-use and when possible by WISeerts group description and tech code level. The estimates currently being used vary by end-use and by program sector. Table 2-1 summarizes the current measure life estimates.

[5] The Focus on Energy Evaluation Team. *State of Wisconsin Public Service Commission, Focus on Energy Evaluation, Evaluation Calendar Year 2009, Detailed Evaluation Plan.* April 21, 2009.

[6] Energy Center of Wisconsin. *Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2006–2015.* November 2005.

Table 2-1. Current Measure Life Estimates[7]

End-use Category	Sector			
	Agricultural	Commercial	Industrial	Schools and Government
Building Shell	10	10	10	10
HVAC	15	15	15	15
Lighting	15	15	15	15
Manufacturing Process	12	12	12	12
Other	17	19	28	10
CFL	6	6	6	6
Motors	16	16	16	16

The current measure life estimates do not differentiate between life for equipment or technology measure and life of service measures. Savings for equipment or technology measure are related to the design or implementation of a device, control, or system. In contrast savings for service measures are obtained through tuning equipment for optimal performance. Service measures generally need to be performed several times over the life of the equipment to maintain the savings. These could include boiler tune-ups, chiller tune-ups, compressed air leakage repair, and steam trap maintenance. As a result, equipment or technology measure life tends to be much longer than service measure life. If a weighted average measure life estimate is calculated based on the current mix of measure savings, bias will be introduced into life cycle net savings and benefit cost analysis if the mix of measure savings changes in the future. To minimize this potential, we found measure life estimates for both types of measures.

The relative program savings for equipment and service measures show the importance of understanding the measure life for both types of measures. Table 2-2 shows the savings percentage from January 1, 2008, to September 30, 2008, for the 18-month contract period[8] by end-use and type of measure. Savings related to service buy-downs for HVAC and manufacturing process end-uses are substantial (especially therm savings).

[7] The Focus on Energy Evaluation Team. *State of Wisconsin Public Service Commission, Focus on Energy Evaluation, Semiannual Report (18-month Contract Period).* April 8, 2009.

[8] Tracking gross savings for measures installed during the 18MCP from two versions of the WISeerts database: (1) WISeerts database as synchronized on April 29, 2008: measures installed in the18MCP included in the sampling frame; and (2) WISeerts database as synchronized on November 7, 2008: measures installed in the second six months of the 18MCP included in the sampling frame.

Table 2-2. Program Savings by End-Use and Savings Type

End-use Category	Percent of Program Savings		
	kW	kWh	therm
Building Shell			
Technology or Equipment Replacement	0.2%	0.1%	4.0%
Service Buydown	0.0%	0.0%	0.0%
HVAC			
Technology or Equipment Replacement	9.8%	14.5%	47.0%
Service Buydown	8.1%	2.2%	29.8%
Lighting			
Technology or Equipment Replacement	31.1%	31.1%	0.0%
Service Buydown	0.0%	0.0%	0.0%
Manufacturing Process			
Technology or Equipment Replacement	12.3%	13.5%	16.6%
Service Buydown	3.1%	4.7%	0.0%
Other			
Technology or Equipment Replacement	5.7%	9.2%	2.6%
Service Buydown	0.0%	0.0%	0.0%
CFL			
Technology or Equipment Replacement	29.2%	24.0%	0.0%
Service Buydown	0.0%	0.0%	0.0%
Motors			
Technology or Equipment Replacement	0.5%	0.7%	0.0%
Service Buydown	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**
Technology or Equipment Replacement	**88.78%**	**93.12%**	**70.17%**
Service Buydown	**11.22%**	**6.88%**	**29.83%**

2.2 MEASURE LIFE PHONE SURVEY SCOPING STUDY

As a secondary objective, KEMA conducted a scoping study to investigate the quality of data that could potentially be gathered from an exploratory phone survey with past Focus participants. The purpose of the scoping study was to discern whether or not this is a viable method for Focus on Energy and for which measures or groups of measures. The exploratory phone survey is not intended to collect data for a statistically based savings persistence study. Savings persistence studies are very expensive, require large samples, and still result in high levels of uncertainty. KEMA's proposed survey would collect Wisconsin specific information that would enable KEMA engineers to improve the quality of the existing measure life estimates. Such an effort could prove to be particularly valuable for measure life estimates that are not based on primary research.

The phone survey would aim to answer three primary questions:

1. Is the participant still in business?

2. If yes, is the measure still installed? What portion of the original savings estimate is still being realized?

3. If no, is the measure still installed? What portion of the original savings estimate is still being realized? If none—is the equipment idle? Removed? etc.

KEMA's previous experience suggested that this type of survey may not provide enough data for a broad-based savings persistence study. A primary challenge is finding a respondent within each sampled participating company who knows about the efficiency measure and can provide a history of the operation of the measure. Another challenge is to identify which technologies are compatible to this method. For example some technologies, such as wall insulation, are hidden from building occupants and changes are hard to sense. Measure installation can usually be confirmed over the phone for most measures if the business is still operating and has a low employee turnover. However, confirming the fraction of energy savings still being realized may be more challenging for certain measures and measure groups. KEMA assessed the results of the *Updates to Measure Life Estimate* task and determined which measure life estimates could benefit from additional data. We evaluated the likelihood of obtaining additional data through phone interviews based on our experience and interviews with Focus on Energy energy advisors.

2.3 ORGANIZATION OF REPORT

The remainder of the report is organized as follows.

Section 3 presents the research and findings for updated measure life estimates. In this section, we describe the methods for research and analysis. We also present the results of the analysis. Finally, we provide our conclusions, recommendations for measure life updates, and recommendations for further research.

Section 4 presents the scoping study to determine the effectiveness of phone surveys to improve the quality of measure life estimate data. This section describes the method we used to determine the quality of data obtained through phone surveys and our analysis of which end-uses and WISeert group descriptions would benefit from such a survey. Finally, we provide our recommendations for phone surveys.

Appendices contain information about sources, raw measure life data findings, the scoping study expert interview guide, and recommended hours of use for lighting and CFL measures. The interview guide was broken into several sections including:

- Boilers and boiler tune-up measure life
- Steam trap repair measure life
- Chiller tune-up measure life
- Compressed air leak repair measure life

- Thermostat set point (controls) measure life
- Lighting measure life
- Agricultural
- Industrial
- General.

3. UPDATES TO MEASURE LIFE ESTIMATES

3.1 INTRODUCTION

In this section, we describe the methods for research and analysis. We also present the results of the analysis. Finally, we provide our conclusions, recommendations for measure life updates, and recommendations for further research.

3.2 METHODS

To update the measure life estimates, a team of KEMA engineers reviewed secondary sources to find current data on measure life. We did not perform any primary research as this was beyond the scope of the study. We reviewed existing studies, workpapers, and technical guides to obtain relevant data. To find as many relevant sources as possible, we encouraged the Public Service Commission of Wisconsin and the Focus Program to provide sources or leads to sources. When possible, we also reviewed the underlying sources and empirical data to understand the strength of the source.

KEMA gathered data at the technology code level then aggregated the data into end-use categories and WISeerts group descriptions.[9] Some sources (e.g., DEER) provide data for very specific measures. The aggregation into WISeerts group descriptions and end-use categories was done using the historical program savings from the period of January 2008 to September 2008 as weights for individual measures. The end-use categories and WISeerts group descriptions are used by the Focus Program for program planning and by the evaluation team for analyses such as impact evaluation, benefit cost, and LCNS.

The existing measure life estimates are based on the following general end-use categories: “Lighting,” “CFLs,” “Motors,” “Building Shell,” “HVAC,” “Manufacturing Processes,” and “Other.” We also investigated the development of estimates based on the new WISeerts group description categorizations (Table 3-1) and at the more specific WISeerts technology code levels. The estimates by end-use, WISeerts group descriptions, and WISeerts technology codes depended on the availability of credible secondary research and the contributions these groups and technologies make toward tracked energy savings. That is, the groups and technologies that account for the larger fractions of tracked savings were prioritized.

[9] Focus on Energy measures are tracked in the WISeerts database at a technology code level. There are over 700 technology codes currently in use. These technology codes are further classified by end-use categories and WISeerts group descriptions. Appendix B lists the measures by technology code and indicates the associated WISeerts group description

Table 3-1. WISeerts
Group Description Categorizations

Group Description	Category ID
Boilers & Burners	1
Lighting	2
Refrigeration	3
HVAC	4
Process	5
Domestic Hot Water	6
Building Shell	7
Laundry	8
Compressed Air, Vacuum Pumps	9
Agriculture	10
Wastewater Treatment	11
Industrial Ovens & Furnaces	12
Pools	13
Food Service	14
Information Technology	16
Plug Loads	17
Motors	61
Other	70

The current measure life estimates do not differentiate between life of equipment or technology measure and life of service measures. Savings for equipment or technology measure are related to the design or implementation of a device, control, or system. In contrast, savings for service measures are obtained through tuning equipment for optimal performance. Service measures generally need to be performed several times over the life of the equipment to maintain the savings. These could include boiler tune-ups, chiller tune-ups, compressed air leakage repair, and steam trap maintenance. As a result, equipment or technology measure life tends to be much longer than service measure life. If a weighted average measure life estimate is calculated based on the current mix of measure savings, bias will be introduced in life cycle net savings and benefit cost analysis if the mix of measure savings changes in the future. To minimize this potential, we found measure life estimates for both types of measures

In the following subsections, we explain how we summarized the findings of the secondary research and assessed the quality of the reviewed measure life estimates. We also explain how the team of KEMA engineers developed updated measure life estimates for each of the end-use categories and the new WISeerts group description categorizations based on the research findings. Finally, we identify measures that would benefit from additional primary research. These include measures with substantial related savings and limited or unavailable reliable measure life estimates.

3.2.1 Review of secondary research

The current measure life estimates used by the Business Programs portion of the benefit-cost analysis are based on the previous Energy Center of Wisconsin (ECW) technical potential

study[10] and information collected during the FY07 program year from the California Database for Energy Efficient Resources (DEER). KEMA's review of the secondary research began with:

1. Energy Efficiency and Customer-Sited Renewable Energy, Wisconsin, 2005
2. Energy Efficiency and Customer-Sited Renewable Energy, Wisconsin, 2009
3. The California Energy Commission, 2009.

These sources contain estimates of measure life for a variety of energy efficiency and renewable energy technologies obtained from other secondary sources. DEER contains information on selected energy-efficient technologies and measures, including estimates of effective useful life (EUL). Since measure life estimates can be developed through field research, secondary research based on field research, lab study, and professional collaboration and estimation, KEMA engineers performed a thorough review of underlying source materials and empirical research performed to determine the validity and applicability of the underlying sources to Focus on Energy.

By reviewing these sources, searching the internet, and talking with experts, we found an additional 14 sources with measure life data that was relevant to Focus on Energy measures.[11] These sources are:

- Measure Life Report, New England, 2007
- Efficiency Vermont, 2005
- CL&P and UI Program Savings, Connecticut, 2008
- ASHRAE Online Database, 2009
- Updated Measure Lifetime Estimates, 2007
- Natural Gas Energy Efficiency, New York, 2006
- Measure Life Study, Massachusetts, 2005
- Steam System Survey Guide, 2002
- Steam Traps Workpaper, California, 2006
- Questar Estimated Gas Savings, Utah, 2008
- Xcel Energy Deemed Savings, 2009
- Natural Gas Efficiency, Oregon, 2003
- Assessment of the Market for Compressed Air Efficiency Systems, 2001
- BC Hydro Measure Life Study, 2009.

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[10] Energy Center of Wisconsin. *Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2006–2015.* November 2005.

[11] Formal citations and high-level description of the source can be found in Appendix A.

A team of KEMA engineers reviewed each of these sources to gather measure life estimates. We also reviewed the underlying sources and primary research to determine the basis for the estimates. We identified the median measure life for each relevant measure within the source and matched them up with the associated Focus on Energy technology code. When sources contained measures that were not an exact match with Focus tech codes, KEMA made informed and appropriate assessments.

3.2.2 Assessment of secondary source data

The measure life estimates reported in the secondary sources were determined through a number of methods such as field research, secondary research based on field research, lab study, and professional collaboration and estimation. KEMA assessed the validity and applicability of each measure life estimate by reviewing the underlying sources or supporting research. Where a measure life estimate was not applicable to Focus on Energy measures, we excluded the finding from our results. For measure life estimates that were applicable to Focus measures, KEMA assigned a rating to define the basis of the estimate. The rating shows if the source of the estimate was primary research, secondary research of primary research, or professional judgment. The rating helped to determine which estimate(s) would provide the most value to updating the existing BP measure life estimate. We assigned a one to measure life estimates that are based on primary field research data, a two to measure life estimates that are based on secondary research of primary research reports, and a three to estimates based on professional judgment or manufacturer design life. When we were unable to determine the basis, we indicated the estimate with an "X" (see Table 3-2).

Table 3-2. Source Rankings WISeerts Group Description Categorizations

Basis of Measure Life Estimate	Rank
Primary Field Research Data	1
Secondary Research of Primary Research Reports	2
Professional Judgment or Manufacturer Design Life	3
Undetermined	X

In our analysis of the measure life sources, we treated sources assigned a "3" or "X" as equal. However, we wanted to maintain the distinction between sources we knew to be opinions and sources with unknown basis. Future research may prove that an "X" source is truly based on primary research.

For easy reference, we tabulated our findings to allow discussion and ease of future revisions (see Appendix B). As additional studies are completed on specific measures, the tabulated findings can be updated and the appropriate measure life estimates can be adjusted. The table in Appendix B is organized as follows:

- The first three columns are the WISeerts group description, the WISeerts technology code, and the WISeerts technology code description.
- The next two columns are the KEMA recommended measure life estimates.
- The remaining columns show the measure life estimates obtained from the various sources. A couple of these sources included persistence data and we included these data in the table as well.

3.2.3 Estimation of measure life

Estimation of measure life is not a simple task and requires understanding of many issues surrounding the measure. Measure life is often defined as "the median number of years that a measure is installed and operational."[12] This time period is based on the estimated life of the piece of equipment and the possibility the equipment will be removed prior to failure. Equipment may be removed prior to failure due to changes in the business. Other sources define measure life as the minimum of design lifetime, economic lifetime, or social lifetime[13]. These terms can be defined as:

- Design lifetime is the length of time the manufacturer intended for the equipment to be useful. This estimate is usually based on laboratory tests and may not be achieved in real world applications. When equipment is installed it is often subjected to stresses beyond those used for the laboratory testing.

- Economic lifetime is the length of time an installation is economically attractive.

- Social lifetime is the length of time before the installation is replaced for reasons other than technical or economic failure. For example, asbestos insulation is generally replaced due to health concerns.

While the second definition provides clarity about the reason for removal, most existing sources have focused on the first definition. The first definition of measure life can be used to describe most measures currently included in the Focus on Energy Business Program portfolio. However, service measures do not fit this definition.[14] Over time, the efficiency of equipment can diminish. A service measure is maintenance work that needs to be performed periodically to ensure the equipment is operating at optimal efficiency. For most equipment, the maintenance needs to be done several times over the life of a piece of equipment that is installed and operating. For this study, we define measure life for service buy-downs as the number of years when efficiency gains due to maintenance have decreased by 50 percent from optimal performance to un-maintained performance.

After compiling the results of the research, we looked for consistency between estimates from different sources. When the measure life estimates were consistent between sources, we used the estimate as the recommended measure life. When there were substantial differences between the estimates, we used the measure life for each measure based on the source with the best rating. At times, there were multiple sources with the same best rating. In these cases, we found the average of the estimates.

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[12] ERS. *Measure Life Study Prepared for the Massachusetts Joint Utilities.* November 17, 2005.

[13] Harry H.J Vreuls, G.M. Piet, and Harold J. M. B. Pauwels, *Energy Savings Lifetimes of Measures: Will the New European Harmonized Lifetimes Account for Less Energy Savings Compared to the Policy Induced Energy Savings Measures?.* IEPEC 2007.

[14] HVAC service buy-down measures include boiler tune-ups, chiller tune-ups, and steam trap repair. Manufacturing process service buy-down measures include compressed air leak repairs.

Following the assessment of the secondary sources, KEMA estimated a measure life for each measure based on the sources with the best rating. We looked for estimates that were consistent between sources. When estimates from different sources were substantially different, we used the estimate with the best source rating. When there were multiple sources with the same best rating, we used the average of the associated ratings. The measure level estimates of measure life were then aggregated to end-use and WISeerts group description. The end-use and WISeerts group description measure life estimates were calculated separately for service measures and technology/equipment measures. The service measures include, but are not limited to, boiler tune-ups, chiller tune-ups, compressed air leakage repair, and steam trap maintenance. The aggregated estimates are weighted averages of the measure life by individual tech code. The weights are based on avoided cost of generation of the savings from January 1, 2008, to September 30, 2008, of the 18-month Contract Period (18MCP).

A. IMPACT OF HOURS OF USE ON MEASURE LIFE ESTIMATES

Different hours of use from one sector to another can cause differences in the measure life among sectors. This effect primarily impacts lamp replacement measures. If a lamp rated to operate 10,000 hours only operates 1,000 hours per year, we would expect the lamp to last approximately ten years. If the same lamp operates 5,000 hours per year, we would expect the lamp to last only two years.

Since measure life for a lamp is likely to vary by annual hours of use, we adjusted the measure life based on proposed annual hours of use included in Appendix D and Appendix E. Appendix D provides the operating hours by sector for lighting end uses based on existing research. Appendix E provides the operating hours by sector for CFL end uses. We made the adjustment to measure life estimates for lamp replacement measures (e.g., replacing an incandescent lamp with a CFL). We did not make any adjustment for light fixtures. Light fixtures are likely to be replaced with a new technology when a substantially more efficient technology is available or during a planned renovation of a space. Therefore, the operating hours do not affect the measure life estimates for light fixture measures.

3.3 RESULTS

The results of this study are based on the best available measure life data. We should note however that our research shows a lack of primary research on measure life for many technologies. In addition, the primary research supporting measure life estimates is generally limited to a few studies. These studies have generally been in California or New England. The challenges and costs of performing primary research on measure life relative to the quality of the potential results limited the scope of this research effort. The difference in climate from California to Wisconsin could cause differences in measure life for some measures (e.g., heating or cooling systems). Even with these limitations, the findings of this study are based on the best available measure life data currently available. If future primary research finds substantial differences in measure life estimates, the findings of this study should be reevaluated. In the following subsections we present the results of this task by WISeerts group description and by end-use description.

3.3.1 Measure life by WISeerts group description

The WISeerts group descriptions provide a more focused perspective than the estimates by end-use previously used. As with measure life by end-use, we separated the equipment or

technology measures from the service measures. Several group description categories do not currently have service measures. However, we have included a service category in the table for each group description and indicate the category as not applicable (i.e., “NA”). We believe this will provide clarity if future service measures are added to these categories. Table 3-3 shows the proposed measure life by group description.

Table 3-3. Recommended Measure Life by WISeerts Group Description

Group Description	Measure Type	Sector				Weighted Average Source Rating*
		Agricultural	Commercial	Industrial	Schools and Government	
Boilers & Burners	Equip or Tech	18	18	18	18	2
	Service	1	1	1	1	2
Lighting	Equip or Tech	11	10	10	10	2
	Service	NA	NA	NA	NA	NA
Refrigeration	Equip or Tech	9	9	9	9	3
	Service	NA	NA	NA	NA	NA
HVAC	Equip or Tech	15	15	15	15	2
	Service	5	5	5	5	3
Process	Equip or Tech	10	10	10	10	2
	Service	NA	NA	NA	NA	NA
Domestic Hot Water	Equip or Tech	15	15	15	15	3
	Service	NA	NA	NA	NA	NA
Building Shell	Equip or Tech	20	20	20	20	3
	Service	NA	NA	NA	NA	NA
Laundry	Equip or Tech	12	12	12	12	3
	Service	NA	NA	NA	NA	NA
Compressed Air, Vacuum Pumps	Equip or Tech	13	13	13	13	3
	Service	2	2	2	2	1
Agriculture	Equip or Tech	13	13	13	13	2
	Service	NA	NA	NA	NA	NA
Wastewater Treatment	Equip or Tech	11	11	11	11	2
	Service	NA	NA	NA	NA	NA
Industrial Ovens & Furnaces	Equip or Tech	13	13	13	13	3
	Service	NA	NA	NA	NA	NA
Pools	Equip or Tech	5	5	5	5	3
	Service	NA	NA	NA	NA	NA
Food Service	Equip or Tech	11	11	11	11	2
	Service	NA	NA	NA	NA	NA
Information Technology	Equip or Tech	2	2	2	2	2
	Service	NA	NA	NA	NA	NA
Plug Loads	Equip or Tech	10	10	10	10	3
	Service	NA	NA	NA	NA	NA
Motors	Equip or Tech	16	16	16	16	2
	Service	NA	NA	NA	NA	NA
New Construction	Equip or Tech	18	18	18	18	NA
	Service	NA	NA	NA	NA	NA

* A “1” indicates the source used primary research; a “2” indicates the source researched reports that were originally based on primary research; and a “3” indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

3.3.2 Measure life by end-use

Based on the currently available research, our analysis suggests only minor changes to the measure life estimates for most end-uses. We propose substantial changes in the following areas:

- Separate equipment or technology based measures from service measures
- Increase the measure life of "Building Shell" end-use from 10 to 19 years
- Decrease the measure life for "Other" end-use to 12 years for all sectors.

We also propose minor adjustments in measure life some of the remaining end-uses. Table 3-4 shows proposed measure life by end-use. The source rating in the last column is a weighted average of the source ratings used to develop the measure life estimate. A one indicates the source used primary research; a two indicates the source researched report that were originally based on primary research; and a three indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

Table 3-4. Recommended Measure Life by End-Use

End-use Category	Measure Type	Sector				Weighted Average Source Rating*
		Agricultural	Commercial	Industrial	Schools and Government	
Building Shell	Equip or Tech	19	19	19	19	3
	Service	NA	NA	NA	NA	NA
HVAC	Equip or Tech	15	15	15	15	2
	Service	5	5	5	5	3
Lighting	Equip or Tech	12	12	12	12	2
	Service	NA	NA	NA	NA	NA
Manufacturing Process	Equip or Tech	11	11	11	11	2
	Service	2	2	2	2	1
Other	Equip or Tech	12	12	12	12	3
	Service	NA	NA	NA	NA	NA
CFL	Equip or Tech	7	5	4	5	2
	Service	NA	NA	NA	NA	NA
Motors	Equip or Tech	16	16	16	16	2
	Service	NA	NA	NA	NA	NA

* A "1" indicates the source used primary research; a "2" indicates the source researched reports that were originally based on primary research; and a "3" indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

3.4 CONCLUSIONS

We found substantial differences between the existing end-use measure life estimates for "Building Shell" and "Other" measures. In addition, the existing measure life estimates do not separate service measures from equipment or technology measures. If a weighted average measure life estimate is calculated based on the current mix of measure savings, bias will be introduced into life cycle net savings and benefit cost analysis if the mix of measure savings

changes in the future. To minimize this potential, we found measure life estimates for both types of measures.

KEMA makes the following recommendations for the PSCW to consider:

1. Use the measure life estimates based on WISeerts group description categories for program analysis whenever possible. These categories are more focused and can provide a clearer understanding of the impact specific equipment has on potential lifetime savings.

2. Use the updated measure life estimates based on end-use categories for program analysis when the data do not allow for disaggregating to the WISeerts group description level.

3. Aggregate measure life data into group description or end-use categories for the purpose of program planning and evaluation (Recommendations 1 and 2). However, there are situations where the use of measure specific life estimate may be more appropriate; for example, when the Program is considering additions or revisions to specific measures. The measure specific estimates are provided in Appendix B.

4. Use separate service measure life estimates in both the end-use and group description categorizations. We could calculate a weighted average measure life estimate based on the current mix of measure savings. However, bias will be introduced in life cycle net savings and benefit cost analysis if the mix of measure savings changes in the future. To minimize this potential, we recommend separate measure life estimates for service and equipment or technology measures.

3.4.1 Recommended further research

This study was a broad-based measure life study using existing research to update the measure life estimates for the seven end-uses and eighteen WISeerts group descriptions. The results of this study provide a reasonable basis for program planning and evaluation; however, as shown above, the measure life estimates for several end-uses and WISeerts group descriptions are not well supported by existing research. Further research could provide support for some of these estimates. These recommendations are in addition to those in the measure life phone survey scoping study discussed later.

The review of secondary sources revealed a lack of measure life data for most service measures. As discussed earlier, these measures include services such as:

- Steam traps repair
- Boiler tune-ups
- Compressed air leak repair.

In addition, this study was not a savings persistence study. Savings persistence describes the percentage of original savings that will remain over time. Savings could change over time if the efficiency of the high efficiency technology degrades at a different rate than its standard efficiency counterpart. Savings could also be reduced over time due to behavioral changes. For example, the system operator may alter temperature set points and operating hours for an HVAC control system. Measures susceptible to behavioral changes include:

- Lighting control systems
- HVAC control systems.

Therefore, measures subject to savings changes over time are not fully described by the findings in this study.

Finally, most of the available research is based on the median number of years that a measure is installed and operational with no indication of the cause of the elimination of the measure. This definition limits the usefulness of the results. The differences between design, economic, or social lifetimes could be dramatic. Knowledge of the economic or social lifetimes could allow program planners the opportunity to develop programs that could extend these lifetimes. Additional research could focus on understanding these different lifetimes for measures with substantial program savings.

Additional research on the measure life could be considered for the following areas. This research could provide data that would be beneficial for both measure life and deemed savings.

- Steam traps. This research could include:
  - Measure life by pressure or application (high pressure versus low, industrial process versus HVAC)
  - Likelihood of maintenance programs in industrial versus commercial settings
  - Failure mode of failed traps
    - Percentage of traps that failed closed.
    - Percentage of traps that failed open.
    - Percentage of traps that failed leaking. This could be further studied on the basis of percent leakage.
- Persistence of savings for boiler tune-ups. The current findings indicate that the savings associated with a boiler tune-up are expected to last two years. However, we do not know how the savings change over time.
- Measure life of compressed air leak repair. This research could include:
  - Measure life by pressure or application
  - Likelihood of maintenance programs in industrial vs. commercial settings
- Measure life estimates based on by design, economic, and social lifetimes.
- Persistence of savings for day-lighting and time-based lighting controls as well as temperature set point/setback savings strategies. These measures are subject to adjustments to suit the desires and needs of the occupants and maintenance staff. These adjustments could reduce or eliminate expected savings over time.

4. MEASURE LIFE PHONE SURVEY SCOPING STUDY

4.1 INTRODUCTION

In this section we describe the method we used to determine the quality of data obtained through phone surveys and our analysis of which end-uses and WISeerts group descriptions would benefit from such a survey. We also provide our recommendations for phone surveys.

4.2 METHODS

To determine the viability of the phone survey, we reviewed historical savings and available measure life data at a technology code level. We then interviewed Focus on Energy energy advisors. Based on this information and our experience we estimated the quality of the data that could be collected and the potential increase these data could have on the quality of the measure life estimates calculated as part of the *Updates to Measure Life Estimates* task.

The exploratory phone survey is not intended to collect data for a statistically based persistence study. Savings persistence studies are very expensive, require large samples, and still result in high levels of uncertainty. KEMA's proposed survey would collect Wisconsin specific information that would enable KEMA engineers to improve the quality of the existing measure life estimates. Such an effort could prove to be particularly valuable for measure life estimates that are not based on primary research.

4.2.1 Review of historical savings and measure life data

The basis of the measure life estimates that we found in the *Updates to Measure Life Estimates* task vary widely. Some measure life estimates are based on field research while other estimates are based on opinions or manufacturer design specifications. In the *Updates to Measure Life Estimates* task, we rated the estimates on a scale of one to three where a one indicated the estimate was based on primary field research, a two indicated the estimate was based on secondary studies of field research, and a three indicated the estimate was based on opinions or manufacturer design specifications. A phone survey could add to the quality of measure life data that was not based on field research. Therefore, the scoping study focused on the measure life data that was based on opinions or manufacturer design specifications.

4.2.2 Focus on Energy advisor interviews

Our experience with program participant phone interviews provides one perspective on the knowledge participants may have about measures that are installed in their facilities. To gain an additional perspective, KEMA interviewed eight Focus on Energy energy advisors about the knowledge participants would have with technologies installed within their facilities. Three advisors represented the agricultural sector, three represented the commercial sector, and two represented the industrial sector. One of the advisors also represented the schools and government sector in addition to their other sector. We asked the advisors general questions such as:

- What percentage of participants would be able to answer questions about the efficiency of equipment when it was installed and the current efficiency of equipment?

- What percentage of participants would know about equipment installed through the program five years ago (specifically is it still installed, what was the efficiency at installation, and what is the current efficiency)?

In addition to general questions, we asked the advisors specific questions about measures with substantial savings and poor measure life source ratings. These more specific questions where in the following areas:

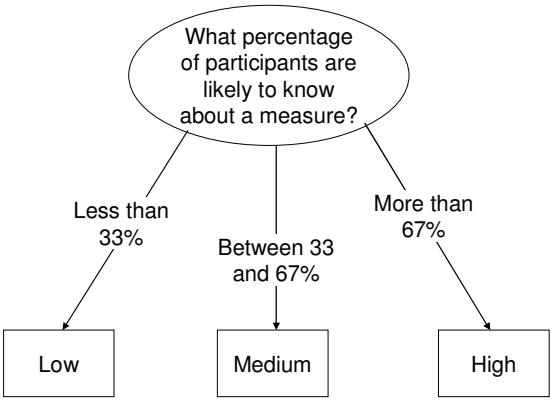
1. Boilers and boiler tune-up measure life
2. Steam trap repair measure life
3. Chiller tune-up measure life
4. Compressed air leak repair measure life
5. Thermostat set-point (controls) measure life
6. Lighting measure life
7. Agricultural
8. Industrial.

Refer to Appendix C for the complete list of questions.

4.2.3 Estimating the quality increase in measure life data

Using the opinions provided by the Focus advisors and our experience, we estimated the quality of data about measure life that we could obtain through phone interviews. We estimated the possible quality of data based on the percentage of participants who are likely to be able to answer a question on the measure (see Figure 4-1).

Figure 4-1. Decision Tree to Determine the Possible Quality of Measure Life Data by Phone

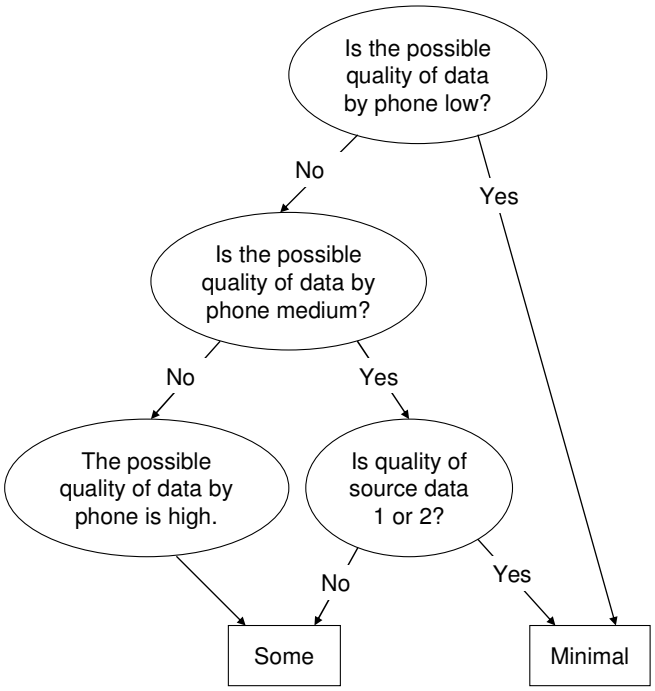


The knowledge of the respondent could be affected by several factors. These could include:

- Size and stability of the company. It is easier to find an individual knowledgeable about a past project in a large company with low turnover than in a small company with high turnover.
- Technical background of the respondent. A respondent whose work is to maintain facility systems will more likely answer technical questions accurately.

Since the energy advisors work with participants in each sector, we used their experience with program participants to ensure that we had a reasonable understanding of knowledge that participants may have. We then compared these estimates to the typical ratings of the sources for measure life estimates by end-use and by WISeerts group description. Where our estimated quality exceeded the quality of measure life estimate source data, we projected the possible improvement in data quality (see Figure 4-2).

Figure 4-2. Decision Tree to Determine the Possible Increase in Quality of Measure Life Data



4.3 RESULTS

This section provides the results of our exploratory interviews with Focus on Energy energy advisors, our assessment of the merits of participant surveys to collected additional measure life data, and the estimated cost of performing such a survey effort.

4.3.1 Focus on Energy advisor interviews

Table 4-1 summarizes the average responses of the Focus on Energy Advisors and indicates the potential quality of data that could be obtained through a phone survey. These opinions suggest that a phone survey can improve the quality of equipment retention rate data for

some measures. We used the overall program percentage for our analysis and included the sector specific percentages to inform the design of the phone survey. The usefulness of the sector percentages is limited by small sample sizes. For example, the Schools and Government percentages are based on a single respondent.

Table 4-1. Focus on Energy Advisor Responses and Potential Quality of Phone Survey Data

Technology Area	Percent of Participants who:	Overall Program	Sector				Potential Quality
			Agricultural	Commercial	Industrial	Schools and Government	
Boilers	Know the date of the last boiler tune-up	67.5%	66.7%	66.7%	70.0%	50.0%	High
	Know the frequency of boiler tune-ups	66.9%	51.7%	66.7%	90.0%	50.0%	High
	Know the pre- and post-tune-up boiler efficiency	50.0%	51.7%	38.3%	65.0%	5.0%	Medium
	Know the current boiler efficiency	39.4%	45.0%	56.7%	5.0%	20.0%	Medium
	Know the efficiency of steam distribution system, excluding steam traps	22.3%	NA	43.7%	1.5%	1.0%	Low
	Know the boiler efficiency improvement due to flue gas (or other) heat recovery	21.3%	NA	48.3%	12.5%	5.0%	Low
Steam Traps	Know the date of the last steam trap survey	69.2%	NA	85.0%	80.0%	100.0%	High
	Know the percentage of failed steam traps traps found	60.0%	NA	83.3%	55.0%	100.0%	Medium
	Know the percentage of failed steam traps by size, type or mode of failure	51.7%	NA	83.3%	30.0%	100.0%	Medium
	Know the frequency of steam trap surveys and repairs	52.5%	NA	51.7%	80.0%	0.0%	Medium
Chillers	Know the date of the last chiller tune-up	58.1%	26.7%	68.3%	90.0%	50.0%	Medium
	Know the frequency of chiller tune-ups	51.3%	23.3%	53.3%	90.0%	5.0%	Medium
	Know the pre- and post-tune-up chiller efficiency	31.3%	16.7%	53.3%	20.0%	5.0%	Low
	Know the current chiller efficiency	29.4%	18.3%	53.3%	10.0%	5.0%	Low
Compressed Air	Know the percentage of compressed air leaks found	54.4%	58.3%	46.7%	60.0%	0.0%	Medium
	Of the leaks found, the percentage of compressed air leaks repaired	64.4%	60.0%	51.7%	90.0%	0.0%	Medium
	Know the date of last compressed air leak survey	61.4%	51.7%	48.3%	65.0%	0.0%	Medium
	Know the frequency of compressed air leak surveys and repairs	64.3%	60.0%	46.7%	65.0%	0.0%	Medium
Thermostats	Know the thermostat set points prior to measure installation	72.1%	58.3%	70.0%	60.0%	80.0%	High
	Know the thermostat set points immediately after measure installation	82.1%	58.3%	73.3%	90.0%	80.0%	High
	Know the current thermostat set points	77.9%	58.3%	73.3%	75.0%	80.0%	High

Technology Area	Percent of Participants who:	Overall Program	Sector				Potential Quality
			Agricultural	Commercial	Industrial	Schools and Government	
Lighting	Know what fixtures were delamped then relamped	69.4%	75.0%	76.7%	50.0%	75.0%	High
	Know the lighting control schedule prior to measure installation	74.4%	88.3%	76.7%	50.0%	100.0%	High
	Know the lighting control schedule immediately after measure installation	76.3%	88.3%	81.7%	50.0%	100.0%	High
	Know the current lighting control schedule	78.1%	88.3%	83.3%	55.0%	100.0%	High
Agricultural	Know the efficiency of their grain dryers	5.0%	3.3%	NA	NA	NA	Low
	Know the efficiency of their agricultural ventilation fans (cfm per watt)	16.7%	16.7%	NA	NA	NA	Low
Industrial	Know the efficiency of melting furnaces	35.0%	NA	NA	50.0%	NA	Medium
General	Can answer questions about efficiency of equipment when it was installed and the efficiency of equipment now	42.5%	50.0%	53.3%	15.0%	25.0%	Medium
	Know about equipment installed through the program five years ago	59.3%	58.3%	63.3%	25.0%	80.0%	Medium
	Have a program to monitor energy use	26.4%	5.0%	33.3%	35.0%	10.0%	Low
	Have an energy monitoring program sophisticated enough to observe decreases in energy efficiency	20.4%	5.0%	44.0%	8.0%	2.0%	Low

Some of the questions we asked the energy advisors were related to savings persistence. We asked these questions as a method to quickly gauge the potential knowledge of the participant. This assumes that if a participant can answer savings persistence questions, they should be able to easily address measure life questions.

Finally, we asked the energy advisors about turnover rates. If a firm has a high turnover rate, the likelihood of finding a person knowledgeable about the technology decreases. According to the energy advisors, turnover rates for agricultural participants are likely to be very low since these are generally family businesses. On the other hand, turnover rates for industrial, commercial, and school and government participants are likely to be higher. Higher turnover rates can reduce the chance of gaining useful information but should not pose a substantial problem. However we believe higher quality measure life data in specific areas can be obtain via phone interviews with past Focus participants. For example, we believe we could obtain data of medium or high quality for steam trap measure life estimates. Many participants are likely to know dates and frequency of surveys as well as the number of traps repaired. These data would help evaluators to more accurately estimate the measure life of these measures.

4.3.2 Estimating the quality increase in measure life data

Table 4-2 summarizes the assessment (by end-use) of possible increases in measure life data quality through a phone survey. The possible increase in the quality of data was determined by comparing the weighted average source rating and the possible quality of data by phone. The greatest potential for improvements to the quality of the measure life estimates via a phone survey with past program participants was found with building shell and HVAC service end-uses. For example, the weighted average source rating for HVAC service end-use measures is three; we believe measure life data available by phone for this measure

would be of medium quality and that there would be a reasonable increase in measure life data quality for these end-uses. The increase in quality is likely to be beneficial for building shell and HVAC service end-uses since the savings associated with these end-uses from January 1, 2008, to September 30, 2008, for the 18MCP are 8.3 percent of kW, 2.4 percent of kWh, and 35.6 percent of therms.

Table 4-2. Assessment of Data Quality Increase through Phone Survey by End-Use

End-use Category	Measure Type	Weighted Average Source Rating*	Possible Quality of Data by Phone	Possible Increase in Quality of Data	Include in Phone Survey?
Building Shell	Equip or Tech	3	Medium	Some	Yes
	Service	NA			
HVAC	Equip or Tech	2	Medium	Minimal	No
	Service	3	Medium	Some	Yes
Lighting	Equip or Tech	2	High	Some	No
	Service	NA			
Manufacturing Process	Equip or Tech	2	Medium	Minimal	No
	Service	1	Medium	Minimal	No
Other	Equip or Tech	3	Low	Minimal	No
	Service	NA			
CFL	Equip or Tech	2	High	Some	No
	Service	NA			
Motors	Equip or Tech	2	Low	Minimal	No
	Service	NA			

* The "weighted average source rating" is from the *Updates to Measure Life Estimates* task. A “1” indicates the source used primary research; a “2” indicates the source researched reports that were originally based on primary research; and a “3” indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

Two end-use categories, “Lighting” and “CFL,” are likely to provide high quality measure life data through a phone survey. However, we do not recommend including these in a phone survey because the measure life estimate is already based on field research. This is because measure life estimates for lighting measures are generally based on secondary research of actual field studies. The phone survey is unlikely to provide a reasonable increase in the data quality relative to the cost of the research effort.

Table 4-3 summarizes the assessment (by WISeerts group description) of possible increase in measure life data quality through a phone survey. Based on the scoping study we recommend a phone survey with past Focus participants who installed measures classified in the HVAC service, building shell, compressed air, and new construction WISeerts group descriptions. We believe there would be a reasonable increase in measure life data quality for these WISeerts group descriptions. The increase in quality is likely to be beneficial since the savings associated with these WISeerts group descriptions from January 1, 2008, to September 30, 2008, for the 18MCP are 12.5 percent of kW, 7.9 percent of kWh, and 12.8 percent of therms.

Table 4-3. Assessment of Data Quality Increase through Phone Survey by WISeerts Group Description

Group Description	Measure Type	Weighted Average Source Rating*	Possible Quality of Data by Phone	Possible Increase in Quality	Include in Phone Survey?
Boilers & Burners	Equip or Tech	2	Medium	Minimal	No
	Service	2	Medium	Minimal	No
Lighting	Equip or Tech	2	High	Some	No
	Service	NA			
Refrigeration	Equip or Tech	3	Low	Minimal	No
	Service	NA			
HVAC	Equip or Tech	2	Medium	Minimal	No
	Service	3	Medium	Some	Yes
Process	Equip or Tech	2	Medium	Minimal	No
	Service	NA			
Domestic Hot Water	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Building Shell	Equip or Tech	3	Medium	Some	Yes
	Service	NA			
Laundry	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Compressed Air, Vacuum Pumps	Equip or Tech	3	Medium	Some	Yes
	Service	1	Medium	Minimal	No
Agriculture	Equip or Tech	2	Low	Minimal	No
	Service	NA			
Wastewater Treatment	Equip or Tech	2	Medium	Minimal	No
	Service	NA			
Industrial Ovens & Furnaces	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Pools	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Food Service	Equip or Tech	2	Low	Minimal	No
	Service	NA			
Information Technology	Equip or Tech	2	Low	Minimal	No
	Service	NA			
Plug Loads	Equip or Tech	3	Low	Minimal	No
	Service	NA			
Motors	Equip or Tech	2	Low	Minimal	No
	Service	NA			
New Construction	Equip or Tech	NA	Medium	Some	Yes
	Service	NA			

* The "weighted average source rating" is from the *Updates to Measure Life Estimates* task. A “1” indicates the source used primary research; a “2” indicates the source researched reports that were originally based on primary research; and a “3” indicates the basis of the measure life is an opinion, manufacturer design specification, or unknown.

In either the end-use or group description categorization, lighting measures show a high possible quality of data by phone, but we do not recommend including these in the phone surveys. This is because measure life estimates for lighting measures are well supported by research and the phone survey is unlikely to provide a reasonable increase in the data quality relative to the cost of the research effort.

4.4 CONCLUSIONS

We believe that a phone study can improve the data quality for some measure life estimates. KEMA recommends the PSCW consider a phone survey with past Focus participants that installed measures classified in the HVAC service, building shell, compressed air, and new construction WISeerts group descriptions. KEMA did not find empirical research during the *Updates to Measure Life Estimates* task for these WISeerts group descriptions; however, based on the scoping study we believe the existing estimates can be improved with information that could be collected from past Focus participants.

We are not recommending a statistically based savings persistence study. A savings persistence study would be very expensive, require large samples, and still result in high levels of uncertainty. KEMA's proposed exploratory survey would collect Wisconsin specific information that would enable KEMA engineers to improve the quality of the existing measure life estimates. Such an effort could prove to be particularly valuable for measure life estimates that are not based on primary research. If the PSCW decides to pursue the additional research, KEMA recommends the research plan and budget is included in the next detailed evaluation plan.

APPENDIX A:SOURCES

Reference Number	Source Bibliography	Abbreviated Title	Date	Summary
1	*Measure Life Report - Residential and Commercial/Industrial Lighting and HVAC Measures*, prepared for The New England SPWG by GDS Associates, June 2007	Measure Life Report, New England, 2007	2007	This study was performed for the New England programs to develop their measure lives. It was a literature review rather than a direct-measurement or survey study. Most data were from the 2005 *Measure Life Study Report* prepared for The Massachusetts Joint Utilities, by ERS (energy & resource solutions).
2	Efficiency Vermont, *Technical Reference User Manual*, November 2005	Efficiency Vermont, 2005	2005	This is the energy savings protocol document for Efficiency Vermont. It has measure lives for most of their measures and cites sources for measure lives for some measures, like refrigeration (DOE study). For most measures, however, no source is listed.
3	CL&P and UI Program Savings Documentation for 2008 Program Year (Connecticut)	CL&P and UI Program Savings, Connecticut, 2008	2008	This is the energy savings protocol document for CL&P and UI It has measure lives for most of their measures, no sources are listed except for a single statement at the beginning of the document, "Generally based on experience or studies."
4	ASHRAE Online Service Life Database, Accessed May 27, 2009	ASHRAE Online Database, 2009	2009	Results based on survey data collected by ASHRAE.
5	*Updated Measure Lifetime Estimates: EULs Based on 10 Years of Studies*, Skumatz, L & Dimetrosky, S, 2007	Updated Measure Lifetime Estimates, 2007	2007	This source was a presentation at the 2007 IEPEC conference and is a summary of more than 100 retention/persistence studies, though what studies these are is not listed in the presentation.
6	*Natural Gas Energy Efficiency Resource Development Potential In New York*, prepared for NYSERDA by Optimal Energy Inc, ACEEE, Vermont Energy Investment Corporation, Resource Insight Inc, and Energy and Environmental Analysts Inc, October 2006	Natural Gas Energy Efficiency, New York, 2006	2006	This is a report on the potential savings from various measures in New York and includes suggested measure lives. Sources are not listed, except that the report says that the data comes from retailers, DOE documents, NYSERDA data, Efficiency Vermont, and professional experience.
7	Measure Life Study prepared for The Massachusetts Joint Utilities by ERS, November 17, 2005	Measure Life Study, Massachusetts, 2005	2005	This is a comprehensive study of measure life. It is based on a literature review of measure lives for a number of programs across the country, some publicly available and others not publicly available.
8	*Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2012 and 2018*, prepared by Energy Center of Wisconsin, public comment draft, April 6, 2009	Energy Efficiency and Customer-Sited Renewable Energy, Wisconsin, 2009	2009	Technical potential study developed for the state of Wisconsin by ECW.

Reference Number	Source Bibliography	Abbreviated Title	Date	Summary
9	The California Energy Commission. (2009). Database for Energy Efficient Resources. Retrieved June 5, 2009, from http://www.energy.ca.gov/deer/	The California Energy Commission, 2009	2009	Comprehensive study of measure life based on several California studies and databases.
10	*Energy Efficiency and Customer-Sited Renewable Energy: Achievable Potential in Wisconsin 2006–2015*, prepared by Energy Center of Wisconsin on behalf of The Governor's Taskforce on Energy Efficiency and Renewables	Energy Efficiency and Customer-Sited Renewable Energy, Wisconsin, 2005	2005	Earlier technical potential study developed for the State of Wisconsin by ECW. This source was used to help develop the existing end-use measure life.
11	*Steam System Survey Guide* by Oak Ridge National Labs	Steam System Survey Guide, 2002	2002	Based on data obtained from a variety of textbooks on steam systems.
12	Steam Traps Workpaper for PY2006-2008, prepared for Southern California Gas Company, prepared by Energy and Environmental Analysis, Inc, December 2006	Steam Traps Workpaper, California, 2006	2006	Review of a number of studies on steam trap failures for SCGC. References all of the studies shown in its attachments shown below (12-x)
12-1	*kW Engineering Steam Trap Survey*	*kW Engineering Steam Trap Survey*	2006	On-site survey of five southern California dry cleaners and billing analysis of SCGC customers.
12-2	*Enbridge Steam Trap Survey*	*Enbridge Steam Trap Survey*	2006	On-site survey of boiler plants by Enbridge (Excel spreadsheet).
12-3	*Enbridge Steam Saver Program 2005*	*Enbridge Steam Saver Program 2005*	2006	Overview of the Endbridge Steam Saver program. Includes a benchmarking study of 25 medium and large boiler plants.
12-4	*Key Parameters for Steam Traps - Mar14*	*Key Parameters for Steam Traps - Mar14*	2006	Part of the Enbridge benchmarking study.
12-5	*Armstrong Steam Trap Survey*	*Armstrong Steam Trap Survey*	2006	Survey of nine dry cleaners by Armstrong International.
12-6	*Enbridge Industrial SteamSaver Program*	*Enbridge Industrial SteamSaver Program*	2006	Marketing document for the Steam Saver Program - includes suggested gas savings data.
12-7	*Steam Boiler Efficiency*	*Steam Boiler Efficiency*	2006	Unclear what this is. Appears to be the results of a survey of steam systems.
13	Questar Gas Company (Utah) Estimated Gas Savings, 2008	Questar Estimated Gas Savings, Utah, 2008	2008	Energy savings protocols for Questar Gas. Includes measure lives for various measures. Cites 2003 Xenergy study, although we cannot find the data that they are citing.
14	Xcel Energy Deemed Savings Technical Assumptions: CO Deemed Boiler Efficiency, 2009	Xcel Energy Deemed Savings, 2009	2009	Technical assumptions for Xcel Energy Deemed Savings values. Includes measure lives. Sources not listed.
15	*Natural Gas Efficiency and Conservation Measure Resource Assessment*, prepared for the Energy Trust of Oregon by Ecotope, Inc, August 2003	Natural Gas Efficiency, Oregon, 2003	2003	No sources listed.

Reference Number	Source Bibliography	Abbreviated Title	Date	Summary
16	*Assessment of the Market for Compressed Air Efficiency Systems* for US DOE by Xenergy, June 2001	Assessment of the Market for Compressed Air Efficiency Systems, 2001	2001	Extensive market assessment/potential study for boiler measures based on a survey of energy audit data from the Compressed Air Challenge and interviews with personnel from manufacturing plants.
17	BC Hydro Measure Life Study (based on conversation with Christine Gustafson at BC Hydro)	BC Hydro Measure Life Study, 2009	2009	This was a telephone conversation in which information on BC Hydro measure lives and sources were shared over the phone. BC Hydro could not provide the document for reference because it also contained sensitive program information.

APPENDIX B: RAW MEASURE LIFE DATA FINDINGS

The following pages contain the raw measure life data findings.

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8							
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating							
Boilers & Burners	1.0100.085	Hot water reset on boiler system	5	5	5	5	3													5	3												
Boilers & Burners	1.0200.085	Outdoor air cutout on boiler system	5	5	5	5	3													5	3												
Boilers & Burners	1.0300.245	Insulate boiler plumbing	15	15	15	15	3																			15		3					
Boilers & Burners	1.0400.085	Damper Controls - Install automatic dampers to tie into combustion units	5	5	5	5	3													5	3					15		3					
Boilers & Burners	1.0500.085	Sequencer controls, automatic, on boiler system	5	5	5	5	3													5	3												
Boilers & Burners	1.0600.460	Variable speed drive for process boiler hot water distribution pump	10	10	10	10	2											10	2							15		3					
Boilers & Burners	1.0610.460	Variable speed drive for HVAC boiler hot water distribution pump	10	10	10	10	2											10	2							15		3					
Boilers & Burners	1.0615.460	Variable speed drive for process boiler induced draft fan	10	10	10	10	2											10	2					15	3	15		3					
Boilers & Burners	1.0620.460	Variable speed drive for HVAC boiler induced draft fan	10	10	10	10	2											10	2					15	3	15		3					
Boilers & Burners	1.0700.085	Boiler oxygen trim controls - custom	5	5	5	5	3													5	3												
Boilers & Burners	1.0701.085	Linkageless Boiler Control - custom	5	5	5	5	3													5	3												
Boilers & Burners	1.0710.085	Boiler oxygen trim controls (Hybrid)	5	5	5	5	3													5	3												
Boilers & Burners	1.0711.085	Linkageless Boiler Control (Hybrid)	5	5	5	5	3													5	3												
Boilers & Burners	1.0800.040	Dedicated Boiler - provide steam during non-heating months	25	25	25	25	3													30	3												
Boilers & Burners	1.0900.045	Boiler (existing) - replace burner	25	25	25	25	3													30	3												
Boilers & Burners	1.1000.145	Flue gas heat recovery system on boilers	10	10	10	10	3													10	3					15		3					
Boilers & Burners	1.1100.330	Steam to Hot Water Conversion	12.5	12.5	12.5	12.5	3													10	3					15		3					
Boilers & Burners	1.1300.430	Boiler Tune-up - Service Buy Down	1	1	1	1	2													2	3					2		3					
Boilers & Burners	1.1400.390	Steam Traps - service buy down	6	6	6	6	2													2	3					2		3					
Boilers & Burners	1.1412.390	Repair leaking steam trap, <50 psig steam (Industrial Only)	6	6	6	6	2													2	3					2		3					
Boilers & Burners	1.1414.390	Repair leaking steam trap, 50-125 psig steam (Industrial Only)	6	6	6	6	2													2	3					2		3					
Boilers & Burners	1.1416.390	Repair leaking steam trap, 126-225 psig steam (Industrial Only)	6	6	6	6	2													2	3					2		3					
Boilers & Burners	1.1418.390	Repair leaking steam trap, >225 psig steam (Industrial Only)	6	6	6	6	2													2	3					2		3					
Boilers & Burners	1.1420.390	Steam Trap Survey	6	6	6	6	2													2	3												
Boilers & Burners	1.1500.245	Condensate Tank Insulation	15	15	15	15	3																										
Boilers & Burners	1.1600.430	Steam System - Repair Leaks	6	6	6	6	2													2	3												
Boilers & Burners	1.1700.245	Insulate boiler expansion tank	15	15	15	15	3																			15		3					
Boilers & Burners	1.1800.085	Hot Water Setback - Reduce boiler set point temperature when system is idle	5	5	5	5	3													5	3												
Boilers & Burners	1.1900.085	Boiler room fan control, automatic	5	5	5	5	3													5	3												
Boilers & Burners	1.2000.040	Chemical feed on boiler system, automatic	15	15	15	15	3																			15		3					
Boilers & Burners	1.2100.415	Steam System Isolation - Isolate equipment and areas that no longer use steam	20	20	20	20	3																			20		3					
Boilers & Burners	1.2200.085	Combustion management system on boiler	5	5	5	5	3													5	3												
Boilers & Burners	1.2790.040	Boiler, hot water, high efficiency modulating, for space heating (AFUE >= 90%)(<175 MBh)	20	20	20	20	1			25	100%	X				21	1			30	3						20	3					
Boilers & Burners	1.2791.040	Boiler, hot water, high efficiency modulating, for space heating (AFUE >= 90%)(175 - 300 MBh)	20	20	20	20	1			25	100%	X				21	1			30	3						20	3					
Boilers & Burners	1.2796.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 46.5 - 51.2 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3					

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Boilers & Burners	1.0100.085	Hot water reset on boiler system	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.0200.085	Outdoor air cutout on boiler system	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.0300.245	Insulate boiler plumbing	15	15	15	15	3			25	+/- 5																	
Boilers & Burners	1.0400.085	Damper Controls - Install automatic dampers to tie into combustion units	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.0500.085	Sequencer controls, automatic, on boiler system	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.0600.460	Variable speed drive for process boiler hot water distribution pump	10	10	10	10	2			25	+/- 5																	
Boilers & Burners	1.0610.460	Variable speed drive for HVAC boiler hot water distribution pump	10	10	10	10	2			25	+/- 5																	
Boilers & Burners	1.0615.460	Variable speed drive for process boiler induced draft fan	10	10	10	10	2			25	+/- 5																	
Boilers & Burners	1.0620.460	Variable speed drive for HVAC boiler induced draft fan	10	10	10	10	2			25	+/- 5																	
Boilers & Burners	1.0700.085	Boiler oxygen trim controls - custom	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.0701.085	Linkageless Boiler Control - custom	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.0710.085	Boiler oxygen trim controls (Hybrid)	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.0711.085	Linkageless Boiler Control (Hybrid)	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.0800.040	Dedicated Boiler - provide steam during non-heating months	25	25	25	25	3			25	+/- 5																	
Boilers & Burners	1.0900.045	Boiler (existing) - replace burner	25	25	25	25	3			25	+/- 5																	
Boilers & Burners	1.1000.145	Flue gas heat recovery system on boilers	10	10	10	10	3			25	+/- 5																	
Boilers & Burners	1.1100.330	Steam to Hot Water Conversion	12.5	12.5	12.5	12.5	3			25	+/- 5																	
Boilers & Burners	1.1300.430	Boiler Tune-up - Service Buy Down	1	1	1	1	2			25	+/- 5						2	X	2	2	X	5	X			1	2
Boilers & Burners	1.1400.390	Steam Traps - service buy down	6	6	6	6	2	6	3	25	+/- 5		10	X	6	2			10	4	X						
Boilers & Burners	1.1412.390	Repair leaking steam trap, <50 psig steam (Industrial Only)	6	6	6	6	2	6	3	25	+/- 5		10	X	6	2			10	4	X						
Boilers & Burners	1.1414.390	Repair leaking steam trap, 50-125 psig steam (Industrial Only)	6	6	6	6	2	6	3	25	+/- 5		10	X	6	2			10	4	X						
Boilers & Burners	1.1416.390	Repair leaking steam trap, 126-225 psig steam (Industrial Only)	6	6	6	6	2	6	3	25	+/- 5		10	X	6	2			10	4	X						
Boilers & Burners	1.1418.390	Repair leaking steam trap, >225 psig steam (Industrial Only)	6	6	6	6	2	6	3	25	+/- 5		10	X	6	2			10	4	X						
Boilers & Burners	1.1420.390	Steam Trap Survey	6	6	6	6	2			25	+/- 5		10	X	6	2			10	4	X						
Boilers & Burners	1.1500.245	Condensate Tank Insulation	15	15	15	15	3			25	+/- 5																	
Boilers & Burners	1.1600.430	Steam System - Repair Leaks	6	6	6	6	2			25	+/- 5		10	X	6	2			10	4	X						
Boilers & Burners	1.1700.245	Insulate boiler expansion tank	15	15	15	15	3			25	+/- 5																	
Boilers & Burners	1.1800.085	Hot Water Setback - Reduce boiler set point temperature when system is idle	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.1900.085	Boiler room fan control, automatic	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.2000.040	Chemical feed on boiler system, automatic	15	15	15	15	3			25	+/- 5																	
Boilers & Burners	1.2100.415	Steam System Isolation - Isolate equipment and areas that no longer use steam	20	20	20	20	3			25	+/- 5																	
Boilers & Burners	1.2200.085	Combustion management system on boiler	5	5	5	5	3			25	+/- 5																	
Boilers & Burners	1.2790.040	Boiler, hot water, high efficiency modulating, for space heating (AFUE >= 90%)(<175 MBh)	20	20	20	20	1	20	1	25	+/- 5																	
Boilers & Burners	1.2791.040	Boiler, hot water, high efficiency modulating, for space heating (AFUE >= 90%)(175 - 300 MBh)	20	20	20	20	1	20	1	25	+/- 5																	
Boilers & Burners	1.2796.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 46.5 - 51.2 MBh	20	20	20	20	1	20	1	25	+/- 5																	

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7						8								
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating								
Boilers & Burners	1.2797.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 51.3 - 56.3 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2798.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 56.4 - 61.9 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2799.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 62.0 - 68.1 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2800.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 68.2 - 74.9 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2801.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 75.0 - 82.5 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2802.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 82.6 - 90.8 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2803.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 90.9 - 99.8 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2804.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 99.9 - 109.8 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2805.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 109.9 - 120.7 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2806.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 120.8 - 132.8 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2807.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 132.9 - 146.1 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2808.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 146.2 - 160.7 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2809.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 160.8 - 176.8 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2810.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 176.9 - 194.5 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2811.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 194.6 -213.9 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2812.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 214.0 - 235.3 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2813.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 235.4 - 258.9 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2814.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 259.0 - 284.8 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2815.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 284.9 - 300.0 MBh	20	20	20	20	1			25	100%	X				21	1			30	3						20	3							
Boilers & Burners	1.2900.430	Boiler Tune-up	1	1	1	1	2													2	3					2		3							
Boilers & Burners	1.3800.085	Hot water reset on boiler system	5	5	5	5	3													5	3														
Boilers & Burners	1.4000.425	Trim existing pump impeller to more closely match system demand	5	5	5	5	3																			5		3							

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Boilers & Burners	1.2797.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 51.3 - 56.3 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2798.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 56.4 - 61.9 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2799.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 62.0 - 68.1 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2800.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 68.2 - 74.9 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2801.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 75.0 - 82.5 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2802.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 82.6 - 90.8 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2803.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 90.9 - 99.8 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2804.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 99.9 - 109.8 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2805.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 109.9 - 120.7 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2806.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 120.8 - 132.8 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2807.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 132.9 - 146.1 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2808.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 146.2 - 160.7 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2809.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 160.8 - 176.8 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2810.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 176.9 - 194.5 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2811.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 194.6 -213.9 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2812.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 214.0 - 235.3 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2813.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 235.4 - 258.9 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2814.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 259.0 - 284.8 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2815.040	High Efficiency Modulating Hot Water Boiler (effic> = 90.0%) 284.9 - 300.0 MBh	20	20	20	20	1	20	1	25	+/- 5																								
Boilers & Burners	1.2900.430	Boiler Tune-up	1	1	1	1	2			25	+/- 5						2	X	2	2	X		5	X			1	2
Boilers & Burners	1.3800.085	Hot water reset on boiler system	5	5	5	5	3			25	+/- 5																								
Boilers & Burners	1.4000.425	Trim existing pump impeller to more closely match system demand	5	5	5	5	3			25	+/- 5																								

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7								8					
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating					Years (Retrofit)	Years (New Construction)	Source Rating			
Boilers & Burners	1.9800.040	Custom Boiler Replacement	20	20	20	20	1									21	1			30	3													
Boilers & Burners	1.9900.280	Custom boiler/burner measure not otherwise specified	20	20	20	20	3																											
Agriculture	10.0100.215	Plate heat exchanger on milk pipeline	15	15	15	15	3																							15				
Agriculture	10.0110.215	Plate Heat Exchanger / Well Water Pre-Cooler	15	15	15	15	3																							15				
Agriculture	10.0120.215	Plate heat exchanger on milk pipeline and VFD on milk vacuum pump	15	15	15	15	3																							15				
Agriculture	10.0160.300	On-farm energy efficient milk pasteurization system – natural gas boiler	15	15	15	15	3																							15				
Agriculture	10.0170.300	On-farm energy efficient milk pasteurization system – electric boiler	15	15	15	15	3																							15				
Agriculture	10.0175.300	On-farm pasteurization system – fuel switching from electric to gas	15	15	15	15	3																							15				
Agriculture	10.0200.460	VFD on Dairy Vacuum Pump (Ag only)(Hybrid)	10	10	10	10	2											10	2											15				
Agriculture	10.0210.460	VFD on Dairy Vacuum Pump (Ag only)(Custom)	10	10	10	10	2											10	2											15				
Agriculture	10.0400.460	VFD on Agricultural Second Use Water System	10	10	10	10	2											10	2															
Agriculture	10.0410.460	VFD on agricultural system not otherwise specified	10	10	10	10	2											10	2											15				
Agriculture	10.0500.070	Scroll Compressors for Dairy Refrigeration (Ag Only)(Hybrid)	15	15	15	15	3																							15				
Agriculture	10.0510.070	Scroll Compressors for Dairy Refrigeration (Ag Only)(Custom)	15	15	15	15	3																							15				
Agriculture	10.0600.460	VFD on Dairy Milk Jar	10	10	10	10	2											10	2															
Agriculture	10.0800.145	Heat Recovery Tank, no heating element	15	15	15	15	3																							15				
Agriculture	10.0802.145	Heat Recovery Tank, no heating element, all other water heating sources (Ag Only)	15	15	15	15	3																							15				
Agriculture	10.1200.145	Heat Recovery, custom, not otherwise specified	15	15	15	15	3																							15				
Agriculture	10.2400.205	Greenhouse Roof Vents Installed	10	10	10	10	X																											
Agriculture	10.2500.405	Ventilation curtain system for livestock operations, replacing mechanical ventilation	10	10	10	10	X																											
Agriculture	10.4100.200	Grain Dryer - energy efficient	15	15	15	15	3																							15	15	3		
Agriculture	10.5000.250	Irrigation Pressure Reduction	20	20	20	20	3																							20				
Agriculture	10.5100.265	Energy Efficient Livestock Waterer (Ag Only) (Prescriptive)	10	10	10	10	X																											
Agriculture	10.5101.265	Energy Efficient Livestock Waterer (Ag Only)(Custom)	10	10	10	10	X																											
Agriculture	10.8000.205	Thermal blanket for use on greenhouse	15	15	15	15	3																							15				
Agriculture	10.8100.095	Shutters on Grain Bin Aeration Fans	10	10	10	10	X																											
Agriculture	10.8200.085	Demand Controller	10	10	10	10	X																											
Agriculture	10.8300.205	Greenhouse Glazing - Change Materials	15	15	15	15	3																							15				
Agriculture	10.8310.205	Greenhouse Glazing - Improve	15	15	15	15	3																							15				
Agriculture	10.8400.205	Reduce air infiltration in greenhouse	15	15	15	15	3																							15				
Agriculture	10.8510.310	Remove Electric Heaters for Potato Storage	10	10	10	10	X																											
Agriculture	10.8700.205	Greenhouse Perimeter Insulation	15	15	15	15	3																							15				

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Boilers & Burners	1.9800.040	Custom Boiler Replacement	20	20	20	20	1	20	1	25	+/- 5																	
Boilers & Burners	1.9900.280	Custom boiler/burner measure not otherwise specified	20	20	20	20	3			25	+/- 5																	
Agriculture	10.0100.215	Plate heat exchanger on milk pipeline	15	15	15	15	3	15	X	10	+/- 3																	
Agriculture	10.0110.215	Plate Heat Exchanger / Well Water Pre-Cooler	15	15	15	15	3	15	X	10	+/- 3																	
Agriculture	10.0120.215	Plate heat exchanger on milk pipeline and VFD on milk vacuum pump	15	15	15	15	3	15	X	10	+/- 3																	
Agriculture	10.0160.300	On-farm energy efficient milk pasteurization system – natural gas boiler	15	15	15	15	3			10	+/- 3																	
Agriculture	10.0170.300	On-farm energy efficient milk pasteurization system – electric boiler	15	15	15	15	3			10	+/- 3																	
Agriculture	10.0175.300	On-farm pasteurization system – fuel switching from electric to gas	15	15	15	15	3			10	+/- 3																	
Agriculture	10.0200.460	VFD on Dairy Vacuum Pump (Ag only)(Hybrid)	10	10	10	10	2	15	X	10	+/- 3																	
Agriculture	10.0210.460	VFD on Dairy Vacuum Pump (Ag only)(Custom)	10	10	10	10	2	15	X	10	+/- 3																	
Agriculture	10.0400.460	VFD on Agricultural Second Use Water System	10	10	10	10	2			10	+/- 3																	
Agriculture	10.0410.460	VFD on agricultural system not otherwise specified	10	10	10	10	2	15, 10	15-1 10-x	10	+/- 3																	
Agriculture	10.0500.070	Scroll Compressors for Dairy Refrigeration (Ag Only)(Hybrid)	15	15	15	15	3	12	X	10	+/- 3																	
Agriculture	10.0510.070	Scroll Compressors for Dairy Refrigeration (Ag Only)(Custom)	15	15	15	15	3	12	X	10	+/- 3																	
Agriculture	10.0600.460	VFD on Dairy Milk Jar	10	10	10	10	2			10	+/- 3																	
Agriculture	10.0800.145	Heat Recovery Tank, no heating element	15	15	15	15	3			10	+/- 3																	
Agriculture	10.0802.145	Heat Recovery Tank, no heating element, all other water heating sources (Ag Only)	15	15	15	15	3			10	+/- 3																	
Agriculture	10.1200.145	Heat Recovery, custom, not otherwise specified	15	15	15	15	3			10	+/- 3																	
Agriculture	10.2400.205	Greenhouse Roof Vents Installed	10	10	10	10	X			10	+/- 3																	
Agriculture	10.2500.405	Ventilation curtain system for livestock operations, replacing mechanical ventilation	10	10	10	10	X			10	+/- 3																	
Agriculture	10.4100.200	Grain Dryer - energy efficient	15	15	15	15	3			10	+/- 3																	
Agriculture	10.5000.250	Irrigation Pressure Reduction	20	20	20	20	3	3 5 20	X X X	10	+/- 3																	
Agriculture	10.5100.265	Energy Efficient Livestock Waterer (Ag Only) (Prescriptive)	10	10	10	10	X			10	+/- 3																	
Agriculture	10.5101.265	Energy Efficient Livestock Waterer (Ag Only)(Custom)	10	10	10	10	X			10	+/- 3																	
Agriculture	10.8000.205	Thermal blanket for use on greenhouse	15	15	15	15	3			10	+/- 3																	
Agriculture	10.8100.095	Shutters on Grain Bin Aeration Fans	10	10	10	10	X			10	+/- 3																	
Agriculture	10.8200.085	Demand Controller	10	10	10	10	X			10	+/- 3																	
Agriculture	10.8300.205	Greenhouse Glazing - Change Materials	15	15	15	15	3			10	+/- 3																	
Agriculture	10.8310.205	Greenhouse Glazing - Improve	15	15	15	15	3			10	+/- 3																	
Agriculture	10.8400.205	Reduce air infiltration in greenhouse	15	15	15	15	3	5	X	10	+/- 3																	
Agriculture	10.8510.310	Remove Electric Heaters for Potato Storage	10	10	10	10	X			10	+/- 3																	
Agriculture	10.8700.205	Greenhouse Perimeter Insulation	15	15	15	15	3			10	+/- 3																	

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8								
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating								
Agriculture	10.8710.205	Greenhouse IR Rated Poly-film	15	15	15	15	3																			15	3							
Agriculture	10.8720.205	Greenhouse Power Vented Unit Heaters	10	10	10	10	3																			10	3							
Agriculture	10.8730.205	Greenhouse Climate Controls	10	10	10	10	3																			10	3							
Agriculture	10.9900.280	Custom agricultural measure not otherwise specified	14.5	14.5	14.5	14.5	3																			25	4	3						
Waste Water Treatment Another group for water supply?	11.0200.425	Trim existing pump impeller to more closely match system demand	5	5	5	5	3																			5		3						
Waste Water Treatment	11.0300.460	Variable speed drive on pump motor	10	10	10	10	2											10	2							10		3						
Waste Water Treatment	11.0320.460	Variable speed drive on blower motor	10	10	10	10	2											10	2							15		3						
Waste Water Treatment	11.0325.460	Variable speed drive on other waste water treatment system	10	10	10	10	2											10	2							15		3						
Waste Water Treatment	11.2000.435	Custom Ultraviolet Measure	2	2	2	2	3																			2		3						
Waste Water Treatment	11.3000.005	Coarse Bubble Aeration	15	15	15	15	x																											
Waste Water Treatment	11.4000.005	Custom Aeration Measure	15	15	15	15	X																											
Waste Water Treatment	11.5000.370	Off peak pumping, shift to	15	15	15	15	X																											
Waste Water Treatment	11.6000.370	Utilize back-up generator to mitigate peak demand	15	15	15	15	X																											
Waste Water Treatment	11.7000.485	Well and Pump - New Installation	15	15	15	15	X																											
Waste Water Treatment	11.9900.280	Custom waste water treatment measure not otherwise specified	15	15	15	15	3																			15		3						
Industrial Ovens & Furnaces	12.1000.045	Recuperative Burners Installed	10	10	10	10	3																			10		3						
Industrial Ovens & Furnaces	12.2000.215	Preheat Combustion Air - install heat exchanger	15	15	15	15	3													10	3					15		3						
Industrial Ovens & Furnaces	12.3000.355	Regenerative Thermal Oxidizer Installed	12	12	12	12	X																											
Industrial Ovens & Furnaces	12.4000.045	Radiant tube inserts installed in exhaust of radiant tube burners (Custom)	5	5	5	5	3																			5		3						
Industrial Ovens & Furnaces	12.4001.045	Radiant tube inserts installed in exhaust of radiant tube burners - per insert (Hybrid)	5	5	5	5	3																			5		3						
Industrial Ovens & Furnaces	12.5000.255	Kiln, Lumber Drying - Improve Efficiency	12	12	12	12	X																											
Industrial Ovens & Furnaces	12.6000.190	High frequency melting furnace replaces line-frequency furnace	20	20	20	20	3																			20		3						
Industrial Ovens & Furnaces	12.7000.460	Variable speed drive installed on an industrial oven or furnace system (Industrial Only)	10	10	10	10	2											10	2															
Industrial Ovens & Furnaces	12.9900.280	Custom industrial oven or furnace measure not otherwise specified	12	12	12	12	X																											
Pools	13.3000.460	Variable frequency drive installed on pool pump motor	UNK	UNK	UNK	UNK	NA																											
Pools	13.3100.090	Pool Cover, Automatic	5	5	5	5	3																			5		3						
Pools	13.4000.425	Trim existing pool pump impeller to more closely match system demand	5	5	5	5	3																											
Pools	13.9900.280	Custom pool measure not otherwise specified	UNK	UNK	UNK	UNK	NA																			30		3						
Food Service	14.0002.280	Food Service Bonus, multiple equipment, 2 types	UNK	UNK	UNK	UNK	NA																											

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			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Agriculture	10.8710.205	Greenhouse IR Rated Poly-film	15	15	15	15	3	5	X	10	+/- 3																	
Agriculture	10.8720.205	Greenhouse Power Vented Unit Heaters	10	10	10	10	3			10	+/- 3																	
Agriculture	10.8730.205	Greenhouse Climate Controls	10	10	10	10	3			10	+/- 3																	
Agriculture	10.9900.280	Custom agricultural measure not otherwise specified	14.5	14.5	14.5	14.5	3			10	+/- 3																	
Waste Water Treatment Another group for water supply?	11.0200.425	Trim existing pump impeller to more closely match system demand	5	5	5	5	3			15	+/- 3																	
Waste Water Treatment	11.0300.460	Variable speed drive on pump motor	10	10	10	10	2			15	+/- 3																	
Waste Water Treatment	11.0320.460	Variable speed drive on blower motor	10	10	10	10	2			15	+/- 3																	
Waste Water Treatment	11.0325.460	Variable speed drive on other waste water treatment system	10	10	10	10	2			15	+/- 3																	
Waste Water Treatment	11.2000.435	Custom Ultraviolet Measure	2	2	2	2	3			15	+/- 3																	
Waste Water Treatment	11.3000.005	Coarse Bubble Aeration	15	15	15	15	x			15	+/- 3																	
Waste Water Treatment	11.4000.005	Custom Aeration Measure	15	15	15	15	X			15	+/- 3																	
Waste Water Treatment	11.5000.370	Off peak pumping, shift to	15	15	15	15	X			15	+/- 3																	
Waste Water Treatment	11.6000.370	Utilize back-up generator to mitigate peak demand	15	15	15	15	X			15	+/- 3																	
Waste Water Treatment	11.7000.485	Well and Pump - New Installation	15	15	15	15	X			15	+/- 3																	
Waste Water Treatment	11.9900.280	Custom waste water treatment measure not otherwise specified	15	15	15	15	3			15	+/- 3																	
Industrial Ovens & Furnaces	12.1000.045	Recuperative Burners Installed	10	10	10	10	3			12	+/- 2																	
Industrial Ovens & Furnaces	12.2000.215	Preheat Combustion Air - install heat exchanger	15	15	15	15	3			12	+/- 2																	
Industrial Ovens & Furnaces	12.3000.355	Regenerative Thermal Oxidizer Installed	12	12	12	12	X			12	+/- 2																	
Industrial Ovens & Furnaces	12.4000.045	Radiant tube inserts installed in exhaust of radiant tube burners (Custom)	5	5	5	5	3			12	+/- 2																	
Industrial Ovens & Furnaces	12.4001.045	Radiant tube inserts installed in exhaust of radiant tube burners - per insert (Hybrid)	5	5	5	5	3			12	+/- 2																	
Industrial Ovens & Furnaces	12.5000.255	Kiln, Lumber Drying - Improve Efficiency	12	12	12	12	X			12	+/- 2																	
Industrial Ovens & Furnaces	12.6000.190	High frequency melting furnace replaces line-frequency furnace	20	20	20	20	3			12	+/- 2																	
Industrial Ovens & Furnaces	12.7000.460	Variable speed drive installed on an industrial oven or furnace system (Industrial Only)	10	10	10	10	2			12	+/- 2																	
Industrial Ovens & Furnaces	12.9900.280	Custom industrial oven or furnace measure not otherwise specified	12	12	12	12	X			12	+/- 2																	
Pools	13.3000.460	Variable frequency drive installed on pool pump motor	UNK	UNK	UNK	UNK	NA																					
Pools	13.3100.090	Pool Cover, Automatic	5	5	5	5	3																					
Pools	13.4000.425	Trim existing pool pump impeller to more closely match system demand	5	5	5	5	3																					
Pools	13.9900.280	Custom pool measure not otherwise specified	UNK	UNK	UNK	UNK	NA																					
Food Service	14.0002.280	Food Service Bonus, multiple equipment, 2 types	UNK	UNK	UNK	UNK	NA																					

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8								
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating								
Food Service	14.0003.280	Food Service Bonus, multiple equipment, 3 types	UNK	UNK	UNK	UNK	NA																											
Food Service	14.1100.180	Fryer, Electric, ENERGY STAR	12	12	12	12	1																											
Food Service	14.1200.180	Fryer, Gas, ENERGY STAR	12	12	12	12	1																											
Food Service	14.1301.180	Fryer, Large Vat, Electric, High Efficiency	12	12	12	12	1																											
Food Service	14.1302.180	Fryer, Large Vat, Gas, High Efficiency	12	12	12	12	1																											
Food Service	14.2103.395	Steamer, Electric, 3 pan - ENERGY STAR	12	12	12	12	1																											
Food Service	14.2104.395	Steamer, Electric, 4 pan - ENERGY STAR	12	12	12	12	1																											
Food Service	14.2105.395	Steamer, Electric, 5 pan - ENERGY STAR	12	12	12	12	1																											
Food Service	14.2106.395	Steamer, Electric, 6 pan - ENERGY STAR	12	12	12	12	1																											
Food Service	14.2107.395	Steamer, Gas, 5 pan - ENERGY STAR	12	12	12	12	1																											
Food Service	14.2206.395	Steamer, Gas, 6 pan - ENERGY STAR	12	12	12	12	1																											
Food Service	14.3000.225	Hot Food Holding Cabinet - ENERGY STAR	12	12	12	12	1																											
Food Service	14.3101.290	Oven, Convection, Electric, High Efficiency - per cavity	12	12	12	12	1																											
Food Service	14.3102.290	Oven, Convection, Gas, High Efficiency - per cavity	12	12	12	12	1																											
Food Service	14.3112.290	Oven, Rack Type, Gas, Single Compartment, High Efficiency	12	12	12	12	1																											
Food Service	14.3122.290	Oven, Rack Type, Gas, Double Compartment, High Efficiency	12	12	12	12	1																											
Food Service	14.3131.290	Oven, Combination Type, Electric, High Efficiency	12	12	12	12	1																											
Food Service	14.3132.290	Oven, Combination Type, Gas, High Efficiency	12	12	12	12	1																											
Food Service	14.3501.210	Griddle, Electric, High Efficiency	12	12	12	12	1																											
Food Service	14.3502.210	Griddle, Gas, High Efficiency	12	12	12	12	1																											
Food Service	14.4110.340	Refrigerator, < 20 cu ft, ENERGY STAR	19	19	19	19	3																											
Food Service	14.4120.340	Refrigerator, 20-48 cu ft, ENERGY STAR	19	19	19	19	3																											
Food Service	14.4130.340	Refrigerator, > 48 cu ft, ENERGY STAR	19	19	19	19	3																											
Food Service	14.4132.340	Refrigerator, Commercial, ENERGY STAR	18	18	18	18	2											18	2															
Food Service	14.4135.340	Refrigerator, Commercial, CEE Tier 2 efficiency, < 20 cu ft	18	18	18	18	2											18	2															
Food Service	14.4136.340	Refrigerator, Commercial, CEE Tier 2 efficiency, 20-48 cu ft	18	18	18	18	2											18	2															
Food Service	14.4137.340	Refrigerator, Commercial, CEE Tier 2 efficiency, >48 cu ft	18	18	18	18	2											18	2															
Food Service	14.4210.340	Freezer, < 20 cu ft, ENERGY STAR	18	18	18	18	2											18	2															
Food Service	14.4220.340	Freezer, 20-48 cu ft, ENERGY STAR	18	18	18	18	2											18	2															
Food Service	14.4230.340	Freezer, > 48 cu ft, ENERGY STAR	18	18	18	18	2											18	2															
Food Service	14.4232.340	Freezer, Commercial, ENERGY STAR	18	18	18	18	2											18	2															
Food Service	14.4235.340	Freezer, Commercial, CEE Tier 2 efficiency, <20 cu ft	18	18	18	18	2											18	2															
Food Service	14.4236.340	Freezer, Commercial, CEE Tier 2 efficiency, 20-48 cu ft	18	18	18	18	2											18	2															

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Food Service	14.0003.280	Food Service Bonus, multiple equipment, 3 types	UNK	UNK	UNK	UNK	NA																					
Food Service	14.1100.180	Fryer, Electric, ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.1200.180	Fryer, Gas, ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.1301.180	Fryer, Large Vat, Electric, High Efficiency	12	12	12	12	1	12	1																			
Food Service	14.1302.180	Fryer, Large Vat, Gas, High Efficiency	12	12	12	12	1	12	1																			
Food Service	14.2103.395	Steamer, Electric, 3 pan - ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.2104.395	Steamer, Electric, 4 pan - ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.2105.395	Steamer, Electric, 5 pan - ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.2106.395	Steamer, Electric, 6 pan - ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.2107.395	Steamer, Gas, 5 pan - ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.2206.395	Steamer, Gas, 6 pan - ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.3000.225	Hot Food Holding Cabinet - ENERGY STAR	12	12	12	12	1	12	1																			
Food Service	14.3101.290	Oven, Convection, Electric, High Efficiency - per cavity	12	12	12	12	1	12	1																			
Food Service	14.3102.290	Oven, Convection, Gas, High Efficiency - per cavity	12	12	12	12	1	12	1																			
Food Service	14.3112.290	Oven, Rack Type, Gas, Single Compartment, High Efficiency	12	12	12	12	1	12	1																			
Food Service	14.3122.290	Oven, Rack Type, Gas, Double Compartment, High Efficiency	12	12	12	12	1	12	1																			
Food Service	14.3131.290	Oven, Combination Type, Electric, High Efficiency	12	12	12	12	1	12	1																			
Food Service	14.3132.290	Oven, Combination Type, Gas, High Efficiency	12	12	12	12	1	12	1																			
Food Service	14.3501.210	Griddle, Electric, High Efficiency	12	12	12	12	1	12	1																			
Food Service	14.3502.210	Griddle, Gas, High Efficiency	12	12	12	12	1	12	1																			
Food Service	14.4110.340	Refrigerator, < 20 cu ft, ENERGY STAR	19	19	19	19	3																					
Food Service	14.4120.340	Refrigerator, 20-48 cu ft, ENERGY STAR	19	19	19	19	3																					
Food Service	14.4130.340	Refrigerator, > 48 cu ft, ENERGY STAR	19	19	19	19	3																					
Food Service	14.4132.340	Refrigerator, Commercial, ENERGY STAR	18	18	18	18	2			12	+/- 3																	
Food Service	14.4135.340	Refrigerator, Commercial, CEE Tier 2 efficiency, < 20 cu ft	18	18	18	18	2			12	+/- 3																	
Food Service	14.4136.340	Refrigerator, Commercial, CEE Tier 2 efficiency, 20-48 cu ft	18	18	18	18	2			12	+/- 3																	
Food Service	14.4137.340	Refrigerator, Commercial, CEE Tier 2 efficiency, >48 cu ft	18	18	18	18	2			12	+/- 3																	
Food Service	14.4210.340	Freezer, < 20 cu ft, ENERGY STAR	18	18	18	18	2			12	+/- 3																	
Food Service	14.4220.340	Freezer, 20-48 cu ft, ENERGY STAR	18	18	18	18	2			12	+/- 3																	
Food Service	14.4230.340	Freezer, > 48 cu ft, ENERGY STAR	18	18	18	18	2			12	+/- 3																	
Food Service	14.4232.340	Freezer, Commercial, ENERGY STAR	18	18	18	18	2			12	+/- 3																	
Food Service	14.4235.340	Freezer, Commercial, CEE Tier 2 efficiency, <20 cu ft	18	18	18	18	2			12	+/- 3																	
Food Service	14.4236.340	Freezer, Commercial, CEE Tier 2 efficiency, 20-48 cu ft	18	18	18	18	2			12	+/- 3																	

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8		
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating
Food Service	14.4237.340	Freezer, Commercial, CEE Tier 2 efficiency, >48 cu ft	18	18	18	18	2											18	2										
Food Service	14.5100.235	Ice Machines, < 500 lbs, High Efficiency	10	10	10	10	2																					10	3
Food Service	14.5110.235	Ice Machine, < 500 lbs/day, ENERGY STAR	10	10	10	10	2																					10	3
Food Service	14.5200.235	Ice Machines, 500-1000 lbs, High Efficiency	10	10	10	10	2																					10	3
Food Service	14.5210.235	Ice Machine, 500-1000 lbs/day, ENERGY STAR	10	10	10	10	3																					10	3
Food Service	14.5300.235	Ice Machines, > 1000 lbs, High Efficiency	10	10	10	10	3																					10	3
Food Service	14.5310.235	Ice Machine, > 1000 lbs/day, ENERGY STAR	10	10	10	10	3																					10	3
Food Service	14.5400.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Gas Booster, Under Counter	10	10	10	10	3																					10	3
Food Service	14.5401.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Electric Booster, Under Counter	10	10	10	10	3																					10	3
Food Service	14.5402.120	Dishwasher, ENERGY STAR, Low Temp, Gas Heat, Under Counter	10	10	10	10	3																					10	3
Food Service	14.5403.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Gas Booster, Door Type	10	10	10	10	3																					10	3
Food Service	14.5404.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Electric Booster, Door Type	10	10	10	10	3																					10	3
Food Service	14.5405.120	Dishwasher, ENERGY STAR, Low Temp, Gas Heat, Door Type	10	10	10	10	3																					10	3
Food Service	14.5406.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Gas Booster, Single Tank Conveyor	10	10	10	10	3																					10	3
Food Service	14.5407.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Electric Booster, Single Tank Conveyor	10	10	10	10	3																					10	3
Food Service	14.5408.120	Dishwasher, ENERGY STAR, Low Temp, Gas Heat, Single Tank Conveyor	10	10	10	10	3																					10	3
Food Service	14.5409.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Gas Booster, Multi Tank Conveyor	10	10	10	10	3																					10	3
Food Service	14.5410.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Electric Booster, Multi Tank Conveyor	10	10	10	10	3																					10	3
Food Service	14.5411.120	Dishwasher, ENERGY STAR, Low Temp, Gas Heat, Multi Tank Conveyor	10	10	10	10	3																					10	3
Food Service	14.5413.120	Dishwasher, ENERGY STAR, High Temp, Electric Heat, Electric Booster, Under Counter	10	10	10	10	3																					10	3
Food Service	14.5414.120	Dishwasher, ENERGY STAR, Low Temp, Electric Heat, Under Counter	10	10	10	10	3																					10	3
Food Service	14.5416.120	Dishwasher, ENERGY STAR, High Temp, Electric Heat, Electric Booster, Door Type	10	10	10	10	3																					10	3
Food Service	14.5417.120	Dishwasher, ENERGY STAR, Low Temp, Electric Heat, Door Type	10	10	10	10	3																					10	3
Food Service	14.5419.120	Dishwasher, ENERGY STAR, High Temp, Electric Heat, Electric Booster, Single Tank Conveyor	10	10	10	10	3																					10	3

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			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Food Service	14.4237.340	Freezer, Commercial, CEE Tier 2 efficiency, >48 cu ft	18	18	18	18	2			12	+/- 3																									
Food Service	14.5100.235	Ice Machines, < 500 lbs, High Efficiency	10	10	10	10	2	10	2																											
Food Service	14.5110.235	Ice Machine, < 500 lbs/day, ENERGY STAR	10	10	10	10	2	10	2																											
Food Service	14.5200.235	Ice Machines, 500-1000 lbs, High Efficiency	10	10	10	10	2	10	2																											
Food Service	14.5210.235	Ice Machine, 500-1000 lbs/day, ENERGY STAR	10	10	10	10	3																													
Food Service	14.5300.235	Ice Machines, > 1000 lbs, High Efficiency	10	10	10	10	3																													
Food Service	14.5310.235	Ice Machine, > 1000 lbs/day, ENERGY STAR	10	10	10	10	3																													
Food Service	14.5400.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Gas Booster, Under Counter	10	10	10	10	3																													
Food Service	14.5401.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Electric Booster, Under Counter	10	10	10	10	3																													
Food Service	14.5402.120	Dishwasher, ENERGY STAR, Low Temp, Gas Heat, Under Counter	10	10	10	10	3																													
Food Service	14.5403.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Gas Booster, Door Type	10	10	10	10	3																													
Food Service	14.5404.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Electric Booster, Door Type	10	10	10	10	3																													
Food Service	14.5405.120	Dishwasher, ENERGY STAR, Low Temp, Gas Heat, Door Type	10	10	10	10	3																													
Food Service	14.5406.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Gas Booster, Single Tank Conveyor	10	10	10	10	3																													
Food Service	14.5407.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Electric Booster, Single Tank Conveyor	10	10	10	10	3																													
Food Service	14.5408.120	Dishwasher, ENERGY STAR, Low Temp, Gas Heat, Single Tank Conveyor	10	10	10	10	3																													
Food Service	14.5409.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Gas Booster, Multi Tank Conveyor	10	10	10	10	3																													
Food Service	14.5410.120	Dishwasher, ENERGY STAR, High Temp, Gas Heat, Electric Booster, Multi Tank Conveyor	10	10	10	10	3																													
Food Service	14.5411.120	Dishwasher, ENERGY STAR, Low Temp, Gas Heat, Multi Tank Conveyor	10	10	10	10	3																													
Food Service	14.5413.120	Dishwasher, ENERGY STAR, High Temp, Electric Heat, Electric Booster, Under Counter	10	10	10	10	3																													
Food Service	14.5414.120	Dishwasher, ENERGY STAR, Low Temp, Electric Heat, Under Counter	10	10	10	10	3																													
Food Service	14.5416.120	Dishwasher, ENERGY STAR, High Temp, Electric Heat, Electric Booster, Door Type	10	10	10	10	3																													
Food Service	14.5417.120	Dishwasher, ENERGY STAR, Low Temp, Electric Heat, Door Type	10	10	10	10	3																													
Food Service	14.5419.120	Dishwasher, ENERGY STAR, High Temp, Electric Heat, Electric Booster, Single Tank Conveyor	10	10	10	10	3																													

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8								
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating								
Food Service	14.5420.120	Dishwasher, ENERGY STAR, Low Temp, Electric Heat, Single Tank Conveyor	10	10	10	10	3																			10	3							
Food Service	14.5422.120	Dishwasher, ENERGY STAR, High Temp, Electric Heat, Electric Booster, Multi Tank Conveyor	10	10	10	10	3																			10	3							
Food Service	14.5423.120	Dishwasher, ENERGY STAR, Low Temp, Electric Heat, Multi Tank Conveyor	10	10	10	10	3																			10	3							
Food Service	14.6000.085	Kitchen Exhaust Hood Demand Control Ventilation	10	10	10	10	3																			10		3						
Food Service	14.9900.280	Custom food service measure not otherwise specified	10	10	10	10	3																			10	3							
New Construction	15.0100.490	Whole building 10-20% energy savings	18	18	18	18	X																											
New Construction	15.0200.490	Whole building 20-30% energy savings	18	18	18	18	X																											
New Construction	15.0300.490	Whole building 30-40% energy savings	18	18	18	18	X																											
Information Technol	16.0400.075	Turn off computers and monitors at night and during the weekends, and / or utilize monitor sleep mode	2	2	2	2	2			2	85%	2																						
Information Technol	16.0410.075	PC Network Energy Management System	2	2	2	2	2			2	85%	2																						
Information Technol	16.1990.280	LCD computer monitor, replacing CRT monitor	UNK	UNK	UNK	UNK	NA																											
Plug Loads	17.0500.465	Vending Machine, Cold Beverage - ENERGY STAR	10	10	10	10	3																				10	3						
Plug Loads	17.0501.465	Vending Machine, ENERGY STAR, Cold Beverage, Software Activated	10	10	10	10	3																				10	3						
Plug Loads	17.0510.085	Vending Machine Controls, on cold beverage machine	5	5	5	5	1																5		3	10		3						
Plug Loads	17.0515.085	Vending Machine Controls, on cold beverage machine - Direct Install ($25 co-pay)	5	5	5	5	1																5		3	10		3						
Plug Loads	17.0520.085	Vending Machine Controls, on snack machine	5	5	5	5	1																5		3									
Plug Loads	17.0600.085	Vending Machine - Install VendingMiser or Disconnect Lamps and Ballasts (Custom)	5	5	5	5	1			15	67%	X											5		3	10		3						
Plug Loads	17.1000.125	Dishwasher, Residential - ENERGY STAR	12	12	12	12	3																			12		3						
Plug Loads	17.1200.350	Refrigerator, Residential - ENERGY STAR	19	19	19	19	3																			19		3						
Plug Loads	17.1500.085	Engine Block Heater - Timer	UNK	UNK	UNK	UNK	NA																											
Training & Special	18.1000.372	Coupon to offset class registration fee, best practices for compressed air systems	NA	NA	NA	NA	NA																											
Training & Special	18.1010.372	Coupon to offset class registration fee, best practices for steam systems	NA	NA	NA	NA	NA																											
Training & Special	18.1020.372	Coupon to offset class registration fee, building operator certification	NA	NA	NA	NA	NA																											
Training & Special	18.1030.372	Coupon to offset class registration fee, operations and maintenance for schools	NA	NA	NA	NA	NA																											
Training & Special	18.1040.372	Coupon to offset class registration fee, practical energy management, commercial	NA	NA	NA	NA	NA																											

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14			15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating
Food Service	14.5420.120	Dishwasher, ENERGY STAR, Low Temp, Electric Heat, Single Tank Conveyor	10	10	10	10	3																				
Food Service	14.5422.120	Dishwasher, ENERGY STAR, High Temp, Electric Heat, Electric Booster, Multi Tank Conveyor	10	10	10	10	3																				
Food Service	14.5423.120	Dishwasher, ENERGY STAR, Low Temp, Electric Heat, Multi Tank Conveyor	10	10	10	10	3																				
Food Service	14.6000.085	Kitchen Exhaust Hood Demand Control Ventilation	10	10	10	10	3																				
Food Service	14.9900.280	Custom food service measure not otherwise specified	10	10	10	10	3																				
New Construction	15.0100.490	Whole building 10-20% energy savings	18	18	18	18	X			18	+/- 2																
New Construction	15.0200.490	Whole building 20-30% energy savings	18	18	18	18	X			18	+/- 2																
New Construction	15.0300.490	Whole building 30-40% energy savings	18	18	18	18	X			18	+/- 2																
Information Technol	16.0400.075	Turn off computers and monitors at night and during the weekends, and / or utilize monitor sleep mode	2	2	2	2	2																				
Information Technol	16.0410.075	PC Network Energy Management System	2	2	2	2	2																				
Information Technol	16.1990.280	LCD computer monitor, replacing CRT monitor	UNK	UNK	UNK	UNK	NA																				
Plug Loads	17.0500.465	Vending Machine, Cold Beverage - ENERGY STAR	10	10	10	10	3			12	+/- 3																
Plug Loads	17.0501.465	Vending Machine, ENERGY STAR, Cold Beverage, Software Activated	10	10	10	10	3			12	+/- 3																
Plug Loads	17.0510.085	Vending Machine Controls, on cold beverage machine	5	5	5	5	1	5	1	12	+/- 3																
Plug Loads	17.0515.085	Vending Machine Controls, on cold beverage machine - Direct Install ($25 co-pay)	5	5	5	5	1	5	1	12	+/- 3																
Plug Loads	17.0520.085	Vending Machine Controls, on snack machine	5	5	5	5	1	5	1	12	+/- 3																
Plug Loads	17.0600.085	Vending Machine - Install VendingMiser or Disconnect Lamps and Ballasts (Custom)	5	5	5	5	1	5	1	12	+/- 3																
Plug Loads	17.1000.125	Dishwasher, Residential - ENERGY STAR	12	12	12	12	3																				
Plug Loads	17.1200.350	Refrigerator, Residential - ENERGY STAR	19	19	19	19	3																				
Plug Loads	17.1500.085	Engine Block Heater - Timer	UNK	UNK	UNK	UNK	NA																				
Training & Special	18.1000.372	Coupon to offset class registration fee, best practices for compressed air systems	NA	NA	NA	NA	NA																				
Training & Special	18.1010.372	Coupon to offset class registration fee, best practices for steam systems	NA	NA	NA	NA	NA																				
Training & Special	18.1020.372	Coupon to offset class registration fee, building operator certification	NA	NA	NA	NA	NA																				
Training & Special	18.1030.372	Coupon to offset class registration fee, operations and maintenance for schools	NA	NA	NA	NA	NA																				
Training & Special	18.1040.372	Coupon to offset class registration fee, practical energy management, commercial	NA	NA	NA	NA	NA																				

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8							
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating							
Training & Special	18.1050.372	Coupon to offset class registration fee, practical energy management, industrial	NA	NA	NA	NA	NA																										
Training & Special	18.1060.372	Coupon to offset class registration fee, practical energy management, schools	NA	NA	NA	NA	NA																										
Training & Special	18.1070.372	Coupon to offset class registration fee, smart strategies for grocery	NA	NA	NA	NA	NA																										
Training & Special	18.1080.372	Coupon to offset class registration fee, smart strategies for healthcare	NA	NA	NA	NA	NA																										
Training & Special	18.1090.372	Coupon to offset class registration fee, smart strategies for hotels	NA	NA	NA	NA	NA																										
Training & Special	18.1100.372	Coupon to offset class registration fee, energy efficient swimming pools	NA	NA	NA	NA	NA																										
Lighting	2.0100.110	Delamp Lighting Reduction	UNK	UNK	UNK	UNK	NA																										
Lighting	2.0200.260	LED Exit Lighting - for specially targeted early replacement only	16	16	16	16	1	13	2	10		X	13	15	X							13	13	15	3	10		3					
Lighting	2.0300.165	CFL <= 30 Watts, replacing incandescent	6.5	5	3.6	5	2	5	2													13	13		3	6		3					
Lighting	2.0301.165	CFL High Wattage 31-115 Watts, replacing incandescent	3.9	5	4.3	6.3	2	5	2	15		X	13		X							13	13		3	6		3					
Lighting	2.0302.165	CFL High Wattage 116-149 Watts, replacing metal halide	6.6	5	3.4	5	2	5	2	15		X	13		X							13	13		3	6		3					
Lighting	2.0303.165	CFL High Wattage 150-199 Watts, replacing metal halide	6.6	5	3.4	5	2	5	2	15		X	13		X							13	13		3	6		3					
Lighting	2.0304.165	CFL High Wattage ≥200 Watts, replacing metal halide	3.9	5	4.3	6.3	2	5	2	15		X	13		X							13	13		3	6		3					
Lighting	2.0305.060	CFL Cold Cathode Screw-In, replacing incandescent	3.9	5	4.3	6.3	3	5	2																	6		3					
Lighting	2.0306.260	LED screw-in lamps replacing incandescent	UNK	UNK	UNK	UNK	NA																										
Lighting	2.0307.165	CFL reflector flood lamps replacing incandescent reflector flood lamps	3.9	5	4.3	6.3	2	5	2													13	13		3	6		3					
Lighting	2.0310.165	CFL Direct Install, replacing incandescent	6.6	5	3.4	5	2	5	2													13	13		3	6		3					
Lighting	2.0400.165	CFL Fixture, replacing incandescent fixture	13	13	13	13	2	13	2	15		X	13		X			16	2			13	13		3	15		3					
Lighting	2.0401.165	CFL High Wattage, >=100 Watts, replacing high bay HID or incandescent	13	13	13	13	2	13	2	15		X	13		X							13	13		3	6		3					
Lighting	2.0410.175	T8 Circular fixture, <=36W, hard wired - Ag Only	13	13	13	13	2	13	2				13		X							13	13		3	5		3					
Lighting	2.0505.085	Occupancy Sensors - Wall Mount <= 200 Watts	8	8	8	8	1	9	2																	10		3					
Lighting	2.0506.085	Occupancy Sensors - Wall Mount >= 201 Watts	8	8	8	8	1	9	2																	10		3					
Lighting	2.0507.085	Occupancy Sensors - Ceiling Mount <= 500 Watts	8	8	8	8	1	9	2																	10		3					
Lighting	2.0508.085	Occupancy Sensors - Ceiling Mount 501-1000 Watts	8	8	8	8	1	9	2																	10		3					
Lighting	2.0509.085	Occupancy Sensors - Ceiling Mount >= 1001 Watts	8	8	8	8	1	9	2																	10		3					
Lighting	2.0515.085	High / low control for 320W PSMH	13	13	13	13	2																										
Lighting	2.0520.085	Daylighting Controls - Automatic stepped, minimum 3 lighting levels (per kW controlled)	15	15	15	15	3																			15		3					
Lighting	2.0530.085	Daylighting Controls, automatic dimming ballasts - per kW controlled	15	15	15	15	3																			15		3					
Lighting	2.0600.085	Daylighting Controls, Automatic	15	15	15	15	3																			15		3					

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Training & Special	18.1050.372	Coupon to offset class registration fee, practical energy management, industrial	NA	NA	NA	NA	NA																					
Training & Special	18.1060.372	Coupon to offset class registration fee, practical energy management, schools	NA	NA	NA	NA	NA																					
Training & Special	18.1070.372	Coupon to offset class registration fee, smart strategies for grocery	NA	NA	NA	NA	NA																					
Training & Special	18.1080.372	Coupon to offset class registration fee, smart strategies for healthcare	NA	NA	NA	NA	NA																					
Training & Special	18.1090.372	Coupon to offset class registration fee, smart strategies for hotels	NA	NA	NA	NA	NA																					
Training & Special	18.1100.372	Coupon to offset class registration fee, energy efficient swimming pools	NA	NA	NA	NA	NA																					
Lighting	2.0100.110	Delamp Lighting Reduction	UNK	UNK	UNK	UNK	NA																					
Lighting	2.0200.260	LED Exit Lighting - for specially targeted early replacement only	16	16	16	16	1	16	1	15	+/- 3																	
Lighting	2.0300.165	CFL <= 30 Watts, replacing incandescent	6.5	5	3.6	5	2	Varies	2	15	+/- 3																	
Lighting	2.0301.165	CFL High Wattage 31-115 Watts, replacing incandescent	3.9	5	4.3	6.3	2	Varies	2	15	+/- 3																	
Lighting	2.0302.165	CFL High Wattage 116-149 Watts, replacing metal halide	6.6	5	3.4	5	2	Varies	2	15	+/- 3																	
Lighting	2.0303.165	CFL High Wattage 150-199 Watts, replacing metal halide	6.6	5	3.4	5	2	Varies	2	15	+/- 3																	
Lighting	2.0304.165	CFL High Wattage ≥200 Watts, replacing metal halide	3.9	5	4.3	6.3	2	Varies	2	15	+/- 3																	
Lighting	2.0305.060	CFL Cold Cathode Screw-In, replacing incandescent	3.9	5	4.3	6.3	3																					
Lighting	2.0306.260	LED screw-in lamps replacing incandescent	UNK	UNK	UNK	UNK	NA	Varies	2	15	+/- 3																	
Lighting	2.0307.165	CFL reflector flood lamps replacing incandescent reflector flood lamps	3.9	5	4.3	6.3	2	Varies	2	15	+/- 3																	
Lighting	2.0310.165	CFL Direct Install, replacing incandescent	6.6	5	3.4	5	2	Varies	2	15	+/- 3																	
Lighting	2.0400.165	CFL Fixture, replacing incandescent fixture	13	13	13	13	2	12	2	15	+/- 3																	
Lighting	2.0401.165	CFL High Wattage, >=100 Watts, replacing high bay HID or incandescent	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.0410.175	T8 Circular fixture, <=36W, hard wired - Ag Only	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.0505.085	Occupancy Sensors - Wall Mount <= 200 Watts	8	8	8	8	1	8	1	15	+/- 3																	
Lighting	2.0506.085	Occupancy Sensors - Wall Mount >= 201 Watts	8	8	8	8	1	8	1	15	+/- 3																	
Lighting	2.0507.085	Occupancy Sensors - Ceiling Mount <= 500 Watts	8	8	8	8	1	8	1	15	+/- 3																	
Lighting	2.0508.085	Occupancy Sensors - Ceiling Mount 501-1000 Watts	8	8	8	8	1	8	1	15	+/- 3																	
Lighting	2.0509.085	Occupancy Sensors - Ceiling Mount >= 1001 Watts	8	8	8	8	1	8	1	15	+/- 3																	
Lighting	2.0515.085	High / low control for 320W PSMH	13	13	13	13	2	Varies	2																			
Lighting	2.0520.085	Daylighting Controls - Automatic stepped, minimum 3 lighting levels (per kW controlled)	15	15	15	15	3																					
Lighting	2.0530.085	Daylighting Controls, automatic dimming ballasts - per kW controlled	15	15	15	15	3																					
Lighting	2.0600.085	Daylighting Controls, Automatic	15	15	15	15	3																					

WISeerts Codes			KEMA Recommended					Measure life summary by source																								
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8						
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating
Lighting	2.0610.085	Bathroom Lighting Controls (Wall Mount), per room - Direct Install ($15 co-pay)	UNK	UNK	UNK	UNK	NA																									
Lighting	2.0625.085	Long-day Lighting Controls for Livestock	UNK	UNK	UNK	UNK	NA																									
Lighting	2.0700.220	HID Fixture - Replace Incandescent Fixture	13	13	13	13	2						13		X			16	2			13	13		3							
Lighting	2.0800.170	T8 - Upgrade existing lighting with T8, elec. ballast and occupancy sensors	9	9	9	9	2	9	2				9		X							13	13		3	10		3				
Lighting	2.0810.170	T8 4L-4-4ft High Performance Replacing T12 2L-8 ft	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3				
Lighting	2.0811.170	T8 4L-4ft High Performance Replacing T12HO/VHO 2L-8 ft	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3				
Lighting	2.0812.170	T8 2L-4ft High Performance HBF Replacing T12HO 1L-8 ft	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3				
Lighting	2.0821.170	T8 1L-4 ft Low Watt with CEE Ballast - 25 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0822.170	T8 2L-4 ft Low Watt with CEE Ballast - 25 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0823.170	T8 3L-4 ft Low Watt with CEE Ballast - 25 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0824.170	T8 4L-4 ft Low Watt with CEE Ballast - 25 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0831.170	T8 1L-4 ft Low Watt with CEE Ballast - 28 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0832.170	T8 2L-4 ft Low Watt with CEE Ballast - 28 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0833.170	T8 3L-4 ft Low Watt with CEE Ballast - 28 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0834.170	T8 4L-4 ft Low Watt with CEE Ballast - 28 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0841.170	T8 1L-4 ft Low Watt with CEE Ballast - 30 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0842.170	T8 2L-4 ft Low Watt with CEE Ballast - 30 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0843.170	T8 3L-4 ft Low Watt with CEE Ballast - 30 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0844.170	T8 4L-4 ft Low Watt with CEE Ballast - 30 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0851.170	T8 Low Watt Relamp - 25 Watts	3.9	5	4.3	6.3	2			15	100%	X	13		X			5	2			13	13	15	3	15		3				
Lighting	2.0852.170	T8 Low Watt Relamp - 28 Watts	3.9	5	4.3	6.3	2			15	100%	X	13		X			5	2			13	13	15	3	15		3				
Lighting	2.0853.170	T8 Low Watt Relamp - 30 Watts	3.9	5	4.3	6.3	2			15	100%	X	13		X			5	2			13	13	15	3	15		3				
Lighting	2.0856.170	T8 Low Watt Relamp 8 ft - 54 Watts	3.9	5	4.3	6.3	2			15	100%	X	13		X			5	2			13	13		3	15		3				
Lighting	2.0860.170	T8 1L-4 ft Hi Lumen Lamp with Low BF	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0870.170	T8 2L-4 ft Hi Lumen Lamp with Low BF	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0880.170	T8 3L-4 ft Hi Lumen Lamp with Low BF	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0890.170	T8 4L-4 ft Hi Lumen Lamp with Low BF	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0891.170	T8 High Performance Fixture with Low Wattage Lamps	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3				
Lighting	2.0895.170	T8 1L-4 ft Hi Lumen Lamp with Low BF (New Construction)	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3				

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17									
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating								
Lighting	2.0610.085	Bathroom Lighting Controls (Wall Mount), per room - Direct Install ($15 co-pay)	UNK	UNK	UNK	UNK	NA																													
Lighting	2.0625.085	Long-day Lighting Controls for Livestock	UNK	UNK	UNK	UNK	NA																													
Lighting	2.0700.220	HID Fixture - Replace Incandescent Fixture	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0800.170	T8 - Upgrade existing lighting with T8, elec. ballast and occupancy sensors	9	9	9	9	2			15	+/- 3																									
Lighting	2.0810.170	T8 4L-4-4ft High Performance Replacing T12 2L-8 ft	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0811.170	T8 4L-4ft High Performance Replacing T12HO/VHO 2L-8 ft	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0812.170	T8 2L-4ft High Performance HBF Replacing T12HO 1L-8 ft	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0821.170	T8 1L-4 ft Low Watt with CEE Ballast - 25 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0822.170	T8 2L-4 ft Low Watt with CEE Ballast - 25 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0823.170	T8 3L-4 ft Low Watt with CEE Ballast - 25 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0824.170	T8 4L-4 ft Low Watt with CEE Ballast - 25 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0831.170	T8 1L-4 ft Low Watt with CEE Ballast - 28 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0832.170	T8 2L-4 ft Low Watt with CEE Ballast - 28 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0833.170	T8 3L-4 ft Low Watt with CEE Ballast - 28 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0834.170	T8 4L-4 ft Low Watt with CEE Ballast - 28 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0841.170	T8 1L-4 ft Low Watt with CEE Ballast - 30 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0842.170	T8 2L-4 ft Low Watt with CEE Ballast - 30 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0843.170	T8 3L-4 ft Low Watt with CEE Ballast - 30 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0844.170	T8 4L-4 ft Low Watt with CEE Ballast - 30 Watts	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0851.170	T8 Low Watt Relamp - 25 Watts	3.9	5	4.3	6.3	2	Varies	2	15	+/- 3																									
Lighting	2.0852.170	T8 Low Watt Relamp - 28 Watts	3.9	5	4.3	6.3	2	Varies	2	15	+/- 3																									
Lighting	2.0853.170	T8 Low Watt Relamp - 30 Watts	3.9	5	4.3	6.3	2	Varies	2	15	+/- 3																									
Lighting	2.0856.170	T8 Low Watt Relamp 8 ft - 54 Watts	3.9	5	4.3	6.3	2	Varies	2	15	+/- 3																									
Lighting	2.0860.170	T8 1L-4 ft Hi Lumen Lamp with Low BF	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0870.170	T8 2L-4 ft Hi Lumen Lamp with Low BF	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0880.170	T8 3L-4 ft Hi Lumen Lamp with Low BF	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0890.170	T8 4L-4 ft Hi Lumen Lamp with Low BF	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0891.170	T8 High Performance Fixture with Low Wattage Lamps	13	13	13	13	2	Varies	2	15	+/- 3																									
Lighting	2.0895.170	T8 1L-4 ft Hi Lumen Lamp with Low BF (New Construction)	13	13	13	13	2	Varies	2	15	+/- 3																									

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8							
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating							
Lighting	2.0896.170	T8 2L-4 ft Hi Lumen Lamp with Low BF (New Construction)	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3						
Lighting	2.0897.170	T8 3L-4 ft Hi Lumen Lamp with Low BF (New Construction)	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3						
Lighting	2.0898.170	T8 4L-4 ft Hi Lumen Lamp with Low BF (New Construction)	13	13	13	13	2			15	100%	X	13	15	X			15	2					15	3		15	3						
Lighting	2.0900.170	T5 2L - F28T5 Fixture, Recessed Indirect 2x4, replacing 3LT8 or 4LT12 (prescriptive)	13	13	13	13	2	13	2	15	100%	X	13		X							13	13		3								
Lighting	2.0910.170	T5 2L - F28T5 Fixture - Replaces Standard T8 or T12	13	13	13	13	2	13	2	15	100%	X	13		X							13	13		3	5		3					
Lighting	2.0920.170	T5 1L - F54T5HO - Replaces Standard 2L - T8 or T12	13	13	13	13	2	13	2	15	100%	X	13		X							13	13		3	5		3					
Lighting	2.0970.260	LED recessed downlight - ENERGY STAR qualified	15	15	15	15	X						13	15	X																		
Lighting	2.1000.260	LED traffic lights replacing incandescent	10	10	10	10	3						13	15	X											10		3					
Lighting	2.1005.260	LED Holiday Lights	9	9	9	9	3						13	15	X											9		3					
Lighting	2.1010.170	T8 2L-4 ft fixture - AG ONLY	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	5		3					
Lighting	2.1015.170	T8 3L-4 ft fixture - AG ONLY	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	5		3					
Lighting	2.1021.170	T8 8 ft fixture - AG ONLY	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	5		3					
Lighting	2.1040.220	High Pressure Sodium Fixture - AG ONLY	13	13	13	13	2	13	2				13	15	X			16	2							5		3					
Lighting	2.1050.220	MH Pulse Start - AG ONLY	13	13	13	13	2	13	2				13	15	X			16	2							5		3					
Lighting	2.1060.170	T8 fixture, 6-lamp - AG ONLY	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	5		3					
Lighting	2.1062.170	BOUNTY - T8 1L replacing T12	13	13	13	13	2	13	2	15	100%	X	13		X			15	2														
Lighting	2.1200.220	High Pressure Sodium (HPS) - Replaces Incandescent Exterior Security Lighting	13	13	13	13	2	13	2				13		X			16	2							10		3					
Lighting	2.1300.220	Metal Halide (MH), Multi-Level - Replaces Fluorescent Lighting	13	13	13	13	2	13	2				13		X			16	2							10		3					
Lighting	2.1400.220	Metal Halide, two-stage, replacing mercury vapor	13	13	13	13	2	13	2				13		X			16	2							10		3					
Lighting	2.1500.220	Metal Halide or High Pressure Sodium Replaces Mercury Vapor Security Lighting	13	13	13	13	2	13	2				13		X			16	2							10		3					
Lighting	2.1600.370	Lighting Schedule - Manual, to reduce operating hours	12	12	12	12	3																			12		3					
Lighting	2.1800.170	T8 lamps, electronic ballasts, replacing metal halide or high pressure sodium	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3								
Lighting	2.1900.170	T8 or T5 - Replaces HID	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3								
Lighting	2.1910.170	T5 F14 with EB, 1-lamp, replaces T8 F17	13	13	13	13	2	13	2	15	100%	X	13		X			15	2														
Lighting	2.1920.170	T5 F14 with EB, 2-lamp, replaces T8 F17	13	13	13	13	2	13	2	15	100%	X	13		X			15	2														
Lighting	2.2100.220	Metal Halide (MH), pulse start	13	13	13	13	2	13	2	15	100%	X	13	15	X			16	2							10		3					
Lighting	2.2110.220	Ceramic Metal Halide (CMH) Fixture, 20-100 Watts - Replaces Incandescent Fixture	13	13	13	13	2	13	2				13		X			16	2							10		3					

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Lighting	2.0896.170	T8 2L-4 ft Hi Lumen Lamp with Low BF (New Construction)	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.0897.170	T8 3L-4 ft Hi Lumen Lamp with Low BF (New Construction)	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.0898.170	T8 4L-4 ft Hi Lumen Lamp with Low BF (New Construction)	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.0900.170	T5 2L - F28T5 Fixture, Recessed Indirect 2x4, replacing 3LT8 or 4LT12 (prescriptive)	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.0910.170	T5 2L - F28T5 Fixture - Replaces Standard T8 or T12	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.0920.170	T5 1L - F54T5HO - Replaces Standard 2L - T8 or T12	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.0970.260	LED recessed downlight - ENERGY STAR qualified	15	15	15	15	X			15	+/- 3																	
Lighting	2.1000.260	LED traffic lights replacing incandescent	10	10	10	10	3			15	+/- 3																	
Lighting	2.1005.260	LED Holiday Lights	9	9	9	9	3			15	+/- 3																	
Lighting	2.1010.170	T8 2L-4 ft fixture - AG ONLY	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1015.170	T8 3L-4 ft fixture - AG ONLY	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1021.170	T8 8 ft fixture - AG ONLY	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1040.220	High Pressure Sodium Fixture - AG ONLY	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1050.220	MH Pulse Start - AG ONLY	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1060.170	T8 fixture, 6-lamp - AG ONLY	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1062.170	BOUNTY - T8 1L replacing T12	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1200.220	High Pressure Sodium (HPS) - Replaces Incandescent Exterior Security Lighting	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1300.220	Metal Halide (MH), Multi-Level - Replaces Fluorescent Lighting	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1400.220	Metal Halide, two-stage, replacing mercury vapor	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1500.220	Metal Halide or High Pressure Sodium Replaces Mercury Vapor Security Lighting	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1600.370	Lighting Schedule - Manual, to reduce operating hours	12	12	12	12	3			15	+/- 3																	
Lighting	2.1800.170	T8 lamps, electronic ballasts, replacing metal halide or high pressure sodium	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1900.170	T8 or T5 - Replaces HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1910.170	T5 F14 with EB, 1-lamp, replaces T8 F17	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.1920.170	T5 F14 with EB, 2-lamp, replaces T8 F17	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2100.220	Metal Halide (MH), pulse start	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2110.220	Ceramic Metal Halide (CMH) Fixture, 20-100 Watts - Replaces Incandescent Fixture	13	13	13	13	2	Varies	2	15	+/- 3																	

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8								
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating								
Lighting	2.2115.220	Ceramic Metal Halide (CMH) Integral Ballast Lamp, <= 25 Watts - Replaces 75-90 Watt Incandescent Lamp	13	13	13	13	2	13	2				13		X			16	2							10		3							
Lighting	2.2130.220	Metal Halide (MH), Pulse Start - 101-175 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			16	2							10		3							
Lighting	2.2140.220	Metal Halide (MH), Pulse Start - 176-320 Watts	13	13	13	13	2	13	2	15	100%	X	13	15	X			16	2							10		3							
Lighting	2.2150.220	Metal Halide (MH), Pulse Start, 320W replacing 400W HID	13	13	13	13	2	13	2	15	100%	X	13		X			16	2							10		3							
Lighting	2.2155.220	Metal Halide (MH), Pulse Start - 750W replacing 1000W MH	13	13	13	13	2	13	2	15	100%	X	13		X			16	2							10		3							
Lighting	2.2170.220	Metal Halide (MH), Electronic Ballast Pulse Start - 250W replacing 400W HID	13	13	13	13	2	13	2	15	100%	X	13		X			16	2							10		3							
Lighting	2.2171.220	Metal Halide (MH), Electronic Ballast Pulse Start - 320W replacing 400W HID	13	13	13	13	2	13	2	15	100%	X	13		X			16	2							10		3							
Lighting	2.2200.220	High Pressure Sodium (HPS) Fixture	13	13	13	13	2	13	2				13	15	X			16	2							10		3							
Lighting	2.2500.175	Fluorescent - Replaces Mercury Vapor	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3										
Lighting	2.2600.330	Reconfigure lighting layout to use light more effectively	10	10	10	10	3																				10	3						
Lighting	2.3100.260	LED Reach-In Refrigerated Case Lighting replaces T12 or T8	20	20	20	20	3						13	15	X											20		3						
Lighting	2.3101.280	BONUS - LED reach-in refrigerated case lighting replaces T12 or T8 - per door	20	20	20	20	3																											
Lighting	2.3150.280	Light fixture, ENERGY STAR, integrated with ceiling fan, residential	UNK	UNK	UNK	UNK	NA																											
Lighting	2.5170.170	T8 4 lamp or T5HO 2 lamp Replacing 250-399 W HID	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3							
Lighting	2.5180.170	T8 6 lamp or T5HO 4 lamp Replacing 400-999 W HID	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3							
Lighting	2.5181.170	T8 6 lamp or T5HO 4 lamp Replacing 400-999 Watts HID - INCLUDES $30 BONUS	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3							
Lighting	2.5182.170	T8 8 lamp or T5HO 6 lamp Replacing 400-999 W HID	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3							
Lighting	2.5183.170	T8 8 lamp or T5HO 6 lamp Replacing 400-999 Watts HID - INCLUDES $20 BONUS	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3							
Lighting	2.5185.170	T8/T5HO <= 500 Watts Replacing >=1000 W HID	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3							
Lighting	2.5186.170	T5HO or T8 <= 800W replacing >=1000W HID	13	13	13	13	2	13	2	15	100%	X	13		X			15	2			13	13		3	15		3							
Lighting	2.5191.085	Add occupancy sensors or multi-level switching to a retrofit project where high bay fluorescent replaces HID	8	8	8	8	1	9	2				9		X							9	9	10	3	10		3							
Lighting	2.9899.280	Distributor SPIFF, CFL	8	8	8	8	1	5	2																									
Lighting	2.9900.280	Custom lighting measure not otherwise specified	13	13	13	13	3						13	15	X							13	13	15	3	25		3							
Refrigeration	3.0100.185	Booster Heater, Kitchen - Replace Electric with Natural Gas	12	12	12	12	X			13	100%	X	12	12	X																			
Refrigeration	3.0200.335	Refrigeration Exhaust - above units in kitchen	12	12	12	12	X																											
Refrigeration	3.0300.145	Refrigeration Waste Heat Recovery	10	10	10	10	X																											
Refrigeration	3.0400.430	Repair Refrigerator Doors - seals, threshold, closing mechanisms	12	12	12	12	X																											

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Lighting	2.2115.220	Ceramic Metal Halide (CMH) Integral Ballast Lamp, <= 25 Watts - Replaces 75-90 Watt Incandescent Lamp	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2130.220	Metal Halide (MH), Pulse Start - 101-175 Watts	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2140.220	Metal Halide (MH), Pulse Start - 176-320 Watts	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2150.220	Metal Halide (MH), Pulse Start, 320W replacing 400W HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2155.220	Metal Halide (MH), Pulse Start - 750W replacing 1000W MH	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2170.220	Metal Halide (MH), Electronic Ballast Pulse Start - 250W replacing 400W HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2171.220	Metal Halide (MH), Electronic Ballast Pulse Start - 320W replacing 400W HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2200.220	High Pressure Sodium (HPS) Fixture	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2500.175	Fluorescent - Replaces Mercury Vapor	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.2600.330	Reconfigure lighting layout to use light more effectively	10	10	10	10	3																					
Lighting	2.3100.260	LED Reach-In Refrigerated Case Lighting replaces T12 or T8	20	20	20	20	3			15	+/- 3																	
Lighting	2.3101.280	BONUS - LED reach-in refrigerated case lighting replaces T12 or T8 - per door	20	20	20	20	3																					
Lighting	2.3150.280	Light fixture, ENERGY STAR, integrated with ceiling fan, residential	UNK	UNK	UNK	UNK	NA																					
Lighting	2.5170.170	T8 4 lamp or T5HO 2 lamp Replacing 250-399 W HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.5180.170	T8 6 lamp or T5HO 4 lamp Replacing 400-999 W HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.5181.170	T8 6 lamp or T5HO 4 lamp Replacing 400-999 Watts HID - INCLUDES $30 BONUS	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.5182.170	T8 8 lamp or T5HO 6 lamp Replacing 400-999 W HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.5183.170	T8 8 lamp or T5HO 6 lamp Replacing 400-999 Watts HID - INCLUDES $20 BONUS	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.5185.170	T8/T5HO <= 500 Watts Replacing >=1000 W HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.5186.170	T5HO or T8 <= 800W replacing >=1000W HID	13	13	13	13	2	Varies	2	15	+/- 3																	
Lighting	2.5191.085	Add occupancy sensors or multi-level switching to a retrofit project where high bay fluorescent replaces HID	8	8	8	8	1	8	1	15	+/- 3																	
Lighting	2.9899.280	Distributor SPIFF, CFL	8	8	8	8	1	8	1																			
Lighting	2.9900.280	Custom lighting measure not otherwise specified	13	13	13	13	3			15	+/- 3																	
Refrigeration	3.0100.185	Booster Heater, Kitchen - Replace Electric with Natural Gas	12	12	12	12	X			12	+/- 3																	
Refrigeration	3.0200.335	Refrigeration Exhaust - above units in kitchen	12	12	12	12	X			12	+/- 3																	
Refrigeration	3.0300.145	Refrigeration Waste Heat Recovery	10	10	10	10	X	10	X	12	+/- 3																	
Refrigeration	3.0400.430	Repair Refrigerator Doors - seals, threshold, closing mechanisms	12	12	12	12	X			12	+/- 3																	

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WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8							
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating							
Refrigeration	3.0500.345	High Efficiency Refrigerator, for Industrial Uses	12	12	12	12	X																										
Refrigeration	3.0600.140	Cooler Economizer	15	15	15	15	3																					15	3				
Refrigeration	3.0800.460	Variable speed drive on refrigeration fan	10	10	10	10	2											10	2							15		3					
Refrigeration	3.0805.460	Variable speed drive on refrigeration circulating pump	10	10	10	10	2									35	1	10	2							15		3					
Refrigeration	3.0900.430	Refrigeration System Maintenance	3	3	3	3	3																			3		3					
Refrigeration	3.0905.430	Preventive maintenance for convenience store refrigeration system - pilot program	3	3	3	3	3																			3		3					
Refrigeration	3.1000.085	Cooler Lighting Monitoring	9	9	9	9	2	9	2																								
Refrigeration	3.1100.405	Cooler Curtain, plastic strip curtain or slats on walk-in cooler door	6	6	6	6	X						3	3	X											10		3					
Refrigeration	3.1199.085	Anti-sweat heater controls, on freezer case with standard door	12	12	12	12	1	10	2	10	100%	2	10	10	X							10	9	10	3	10		3					
Refrigeration	3.1200.085	Cooler Door Anti-Sweat Heater Controls (Prescriptive)	12	12	12	12	1	10	2	10	100%	2	10	10	X							10	9	10	3	10		3					
Refrigeration	3.1202.085	Cooler Door Anti-Sweat Heater Controls, on low-energy or no-energy door	12	12	12	12	1	10	2	10	100%	2	10	10	X							10	9	10	3	10		3					
Refrigeration	3.1210.510	Refrigerated Case Door, Low-Energy or No-Energy (Custom)	10	10	10	10	2	10	2	10	100%	2																					
Refrigeration	3.1220.510	Refrigerated Case Door, Low-Energy	10	10	10	10	2			10	100%	2																12	3				
Refrigeration	3.1225.510	Refrigerated Case Door, No-Energy	10	10	10	10	2			10	100%	2																					
Refrigeration	3.1300.085	Floating Head Pressure Controls	10	10	10	10	2	10	2				10	10	X								9	10	3	10	10	3					
Refrigeration	3.1400.270	Electronically Commutated Motor replacing single phase shaded-pole evaporator or condenser fan motors	15	15	15	15	2	15	2									18	2														
Refrigeration	3.1410.270	ECM (electronically commutated) motor replacing shaded-pole motor in refrigerated case	15	15	15	15	2	15	2									18	2							15		3					
Refrigeration	3.1420.270	PSC (permanent split capacitor) motor replacing shaded-pole motor in refrigerated case	15	15	15	15	2	15	2	15	100%	X						18	2							15		3					
Refrigeration	3.1500.280	Liquid Pressure Amplifiers installed when floating head pressure controls are not presently installed	5	5	5	5	3																			5		3					
Refrigeration	3.1600.330	Parallel Rack Systems in place of individual compressors per case	10	10	10	10	3																			10		3					
Refrigeration	3.1700.145	Heat Recovery - Desuperheater / Capture heat off compressors to pre-heat domestic hot water	10	10	10	10	3																			10		3					
Refrigeration	3.1800.145	Heat Recovery - Capture heat off compressors to pre-heat supply air for space heating	10	10	10	10	3																			10		3					
Refrigeration	3.1900.085	Defrost controls which sense optimal defrost cycles	10	10	10	10	2	10	2				10	10	X							10	9	10	3	10		3					
Refrigeration	3.2000.145	Mechanical Sub-Cooling - Installation of additional subcooled compressor, expansion valve and heat exchanger	10	10	10	10	3																13	15	3	10		3					
Refrigeration	3.2100.145	Ambient Sub-Cooling - Installation of oversized condensor or large subcooling exchanger	10	10	10	10	3																			10		3					
Refrigeration	3.2200.085	Cooler Evaporator Fan Control and Electronic Temperature Controls	10	10	10	10	2	10	2	15	100%	2										10	9	10	3	10		3					
Refrigeration	3.2300.085	Cooler Door Anti-Sweat Heater Controls (Custom)	10	10	10	10	2	10	2	10	100%	2	10	10	X							10	9	10	3	10		3					

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Refrigeration	3.0500.345	High Efficiency Refrigerator, for Industrial Uses	12	12	12	12	X			12	+/- 3																							
Refrigeration	3.0600.140	Cooler Economizer	15	15	15	15	3			12	+/- 3																							
Refrigeration	3.0800.460	Variable speed drive on refrigeration fan	10	10	10	10	2			12	+/- 3																							
Refrigeration	3.0805.460	Variable speed drive on refrigeration circulating pump	10	10	10	10	2			12	+/- 3																							
Refrigeration	3.0900.430	Refrigeration System Maintenance	3	3	3	3	3			12	+/- 3																							
Refrigeration	3.0905.430	Preventive maintenance for convenience store refrigeration system - pilot program	3	3	3	3	3			12	+/- 4																							
Refrigeration	3.1000.085	Cooler Lighting Monitoring	9	9	9	9	2			12	+/- 3																							
Refrigeration	3.1100.405	Cooler Curtain, plastic strip curtain or slats on walk-in cooler door	6	6	6	6	X	4	X	12	+/- 3																							
Refrigeration	3.1199.085	Anti-sweat heater controls, on freezer case with standard door	12	12	12	12	1	12	1	12	+/- 3																							
Refrigeration	3.1200.085	Cooler Door Anti-Sweat Heater Controls (Prescriptive)	12	12	12	12	1	12	1	12	+/- 3																							
Refrigeration	3.1202.085	Cooler Door Anti-Sweat Heater Controls, on low-energy or no-energy door	12	12	12	12	1	12	1	12	+/- 3																							
Refrigeration	3.1210.510	Refrigerated Case Door, Low-Energy or No-Energy (Custom)	10	10	10	10	2			12	+/- 3																							
Refrigeration	3.1220.510	Refrigerated Case Door, Low-Energy	10	10	10	10	2			12	+/- 3																							
Refrigeration	3.1225.510	Refrigerated Case Door, No-Energy	10	10	10	10	2	12	3	12	+/- 3																							
Refrigeration	3.1300.085	Floating Head Pressure Controls	10	10	10	10	2	15	X	12	+/- 3																							
Refrigeration	3.1400.270	Electronically Commutated Motor replacing single phase shaded-pole evaporator or condenser fan motors	15	15	15	15	2			12	+/- 3																							
Refrigeration	3.1410.270	ECM (electronically commutated) motor replacing shaded-pole motor in refrigerated case	15	15	15	15	2			12	+/- 3																							
Refrigeration	3.1420.270	PSC (permanent split capacitor) motor replacing shaded-pole motor in refrigerated case	15	15	15	15	2			12	+/- 3																							
Refrigeration	3.1500.280	Liquid Pressure Amplifiers installed when floating head pressure controls are not presently installed	5	5	5	5	3			12	+/- 3																							
Refrigeration	3.1600.330	Parallel Rack Systems in place of individual compressors per case	10	10	10	10	3			12	+/- 3																							
Refrigeration	3.1700.145	Heat Recovery - Desuperheater / Capture heat off compressors to pre-heat domestic hot water	10	10	10	10	3			12	+/- 3																							
Refrigeration	3.1800.145	Heat Recovery - Capture heat off compressors to pre-heat supply air for space heating	10	10	10	10	3			12	+/- 3																							
Refrigeration	3.1900.085	Defrost controls which sense optimal defrost cycles	10	10	10	10	2			12	+/- 3																							
Refrigeration	3.2000.145	Mechanical Sub-Cooling - Installation of additional subcooled compressor, expansion valve and heat exchanger	10	10	10	10	3			12	+/- 3																							
Refrigeration	3.2100.145	Ambient Sub-Cooling - Installation of oversized condensor or large subcooling exchanger	10	10	10	10	3			12	+/- 3																							
Refrigeration	3.2200.085	Cooler Evaporator Fan Control and Electronic Temperature Controls	10	10	10	10	2	16	X	12	+/- 3																							
Refrigeration	3.2300.085	Cooler Door Anti-Sweat Heater Controls (Custom)	10	10	10	10	2	12	X	12	+/- 3																							

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8							
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating							
Refrigeration	3.2400.280	Cooler Night Covers - Cover the glass cooler doors during non-operating hours	5	5	5	5	3			4	100%	X	10	10	X											5		3					
Refrigeration	3.2500.370	Night Shutoff of Display Coolers	2	2	2	2	3																			2		3					
Refrigeration	3.2600.080	Evaporative condensers replace air-cooled condensers	10	10	10	10	3																			10		3					
Refrigeration	3.9900.280	Custom refrigeration measure not otherwise specified	15	15	15	15	3															10	20	20	3	10		3					
HVAC	4.0150.085	Automated control system on ventilation systems and boiler room fans	10	10	10	10	2	10	2																	5		3					
HVAC	4.0200.140	Economizer	10	10	10	10	2			14	70%	X											13	15	3	10		3					
HVAC	4.0241.150	High volume low speed (HVLS) fans replace box fans, 20 ft. dia. - prescriptive	15	15	15	15	3						15		X								13		3	15		3					
HVAC	4.0243.150	High volume low speed (HVLS) fans replace box fans, 22 ft. dia. - prescriptive	15	15	15	15	3						15		X								13		3	15		3					
HVAC	4.0245.150	High volume low speed (HVLS) fans replace box fans, 24 ft. dia. - prescriptive	15	15	15	15	3						15		X								13		3	15		3					
HVAC	4.0250.150	High volume low speed (HVLS) fans replace box fans (Ag only)(Custom)	15	15	15	15	3						15		X								13		3	15		3					
HVAC	4.0300.150	Destratification fans in high ceiling areas	10	10	10	10	3						15	20	X											10		3					
HVAC	4.0310.025	Air rotation or air turnover units to minimize stratification	15	15	15	15	3																				15	3					
HVAC	4.0400.240	Infrared heating units, high or low Intensity - New Construction	15	15	15	15	3																				15	3					
HVAC	4.0410.240	Infrared heating units - high or low intensity - Existing Building	15	15	15	15	3																			15		3					
HVAC	4.0500.085	Occupancy-Based Outside Air System	UNK	UNK	UNK	UNK	NA																										
HVAC	4.0510.085	Large Space Air Management - control outside air based on occupancy in applicable areas	UNK	UNK	UNK	UNK	NA																										
HVAC	4.0550.145	Energy recovery ventilator - wheel heat exchanger	14	14	14	14	1																										
HVAC	4.0552.145	Energy recovery ventilator - plate heat exchanger	20	20	20	20	3																				20	3					
HVAC	4.0600.145	Exhaust Air Heat Recovery System	UNK	UNK	UNK	UNK	NA																										
HVAC	4.0610.155	Ventilation Filtration vs Make Up Air System	UNK	UNK	UNK	UNK	NA																										
HVAC	4.0700.015	Air curtain installed above doors	5	5	5	5	3																				5	3					
HVAC	4.0720.150	Ventilation Fans, High Efficiency - 20"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0730.150	Ventilation Fans, High Efficiency - 30"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0736.150	Ventilation Fans, High Efficiency - 36"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0742.150	Ventilation Fans, High Efficiency - 42"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0748.150	Ventilation Fans, High Efficiency - 48"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0750.150	Ventilation Fans, High Efficiency - 50"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0751.150	Ventilation Fans, High Efficiency - 51"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0752.150	Ventilation Fans, High Efficiency - 52"	15	15	15	15	3						15	20	X									15	3		15	3					

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14			15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating
Refrigeration	3.2400.280	Cooler Night Covers - Cover the glass cooler doors during non-operating hours	5	5	5	5	3	5	X	12	+/- 3																								
Refrigeration	3.2500.370	Night Shutoff of Display Coolers	2	2	2	2	3			12	+/- 3																								
Refrigeration	3.2600.080	Evaporative condensers replace air-cooled condensers	10	10	10	10	3			12	+/- 3																								
Refrigeration	3.9900.280	Custom refrigeration measure not otherwise specified	15	15	15	15	3			12	+/- 3																								
HVAC	4.0150.085	Automated control system on ventilation systems and boiler room fans	10	10	10	10	2																												
HVAC	4.0200.140	Economizer	10	10	10	10	2	10	2	15	+/- 5																								
HVAC	4.0241.150	High volume low speed (HVLS) fans replace box fans, 20 ft. dia. - prescriptive	15	15	15	15	3			15	+/- 5																								
HVAC	4.0243.150	High volume low speed (HVLS) fans replace box fans, 22 ft. dia. - prescriptive	15	15	15	15	3			15	+/- 5																								
HVAC	4.0245.150	High volume low speed (HVLS) fans replace box fans, 24 ft. dia. - prescriptive	15	15	15	15	3			15	+/- 5																								
HVAC	4.0250.150	High volume low speed (HVLS) fans replace box fans (Ag only)(Custom)	15	15	15	15	3			15	+/- 5																								
HVAC	4.0300.150	Destratification fans in high ceiling areas	10	10	10	10	3			15	+/- 5																								
HVAC	4.0310.025	Air rotation or air turnover units to minimize stratification	15	15	15	15	3																												
HVAC	4.0400.240	Infrared heating units, high or low Intensity - New Construction	15	15	15	15	3																												
HVAC	4.0410.240	Infrared heating units - high or low intensity - Existing Building	15	15	15	15	3																												
HVAC	4.0500.085	Occupancy-Based Outside Air System	UNK	UNK	UNK	UNK	NA																												
HVAC	4.0510.085	Large Space Air Management - control outside air based on occupancy in applicable areas	UNK	UNK	UNK	UNK	NA																												
HVAC	4.0550.145	Energy recovery ventilator - wheel heat exchanger	14	14	14	14	1	14	1																										
HVAC	4.0552.145	Energy recovery ventilator - plate heat exchanger	20	20	20	20	3																												
HVAC	4.0600.145	Exhaust Air Heat Recovery System	UNK	UNK	UNK	UNK	NA																												
HVAC	4.0610.155	Ventilation Filtration vs Make Up Air System	UNK	UNK	UNK	UNK	NA																												
HVAC	4.0700.015	Air curtain installed above doors	5	5	5	5	3																												
HVAC	4.0720.150	Ventilation Fans, High Efficiency - 20"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0730.150	Ventilation Fans, High Efficiency - 30"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0736.150	Ventilation Fans, High Efficiency - 36"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0742.150	Ventilation Fans, High Efficiency - 42"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0748.150	Ventilation Fans, High Efficiency - 48"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0750.150	Ventilation Fans, High Efficiency - 50"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0751.150	Ventilation Fans, High Efficiency - 51"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0752.150	Ventilation Fans, High Efficiency - 52"	15	15	15	15	3			15	+/- 5																								

WISeerts Codes			KEMA Recommended					Measure life summary by source																								
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8						
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating						
HVAC	4.0754.150	Ventilation Fans, High Efficiency - 54"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0755.150	Ventilation Fans, High Efficiency - 55"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0760.150	Ventilation Fans, High Efficiency - 60"	15	15	15	15	3						15	20	X									15	3		15	3					
HVAC	4.0800.095	Mechanical Vent Dampers	UNK	UNK	UNK	UNK	NA																									
HVAC	4.0900.185	Booster Coils - Replace Electric with Hot Water (Natural Gas)	UNK	UNK	UNK	UNK	NA																									
HVAC	4.1000.390	Steam Traps - service buy down	5	5	5	5	X																									
HVAC	4.1100.460	Variable speed drive on HVAC ventilation fan	10	10	10	10	3																									
HVAC	4.1110.460	Variable speed drive on chilled water pump or cooling tower condenser pump	15	15	15	15	1						13	20	X	35	1	10	2				13	15	3	10		3				
HVAC	4.1115.460	Variable speed drive on cooling tower fan	10	10	10	10	3																			10		3				
HVAC	4.1120.460	Variable speed drive on the pump or fan motor of HVAC system (Custom)	10	10	10	10	3																			10		3				
HVAC	4.1200.105	Dessicant Dehumidifier	15	15	15	15	3																			15		3				
HVAC	4.1300.085	Energy Management System - more efficiently control HVAC system	15	15	15	15	1	10	2																	5		3				
HVAC	4.1301.085	Demand Limiting Controls - reduce building peak electrical demand	UNK	UNK	UNK	UNK	NA																									
HVAC	4.1400.370	Building Scheduling - Adjust occupied/unoccupied schedule	5	5	5	5	3																			5		3				
HVAC	4.1500.115	Direct Fired Heating Systems	UNK	UNK	UNK	UNK	NA																									
HVAC	4.1600.365	Rooftop upgrade	21	21	21	21	1									21	1						13		3	10		3				
HVAC	4.1697.190	Furnaces (90% AFUE or Greater & ECM Motor), 54.675 - 60.749 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1698.190	Furnaces (90% AFUE or Greater & ECM Motor), 60.750 - 67.499 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1699.190	Furnaces (90% AFUE or Greater & ECM Motor), 67.5 - 74.9 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1701.190	Furnaces (90% AFUE or Greater & ECM Motor), 75.0 - 82.5 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1702.190	Furnaces (90% AFUE or Greater & ECM Motor), 82.5 - 90.75 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1703.190	Furnaces (90% AFUE or Greater & ECM Motor), 90.76 - 99.82 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1704.190	Furnaces (90% AFUE or Greater & ECM Motor), 99.83 - 109.8 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1705.190	Furnaces (90% AFUE or Greater & ECM Motor), 109.9 - 120.7 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1706.190	Furnaces (90% AFUE or Greater & ECM Motor), 120.8 - 132.9 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1707.190	Furnaces (90% AFUE or Greater & ECM Motor), 133.0 - 146.1 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1708.190	Furnaces (90% AFUE or Greater & ECM Motor), 146.2 - 160.8 MBh	18	18	18	18	2											18	2								20	3				
HVAC	4.1800.050	Chiller System - replace existing chiller system with new high efficiency unit	20	20	20	20	1	23	2				17		X	25	1	18	2				13		3	15		3				
HVAC	4.1810.430	Chiller System Tune Up, Air Cooled - service buydown, System ≤500 tons	5	5	5	5	3																			5		3				
HVAC	4.1811.430	Chiller System Tune Up, Air Cooled - service buydown, System >500 tons	5	5	5	5	3																			5		3				
HVAC	4.1812.430	Chiller System Tune Up, Water Cooled - service buydown, System ≤500 tons	5	5	5	5	3																			5		3				

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WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17									
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating								
HVAC	4.0754.150	Ventilation Fans, High Efficiency - 54"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0755.150	Ventilation Fans, High Efficiency - 55"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0760.150	Ventilation Fans, High Efficiency - 60"	15	15	15	15	3			15	+/- 5																								
HVAC	4.0800.095	Mechanical Vent Dampers	UNK	UNK	UNK	UNK	NA																												
HVAC	4.0900.185	Booster Coils - Replace Electric with Hot Water (Natural Gas)	UNK	UNK	UNK	UNK	NA																												
HVAC	4.1000.390	Steam Traps - service buy down	5	5	5	5	X																												
HVAC	4.1100.460	Variable speed drive on HVAC ventilation fan	10	10	10	10	3	15	1																										
HVAC	4.1110.460	Variable speed drive on chilled water pump or cooling tower condenser pump	15	15	15	15	1	15	1	23	+/- 5																								
HVAC	4.1115.460	Variable speed drive on cooling tower fan	10	10	10	10	3																												
HVAC	4.1120.460	Variable speed drive on the pump or fan motor of HVAC system (Custom)	10	10	10	10	3																												
HVAC	4.1200.105	Dessicant Dehumidifier	15	15	15	15	3																												
HVAC	4.1300.085	Energy Management System - more efficiently control HVAC system	15	15	15	15	1	15	1																										
HVAC	4.1301.085	Demand Limiting Controls - reduce building peak electrical demand	UNK	UNK	UNK	UNK	NA																												
HVAC	4.1400.370	Building Scheduling - Adjust occupied/unoccupied schedule	5	5	5	5	3																												
HVAC	4.1500.115	Direct Fired Heating Systems	UNK	UNK	UNK	UNK	NA																												
HVAC	4.1600.365	Rooftop upgrade	21	21	21	21	1			15	+/- 5																								
HVAC	4.1697.190	Furnaces (90% AFUE or Greater & ECM Motor), 54.675 - 60.749 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1698.190	Furnaces (90% AFUE or Greater & ECM Motor), 60.750 - 67.499 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1699.190	Furnaces (90% AFUE or Greater & ECM Motor), 67.5 - 74.9 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1701.190	Furnaces (90% AFUE or Greater & ECM Motor), 75.0 - 82.5 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1702.190	Furnaces (90% AFUE or Greater & ECM Motor), 82.5 - 90.75 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1703.190	Furnaces (90% AFUE or Greater & ECM Motor), 90.76 - 99.82 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1704.190	Furnaces (90% AFUE or Greater & ECM Motor), 99.83 - 109.8 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1705.190	Furnaces (90% AFUE or Greater & ECM Motor), 109.9 - 120.7 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1706.190	Furnaces (90% AFUE or Greater & ECM Motor), 120.8 - 132.9 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1707.190	Furnaces (90% AFUE or Greater & ECM Motor), 133.0 - 146.1 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1708.190	Furnaces (90% AFUE or Greater & ECM Motor), 146.2 - 160.8 MBh	18	18	18	18	2	20	2	23	+/-4																								
HVAC	4.1800.050	Chiller System - replace existing chiller system with new high efficiency unit	20	20	20	20	1	20	1	23	+/- 5																								
HVAC	4.1810.430	Chiller System Tune Up, Air Cooled - service buydown, System ≤500 tons	5	5	5	5	3			23	+/- 5																								
HVAC	4.1811.430	Chiller System Tune Up, Air Cooled - service buydown, System >500 tons	5	5	5	5	3			23	+/- 5																								
HVAC	4.1812.430	Chiller System Tune Up, Water Cooled - service buydown, System ≤500 tons	5	5	5	5	3			23	+/- 5																								

WISeerts Codes			KEMA Recommended					Measure life summary by source																								
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8						
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating
HVAC	4.1813.430	Chiller System Tune Up, Water Cooled - service buydown, System >500 Tons	5	5	5	5	3																		5		3
HVAC	4.1820.085	Chiller Optimization Controls	10	10	10	10	3																10	15	3	15		3
HVAC	4.1830.085	Chilled Water Free Cooling Controls and Equipment	10	10	10	10	3																10	15	3	15		3
HVAC	4.1900.195	Geothermal Installation (Custom)	15	15	15	15	3																				15	3
HVAC	4.1910.195	Heat exchanger field with heat pumps, closed loop, EER 14.0 - 14.99 and COP 3.30+	15	15	15	15	3																				15	3
HVAC	4.1920.195	Heat exchanger field with heat pumps, closed loop, EER 15.0 - 15.99 and COP 3.40+	15	15	15	15	3																				15	3
HVAC	4.1930.195	Heat exchanger field with heat pumps, closed loop, EER 16.0+ and COP 3.50+	15	15	15	15	3																				15	3
HVAC	4.1950.195	Desuperheater for domestic hot water tempering - servicing natural gas water heater	10	10	10	10	3																				10	3
HVAC	4.1952.195	Desuperheater for domestic hot water tempering - servicing electric water heater	10	10	10	10	3																				10	3
HVAC	4.2000.445	Unit Heaters - Steady state efficiency 83% or greater	15	15	15	15	3																				15	3
HVAC	4.2050.185	Space Heating - Replace Electric Units with Natural Gas Units	20	20	20	20	3																		20		3
HVAC	4.2100.505	Zoning - Increase zoning in building	20	20	20	20	3																		20		3
HVAC	4.2110.455	Replace Constant Volume HVAC with VAV	15	15	15	15	1																13		3			
HVAC	4.2300.085	Minimum Temp Setting - Maintain minimum temperatures in unoccupied spaces	UNK	UNK	UNK	UNK	NA																					
HVAC	4.2900.430	Tune-up/repair, establish regular PM	5	5	5	5	3																		5		3
HVAC	4.2910.430	Thermostat calibration	5	5	5	5	3																		5		3
HVAC	4.2920.430	Unit Ventilator Maintenance	15	15	15	15	X																					
HVAC	4.3200.085	Humidistat Control of Air Handler	UNK	UNK	UNK	UNK	NA																					
HVAC	4.3300.085	Ventilation Controls Installed	5	5	5	5	3																		5		3
HVAC	4.3305.085	Controls on paint or spray booth exhaust / supply system	10	10	10	10	3																		10		3
HVAC	4.3400.370	Reduce Operating Hours of Kitchen Exhaust System	UNK	UNK	UNK	UNK	NA																					
HVAC	4.3450.230	Hydronic in-floor heating system, high efficiency system	25	25	25	25	X																			30	3
HVAC	4.3500.430	Retrocommissioning, <200k sq. ft., multiple measure implementation	10	10	10	10	3																		10		3
HVAC	4.3501.430	Retrocommissioning, 200k - 400k sq. ft., multiple measure implementation	10	10	10	10	3																		10		3
HVAC	4.3502.430	Retrocommissioning, >400k sq. ft., multiple measure implementation	10	10	10	10	3																		10		3
HVAC	4.3512.430	Tune-up/repair, optimize refrigerant/airflow/clean coils, existing system	5	5	5	5	3																		5		3
HVAC	4.3515.435	Ultraviolet A/C Coil Cleaning System	20	20	20	20	3																			20	3
HVAC	4.3530.365	A/C Split System < 65 MBh SEER 14	15	15	15	15	2	15	2																	14	3
HVAC	4.3540.365	A/C Split Systems	15	15	15	15	2	15	2				13	15	X	21	1	18	2					15	3		14	3
HVAC	4.3550.365	A/C Split Systems	15	15	15	15	2	15	2				13	15	X	21	1	18	2					15	3		14	3
HVAC	4.3570.365	Rooftop A/C <65 MBH	15	15	15	15	2	15	2				13	15	X	21	1	18	2					15	3		15	3
HVAC	4.3571.365	Rooftop A/C, <65 MBh, EER = 11.4, expires 01June08	15	15	15	15	2	15	2																	15	3

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
HVAC	4.1813.430	Chiller System Tune Up, Water Cooled - service buydown, System >500 Tons	5	5	5	5	3			23	+/- 5																									
HVAC	4.1820.085	Chiller Optimization Controls	10	10	10	10	3			23	+/- 5																									
HVAC	4.1830.085	Chilled Water Free Cooling Controls and Equipment	10	10	10	10	3			23	+/- 5																									
HVAC	4.1900.195	Geothermal Installation (Custom)	15	15	15	15	3	15	3																											
HVAC	4.1910.195	Heat exchanger field with heat pumps, closed loop, EER 14.0 - 14.99 and COP 3.30+	15	15	15	15	3	15	3																											
HVAC	4.1920.195	Heat exchanger field with heat pumps, closed loop, EER 15.0 - 15.99 and COP 3.40+	15	15	15	15	3	15	3																											
HVAC	4.1930.195	Heat exchanger field with heat pumps, closed loop, EER 16.0+ and COP 3.50+	15	15	15	15	3	15	3																											
HVAC	4.1950.195	Desuperheater for domestic hot water tempering - servicing natural gas water heater	10	10	10	10	3																													
HVAC	4.1952.195	Desuperheater for domestic hot water tempering - servicing electric water heater	10	10	10	10	3																													
HVAC	4.2000.445	Unit Heaters - Steady state efficiency 83% or greater	15	15	15	15	3																													
HVAC	4.2050.185	Space Heating - Replace Electric Units with Natural Gas Units	20	20	20	20	3																													
HVAC	4.2100.505	Zoning - Increase zoning in building	20	20	20	20	3																													
HVAC	4.2110.455	Replace Constant Volume HVAC with VAV	15	15	15	15	1	15	1	15	+/- 5																									
HVAC	4.2300.085	Minimum Temp Setting - Maintain minimum temperatures in unoccupied spaces	UNK	UNK	UNK	UNK	NA																													
HVAC	4.2900.430	Tune-up/repair, establish regular PM	5	5	5	5	3			15	+/- 5																									
HVAC	4.2910.430	Thermostat calibration	5	5	5	5	3			15	+/- 5																									
HVAC	4.2920.430	Unit Ventilator Maintenance	15	15	15	15	X			15	+/- 5																									
HVAC	4.3200.085	Humidistat Control of Air Handler	UNK	UNK	UNK	UNK	NA																													
HVAC	4.3300.085	Ventilation Controls Installed	5	5	5	5	3																													
HVAC	4.3305.085	Controls on paint or spray booth exhaust / supply system	10	10	10	10	3																													
HVAC	4.3400.370	Reduce Operating Hours of Kitchen Exhaust System	UNK	UNK	UNK	UNK	NA																													
HVAC	4.3450.230	Hydronic in-floor heating system, high efficiency system	25	25	25	25	X																													
HVAC	4.3500.430	Retrocommissioning, <200k sq. ft., multiple measure implementation	10	10	10	10	3																													
HVAC	4.3501.430	Retrocommissioning, 200k - 400k sq. ft., multiple measure implementation	10	10	10	10	3																													
HVAC	4.3502.430	Retrocommissioning, >400k sq. ft., multiple measure implementation	10	10	10	10	3																													
HVAC	4.3512.430	Tune-up/repair, optimize refrigerant/airflow/clean coils, existing system	5	5	5	5	3	3	X	15	+/- 5																									
HVAC	4.3515.435	Ultraviolet A/C Coil Cleaning System	20	20	20	20	3																													
HVAC	4.3530.365	A/C Split System < 65 MBh SEER 14	15	15	15	15	2	15	2																											
HVAC	4.3540.365	A/C Split Systems	15	15	15	15	2	15	2	15	+/- 5																									
HVAC	4.3550.365	A/C Split Systems	15	15	15	15	2	15	2	15	+/- 5																									
HVAC	4.3570.365	Rooftop A/C <65 MBH	15	15	15	15	2	15	2	15	+/- 5																									
HVAC	4.3571.365	Rooftop A/C, <65 MBh, EER = 11.4, expires 01June08	15	15	15	15	2	15	2																											

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8		
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating
HVAC	4.3572.365	Rooftop A/C, <65 MBh, EER = 11.5, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3573.365	Rooftop A/C, <65 MBh, EER = 11.6, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3574.365	Rooftop A/C, <65 MBh, EER = 11.7, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3575.365	Rooftop A/C, <65 MBh, EER = 11.8, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3576.365	Rooftop A/C, <65 MBh, EER = 11.9, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3577.365	Rooftop A/C, <65 MBh, EER = 12.0, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3578.365	Rooftop A/C, <65 MBh, EER = 12.1, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3579.365	Rooftop A/C, <65 MBh, EER = 12.2, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3580.365	Rooftop A/C, <65 MBh, EER = 12.3, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3581.365	Rooftop A/C, <65 MBh, EER = 12.4, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3582.365	Rooftop A/C, <65 MBh, EER = 12.5, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3583.365	Rooftop A/C, <65 MBh, EER = 12.6, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3584.365	Rooftop A/C, <65 MBh, EER = 12.7, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3585.365	Rooftop A/C, <65 MBh, EER = 12.8, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3600.365	Rooftop A/C >=65 & < 135 MBH	15	15	15	15	2	15	2				13	15	X	21	1	18	2					15	3		15	3
HVAC	4.3601.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.1, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3602.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.2, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3603.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.3, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3604.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.4, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3605.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.5, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3606.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.6, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3607.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.7, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3608.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.8, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3609.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.9, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3610.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.0, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3611.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.1, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3612.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.2, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3613.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.3, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3614.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.4, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3615.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.5, expires 01June08	15	15	15	15	2	15	2																		15	3
HVAC	4.3616.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.6, expires 01June08	15	15	15	15	2	15	2																		15	3

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
HVAC	4.3572.365	Rooftop A/C, <65 MBh, EER = 11.5, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3573.365	Rooftop A/C, <65 MBh, EER = 11.6, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3574.365	Rooftop A/C, <65 MBh, EER = 11.7, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3575.365	Rooftop A/C, <65 MBh, EER = 11.8, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3576.365	Rooftop A/C, <65 MBh, EER = 11.9, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3577.365	Rooftop A/C, <65 MBh, EER = 12.0, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3578.365	Rooftop A/C, <65 MBh, EER = 12.1, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3579.365	Rooftop A/C, <65 MBh, EER = 12.2, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3580.365	Rooftop A/C, <65 MBh, EER = 12.3, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3581.365	Rooftop A/C, <65 MBh, EER = 12.4, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3582.365	Rooftop A/C, <65 MBh, EER = 12.5, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3583.365	Rooftop A/C, <65 MBh, EER = 12.6, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3584.365	Rooftop A/C, <65 MBh, EER = 12.7, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3585.365	Rooftop A/C, <65 MBh, EER = 12.8, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3600.365	Rooftop A/C >=65 & < 135 MBH	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3601.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.1, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3602.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.2, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3603.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.3, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3604.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.4, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3605.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.5, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3606.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.6, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3607.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.7, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3608.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.8, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3609.365	Rooftop A/C, ≥65 and <135 MBh, EER = 11.9, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3610.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.0, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3611.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.1, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3612.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.2, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3613.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.3, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3614.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.4, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3615.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.5, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3616.365	Rooftop A/C, ≥65 and <135 MBh, EER = 12.6, expires 01June08	15	15	15	15	2	15	2																			

WISeerts Codes			KEMA Recommended					Measure life summary by source																								
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7						8				
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating				
HVAC	4.3700.365	Rooftop A/C>=135 & <240 MBH	15	15	15	15	2	15	2				13	15	X	21	1	18	2					15	3		15	3				
HVAC	4.3701.365	Rooftop A/C, ≥135 and <240 MBh, EER = 10.9, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3702.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.0, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3703.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.1, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3704.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.2, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3705.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.3, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3706.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.4, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3707.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.5, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3708.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.6, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3709.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.7, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3710.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.8, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3711.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.9, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3712.365	Rooftop A/C, ≥135 and <240 MBh, EER = 12.0, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3713.365	Rooftop A/C, ≥135 and <240 MBh, EER = 12.1, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3714.365	Rooftop A/C, ≥135 and <240 MBh, EER = 12.2, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3750.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.0, expires 01June08	15	15	15	15	2	15	2				13	15	X	21	1	18	2					15	3		15	3				
HVAC	4.3751.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.1, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3752.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.2, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3753.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.3, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3754.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.4, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3755.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.5, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3756.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.6, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3757.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.7, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3758.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.8, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3759.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.9, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3760.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.0, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3761.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.1, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3762.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.2, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3763.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.3, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3764.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.4, expires 01June08	15	15	15	15	2	15	2																		15	3				
HVAC	4.3800.295	PTAC, SEER >= 13.0 or EER >= 11.3	15	15	15	15	2	15	2					15	X	21	1							15	3		10	3				

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
HVAC	4.3700.365	Rooftop A/C>=135 & <240 MBH	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3701.365	Rooftop A/C, ≥135 and <240 MBh, EER = 10.9, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3702.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.0, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3703.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.1, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3704.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.2, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3705.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.3, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3706.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.4, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3707.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.5, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3708.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.6, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3709.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.7, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3710.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.8, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3711.365	Rooftop A/C, ≥135 and <240 MBh, EER = 11.9, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3712.365	Rooftop A/C, ≥135 and <240 MBh, EER = 12.0, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3713.365	Rooftop A/C, ≥135 and <240 MBh, EER = 12.1, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3714.365	Rooftop A/C, ≥135 and <240 MBh, EER = 12.2, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3750.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.0, expires 01June08	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3751.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.1, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3752.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.2, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3753.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.3, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3754.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.4, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3755.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.5, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3756.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.6, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3757.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.7, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3758.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.8, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3759.365	Rooftop A/C, ≥240 and <760 MBh, EER = 10.9, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3760.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.0, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3761.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.1, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3762.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.2, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3763.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.3, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3764.365	Rooftop A/C, ≥240 and <760 MBh, EER = 11.4, expires 01June08	15	15	15	15	2	15	2																			
HVAC	4.3800.295	PTAC, SEER >= 13.0 or EER >= 11.3	15	15	15	15	2	15	2	15	+/- 5																	

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8							
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating							
HVAC	4.3805.295	PTAC, <8000 Btuh, ≥12.1 EER, Retrofit Application	15	15	15	15	2	15	2				13		X	21	1						13		3	10		3						
HVAC	4.3806.295	PTAC, <8000 Btuh, ≥12.1 EER, New Construction	15	15	15	15	2	15	2					15	X	21	1							15	3		10	3					
HVAC	4.3810.295	PTAC, 8000 - 9999 Btuh, ≥11.5 EER, Retrofit Application	15	15	15	15	2	15	2				13		X	21	1						13		3	10		3						
HVAC	4.3811.295	PTAC, 8000 - 9999 Btuh, ≥11.5 EER, New Construction	15	15	15	15	2	15	2					15	X	21	1							15	3		10	3					
HVAC	4.3815.295	PTAC, 10000-12999 Btuh, ≥10.9 EER, Retrofit Application	15	15	15	15	2	15	2				13		X	21	1						13		3	10		3						
HVAC	4.3816.295	PTAC, 10000-12999 Btuh, ≥10.9 EER, New Construction	15	15	15	15	2	15	2					15	X	21	1							15	3		10	3					
HVAC	4.3820.295	PTAC, ≥13000 Btuh, ≥9.8 EER, Retrofit Application	15	15	15	15	2	15	2				13		X	21	1						13		3	10		3						
HVAC	4.3821.295	PTAC, ≥13000 Btuh, ≥9.8 EER, New Construction	15	15	15	15	2	15	2					15	X	21	1							15	3		10	3					
HVAC	4.3822.295	PTHP, <8000 Btuh, ≥12.1 EER, Retrofit Application	15	15	15	15	2	15	2				13		X								13		3									
HVAC	4.3823.295	PTHP, <8000 Btuh, ≥12.1 EER, New Construction	15	15	15	15	2	15	2					15	X									15	3								
HVAC	4.3824.295	PTHP, 8000 - 9999 Btuh, ≥11.5 EER, Retrofit Application	15	15	15	15	2	15	2				13		X								13		3									
HVAC	4.3825.295	PTHP, 8000 - 9999 Btuh, ≥11.5 EER, New Construction	15	15	15	15	2	15	2					15	X									15	3								
HVAC	4.3826.295	PTHP, 10000-12999 Btuh, ≥10.9 EER, Retrofit Application	15	15	15	15	2	15	2				13		X								13		3									
HVAC	4.3827.295	PTHP, 10000-12999 Btuh, ≥10.9 EER, New Construction	15	15	15	15	2	15	2					15	X									15	3								
HVAC	4.3830.295	PTHP, ≥13000 Btuh, ≥9.8 EER, Retrofit Application	15	15	15	15	2	15	2				13		X								13		3									
HVAC	4.3831.295	PTHP, ≥13000 Btuh, ≥9.8 EER, New Construction	15	15	15	15	2	15	2					15	X									15	3								
HVAC	4.4000.105	Dehumidifier, Residential, ENERGY STAR	15	15	15	15	3																				15	3					
HVAC	4.4100.050	High Efficiency Chillers - Retrofit, air cooled all sizes	20	20	20	20	1	23	2				17		X								13		3	23		3						
HVAC	4.4200.050	High Efficiency Chillers - Retrofit, water cooled < 150 tons	20	20	20	20	1	23	2				17		X								13		3	23		3						
HVAC	4.4300.050	High Efficiency Chillers - Retrofit, water cooled ≥ 150 tons and < 300 tons	20	20	20	20	1	23	2				17		X								13		3	23		3						
HVAC	4.4400.050	High Efficiency Chillers - Retrofit, water cooled ≥ 300 tons	20	20	20	20	1	23	2				17		X								13		3	23		3						
HVAC	4.4500.050	High Efficiency Chillers - New Construction, air cooled all sizes	20	20	20	20	1	23	2					23	X	25	1							20	3		23	3					
HVAC	4.4600.050	High Efficiency Chillers - New Construction, water cooled < 150 tons	20	20	20	20	1	23	2					23	X	25	1							20	3		23	3					
HVAC	4.4700.050	High Efficiency Chillers - New Construction, water cooled ≥ 150 tons and < 300 tons	20	20	20	20	1	23	2					23	X	25	1							20	3		23	3					
HVAC	4.4800.050	High Efficiency Chillers - New Construction, water cooled ≥ 300 tons	20	20	20	20	1	23	2					23	X	25	1							20	3		23	3					
HVAC	4.5000.085	Guest Room Energy Management Controls - Electric heat PTAC systems only	8	8	8	8	2	8	2																		10	3					
HVAC	4.5010.085	Guest Room Energy Management Controls - Other control system options	8	8	8	8	2	8	2																		10	3					

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
HVAC	4.3805.295	PTAC, <8000 Btuh, ≥12.1 EER, Retrofit Application	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3806.295	PTAC, <8000 Btuh, ≥12.1 EER, New Construction	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3810.295	PTAC, 8000 - 9999 Btuh, ≥11.5 EER, Retrofit Application	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3811.295	PTAC, 8000 - 9999 Btuh, ≥11.5 EER, New Construction	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3815.295	PTAC, 10000-12999 Btuh, ≥10.9 EER, Retrofit Application	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3816.295	PTAC, 10000-12999 Btuh, ≥10.9 EER, New Construction	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3820.295	PTAC, ≥13000 Btuh, ≥9.8 EER, Retrofit Application	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3821.295	PTAC, ≥13000 Btuh, ≥9.8 EER, New Construction	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3822.295	PTHP, <8000 Btuh, ≥12.1 EER, Retrofit Application	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3823.295	PTHP, <8000 Btuh, ≥12.1 EER, New Construction	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3824.295	PTHP, 8000 - 9999 Btuh, ≥11.5 EER, Retrofit Application	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3825.295	PTHP, 8000 - 9999 Btuh, ≥11.5 EER, New Construction	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3826.295	PTHP, 10000-12999 Btuh, ≥10.9 EER, Retrofit Application	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3827.295	PTHP, 10000-12999 Btuh, ≥10.9 EER, New Construction	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3830.295	PTHP, ≥13000 Btuh, ≥9.8 EER, Retrofit Application	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.3831.295	PTHP, ≥13000 Btuh, ≥9.8 EER, New Construction	15	15	15	15	2	15	2	15	+/- 5																	
HVAC	4.4000.105	Dehumidifier, Residential, ENERGY STAR	15	15	15	15	3																					
HVAC	4.4100.050	High Efficiency Chillers - Retrofit, air cooled all sizes	20	20	20	20	1	20	1	23	+/- 5																	
HVAC	4.4200.050	High Efficiency Chillers - Retrofit, water cooled < 150 tons	20	20	20	20	1	20	1	23	+/- 5																	
HVAC	4.4300.050	High Efficiency Chillers - Retrofit, water cooled ≥ 150 tons and < 300 tons	20	20	20	20	1	20	1	23	+/- 5																	
HVAC	4.4400.050	High Efficiency Chillers - Retrofit, water cooled ≥ 300 tons	20	20	20	20	1	20	1	23	+/- 5																	
HVAC	4.4500.050	High Efficiency Chillers - New Construction, air cooled all sizes	20	20	20	20	1	20	1	23	+/- 5																	
HVAC	4.4600.050	High Efficiency Chillers - New Construction, water cooled < 150 tons	20	20	20	20	1	20	1	23	+/- 5																	
HVAC	4.4700.050	High Efficiency Chillers - New Construction, water cooled ≥ 150 tons and < 300 tons	20	20	20	20	1	20	1	23	+/- 5																	
HVAC	4.4800.050	High Efficiency Chillers - New Construction, water cooled ≥ 300 tons	20	20	20	20	1	20	1	23	+/- 5																	
HVAC	4.5000.085	Guest Room Energy Management Controls - Electric heat PTAC systems only	8	8	8	8	2																					
HVAC	4.5010.085	Guest Room Energy Management Controls - Other control system options	8	8	8	8	2																					

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8		
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating
HVAC	4.5020.085	Guest Room Energy Management Controls - Direct Install ($75 co-pay)	8	8	8	8	2	8	2																		10	3
HVAC	4.5025.085	Guest Room Energy Management Controls - Direct Install ($95 co-pay)	8	8	8	8	2	8	2																		10	3
HVAC	4.5100.425	Trim existing pump impeller to more closely match system demand	5	5	5	5	3																				5	3
HVAC	4.5110.365	Rooftop A/C, <65 MBh, EER = 11.6	15	15	15	15	2	15	2				13	15	X	21	1							15	3		15	3
HVAC	4.5111.365	Rooftop A/C, <65 MBh, EER = 11.7	15	15	15	15	2	15	2																		15	3
HVAC	4.5112.365	Rooftop A/C, <65 MBh, EER = 11.8	15	15	15	15	2	15	2																		15	3
HVAC	4.5113.365	Rooftop A/C, <65 MBh, EER = 11.9	15	15	15	15	2	15	2																		15	3
HVAC	4.5114.365	Rooftop A/C, <65 MBh, EER = 12.0	15	15	15	15	2	15	2																		15	3
HVAC	4.5115.365	Rooftop A/C, <65 MBh, EER = 12.1	15	15	15	15	2	15	2																		15	3
HVAC	4.5116.365	Rooftop A/C, <65 MBh, EER = 12.2	15	15	15	15	2	15	2																		15	3
HVAC	4.5117.365	Rooftop A/C, <65 MBh, EER = 12.3	15	15	15	15	2	15	2																		15	3
HVAC	4.5118.365	Rooftop A/C, <65 MBh, EER = 12.4	15	15	15	15	2	15	2																		15	3
HVAC	4.5119.365	Rooftop A/C, <65 MBh, EER = 12.5	15	15	15	15	2	15	2																		15	3
HVAC	4.5120.365	Rooftop A/C, <65 MBh, EER = 12.6	15	15	15	15	2	15	2																		15	3
HVAC	4.5121.365	Rooftop A/C, <65 MBh, EER = 12.7	15	15	15	15	2	15	2																		15	3
HVAC	4.5122.365	Rooftop A/C, <65 MBh, EER = 12.8	15	15	15	15	2	15	2																		15	3
HVAC	4.5123.365	Rooftop A/C, <65 MBh, EER = 12.9	15	15	15	15	2	15	2																		15	3
HVAC	4.5124.365	Rooftop A/C, <65 MBh, EER = 13.0	15	15	15	15	2	15	2																		15	3
HVAC	4.5125.365	Rooftop A/C, <65 MBh, EER = 13.1	15	15	15	15	2	15	2																		15	3
HVAC	4.5126.365	Rooftop A/C, 65 to 134 MBh, EER = 11.5	15	15	15	15	2	15	2																		15	3
HVAC	4.5127.365	Rooftop A/C, 65 to 134 MBh, EER = 11.6	15	15	15	15	2	15	2																		15	3
HVAC	4.5128.365	Rooftop A/C, 65 to 134 MBh, EER = 11.7	15	15	15	15	2	15	2																		15	3
HVAC	4.5129.365	Rooftop A/C, 65 to 134 MBh, EER = 11.8	15	15	15	15	2	15	2																		15	3
HVAC	4.5130.365	Rooftop A/C, 65 to 134 MBh, EER = 11.9	15	15	15	15	2	15	2																		15	3
HVAC	4.5131.365	Rooftop A/C, 65 to 134 MBh, EER = 12.0	15	15	15	15	2	15	2																		15	3
HVAC	4.5132.365	Rooftop A/C, 65 to 134 MBh, EER = 12.1	15	15	15	15	2	15	2																		15	3
HVAC	4.5133.365	Rooftop A/C, 65 to 134 MBh, EER = 12.2	15	15	15	15	2	15	2																		15	3
HVAC	4.5134.365	Rooftop A/C, 65 to 134 MBh, EER = 12.3	15	15	15	15	2	15	2																		15	3
HVAC	4.5135.365	Rooftop A/C, 65 to 134 MBh, EER = 12.4	15	15	15	15	2	15	2																		15	3
HVAC	4.5136.365	Rooftop A/C, 65 to 134 MBh, EER = 12.5	15	15	15	15	2	15	2																		15	3
HVAC	4.5137.365	Rooftop A/C, 65 to 134 MBh, EER = 12.6	15	15	15	15	2	15	2																		15	3
HVAC	4.5138.365	Rooftop A/C, 65 to 134 MBh, EER = 12.7	15	15	15	15	2	15	2																		15	3
HVAC	4.5139.365	Rooftop A/C, 65 to 134 MBh, EER = 12.8	15	15	15	15	2	15	2																		15	3
HVAC	4.5140.365	Rooftop A/C, 65 to 134 MBh, EER = 12.9	15	15	15	15	2	15	2																		15	3
HVAC	4.5141.365	Rooftop A/C, 65 to 134 MBh, EER = 13.0	15	15	15	15	2	15	2																		15	3
HVAC	4.5142.365	Rooftop A/C, 65 to 134 MBh, EER = 13.1	15	15	15	15	2	15	2																		15	3
HVAC	4.5143.365	Rooftop A/C, 65 to 134 MBh, EER = 13.2	15	15	15	15	2	15	2																		15	3
HVAC	4.5144.365	Rooftop A/C, 135 to 239 MBh, EER = 11.5	15	15	15	15	2	15	2																		15	3

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17									
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating								
HVAC	4.5020.085	Guest Room Energy Management Controls - Direct Install ($75 co-pay)	8	8	8	8	2																												
HVAC	4.5025.085	Guest Room Energy Management Controls - Direct Install ($95 co-pay)	8	8	8	8	2																												
HVAC	4.5100.425	Trim existing pump impeller to more closely match system demand	5	5	5	5	3																												
HVAC	4.5110.365	Rooftop A/C, <65 MBh, EER = 11.6	15	15	15	15	2	15	2	15	+/- 5																								
HVAC	4.5111.365	Rooftop A/C, <65 MBh, EER = 11.7	15	15	15	15	2	15	2																										
HVAC	4.5112.365	Rooftop A/C, <65 MBh, EER = 11.8	15	15	15	15	2	15	2																										
HVAC	4.5113.365	Rooftop A/C, <65 MBh, EER = 11.9	15	15	15	15	2	15	2																										
HVAC	4.5114.365	Rooftop A/C, <65 MBh, EER = 12.0	15	15	15	15	2	15	2																										
HVAC	4.5115.365	Rooftop A/C, <65 MBh, EER = 12.1	15	15	15	15	2	15	2																										
HVAC	4.5116.365	Rooftop A/C, <65 MBh, EER = 12.2	15	15	15	15	2	15	2																										
HVAC	4.5117.365	Rooftop A/C, <65 MBh, EER = 12.3	15	15	15	15	2	15	2																										
HVAC	4.5118.365	Rooftop A/C, <65 MBh, EER = 12.4	15	15	15	15	2	15	2																										
HVAC	4.5119.365	Rooftop A/C, <65 MBh, EER = 12.5	15	15	15	15	2	15	2																										
HVAC	4.5120.365	Rooftop A/C, <65 MBh, EER = 12.6	15	15	15	15	2	15	2																										
HVAC	4.5121.365	Rooftop A/C, <65 MBh, EER = 12.7	15	15	15	15	2	15	2																										
HVAC	4.5122.365	Rooftop A/C, <65 MBh, EER = 12.8	15	15	15	15	2	15	2																										
HVAC	4.5123.365	Rooftop A/C, <65 MBh, EER = 12.9	15	15	15	15	2	15	2																										
HVAC	4.5124.365	Rooftop A/C, <65 MBh, EER = 13.0	15	15	15	15	2	15	2																										
HVAC	4.5125.365	Rooftop A/C, <65 MBh, EER = 13.1	15	15	15	15	2	15	2																										
HVAC	4.5126.365	Rooftop A/C, 65 to 134 MBh, EER = 11.5	15	15	15	15	2	15	2																										
HVAC	4.5127.365	Rooftop A/C, 65 to 134 MBh, EER = 11.6	15	15	15	15	2	15	2																										
HVAC	4.5128.365	Rooftop A/C, 65 to 134 MBh, EER = 11.7	15	15	15	15	2	15	2																										
HVAC	4.5129.365	Rooftop A/C, 65 to 134 MBh, EER = 11.8	15	15	15	15	2	15	2																										
HVAC	4.5130.365	Rooftop A/C, 65 to 134 MBh, EER = 11.9	15	15	15	15	2	15	2																										
HVAC	4.5131.365	Rooftop A/C, 65 to 134 MBh, EER = 12.0	15	15	15	15	2	15	2																										
HVAC	4.5132.365	Rooftop A/C, 65 to 134 MBh, EER = 12.1	15	15	15	15	2	15	2																										
HVAC	4.5133.365	Rooftop A/C, 65 to 134 MBh, EER = 12.2	15	15	15	15	2	15	2																										
HVAC	4.5134.365	Rooftop A/C, 65 to 134 MBh, EER = 12.3	15	15	15	15	2	15	2																										
HVAC	4.5135.365	Rooftop A/C, 65 to 134 MBh, EER = 12.4	15	15	15	15	2	15	2																										
HVAC	4.5136.365	Rooftop A/C, 65 to 134 MBh, EER = 12.5	15	15	15	15	2	15	2																										
HVAC	4.5137.365	Rooftop A/C, 65 to 134 MBh, EER = 12.6	15	15	15	15	2	15	2																										
HVAC	4.5138.365	Rooftop A/C, 65 to 134 MBh, EER = 12.7	15	15	15	15	2	15	2																										
HVAC	4.5139.365	Rooftop A/C, 65 to 134 MBh, EER = 12.8	15	15	15	15	2	15	2																										
HVAC	4.5140.365	Rooftop A/C, 65 to 134 MBh, EER = 12.9	15	15	15	15	2	15	2																										
HVAC	4.5141.365	Rooftop A/C, 65 to 134 MBh, EER = 13.0	15	15	15	15	2	15	2																										
HVAC	4.5142.365	Rooftop A/C, 65 to 134 MBh, EER = 13.1	15	15	15	15	2	15	2																										
HVAC	4.5143.365	Rooftop A/C, 65 to 134 MBh, EER = 13.2	15	15	15	15	2	15	2																										
HVAC	4.5144.365	Rooftop A/C, 135 to 239 MBh, EER = 11.5	15	15	15	15	2	15	2																										

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7						8								
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating								
HVAC	4.5145.365	Rooftop A/C, 135 to 239 MBh, EER = 11.6	15	15	15	15	2	15	2																				15	3					
HVAC	4.5146.365	Rooftop A/C, 135 to 239 MBh, EER = 11.7	15	15	15	15	2	15	2																				15	3					
HVAC	4.5147.365	Rooftop A/C, 135 to 239 MBh, EER = 11.8	15	15	15	15	2	15	2																				15	3					
HVAC	4.5148.365	Rooftop A/C, 135 to 239 MBh, EER = 11.9	15	15	15	15	2	15	2																				15	3					
HVAC	4.5149.365	Rooftop A/C, 135 to 239 MBh, EER = 12.0	15	15	15	15	2	15	2																				15	3					
HVAC	4.5150.365	Rooftop A/C, 135 to 239 MBh, EER = 12.1	15	15	15	15	2	15	2																				15	3					
HVAC	4.5151.365	Rooftop A/C, 135 to 239 MBh, EER = 12.2	15	15	15	15	2	15	2																				15	3					
HVAC	4.5152.365	Rooftop A/C, 135 to 239 MBh, EER = 12.3	15	15	15	15	2	15	2																				15	3					
HVAC	4.5153.365	Rooftop A/C, 135 to 239 MBh, EER = 12.4	15	15	15	15	2	15	2																				15	3					
HVAC	4.5154.365	Rooftop A/C, 135 to 239 MBh, EER = 12.5	15	15	15	15	2	15	2																				15	3					
HVAC	4.5155.365	Rooftop A/C, 135 to 239 MBh, EER = 12.6	15	15	15	15	2	15	2																				15	3					
HVAC	4.5156.365	Rooftop A/C, 135 to 239 MBh, EER = 12.7	15	15	15	15	2	15	2																				15	3					
HVAC	4.5157.365	Rooftop A/C, 135 to 239 MBh, EER = 12.8	15	15	15	15	2	15	2																				15	3					
HVAC	4.5158.365	Rooftop A/C, 135 to 239 MBh, EER = 12.9	15	15	15	15	2	15	2																				15	3					
HVAC	4.5159.365	Rooftop A/C, 135 to 239 MBh, EER = 13.0	15	15	15	15	2	15	2																				15	3					
HVAC	4.5160.365	Rooftop A/C, 240 to 759 MBh, EER = 10.5	15	15	15	15	2	15	2																				15	3					
HVAC	4.5161.365	Rooftop A/C, 240 to 759 MBh, EER = 10.6	15	15	15	15	2	15	2																				15	3					
HVAC	4.5162.365	Rooftop A/C, 240 to 759 MBh, EER = 10.7	15	15	15	15	2	15	2																				15	3					
HVAC	4.5163.365	Rooftop A/C, 240 to 759 MBh, EER = 10.8	15	15	15	15	2	15	2																				15	3					
HVAC	4.5164.365	Rooftop A/C, 240 to 759 MBh, EER = 10.9	15	15	15	15	2	15	2																				15	3					
HVAC	4.5165.365	Rooftop A/C, 240 to 759 MBh, EER = 11.0	15	15	15	15	2	15	2																				15	3					
HVAC	4.5166.365	Rooftop A/C, 240 to 759 MBh, EER = 11.1	15	15	15	15	2	15	2																				15	3					
HVAC	4.5167.365	Rooftop A/C, 240 to 759 MBh, EER = 11.2	15	15	15	15	2	15	2																				15	3					
HVAC	4.5168.365	Rooftop A/C, 240 to 759 MBh, EER = 11.3	15	15	15	15	2	15	2																				15	3					
HVAC	4.5169.365	Rooftop A/C, 240 to 759 MBh, EER = 11.4	15	15	15	15	2	15	2																				15	3					
HVAC	4.5170.365	Rooftop A/C, 240 to 759 MBh, EER = 11.5	15	15	15	15	2	15	2																				15	3					
HVAC	4.5171.365	Rooftop A/C, 240 to 759 MBh, EER = 11.6	15	15	15	15	2	15	2																				15	3					
HVAC	4.5172.365	Rooftop A/C, 240 to 759 MBh, EER = 11.7	15	15	15	15	2	15	2																				15	3					
HVAC	4.5173.365	Rooftop A/C, 240 to 759 MBh, EER = 11.8	15	15	15	15	2	15	2																				15	3					
HVAC	4.5174.365	Rooftop A/C, 240 to 759 MBh, EER = 11.9	15	15	15	15	2	15	2																				15	3					
HVAC	4.6000.155	Air filtration for exhaust air system	UNK	UNK	UNK	UNK	NA																												

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17									
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating								
HVAC	4.5145.365	Rooftop A/C, 135 to 239 MBh, EER = 11.6	15	15	15	15	2	15	2																											
HVAC	4.5146.365	Rooftop A/C, 135 to 239 MBh, EER = 11.7	15	15	15	15	2	15	2																											
HVAC	4.5147.365	Rooftop A/C, 135 to 239 MBh, EER = 11.8	15	15	15	15	2	15	2																											
HVAC	4.5148.365	Rooftop A/C, 135 to 239 MBh, EER = 11.9	15	15	15	15	2	15	2																											
HVAC	4.5149.365	Rooftop A/C, 135 to 239 MBh, EER = 12.0	15	15	15	15	2	15	2																											
HVAC	4.5150.365	Rooftop A/C, 135 to 239 MBh, EER = 12.1	15	15	15	15	2	15	2																											
HVAC	4.5151.365	Rooftop A/C, 135 to 239 MBh, EER = 12.2	15	15	15	15	2	15	2																											
HVAC	4.5152.365	Rooftop A/C, 135 to 239 MBh, EER = 12.3	15	15	15	15	2	15	2																											
HVAC	4.5153.365	Rooftop A/C, 135 to 239 MBh, EER = 12.4	15	15	15	15	2	15	2																											
HVAC	4.5154.365	Rooftop A/C, 135 to 239 MBh, EER = 12.5	15	15	15	15	2	15	2																											
HVAC	4.5155.365	Rooftop A/C, 135 to 239 MBh, EER = 12.6	15	15	15	15	2	15	2																											
HVAC	4.5156.365	Rooftop A/C, 135 to 239 MBh, EER = 12.7	15	15	15	15	2	15	2																											
HVAC	4.5157.365	Rooftop A/C, 135 to 239 MBh, EER = 12.8	15	15	15	15	2	15	2																											
HVAC	4.5158.365	Rooftop A/C, 135 to 239 MBh, EER = 12.9	15	15	15	15	2	15	2																											
HVAC	4.5159.365	Rooftop A/C, 135 to 239 MBh, EER = 13.0	15	15	15	15	2	15	2																											
HVAC	4.5160.365	Rooftop A/C, 240 to 759 MBh, EER = 10.5	15	15	15	15	2	15	2																											
HVAC	4.5161.365	Rooftop A/C, 240 to 759 MBh, EER = 10.6	15	15	15	15	2	15	2																											
HVAC	4.5162.365	Rooftop A/C, 240 to 759 MBh, EER = 10.7	15	15	15	15	2	15	2																											
HVAC	4.5163.365	Rooftop A/C, 240 to 759 MBh, EER = 10.8	15	15	15	15	2	15	2																											
HVAC	4.5164.365	Rooftop A/C, 240 to 759 MBh, EER = 10.9	15	15	15	15	2	15	2																											
HVAC	4.5165.365	Rooftop A/C, 240 to 759 MBh, EER = 11.0	15	15	15	15	2	15	2																											
HVAC	4.5166.365	Rooftop A/C, 240 to 759 MBh, EER = 11.1	15	15	15	15	2	15	2																											
HVAC	4.5167.365	Rooftop A/C, 240 to 759 MBh, EER = 11.2	15	15	15	15	2	15	2																											
HVAC	4.5168.365	Rooftop A/C, 240 to 759 MBh, EER = 11.3	15	15	15	15	2	15	2																											
HVAC	4.5169.365	Rooftop A/C, 240 to 759 MBh, EER = 11.4	15	15	15	15	2	15	2																											
HVAC	4.5170.365	Rooftop A/C, 240 to 759 MBh, EER = 11.5	15	15	15	15	2	15	2																											
HVAC	4.5171.365	Rooftop A/C, 240 to 759 MBh, EER = 11.6	15	15	15	15	2	15	2																											
HVAC	4.5172.365	Rooftop A/C, 240 to 759 MBh, EER = 11.7	15	15	15	15	2	15	2																											
HVAC	4.5173.365	Rooftop A/C, 240 to 759 MBh, EER = 11.8	15	15	15	15	2	15	2																											
HVAC	4.5174.365	Rooftop A/C, 240 to 759 MBh, EER = 11.9	15	15	15	15	2	15	2																											
HVAC	4.6000.155	Air filtration for exhaust air system	UNK	UNK	UNK	UNK	NA																													

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8								
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating								
HVAC	4.8740.150	Horizontal Air Flow Fan < 20 inches - Greenhouses	15	15	15	15	X						15	20	X																				
HVAC	4.8741.150	Horizontal Air Flow Fan > 20 inches - Greenhouses	15	15	15	15	X						15	20	X																				
HVAC	4.9900.280	Custom HVAC measure not otherwise specified	UNK	UNK	UNK	UNK	NA																												
Process	5.0100.320	Process Heating Improvement or Upgrade	13	13	13	13	3																13		3	8		3							
Process	5.0110.190	Install Stack Melting Furnace	15	15	15	15	2											15	2				13	15	3	20		3							
Process	5.0300.145	Process Heat Recovery	10	10	10	10	3													10	3		13	15	3	15		3							
Process	5.0330.145	Process Heat Recovery - Condensing Heat Exchanger	10	10	10	10	3													10	3		13	15	3	10		3							
Process	5.1990.360	Pressure Screen Rotor, High Efficiency	13	13	13	13	3																13	15	3										
Process	5.2000.360	Repulper Rotor, High Efficiency	13	13	13	13	3																13	15	3										
Process	5.2010.360	Extraction plate for repulper rotor	13	13	13	13	3																13	15	3										
Process	5.3000.480	Welder - Replace with high-efficiency unit	13	13	13	13	3																13	15	3										
Process	5.4000.460	Variable speed drive installed on industrial process pump motor	10	10	10	10	2											10	2	5	3		13	15	3										
Process	5.4020.325	Pump/piping system efficiency improvement	13	13	13	13	3																13		3										
Process	5.4100.425	Trim pump impeller to more closely match process demand	5	5	5	5	3											11	2				13		3	5		3							
Process	5.4500.460	Variable speed drive installed on industrial process fan motor	10	10	10	10	2											10	2				13	15	3	15		3							
Process	5.4505.460	Variable speed drive installed on industrial process, not otherwise specified	10	10	10	10	2											10	2				13	15	3	15		3							
Process	5.4520.320	Plastics equipment, efficient radiant heater band retrofit	15	15	15	15	3																13	15	3										
Process	5.9900.280	Custom process measure not otherwise specified	12	12	12	12	X																												
Domestic Hot Wate	6.0100.095	Flue damper on water heater	UNK	UNK	UNK	UNK	NA																												
Domestic Hot Wate	6.0200.185	Hot Water Heater - Replace Electric with Natural Gas	15	15	15	15	1																												
Domestic Hot Wate	6.0210.185	Booster Heater, Dishwasher - Replace Electric with Natural Gas	UNK	UNK	UNK	UNK	NA																												
Domestic Hot Wate	6.0300.475	Hot Water Heater Installation or Upgrade	10	10	10	10	3																			10		3							
Domestic Hot Wate	6.0400.330	Water temperature reduction on water heater	UNK	UNK	UNK	UNK	NA																												
Domestic Hot Wate	6.0500.380	Showerhead, low flow, natural gas - direct install	9	9	9	9	3																			9		3							
Domestic Hot Wate	6.0510.380	Showerhead, low flow, electric - direct install	9	9	9	9	3																			9		3							
Domestic Hot Wate	6.0512.380	Showerhead, Low Flow, 25% Electric / 75% Natural Gas - Direct Install (Schools and Gov Only)	10	10	10	10	3																			10		3							
Domestic Hot Wate	6.0600.245	Tank insulation on water heater	5	5	5	5	3																			5		3							
Domestic Hot Wate	6.0700.245	Pipe insulation on domestic hot water lines	10	10	10	10	3																			10		3							
Domestic Hot Wate	6.0800.085	Circulation pump timeclock on domestic hot water system	10	10	10	10	3																			10		3							
Domestic Hot Wate	6.0900.005	Low Flow Faucet Aerators, natural gas direct install	9	9	9	9	3																			9		3							
Domestic Hot Wate	6.0910.005	Low Flow Faucet Aerators, electric - direct install	9	9	9	9	3																			9		3							
Domestic Hot Wate	6.0912.005	Low Flow Faucet Aerators, 25% electric / 75% Natural Gas - Direct Install (Schools and Gov Only)	9	9	9	9	3																												

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
HVAC	4.8740.150	Horizontal Air Flow Fan < 20 inches - Greenhouses	15	15	15	15	X			15	+/- 5																	
HVAC	4.8741.150	Horizontal Air Flow Fan > 20 inches - Greenhouses	15	15	15	15	X			15	+/- 5																	
HVAC	4.9900.280	Custom HVAC measure not otherwise specified	UNK	UNK	UNK	UNK	NA																					
Process	5.0100.320	Process Heating Improvement or Upgrade	13	13	13	13	3			12	+/- 2																	
Process	5.0110.190	Install Stack Melting Furnace	15	15	15	15	2			12	+/- 2																	
Process	5.0300.145	Process Heat Recovery	10	10	10	10	3			12	+/- 2																	
Process	5.0330.145	Process Heat Recovery - Condensing Heat Exchanger	10	10	10	10	3			12	+/- 2																	
Process	5.1990.360	Pressure Screen Rotor, High Efficiency	13	13	13	13	3			12	+/- 2																	
Process	5.2000.360	Repulper Rotor, High Efficiency	13	13	13	13	3			12	+/- 2																	
Process	5.2010.360	Extraction plate for repulper rotor	13	13	13	13	3			12	+/- 2																	
Process	5.3000.480	Welder - Replace with high-efficiency unit	13	13	13	13	3			12	+/- 2																	
Process	5.4000.460	Variable speed drive installed on industrial process pump motor	10	10	10	10	2			12	+/- 2																	
Process	5.4020.325	Pump/piping system efficiency improvement	13	13	13	13	3			12	+/- 2																	
Process	5.4100.425	Trim pump impeller to more closely match process demand	5	5	5	5	3			12	+/- 2																	
Process	5.4500.460	Variable speed drive installed on industrial process fan motor	10	10	10	10	2			12	+/- 2																	
Process	5.4505.460	Variable speed drive installed on industrial process, not otherwise specified	10	10	10	10	2			12	+/- 2																	
Process	5.4520.320	Plastics equipment, efficient radiant heater band retrofit	15	15	15	15	3			12	+/- 2																	
Process	5.9900.280	Custom process measure not otherwise specified	12	12	12	12	X			12	+/- 2																	
Domestic Hot Wate	6.0100.095	Flue damper on water heater	UNK	UNK	UNK	UNK	NA																					
Domestic Hot Wate	6.0200.185	Hot Water Heater - Replace Electric with Natural Gas	15	15	15	15	1	15	1																			
Domestic Hot Wate	6.0210.185	Booster Heater, Dishwasher - Replace Electric with Natural Gas	UNK	UNK	UNK	UNK	NA																					
Domestic Hot Wate	6.0300.475	Hot Water Heater Installation or Upgrade	10	10	10	10	3																					
Domestic Hot Wate	6.0400.330	Water temperature reduction on water heater	UNK	UNK	UNK	UNK	NA																					
Domestic Hot Wate	6.0500.380	Showerhead, low flow, natural gas - direct install	9	9	9	9	3																					
Domestic Hot Wate	6.0510.380	Showerhead, low flow, electric - direct install	9	9	9	9	3																					
Domestic Hot Wate	6.0512.380	Showerhead, Low Flow, 25% Electric / 75% Natural Gas - Direct Install (Schools and Gov Only)	10	10	10	10	3																					
Domestic Hot Wate	6.0600.245	Tank insulation on water heater	5	5	5	5	3	7	X																			
Domestic Hot Wate	6.0700.245	Pipe insulation on domestic hot water lines	10	10	10	10	3	13 11	3																			
Domestic Hot Wate	6.0800.085	Circulation pump timeclock on domestic hot water system	10	10	10	10	3	15	X																			
Domestic Hot Wate	6.0900.005	Low Flow Faucet Aerators, natural gas direct install	9	9	9	9	3	10	X																			
Domestic Hot Wate	6.0910.005	Low Flow Faucet Aerators, electric - direct install	9	9	9	9	3	10	X																			
Domestic Hot Wate	6.0912.005	Low Flow Faucet Aerators, 25% electric / 75% Natural Gas - Direct Install (Schools and Gov Only)	9	9	9	9	3	10	X																			

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7					8								
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating								
Domestic Hot Wate	6.0920.005	Low Flow Faucet Aerators, kitchen, natural gas	9	9	9	9	3																			9		3						
Domestic Hot Wate	6.0930.005	Low Flow Faucet Aerators, kitchen, electric	9	9	9	9	3																			9		3						
Domestic Hot Wate	6.1001.315	Pre-Rinse Sprayer, Low Flow, Natural Gas, commercial application	5	5	5	5	3																			5		3						
Domestic Hot Wate	6.1002.315	Pre-Rinse Sprayer, Low Flow, Electric, commercial application	5	5	5	5	3																			5		3						
Domestic Hot Wate	6.1007.315	Pre-Rinse Sprayer, Low Flow, Natural Gas - direct install	5	5	5	5	3																			5		3						
Domestic Hot Wate	6.1008.315	Pre-Rinse Sprayer, Low Flow, Electric - direct install	5	5	5	5	3																			5		3						
Domestic Hot Wate	6.1011.315	Pre-Rinse Sprayer, Low Flow, - 25% Electric / 75% Natural Gas - Direct Install (Schools and Gov Only)	5	5	5	5	3																			5		3						
Domestic Hot Wate	6.1700.475	Water Heater (Ag Only) - Replace natural gas water heater with more efficient natural gas water heater (Hybrid)	15	15	15	15	1																			13		3						
Domestic Hot Wate	6.1710.475	Water Heater (Ag Only) - Replace natural gas water heater with more efficient natural gas water heater (Custom)	15	15	15	15	1																											
Domestic Hot Wate	6.1800.475	Water Heater (Ag Only) - Replace electric water heater with more efficient electric water heater (Hybrid)	15	15	15	15	1																											
Domestic Hot Wate	6.1810.475	Water Heater (Ag Only) - Replace electric water heater with more efficient electric water heater (Custom)	15	15	15	15	1																											
Domestic Hot Wate	6.2010.475	Water Heater - Natural gas condensing, thermal efficiency 90% +	15	15	15	15	1																			15		3						
Domestic Hot Wate	6.2020.475	Water Heater - Electric water heater .93 EF or greater	15	15	15	15	1																											
Domestic Hot Wate	6.2030.160	Flue closure due to residential water heater change	UNK	UNK	UNK	UNK	NA																											
Domestic Hot Wate	6.2040.185	Water heater fuel switching, electric to natural gas	15	15	15	15	3																			15		3						
Domestic Hot Wate	6.2045.185	Water heater fuel switching - electric to non-electric (Ag Only)(Hybrid)	15	15	15	15	3																			15		3						
Domestic Hot Wate	6.2047.185	Water heater fuel switching - electric to natural gas (Ag Only)(Custom)	15	15	15	15	3																			15		3						
Domestic Hot Wate	6.2048.185	Water heater fuel switching - electric to propane (Ag Only)(Custom)	15	15	15	15	3																			15		3						
Domestic Hot Wate	6.2050.475	Water Heater - Indirect, with 90% AFUE or greater modulating hot water boiler	15	15	15	15	1																			20		3						
Domestic Hot Wate	6.2060.475	Water Heater - Power-vented natural gas with EF .64 to .79	13	13	13	13	3																			13		3						
Domestic Hot Wate	6.2070.475	Water Heater - Power-vented natural gas with EF .80 or greater	13	13	13	13	3																			13		3						
Domestic Hot Wate	6.9900.280	Custom hot water measure not otherwise specified	15	15	15	15	3																			15		3						
Motors	61.0111.270	Motor NEMA premium efficiency 1.0 hp	15	15	15	15	2	15	2															20	3		25	3						
Motors	61.0112.270	Motor NEMA premium efficiency 1.5 hp	15	15	15	15	2	15	2															20	3		25	3						
Motors	61.0113.270	Motor NEMA premium efficiency 2.0 hp	15	15	15	15	2	15	2															20	3		25	3						

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Domestic Hot Wate	6.0920.005	Low Flow Faucet Aerators, kitchen, natural gas	9	9	9	9	3	10	X																			
Domestic Hot Wate	6.0930.005	Low Flow Faucet Aerators, kitchen, electric	9	9	9	9	3	10	X																			
Domestic Hot Wate	6.1001.315	Pre-Rinse Sprayer, Low Flow, Natural Gas, commercial application	5	5	5	5	3																					
Domestic Hot Wate	6.1002.315	Pre-Rinse Sprayer, Low Flow, Electric, commercial application	5	5	5	5	3																					
Domestic Hot Wate	6.1007.315	Pre-Rinse Sprayer, Low Flow, Natural Gas - direct install	5	5	5	5	3																					
Domestic Hot Wate	6.1008.315	Pre-Rinse Sprayer, Low Flow, Electric - direct install	5	5	5	5	3																					
Domestic Hot Wate	6.1011.315	Pre-Rinse Sprayer, Low Flow, - 25% Electric / 75% Natural Gas - Direct Install (Schools and Gov Only)	5	5	5	5	3																					
Domestic Hot Wate	6.1700.475	Water Heater (Ag Only) - Replace natural gas water heater with more efficient natural gas water heater (Hybrid)	15	15	15	15	1	15	1																			
Domestic Hot Wate	6.1710.475	Water Heater (Ag Only) - Replace natural gas water heater with more efficient natural gas water heater (Custom)	15	15	15	15	1	15	1																			
Domestic Hot Wate	6.1800.475	Water Heater (Ag Only) - Replace electric water heater with more efficient electric water heater (Hybrid)	15	15	15	15	1	15	1																			
Domestic Hot Wate	6.1810.475	Water Heater (Ag Only) - Replace electric water heater with more efficient electric water heater (Custom)	15	15	15	15	1	15	1																			
Domestic Hot Wate	6.2010.475	Water Heater - Natural gas condensing, thermal efficiency 90% +	15	15	15	15	1	15	1																			
Domestic Hot Wate	6.2020.475	Water Heater - Electric water heater .93 EF or greater	15	15	15	15	1	15	1																			
Domestic Hot Wate	6.2030.160	Flue closure due to residential water heater change	UNK	UNK	UNK	UNK	NA																					
Domestic Hot Wate	6.2040.185	Water heater fuel switching, electric to natural gas	15	15	15	15	3																					
Domestic Hot Wate	6.2045.185	Water heater fuel switching - electric to non-electric (Ag Only)(Hybrid)	15	15	15	15	3																					
Domestic Hot Wate	6.2047.185	Water heater fuel switching - electric to natural gas (Ag Only)(Custom)	15	15	15	15	3																					
Domestic Hot Wate	6.2048.185	Water heater fuel switching - electric to propane (Ag Only)(Custom)	15	15	15	15	3																					
Domestic Hot Wate	6.2050.475	Water Heater - Indirect, with 90% AFUE or greater modulating hot water boiler	15	15	15	15	1	15	1																			
Domestic Hot Wate	6.2060.475	Water Heater - Power-vented natural gas with EF .64 to .79	13	13	13	13	3																					
Domestic Hot Wate	6.2070.475	Water Heater - Power-vented natural gas with EF .80 or greater	13	13	13	13	3																					
Domestic Hot Wate	6.9900.280	Custom hot water measure not otherwise specified	15	15	15	15	3	5	3																			
Motors	61.0111.270	Motor NEMA premium efficiency 1.0 hp	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0112.270	Motor NEMA premium efficiency 1.5 hp	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0113.270	Motor NEMA premium efficiency 2.0 hp	15	15	15	15	2	15	X	16	+/- 3																	

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WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8		
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating
Motors	61.0114.270	Motor NEMA premium efficiency 3.0 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0115.270	Motor NEMA premium efficiency 5.0 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0116.270	Motor NEMA premium efficiency 7.5 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0117.270	Motor NEMA premium efficiency 10 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0118.270	Motor NEMA premium efficiency 15 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0119.270	Motor NEMA premium efficiency 20 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0120.270	Motor NEMA premium efficiency 25 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0121.270	Motor NEMA premium efficiency 30 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0122.270	Motor NEMA premium efficiency 40 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0123.270	Motor NEMA premium efficiency 50 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0124.270	Motor NEMA premium efficiency 60 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0125.270	Motor NEMA premium efficiency 75 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0126.270	Motor NEMA premium efficiency 100 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0127.270	Motor NEMA premium efficiency 125 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0128.270	Motor NEMA premium efficiency 150 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0129.270	Motor NEMA premium efficiency 200 hp	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0130.270	Motor NEMA premium efficiency 1.0 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0131.270	Motor NEMA premium efficiency 1.5 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0132.270	Motor NEMA premium efficiency 2.0 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0133.270	Motor NEMA premium efficiency 3.0 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0134.270	Motor NEMA premium efficiency 5.0 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0135.270	Motor NEMA premium efficiency 7.5 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0136.270	Motor NEMA premium efficiency 10 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0137.270	Motor NEMA premium efficiency 15 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0138.270	Motor NEMA premium efficiency 20 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0139.270	Motor NEMA premium efficiency 25 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0140.270	Motor NEMA premium efficiency 30 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0141.270	Motor NEMA premium efficiency 40 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0142.270	Motor NEMA premium efficiency 50 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0143.270	Motor NEMA premium efficiency 60 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3

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WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Motors	61.0114.270	Motor NEMA premium efficiency 3.0 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0115.270	Motor NEMA premium efficiency 5.0 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0116.270	Motor NEMA premium efficiency 7.5 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0117.270	Motor NEMA premium efficiency 10 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0118.270	Motor NEMA premium efficiency 15 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0119.270	Motor NEMA premium efficiency 20 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0120.270	Motor NEMA premium efficiency 25 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0121.270	Motor NEMA premium efficiency 30 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0122.270	Motor NEMA premium efficiency 40 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0123.270	Motor NEMA premium efficiency 50 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0124.270	Motor NEMA premium efficiency 60 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0125.270	Motor NEMA premium efficiency 75 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0126.270	Motor NEMA premium efficiency 100 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0127.270	Motor NEMA premium efficiency 125 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0128.270	Motor NEMA premium efficiency 150 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0129.270	Motor NEMA premium efficiency 200 hp	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0130.270	Motor NEMA premium efficiency 1.0 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0131.270	Motor NEMA premium efficiency 1.5 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0132.270	Motor NEMA premium efficiency 2.0 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0133.270	Motor NEMA premium efficiency 3.0 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0134.270	Motor NEMA premium efficiency 5.0 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0135.270	Motor NEMA premium efficiency 7.5 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0136.270	Motor NEMA premium efficiency 10 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0137.270	Motor NEMA premium efficiency 15 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0138.270	Motor NEMA premium efficiency 20 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0139.270	Motor NEMA premium efficiency 25 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0140.270	Motor NEMA premium efficiency 30 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0141.270	Motor NEMA premium efficiency 40 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0142.270	Motor NEMA premium efficiency 50 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								
Motors	61.0143.270	Motor NEMA premium efficiency 60 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																								

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WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8		
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating
Motors	61.0144.270	Motor NEMA premium efficiency 75 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0145.270	Motor NEMA premium efficiency 100 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0146.270	Motor NEMA premium efficiency 125 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0147.270	Motor NEMA premium efficiency 150 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0148.270	Motor NEMA premium efficiency 200 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0150.270	Motor NEMA premium efficiency 1.5 hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0152.270	Motor NEMA premium efficiency 3.0 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0153.270	Motor NEMA premium efficiency 5.0 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0154.270	Motor NEMA premium efficiency 7.5 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0155.270	Motor NEMA premium efficiency 10 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0156.270	Motor NEMA premium efficiency 15 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0157.270	Motor NEMA premium efficiency 20 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0158.270	Motor NEMA premium efficiency 25 hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0159.270	Motor NEMA premium efficiency 30hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0161.270	Motor NEMA premium efficiency 50hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0162.270	Motor NEMA premium efficiency 60hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0163.270	Motor NEMA premium efficiency 75 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0164.270	Motor NEMA premium efficiency 100hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0166.270	Motor NEMA premium efficiency 150hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	2															20	3		25	3
Motors	61.0167.270	Motor NEMA premium efficiency 200hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	2															20	3		25	3
Motors	61.1000.280	Distributor SPIFF, motors <=30 hp	15	15	15	15	2	15	2															20	3			
Motors	61.1005.280	Distributor SPIFF, motors >30 hp	15	15	15	15	2	15	2															20	3			
Motors	61.1010.280	Bonus, VFD on motor, for pre- and post-installation kW data	10	10	10	10	2											10	2			13	13		x	15		3
Motors	61.9900.280	Motor, measures not otherwise specified	16	16	16	16	X																					
Building Shell	7.0200.020	Attic Penetrations - Seal holes between the attic and upper floor	20	20	20	20	3																	20	3	40		3
Building Shell	7.0300.245	Attic Insulation - Add additional insulation	20	20	20	20	3																	20	3	40		3
Building Shell	7.0400.245	Roof Insulation - Insulate roof when re-roofing	20	20	20	20	1																	20	3	40		3
Building Shell	7.0500.245	Insulation (Wall)	20	20	20	20	3																	20	3	40		3
Building Shell	7.0600.245	Ceiling Insulation	20	20	20	20	3																	20	3	40		3

WISeerts Codes			KEMA Recommended					Measure life summary by source																											
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14				15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating		Years	Source Rating	Years	Source Rating	Years	Source Rating
Motors	61.0144.270	Motor NEMA premium efficiency 75 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0145.270	Motor NEMA premium efficiency 100 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0146.270	Motor NEMA premium efficiency 125 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0147.270	Motor NEMA premium efficiency 150 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0148.270	Motor NEMA premium efficiency 200 hp 1800 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0150.270	Motor NEMA premium efficiency 1.5 hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0152.270	Motor NEMA premium efficiency 3.0 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0153.270	Motor NEMA premium efficiency 5.0 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0154.270	Motor NEMA premium efficiency 7.5 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0155.270	Motor NEMA premium efficiency 10 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0156.270	Motor NEMA premium efficiency 15 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0157.270	Motor NEMA premium efficiency 20 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0158.270	Motor NEMA premium efficiency 25 hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0159.270	Motor NEMA premium efficiency 30hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0161.270	Motor NEMA premium efficiency 50hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0162.270	Motor NEMA premium efficiency 60hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0163.270	Motor NEMA premium efficiency 75 hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0164.270	Motor NEMA premium efficiency 100hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0166.270	Motor NEMA premium efficiency 150hp 3600 RPM ODP & TEFC	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.0167.270	Motor NEMA premium efficiency 200hp 3600 RPM ODP & TEFC (installed before May 1 2008)	15	15	15	15	2	15	X	16	+/- 3																	
Motors	61.1000.280	Distributor SPIFF, motors <=30 hp	15	15	15	15	2			16	+/- 3																	
Motors	61.1005.280	Distributor SPIFF, motors >30 hp	15	15	15	15	2			16	+/- 3																	
Motors	61.1010.280	Bonus, VFD on motor, for pre- and post-installation kW data	10	10	10	10	2			16	+/- 3																	
Motors	61.9900.280	Motor, measures not otherwise specified	16	16	16	16	X			16	+/- 3																	
Building Shell	7.0200.020	Attic Penetrations - Seal holes between the attic and upper floor	20	20	20	20	3																					
Building Shell	7.0300.245	Attic Insulation - Add additional insulation	20	20	20	20	3																					
Building Shell	7.0400.245	Roof Insulation - Insulate roof when re-roofing	20	20	20	20	1	20	1																			
Building Shell	7.0500.245	Insulation (Wall)	20	20	20	20	3																					
Building Shell	7.0600.245	Ceiling Insulation	20	20	20	20	3																					

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8							
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating							
Building Shell	7.0700.245	Window Tinting - to reduce air-conditioning loads	10	10	10	10	1																	20	3								
Building Shell	7.0900.130	Overhead Door Replacement	20	20	20	20	3																	20	3	40		3					
Building Shell	7.1000.130	Door Replacement - Replace all doors with energy-efficient insulated doors with double pane insulated glass	20	20	20	20	3																	20	3	40		3					
Building Shell	7.1100.500	Window Replacement - high efficiency units	20	20	20	20	3																	20	3	30		3					
Building Shell	7.1200.500	Close Windows/Doors - Keep all closed during winter	20	20	20	20	3																	20	3								
Building Shell	7.1400.020	Weather-stripping around doors, replacement	20	20	20	20	3																	20	3	40		3					
Building Shell	7.1500.020	Caulk Windows	20	20	20	20	3																	20	3	40		3					
Building Shell	7.1600.020	Overhead Door Seals	20	20	20	20	3																	20	3	40		3					
Building Shell	7.1700.020	Door Threshold Replacement	20	20	20	20	3																	20	3	40		3					
Building Shell	7.1800.020	Air Conditioner Covers - Installed on window air-conditioners during winter	20	20	20	20	3																	20	3								
Building Shell	7.8400.020	Reduce air infiltration - not otherwise specified	20	20	20	20	3																	20	3								
Building Shell	7.9900.280	Custom building envelope measure not otherwise specified	20	20	20	20	3																	20	3	40		3					
Renewable Energy	70.0100.305	Solar - Photovoltaic	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.0200.385	Solar - Thermal	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.1100.030	Biogas - Electric	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.1200.030	Biogas - Thermal	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.2100.030	Biomass - Electric	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.2200.030	Biomass - Thermal	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.2210.030	Brown Grease Boiler Burner	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.4000.030	Corn Burning Boiler	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.4200.030	Wood or Corn Boiler - Outside	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.4240.030	Wood or Corn Burner - Indooor	UNK	UNK	UNK	UNK	NA																										
Renewable Energy	70.8500.030	Wood Boiler - Improve Efficiency	UNK	UNK	UNK	UNK	NA																										
Laundry	8.0100.055	Laundry Equipment - Replace with new high efficiency units	11	11	11	11	3																										
Laundry	8.0200.145	Laundry Heat Recovery	UNK	UNK	UNK	UNK	NA																										
Laundry	8.1100.055	Clothes Washer - ENERGY STAR	11	11	11	11	3																			14		3					
Laundry	8.1110.055	Clothes Washer, Residential, CEE Tier 2	11	11	11	11	3																										
Laundry	8.1120.055	Clothes Washer, Residential, CEE Tier 3	11	11	11	11	3																										
Laundry	8.9900.280	Custom laundry measure not otherwise specified	12	12	12	12	3																			12		3					
Compressed Air, Vacuum Pumps	9.0100.085	Compressor shutoff at night	10	10	10	10	3			UNK	85%	X											18		3	10		3					
Compressed Air, Vacuum Pumps	9.0200.275	Compressed air nozzles	15	15	15	15	3																18	20	3	15		3					
Compressed Air, Vacuum Pumps	9.0300.070	Air Compressor Upgrade - higher efficiency model	15	15	15	15	3																18		3	15		3					
Compressed Air, Vacuum Pumps	9.0400.430	Compressed Air Leak Repair	2	2	2	2	1			1	100%	X														2		3					
Compressed Air, Vacuum Pumps	9.0404.430	Compressed Air System Leak Survey, with Repair, <= 250 hp	2	2	2	2	1			1	100%	X																					
Compressed Air, Vacuum Pumps	9.0405.430	Compressed Air System Leak Survey, with Repair, > 250 hp	2	2	2	2	1			1	100%	X																					
Compressed Air, Vacuum Pumps	9.0407.430	Compressed Air System Leak Repair	2	2	2	2	1																										
Compressed Air, Vacuum Pumps	9.0410.430	Reduce Operating Pressure of Compressed Air System	20	20	20	20	3			UNK	85%	X											18		3	20		3					
Compressed Air, Vacuum Pumps	9.0500.285	Duct in Outside Air to Compressor	20	20	20	20	3																18	20	3	20		3					

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14			15		16		17	
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating
Building Shell	7.0700.245	Window Tinting - to reduce air-conditioning loads	10	10	10	10	1	10	1																		
Building Shell	7.0900.130	Overhead Door Replacement	20	20	20	20	3																				
Building Shell	7.1000.130	Door Replacement - Replace all doors with energy-efficient insulated doors with double pane insulated glass	20	20	20	20	3																				
Building Shell	7.1100.500	Window Replacement - high efficiency units	20	20	20	20	3	20	X																		
Building Shell	7.1200.500	Close Windows/Doors - Keep all closed during winter	20	20	20	20	3																				
Building Shell	7.1400.020	Weather-stripping around doors, replacement	20	20	20	20	3																				
Building Shell	7.1500.020	Caulk Windows	20	20	20	20	3																				
Building Shell	7.1600.020	Overhead Door Seals	20	20	20	20	3																				
Building Shell	7.1700.020	Door Threshold Replacement	20	20	20	20	3																				
Building Shell	7.1800.020	Air Conditioner Covers - Installed on window air-conditioners during winter	20	20	20	20	3																				
Building Shell	7.8400.020	Reduce air infiltration - not otherwise specified	20	20	20	20	3	18	X																		
Building Shell	7.9900.280	Custom building envelope measure not otherwise specified	20	20	20	20	3	15	X																		
Renewable Energy	70.0100.305	Solar - Photovoltaic	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.0200.385	Solar - Thermal	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.1100.030	Biogas - Electric	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.1200.030	Biogas - Thermal	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.2100.030	Biomass - Electric	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.2200.030	Biomass - Thermal	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.2210.030	Brown Grease Boiler Burner	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.4000.030	Corn Burning Boiler	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.4200.030	Wood or Corn Boiler - Outside	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.4240.030	Wood or Corn Burner - Indoor	UNK	UNK	UNK	UNK	NA																				
Renewable Energy	70.8500.030	Wood Boiler - Improve Efficiency	UNK	UNK	UNK	UNK	NA																				
Laundry	8.0100.055	Laundry Equipment - Replace with new high efficiency units	11	11	11	11	3	11	3																		
Laundry	8.0200.145	Laundry Heat Recovery	UNK	UNK	UNK	UNK	NA																				
Laundry	8.1100.055	Clothes Washer - ENERGY STAR	11	11	11	11	3	11	3																		
Laundry	8.1110.055	Clothes Washer, Residential, CEE Tier 2	11	11	11	11	3	11	3																		
Laundry	8.1120.055	Clothes Washer, Residential, CEE Tier 3	11	11	11	11	3	11	3																		
Laundry	8.9900.280	Custom laundry measure not otherwise specified	12	12	12	12	3																				
Compressed Air, Vacuum Pumps	9.0100.085	Compressor shutoff at night	10	10	10	10	3			12	+/- 2																
Compressed Air, Vacuum Pumps	9.0200.275	Compressed air nozzles	15	15	15	15	3			12	+/- 2																
Compressed Air, Vacuum Pumps	9.0300.070	Air Compressor Upgrade - higher efficiency model	15	15	15	15	3			12	+/- 2																
Compressed Air, Vacuum Pumps	9.0400.430	Compressed Air Leak Repair	2	2	2	2	1			12	+/- 2													2	1	1	2
Compressed Air, Vacuum Pumps	9.0404.430	Compressed Air System Leak Survey, with Repair, <= 250 hp	2	2	2	2	1			12	+/- 2													2	1	1	2
Compressed Air, Vacuum Pumps	9.0405.430	Compressed Air System Leak Survey, with Repair, > 250 hp	2	2	2	2	1			12	+/- 2													2	1	1	2
Compressed Air, Vacuum Pumps	9.0407.430	Compressed Air System Leak Repair	2	2	2	2	1																	2	1	1	2
Compressed Air, Vacuum Pumps	9.0410.430	Reduce Operating Pressure of Compressed Air System	20	20	20	20	3			12	+/- 2																
Compressed Air, Vacuum Pumps	9.0500.285	Duct in Outside Air to Compressor	20	20	20	20	3			12	+/- 2																

WISeerts Codes			KEMA Recommended					Measure life summary by source																									
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		1		2			3			4		5		6		7				8							
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Persist.	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (Small Comm.)	Years (C&I retro)	Years (NC C&I)	Source Rating	Years (Retrofit)	Years (New Construction)	Source Rating							
Compressed Air, Vacuum Pumps	9.0600.400	Compressed Air Storage Tank	15	15	15	15	3																18	20	3	15		3					
Compressed Air, Vacuum Pumps	9.0700.330	Reduce Process Needs for Compressed Air	20	20	20	20	3																18		3	20		3					
Compressed Air, Vacuum Pumps	9.0710.135	Blower Purge Dryer	15	15	15	15	3																18	20	3	15		3					
Compressed Air, Vacuum Pumps	9.0720.135	Cycling Air Dryer	10	10	10	10	3																18	20	3	10		3					
Compressed Air, Vacuum Pumps	9.0800.460	Variable speed drive on existing air compressor motor	10	10	10	10	2											10	2				18			15		3					
Compressed Air, Vacuum Pumps	9.0801.070	Air compressor equipped with variable speed drive, new equipment	15	15	15	15	3						13	15	X									20	3	15		3					
Compressed Air, Vacuum Pumps	9.0802.070	Air compressor equipped with variable speed drive, new equipment - includes bonus, expiring 31Jan2008	15	15	15	15	3						13	15	X									20	3	15		3					
Compressed Air, Vacuum Pumps	9.0820.460	Variable speed drive on vacuum pump motor	10	10	10	10	2											10	2				18	20	3	15		3					
Compressed Air, Vacuum Pumps	9.0900.415	Compressed Air System Isolation - Isolate equipment and areas that are not using compressed air	15	15	15	15	3																			15		3					
Compressed Air, Vacuum Pumps	9.1000.430	Vacuum Leak Repair	2	2	2	2	1			1	100%	X														2		3					
Compressed Air, Vacuum Pumps	9.1100.415	Vacuum System Isolation - Isolate equipment and areas that are not using vacuum system	5	5	5	5	3																			5		3					
Compressed Air, Vacuum Pumps	9.1200.070	Variable Speed Compressor - Upgrade to new equipment	13	13	13	13	3																13		3								
Compressed Air, Vacuum Pumps	9.1250.070	Variable Displacement Compressor	13	13	13	13	3																13		3	15		3					
Compressed Air, Vacuum Pumps	9.1400.145	Compressed Air Heat Recovery	13	13	13	13	3																13		3								
Compressed Air, Vacuum Pumps	9.9900.280	Custom compressed air measure not otherwise specified	15	15	15	15	3																	15	3	15		3					

WISeerts Codes			KEMA Recommended					Measure life summary by source																										
WISeerts Group Description	WISeerts Technology Code(s)	Tech Code Description	Ag	Comm	Ind	S&G		9		10			11		12		13		14			15		16		17									
			Years	Years	Years	Years	Source	Years	Source Rating	Years	Error	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating	Years (low press)	Years (hi press)	Source Rating	Years	Source Rating	Years	Source Rating	Years	Source Rating								
Compressed Air, Vacuum Pumps	9.0600.400	Compressed Air Storage Tank	15	15	15	15	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.0700.330	Reduce Process Needs for Compressed Air	20	20	20	20	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.0710.135	Blower Purge Dryer	15	15	15	15	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.0720.135	Cycling Air Dryer	10	10	10	10	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.0800.460	Variable speed drive on existing air compressor motor	10	10	10	10	2			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.0801.070	Air compressor equipped with variable speed drive, new equipment	15	15	15	15	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.0802.070	Air compressor equipped with variable speed drive, new equipment - includes bonus, expiring 31Jan2008	15	15	15	15	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.0820.460	Variable speed drive on vacuum pump motor	10	10	10	10	2			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.0900.415	Compressed Air System Isolation - Isolate equipment and areas that are not using compressed air	15	15	15	15	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.1000.430	Vacuum Leak Repair	2	2	2	2	1			12	+/- 2															2	1	1	2					
Compressed Air, Vacuum Pumps	9.1100.415	Vacuum System Isolation - Isolate equipment and areas that are not using vacuum system	5	5	5	5	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.1200.070	Variable Speed Compressor - Upgrade to new equipment	13	13	13	13	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.1250.070	Variable Displacement Compressor	13	13	13	13	3			12	+/- 2																							
Compressed Air, Vacuum Pumps	9.1400.145	Compressed Air Heat Recovery	13	13	13	13	3	14	1	12	+/- 2																							
Compressed Air, Vacuum Pumps	9.9900.280	Custom compressed air measure not otherwise specified	15	15	15	15	3			12	+/- 2																							

Boilers and boiler tune-up measure life

What percentage of participants is likely to know:

The pre- and post-tune-up efficiency?

_____

Comments:_____

_____

The current efficiency?

_____

Comments:_____

_____

The date of the last tune-up?

_____

Comments:_____

_____

How frequently boiler tune-ups are performed?

_____

Comments:_____

_____

Efficiency of steam distribution system, excluding steam traps (i.e., losses related to heat loss in piping, condensate tanks, etc.)?

_____

Comments:_____

_____

Boiler efficiency improvement due to flue gas (or other) heat recovery?

_____

Comments:_____

_____

Steam trap repair measure life

What percentage of participants is likely to know:

Percentage of failed traps found?

_____

Comments:_____

_____

Percentage of failed traps by size, type, or mode of failure (open, leaking, or closed)?

_____

Comments:_____

_____

When was the last leak survey?

_____

Comments:_____

_____

How frequently leak surveys and repairs are performed?

_____

Comments:_____

_____

Chiller tune-up measure life

What percentage of participants is likely to know:

The pre- and post-tune-up efficiency?

_____

Comments:_____

_____

The current efficiency?

_____

Comments:_____

_____

The date of the last tune-up?

_____

Comments:_____

_____

How frequently chiller tune-ups are performed?

_____

Comments:_____

_____

Compressed air leak repair measure life

What percentage of participants is likely to know:

Percentage of leaks found?

_____

Comments:_____

_____

Of the leaks found, the percentage of leaks repaired?

_____

Comments:_____

_____

When was the last leak survey?

_____

Comments:_____

_____

How frequently leak surveys and repairs are performed?

_____

Comments:_____

_____

Thermostat set point (controls) measure life

What percentage of participants is likely to know:

Set points prior to the change?

_____

Comments:_____

_____

Set points immediately after the change?

_____

Comments:_____

_____

Set points now?

_____

Comments:_____

_____

Lighting measure life

What percentage of participants is likely to know:

What fixtures were delamped then relamped?

_____

Comments:_____

_____

Lighting control schedule prior to the change?

_____

Comments:_____

_____

Lighting control schedule immediately after the change?

_____

Comments:_____

_____

Lighting control schedule now?

_____

Comments:_____

_____

Agricultural

What percentage of participants is likely to know:

Efficiency of their grain dryers?

_____

Comments:_____

_____

Efficiency of their ventilation fans (cfm per watt)?

_____

Comments:_____

_____

Industrial

What percentage of participants is likely to be able to talk about the:

Efficiency of melting furnaces?

_____

Comments:_____

_____

General

In general, what percentage of participants has a program to monitor energy use?

Comments:

What percentage of participants have an energy monitoring program sophisticated enough to observe decreases in energy efficiency?

Comments:

What percentage of participants would be able to answer questions about efficiency of equipment when it was installed and the efficiency of equipment now?

Comments:

What percentage of participants would know about equipment installed through the program five years ago (specifically is it still installed, what was the efficiency, and what is the efficiency)?

Comments:

What is the turnover rate of employees at participating facilities (i.e., is it likely that the participant's contact person will change over a five year period)?

Comments:

APPENDIX D: RECOMMENDED VALUES FOR LIGHTING HOURS OF USE

Hours of use refers to the average annual hours that a measure will operate. In this section, we are specifically interested in the hours of use for lighting in each sector. These values were previously deemed (see Table D-1). These deemed values were provided by Focus on Energy staff and we do not have documentation supporting the values. Because of this, we developed new values based on the sources cited in the analysis below.

Table D-1. Existing Hours of Use Values

Sector	Hours
Agriculture	4,368
Commercial	3,680
Industrial	4,576
Schools & Government	3,230

The studies we reviewed provided hours of use by building type. Since the measure life estimates will be used in the benefit cost analysis by sector, we needed to know the hours of use by sector.[15] Therefore, we used the hours of use by building type to estimate the hours of use by sector. We found the hours of use by sector in two steps. First, we averaged the values for each building type across all sources. Second, we found the weighted average within each sector. We used the percentages of lighting kWh used by each building type as the weights. Where possible we used Wisconsin data to calculate the weights for each Focus sector. When Wisconsin specific data were unavailable, we used national data. We also provide the sources of the data.

D.1 AVERAGE HOURS OF USE BY BUILDING TYPE

The sources we reviewed provided a wide range of operating hours for each building type. The wide range may come from differences in geographic, cultural, or regulatory environment. The available studies were not performed in the upper Midwest and it is not clear that any geographic region is more applicable to Wisconsin than another region. To account for the geographic, cultural, and regulatory differences, we found the average hours of use from the available studies. This approach is different from the approach we used to determine measure life estimates. The measure life estimates were for specific measures and we could more easily account for differences.

D.2 WEIGHTING FACTORS

The average hours of use vary from one building type to another. Since each sector is comprised of many building types, we used a weighted average to determine the sector hours of operation.

[15] The *Focus on Energy Evaluation Business Programs: Deemed Savings Parameter Development* report proposes new lighting hours of use by building type for use in deemed savings calculations. The hours proposed in this appendix are used only to estimate measure life by sector.

D.2.1 Commercial sector weights

We were unable to find a source for data on the percentage of lighting kWh used by the various building types in Wisconsin for the Commercial sector. To find weights for the commercial sector, we used a national DOE Study.[16] This study includes the percentage of lighting kWh used by each building type nationally.

The DOE study included some building uses that are not commercial uses in Wisconsin. As a result, the percentage of commercial lighting kWh represented by building use was less than 100. Table D-2 shows the percentage of lighting kWh by building use and the associated weight.

Table D-2. Commercial Hours of Use Weights by Building Use[17]

Building Use	% of Commercial Lighting kWh Represented by Building Use from DOE	Weights by Building Use
Food Sales	3%	3%
Food Service	3%	3%
Health Care	7%	8%
Hotel/Motel	5%	6%
Laboratory	1%	1%
Nursing Home	1%	1%
Office	21%	24%
Public Assembly	4%	5%
Public Order/Safety	1%	1%
Public Services (non-food)	5%	6%
Religious Worship	2%	2%
Retail	20%	23%
Warehouse	13%	15%
Total	**84%**	**100%**

"Office" is the largest building use, followed closely by "retail." "Laboratory," "nursing home," and "public order/safety" represent the lowest percentage of commercial lighting kWh usage.

D.2.2 Industrial sector weights

No weights were required. The sources provided hours of operation specific to industrial facilities and did not break them out by building type. As a result, we did not need to find a weighted average for the industrial operating hours.

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[16] Navigant Consulting. *U.S. Lighting Market Characterization – Volume 1: National Lighting Inventory and Energy Consumption Estimate*. September 2002.

[17] Percentages adjusted to eliminate building uses that are not from the commercial sector.

D.2.3 School and Governments sector weights

For the schools & government sector, sources typically include building uses for "k-12 school," "college/university," and "office" but nothing resembling "school & government." We considered using a similar method as described for the commercial sector, but determined that a more accurate Wisconsin-specific approach was possible based on the data tracked in the WISeerts database.

We reviewed the WISeerts database to determine the percentage of Focus on Energy Schools & Government sector lighting savings which could be categorized as "k-12 school," "college/university," and "office." This involved categorizing projects based on the name of the institution. We assumed that any institution with "university" in the name is college/university. Likewise, "school" would indicate a k-12 school project and "city," "police," or "municipal" would likely indicate office space. We found some outliers (e.g., as "Potawatomi Bingo and Casino," city garages, or city warehouses), but these were a small minority. Table D-3 shows the results of this analysis.

Table D-3. Schools & Government Weighting by Building Use

Building Use	% of Commercial Lighting kWh Represented by Building Use
K-12 School	36%
College/University	41%
Office/Other	23%

We considered trying to adjust these factors to more heavily weight gymnasiums to account for the high percentage of energy savings which came from high bay lighting. However, we found that data for "schools" in general was much more readily available than that for gymnasiums. Also, the values for schools were generally very similar to those for gymnasiums and included gymnasium hours of use in their final estimate.

D.2.4 Agricultural sector weights

We were unable to find studies on lighting usage in the agricultural sector. Therefore, we looked through the existing engineering reviews of projects installed during Focus on Energy's 18-month Contract Period (18MCP). Because most lighting measures are deemed, we generally do not collect hours of use for these reviews. However, for this round of evaluation, KEMA engineers collected some self-reported hours of use data. As a result, we had six engineering reviews of lighting projects from the 18MCP that included hours of use. These projects represented 362 light fixtures of various types. This is a small sample but was the only data available to us. We do not report the specific weights due to potential confidentiality issues.

D.3 HOURS OF USE

For the commercial sector, we estimated hours of use from each source as shown below in Table D-4. This table shows the average values for each building use in the Average Hours column. These values are then weighted and combined to create the overall average.

Table D-4. Commercial Hours of Use by Source

Building Use	Weight	Average Hours	DOE[18]	PG&E 1996[19]	Conn Protocols[20]	PG&E RL[21]	SDG&E ToU[22]	SDG&E 2006[23]
Food Sales	3%	5,261	5,256	5,800	4,428	4,636	6,390	5,058
Food Service	3%	4,551	4,599	4,600	5,076	4,278	4,450	4,305
Health Car	8%	4,115	4,617	4,400	6,363		2,689	2,504
Hotel/Motel	6%	4,182			4,182			
Lab	1%	4,056			4,056			
Nursing Home	1%	3,748			3,748			
Office	24%	3,426	3,760	4,000	3,748	2,558	3,792	2,698
Public Assembly	5%	2,579	2,665		2,112			2,961
Public Order/Safety	1%	4,157	3,504		4,809			
Public Services (non-food)	6%	3,489	3,431	3,400	3,636			
Religious Worship	2%	1,890	1,825		1,955			
Retail	23%	3,936	4,258	4,450	4,213	1,621	5,435	3,640
Warehouse	15%	3,264	3,705	3,550	2,602		3,211	3,250
Total	**100%**	3,671						

The building uses with the largest variation between sources are health care and retail. The overall average commercial hours of use across all sources and all building uses is 3,671 hours/year.

For the schools & government sector, we calculated hours of use from each source as shown below in Table D-5.

[18] Navigant Consulting. *U.S. Lighting Market Characterization – Volume 1: National Lighting Inventory and Energy Consumption Estimate*. September 2002.

[19] Quantum Consulting. *Evaluation Of Pacific Gas & Electric Company's 1996 Commercial Energy Efficiency Incentives Program: Lighting Technologies.* March 1, 1998.

[20] Connecticut Light & Power and The United Illuminating Company. *CL&P and UI Program Savings Documentation for 2008 Program Year.* September 25, 2007.

[21] Quantec. *Evaluation of the 2004-2005 RightLights Program*. April 21, 2006.

[22] RLW Analytics. *SDG&E 2004-05 Express Efficiency Lighting Program Time of Use Study.* February 15, 2007.

[23] KEMA Services, Inc. *Small Business Super Saver Program Hours of Operation Study*. September 2006.

Table D-5. Schools & Government Hours of Use by Source

Building Type	Weight	Average	PG&E 1996	DOE Study	New England Schools[24]	SDG&E 2004-5	SDG&E 2006	Conn. Protocols
Office	23%	3,600	4,000	-	-	2,698	3,792	3,748
School	36%	2,308	2,150	-	2,147	2,795	1,795	2,187
College	41%	3,044	3,900	-	-	-	-	2,187
Overall Average	**100%**	2,902						

Table D-5 illustrates the considerable variation among both sources and building uses. College shows the greatest variation between sources, with values ranging from 2,187 to 5,010 hours/year. One might expect schools to show a high variation based on the policies of school districts in different states, but here we see a relatively tight range of values for schools, all falling within 35 percent of each-other.

Where sources listed only a single value for “education” or “schools” and no value for “college” or “university,” we included the value for schools and left the value for college blank. This is due to the higher hours of use typical of colleges, where some buildings are open for extended hours in a way that k-12 schools are not.

For the industrial sector, no weighting system was necessary as the sources generally included “industrial” as a building use. Table D-6 shows the values from each source and the sector average.

Table D-6. Industrial Hours of Use by Source

Study	Hours
DOE	5,054
PG&E Rightlights	3,562
SDG&E 2004-5	2,895
SDG&E 2006	5,512
Connecticut	4,114
Average	**4,227**

The values range from 2,895 to 5,512 hours/year with an average of 4,227 hours/year.

Proposed agriculture lighting hours of use are based on the weighted average of hours of use from projects in the 18MCP. The weights used were based on the number of fixtures installed. Table D-7 shows these results.

Table D-7. Agricultural Hours of Use

Sector	Hours
Agriculture	4,698

[24] RLW Analytics. *CT & MA Utilities 2004-2005 Lighting Hours of Use for School Buildings Baseline Study*. September 7, 2006.

In conclusion, we used the proposed hours of use values in Table D-8 to adjust the measure life estimates for lighting measures that are sensitive to hours of use.

Table D-8. Current and Proposed Lighting Hours of Use by Sector

Sector	Current Hours	Proposed Hours
Agriculture	4,368	4,698
Commercial	3,680	3,671
Industrial	4,576	4,227
Schools & Government	3,230	2,902

APPENDIX E: RECOMMENDED VALUES FOR CFL HOURS OF USE

Hours of use refers to the average annual hours that a measure will operate. In this section, we are specifically interested in the hours of use for CFLs in each sector. As currently deemed, the CFL ≤ 32 watts measure and the CFL reflector flood lamp measure have different hours of use from the values used for most other lighting measures. These are shown in Table E-1.

Table E-1. Existing CFL Hours of Use Values

Sector	Hours
Agriculture	3,490
Commercial	3,130
Industrial	6,100
Schools & Government CFL <= 32W	3,040
Schools & Government CFL Reflector <= 30W	3,230

To estimate new hours of use for the Agriculture and Commercial sectors, KEMA repeated the previous survey data analysis using data from the most recent rounds of impact evaluation. Since the measure life estimates will be used in the benefit cost analysis by sector, we determined the hours of use by sector.[25] We calculated the hours of use for the Commercial and Agricultural sectors from data collected during impact evaluation surveys conducted with Focus customers who installed low wattage CFLs over the last three rounds of impact evaluation[26]. In these evaluations, we asked customers to answer a series of questions relating to the operating hours of the new equipment. Using that data, KEMA calculated the weighted average of the Hours of Use. Table E-2 shows the results of the analysis.

[25] The *Focus on Energy Evaluation Business Programs: Deemed Savings Parameter Development* report proposes new lighting hours of use by building type for use in deemed savings calculations. The hours proposed in this appendix are used only to estimate measure life by sector.

[26] Data is from the last three rounds of impact evaluation that included CATI surveys.

Table E-2. CFL and Incandescent Hours of Use Based on Survey Analysis[27]

Sector	Period	Hours/ Year
Agriculture	FY04	1,856
	FY06	2,539
	18 MCP	2,902
Commercial	FY04	2,604
	FY06	3,552
	18 MCP	3,337
Overall	FY04	2,271
	FY06	3,170
	18 MCP	3,158

The table shows that the hours of use vary across years even within the same sector. The table also shows the reported hours of use have often increased over time.

Table E-3 shows the average hours of use for all program periods. The table shows that Channel lighting has the highest hours of use at 3,219 hours per year. The Agriculture sector has the lowest hours of use at 2,373 hours per year. These values represent one possible source for revising the CFL deemed hours of use.

Table E-3. Summary of CFL Hours of Use from Survey Analysis

Sector	Sample	Hours/ Year
Agriculture	92	2,537
Commercial	126	3,273
Overall	218	2,974

All other (non-CFL) lighting measures rebated by Focus share a single value for hours of use by sector. A proposed update to these values is included in Appendix D. These values represent another possible source for updating the CFL deemed savings measures.

We summarized the Hours of Use from several sources in

[27] Channel refers to the Commercial, Industrial, and Schools & Government sectors that were reported together in FY06.

Table E-4. These sources include a DOE study[28], an SCE Impact Evaluation[29], the impact evaluation survey analysis, and the Focus non-CFL measures.

[28] Navigant Consulting. *U.S. Lighting Market Characterization – Volume 1: National Lighting Inventory and Energy Consumption Estimate*. September 2002.

[29] Decision Sciences Research Associates, Inc. *1994 Commercial CFL Evaluation First Year Impact Evaluation Report*. February 1996.

Table E-4. CFL Hours of Use from Various Sources

Sector	DOE Study		SCE	Focus Survey Analysis	Focus Non-CFL
	Standard	Reflector			
Agriculture	-	-	-	2,537	4,698
Commercial	3,650	3,650	-	3,273	3,671
Industrial	5,220	4,198	-	-	4,227
Schools & Government	-	-	-	-	2,902
Average	4,435	3,924	3,345	2,962	3,875

The values for the Commercial sector are consistent across sources and lamp types with values that are approximately 3,650 hours/year. The Focus survey analysis suggests slightly lower values than the other sources for the Commercial sector (3,273 hours/year). The Industrial sector values show relative consistency between the reflector hours of use (4,198 hours/year) and those of the Non-CFL data (4,576 hours/year), but the data for standard CFLs provided by DOE is higher (5,220 hours/year). For the Schools & Government sector, the only value available is from the non-CFL lighting measures. For the Agriculture sector, the data from the Focus survey analysis is much lower (2,537 hours/year) than the non-CFL Focus lighting measures value (4,698 hours/year).

We recommend using the values from the Focus survey analysis for the Agriculture and Commercial sectors as they most represent the actual installations that are occurring through the Focus program. For the Industrial and Schools & Government sectors, we recommend using the non-CFL lighting hours.

In conclusion, we used the proposed hours of use values in Table E-5 to adjust the measure life estimates for CFL measures that are sensitive to hours of use.

Table E-5. Current and Proposed CFL Hours of Use by Sector

Sector	Current Hours	Proposed Hours
Agriculture	3,490	2,537
Commercial	3,130	3,273
Industrial	6,100	4,576
Schools & Government CFL <= 32W	3,040	3,230
Schools & Government CFL Reflector <= 30W	3,230	