Residential Equipment
Central Air Conditioner (CAC)

Description: Central Air Conditioners < 65 MBTu with SEER 14 and above
Baseline: Federal Standard 13 SEER *
Useful Life: 15 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{1}{\text{BASE}} - \frac{1}{\text{SEER}}\right) \text{ x CAP x CFLH x ADJ}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

BASE: baseline efficiency SEER 13.0
SEER: efficiency rating of new CAC (from application … range = 14.0 to 25.0)
CAP: capacity of new CAC in MBTu (from application … range = 8.0 to 65.0)
CFLH: 811 equivalent full load hours of cooling (calculated from Assessment)
ADJ: 0.8614 adjustment factor to convert Iowa average CDDs to Sioux City, IA CDDs
LF: 0.0859 load factor (based on Residential Base – Cooling load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = \$9.935 \text{ x } (\text{SEER} - \text{BASE}) \text{ x CAP}$$

Incentives:

SEER 14-14.9:	$150 per ton (CAP/ 12)
SEER 15-15.9:	$225 per ton (CAP / 12)
SEER 16 and above:	$300 per ton (CAP /12)
Incentive Cap:	N/A
Financing:	none

Simple Payback:

Payback Pre-Incentive:	33.26 yrs
Payback Post-Incentive:	3.77 yrs
Incentive/Cost Ratio:	89%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Residential Equipment
Window Air Conditioner

Description: ENERGY STAR Labeled Window Air Conditioners
Baseline: Federal Standard 9.8 EER *
Useful Life: 9 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{1}{\text{BASE}} - \frac{1}{\text{EER}}\right) \text{ x CAP x CFLH x ADJ}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

BASE: from ENERGY STAR website
EER: efficiency rating of new unit (from rebate application … range = 10.0 to 12.0)
CAP: capacity of new unit in MBTu (from rebate application … range = 8.0 to 14.0)
CFLH: 243 equivalent full load hours of cooling (calculated from Assessment)
ADJ: 0.8614 adjustment factor to convert from Iowa average CDDs to Sioux City, IA CDDs
LF: 0.0859 load factor (based on Residential Base – Cooling load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = \$3.468 \text{ x } (\text{EER} - \text{BASE}) \text{ x CAP}$$

Incentives:

All Units: $40 per unit
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 20.97 yrs
Payback Post-Incentive: 0.52 yrs
Incentive/Cost Ratio: 98%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

Description: Clarification of measure description
Savings Algorithm: Clarification of BASE calculation

Residential Equipment
Furnace

Description: High Efficiency Furnace < 250 MBTu with AFUE 95% and above
Baseline: Federal Standard Efficiency Furnace < 250 MBTu with 78% AFUE *
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual Therms} = \left(\frac{1}{\text{BASE}} - \frac{1}{\text{AFUE}}\right) \text{ x CAP x HF x ADJ}$$

$$\text{Peak Therms} = \text{ Annual Therms x } \frac{1}{365} \div \text{LF}$$

BASE: baseline efficiency 0.8000 AFUE
AFUE: efficiency rating of new unit (from application … range = 0.9500 to 0.9800)
CAP: capacity of new unit in MBTu (from application)
HFLH: 9.165 heating factor (calculated from Assessment)
ADJ: 1.2113 adjustment factor to convert from Iowa average HDDs to Sioux Falls, IA HDDs
LF: 0.2107 load factor (based on Residential – Heating load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = \$300.00 + (\$297.00 \text{ x } (\text{AFUE} - 0.9000) \text{ x CAP})$$

Incentives:

AFUE 0.950 and above: ~~$400~~ $300
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 10.32 yrs
Payback Post-Incentive: 7.50 yrs
Incentive/Cost Ratio: 27%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

New measure

Reasons for Revisions (03/31/2015):

Incentives: Revised incentive per SD PUC effective 1/1/2015

Residential Equipment
Furnace Fan (Furnace < 250 MBTu)

Description: ECM Motor – Gas Furnace < 250 MBTu
Baseline: Standard Motor *
Useful Life: 15 Years *

Savings Algorithm *:

Annual kWh = 469.05

Peak kW = 0

Incremental Cost Algorithm *:

Incremental Cost = $200

Incentives:

All Units: $50 per unit
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 5.26 yrs
Payback Post-Incentive: 3.94 yrs
Incentive/Cost Ratio: 25%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  Furnace fans must be installed in furnaces < 250 MBTu and must achieve a CEE air handling ratio <= 0.02.

Reasons for Revisions (01/01/2014):

Comments: Clarification of measure requirements

Reasons for Revisions (01/01/2015):

Description: Clarification of measure description
Comments: Clarification of measure requirements

Residential Equipment
Air Source Heat Pump (ASHP)

Description: Air Source Heat Pump < 65 MBTu with SEER >= 14 or HSPF >= 8
Baseline: Federal Standard Air Source Heat Pump with 13 SEER and 7.7 HSPF *
Useful Life: 18 Years *

Savings Algorithm *:

$$\text{Cooling kWh} = \left(\frac{1}{\text{SEER(base)}} - \frac{1}{\text{SEER(act)}}\right) \text{ x CAP x CFLH x ADJ(cool)}$$

$$\text{Heating kWh} = \left(\frac{1}{\text{HSPF(base)}} - \frac{1}{\text{HSPF(act)}}\right) \text{ x CAP x HFLH x ADJ(heat)}$$

$$\text{Annual kWh} = \text{Cooling kWh} + \text{Heating kWh}$$

$$\text{Peak kW} = \text{ Cooling kWh x } \frac{1}{8760} \div \text{LF}$$

SEER(base): baseline efficiency SEER 13.0
SEER(act): cooling efficiency rating of new ASHP (from rebate application … range = 14.0 to 25.0)
HSPF(base): baseline efficiency HSPF 7.7
HSPF(act): heating efficiency rating of new ASHP (from rebate application … range = 8.0 to 11.0)
ADJ(cool): 0.8614 adjustment factor to convert from Iowa average CDDs to Sioux City, IA CDDs
ADJ(heat): 1.0787 adjustment factor to convert from Iowa average HDDs to Sioux City, IA HDDs
CFLH: 794 equivalent full load hours of cooling (calculated from Assessment)
HFLH: 2,282 equivalent full load hours of heating (calculated from Assessment)
CAP: capacity of cooling system in MBTu (from rebate application … range = 8.0 to 65.0)
LF: 0.0712 load factor (based on Residential Heat – Cooling load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = (\$9.935 \text{ x } (\text{SEER(act)} - \text{SEER(base)}) \text{ x CAP}) + (\$3.409 \text{ x } (\text{HSPF(act)} - \text{HSPF(base)}) \text{ x CAP})$$

Incentives:

SEER 14-14.9:	$150 per ton (CAP /12)
SEER 15-15.9:	$225 per ton (CAP/ 12)
SEER 16 and above:	$300 per ton (CAP / 12)
HSPF 8-8.9:	$7.50 per ton additional to SEER rebate
HSPF 9 and above:	$15.00 per ton additional to SEER rebate
Incentive Cap:	N/A
Financing:	none

Simple Payback:

Payback Pre-Incentive:	11.66 yrs
Payback Post-Incentive:	2.86 yrs
Incentive/Cost Ratio:	75%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Residential Equipment
Ground Source Heat Pump (GSHP)

Description: Ground Source Heat Pump < 65 MBTu with EER >= 14 or COP >= 3
Baseline: Federal Standard Ground Source Heat Pump with 11.18 Equivalent EER and 2.26 Equivalent COP *
Useful Life: 18 Years *

Savings Algorithm *:

$$\text{Cooling kWh} = \left(\frac{1}{\text{EER(base)}} - \frac{1}{\text{EER(act)}}\right) \text{ x CAP x CFLH x ADJ(cool)}$$

$$\text{Heating kWh} = \text{ BACKUP} + \left(\frac{1}{\text{COP(base)}} - \frac{1}{\text{COP(act)}}\right) \text{ x CAP x HFLH x ADJ(heat)}$$

$$\text{Annual kWh} = \text{Cooling kWh} + \text{Heating kWh}$$

$$\text{Peak kW} = \text{ Cooling kWh x } \frac{1}{8760} \div \text{LF}$$

EER(base): baseline efficiency EER 11.18
EER(act): cooling efficiency rating of new GSHP (from rebate application … range = 14.0 to 40.0)
COP(base): baseline efficiency COP 2.26
COP(act): heating efficiency rating of new ASHP (from rebate application … range = 3.0 to 6.0)
CFLH: 659 equivalent full load hours of cooling (calculated from Assessment)
HFLH: 669 equivalent full load hours of heating (calculated from Assessment)
ADJ(cool): 0.8614 adjustment factor to convert from Iowa average CDDs to Sioux City, IA CDDs
ADJ(heat): 1.0787 adjustment factor to convert from Iowa average HDDs to Sioux City, IA HDDs
CAP: capacity of cooling system in MBTu (from rebate application … range = 8.0 to 65.0)
BACKUP: 5,360.61 kWh savings due to not needing backup heating capability from an ASHP
LF: 0.0712 load factor (based on Residential Heat – Cooling load shape)

Incremental Cost Algorithm *:

Incremental Cost = ($0.6262 x (Annual kWh – BACKUP)) + $7,209.68

Incentives:

EER 14-17.9:	$1,200
EER 18-22.9:	$1,800
EER 23 and above:	$2,400
COP 3-3.9:	$200 additional to EER rebate
COP 4-4.9:	$400 additional to EER rebate
COP 5 and above:	$600 additional to EER rebate
Incentive Cap:	N/A
Financing:	none

Simple Payback:

Payback Pre-Incentive:	20.31 yrs	
Payback Post-Incentive:	4.67 yrs	(includes state and federal tax incentives)
Incentive/Cost Ratio:	77%	(includes state and federal tax incentives)

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

New measure

Residential Equipment
Programmable Thermostat – Gas Heat

Description: Programmable Thermostat – Gas Heat
Baseline: Standard Thermostat – Gas Heat
Useful Life: 15 Years *

Savings Algorithm *:

Annual Therms = 21.12 x ADJ

Peak Therms = Annual Therms x $\frac{1}{365} \div$ LF

ADJ: 1.2113 adjustment factor to convert from Iowa average HDDs to Sioux Falls, SD HDDs
LF: 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm *:

Incremental Cost = $33.29

Incentives:

All Installations: $25 per thermostat
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 0.98 yrs
Payback Post-Incentive: 0.24 yrs
Incentive/Cost Ratio: 75%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  This measure is available to customers taking gas service only from MidAmerican.

  Non-energy benefits of $13.01 to $15.52 per customer are assumed for cost-effectiveness purposes. These benefits approximate avoided electric costs per programmable thermostat based on results from the Programmable Thermostat – Gas Heat + Electric Cooling measure and adjusted for climate differences between Sioux Falls, SD and Sioux City, IA.

Residential Equipment
Programmable Thermostat – Gas Heat + Electric Cooling

Description: Programmable Thermostat – Gas Heat + Electric Cooling
Baseline: Standard Thermostat – Gas Heat + Electric Cooling
Useful Life: 15 Years *

Savings Algorithm *:

Annual kWh = 80.14 x ADJ(cool)

Annual Therms = 21.12 x ADJ(heat)

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF(elec)}$$

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF(gas)}$$

ADJ(cool): 0.8614 adjustment factor to convert from Iowa average CDDs to Sioux City, IA CDDs
ADJ(heat): 1.0787 adjustment factor to convert from Iowa average HDDs to Sioux City, IA HDDs
LF(elec): 0.0859 load factor (based on Residential Base – Cooling load shape)
LF(gas): 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm *:

Incremental Cost = $33.29

Incentives:

All Installations: $25 per thermostat
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 1.42 yrs
Payback Post-Incentive: 0.35 yrs
Incentive/Cost Ratio: 75%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is available to customers taking gas and electric service from MidAmerican that use gas for heating and electricity for cooling.

Residential Equipment
Clothes Washer – Electric Water Heat and Electric Dry

~~Description: ENERGY STAR labeled High Efficiency Clothes Washer~~
~~Baseline: Standard Clothes Washer with MEF 1.26 and Water Factor 9.0 (federal standard)~~
~~Useful Life: 11 Years *~~

~~Savings Algorithm *:~~

~~$$\text{Annual kWh} = \left(\frac{1}{\text{MEF(base)}} - \frac{1}{\text{MEF(act)}}\right) \times \text{CAP} \times \text{LOADS}$$~~

~~$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF(elec)}$$~~

~~MEF(base): Baseline Modified Energy Factor 1.26~~
~~MEF(act): Modified Energy Factor of new clothes washer (from application … range = 1.72 to 4.00)~~
~~CAP: Cubic foot volume of clothes washer (from application … range = 1.00 to 5.00)~~
~~LOADS: 394 annual washing loads (calculated from Assessment)~~
~~LF: 0.9561 load factor (based on Residential Base – Baseload load shape)~~

~~Incremental Cost Algorithm *:~~

~~Incremental Cost = $130.81 x (MEF(act) – MEF(base)) x CAP~~

~~Incentives:~~

~~All Installations: $300 per unit~~
~~Incentive Cap: N/A~~
~~Financing: none~~

~~Simple Payback:~~

~~Payback Pre-Incentive: 7.18 yrs~~
~~Payback Post-Incentive: 2.78 yrs~~
~~Incentive/Cost Ratio: 61%~~

~~Comments:~~

~~* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.~~

~~This measure is available to customers taking electric service from MidAmerican and who use electricity for both water heating and clothes drying.~~

~~Non-energy benefits of $0.00484/gallon of annual water savings are assumed for cost-effectiveness purposes, which is the average incremental water and sewer rate for Dakota Dunes and North Sioux City.~~

~~Reasons for Revisions (01/01/2014): Description: Clarification of measure description~~

Reasons for Revisions (01/01/2016): Measure no longer available as a result of Federal standard change.

Residential Audit
Single Family Audit

Description: Single Family Audit
Baseline: N/A
Useful Life: N/A

Savings Algorithm:

No savings are associated with this measure.

Incremental Cost Algorithm:

Contract cost associated with conducting an audit.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: N/A
Payback Post-Incentive: N/A
Incentive/Cost Ratio: 100%

Comments:

Audits are available to all customers in single family homes where the homes are at least ten years old.

Audits are limited to one per customer during the plan period.

Residential Audit
Multifamily Audit

Description: Multifamily Audit
Baseline: N/A
Useful Life: N/A

Savings Algorithm:

No savings are associated with this measure.

Incremental Cost Algorithm:

Contract cost associated with conducting an audit.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: N/A
Payback Post-Incentive: N/A
Incentive/Cost Ratio: 100%

Comments:

Multifamily audits are available in all multifamily buildings in MidAmerican's service territory. Multifamily buildings generally are defined as four or more units or three or more stories, including apartments and condominiums.

Audits are limited to one per customer during the plan period.

Residential Audit
Hot Water Pipe Insulation – Single Family Electric

Description: Hot Water Pipe Insulation (R-4) – Single Family Electric
Baseline: No Hot Water Pipe Insulation
Useful Life: 13 Years *

Savings Algorithm *:

Annual kWh = 11.52 x FT

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

FT: Linear feet of insulation installed (from audit report … range = 1.0 to 6.0)
LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 1.14 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  This measure is a direct install measure available in a single family audit.

Residential Audit
Hot Water Pipe Insulation – Single Family Gas

Description: Hot Water Pipe Insulation (R-4) – Single Family Gas
Baseline: No Hot Water Pipe Insulation
Useful Life: 13 Years *

Savings Algorithm *:

Annual Therms $= 0.52$ x FT

Peak Therms $=$ Annual Therms x $\frac{1}{365} \div$ LF

FT: Linear feet of insulation installed (from audit report … range = 1.0 to 6.0)
LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	2.32 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  This measure is a direct install measure available in a single family audit.

Residential Audit
Faucet Aerator – Single Family Electric

Description: Low Flow Aerator (1.5 gpm) - Single Family Electric
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual kWh = 46.60

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.56 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a single family audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on the ratio of kWh savings to water savings for low-flow showerheads) at $0.00484 per gallon, which equals $7.41 per aerator per year.

Residential Audit
Faucet Aerator – Single Family Gas

Description: Low Flow Aerator (1.5 gpm) - Single Family Gas
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 2.16

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.40 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a single family audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on the ratio of kWh savings to water savings for low-flow showerheads) at $0.00859 per gallon, which equals $13.14 per aerator per year.

Residential Audit
Kitchen Aerator – Single Family Electric

Description: Low Flow Aerator (1.5 gpm) - Single Family Electric
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual kWh = 46.60

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: ---- yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a single family audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on the ratio of kWh savings to water savings for low-flow showerheads) at $0.00484 per gallon, which equals $7.41 per aerator per year.

Residential Audit
Kitchen Aerator – Single Family Gas

Description: Low Flow Aerator (1.5 gpm) - Single Family Gas
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 2.16

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 0.44 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a single family audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on the ratio of kWh savings to water savings for low-flow showerheads) at $0.00859 per gallon, which equals $13.14 per aerator per year.

Residential Audit
Low Flow Showerhead – Single Family Electric

Description: Low Flow Showerhead (1.5 gpm) - Single Family Electric
Baseline: Standard Showerhead (2.5 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual kWh = 222.13

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.19 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a single family audit.

Non-energy related benefits are included associated with saving 7,300 gallons of water per year (20 minutes per day x 365 days x 1 gpm) at $0.00484 per gallon, which equals $35.33 per showerhead per year.

Residential Audit
Low Flow Showerhead – Single Family Gas

Description: Low Flow Showerhead (1.5 gpm) - Single Family Gas
Baseline: Standard Showerhead (2.5 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 10.30

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 0.14 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a single family audit.

Non-energy related benefits are included associated with saving 7,300 gallons of water per year (20 minutes per day x 365 days x 1 gpm) at $0.00859 per gallon, which equals $62.71 per showerhead per year.

Residential Audit
Water Heater Blanket – Single Family Gas

Reasons for Revisions (01/01/2014):

Measure removed

Residential Audit
Faucet Aerator – Multifamily Gas

Description: Low Flow Aerator (1.5 gpm) - Multifamily Gas
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 2.07

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.22 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multifamily audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on water savings from the single family measure) at $0.00829 per gallon, which equals $12.68 per aerator per year.

Residential Audit
Faucet Aerator – Multifamily Electric

Description: Low Flow Aerator (1.5 gpm) - Electric
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual kWh = 43.08

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 0.32 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multi-family assessment.

Non-energy related benefits are included associated with saving 1,020 gallons of water per year at $0.00688 per gallon, which equals $7.02 per aerator per year.

Reasons for Revisions (01/01/2014):

New measure

Residential Audit
Kitchen Aerator – Multifamily Gas

Description: Low Flow Aerator (1.5 gpm) - Multifamily Gas
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 2.07

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 0.35 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multifamily audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on water savings from the single family measure) at $0.00829 per gallon, which equals $12.68 per aerator per year.

Residential Audit
Kitchen Aerator – Multifamily Electric

Description: Low Flow Aerator (1.5 gpm) - Electric
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual kWh = 43.08

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.50 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multi-family assessment.

Non-energy related benefits are included associated with saving 1,020 gallons of water per year at $0.00688 per gallon, which equals $7.02 per aerator per year.

Reasons for Revisions (01/01/2014):

New measure

Residential Audit
Low Flow Showerhead – Multifamily Gas

Description: Low Flow Showerhead (1.5 gpm) - Multifamily Gas
Baseline: Standard Showerhead (2.5 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 14.82

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.21 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multifamily audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on water savings from the single family measure) at $0.00829 per gallon, which equals $60.52 per aerator per year.

Residential Audit
Low Flow Showerhead – Multifamily Electric

Description: Low Flow Showerhead (1.5 gpm) - Electric
Baseline: Standard Showerhead (2.5 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual kWh = 308.05

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 0.22 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multi-family assessment.

Non-energy related benefits are included associated with saving 7,300 gallons of water per year (20 minutes per day x 365 days x 1 gpm) at $0.00688 per gallon, which equals $50.22 per showerhead per year.

Reasons for Revisions (01/01/2014):

New measure

Residential Audit
Hot Water Pipe Insulation – Multifamily Gas

Description: Hot Water Pipe Insulation (R-4) – Multifamily Gas
Baseline: No Hot Water Pipe Insulation
Useful Life: 13 Years *

Savings Algorithm *:

Annual Therms = 0.52 x FT

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

FT: Linear feet of insulation installed (from audit report … range =1.0 to 6.0)
LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 2.32 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  This measure is a direct install measure available in a multifamily audit.

Residential Audit
Programmable Thermostat – Gas Heat

Description: Programmable Thermostat – Gas Heat
Baseline: Standard Thermostat – Gas Heat
Useful Life: 15 Years *

Savings Algorithm *:

Annual Therms = 21.12 x ADJ

Peak Therms = Annual Therms x $\frac{1}{365}$ ÷ LF

ADJ: 1.2113 adjustment factor to convert from Iowa average HDDs to Sioux Falls, SD HDDs
LF: 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 3.15 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  This measure is a direct install measure available in a single family audit to customers taking gas service only from MidAmerican.

  Non-energy benefits of $13.01 to$15.52 per customer are assumed for cost-effectiveness purposes. These benefits approximate avoided electric costs per programmable thermostat based on results from the Programmable Thermostat – Gas Heat + Electric Cooling measure and adjusted for climate differences between Sioux Falls, SD and Sioux City, IA.

Residential Audit
Programmable Thermostat – Gas Heat + Electric Cooling

Description: Programmable Thermostat – Gas Heat + Electric Cooling
Baseline: Standard Thermostat – Gas Heat + Electric Cooling
Useful Life: 15 Years *

Savings Algorithm *:

Annual kWh = 80.14 x ADJ(cool)

Annual Therms = 21.12 x ADJ(heat)

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF(elec)}$$

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF(gas)}$$

ADJ(cool): 0.8614 adjustment factor to convert from Iowa average CDDs to Sioux City, IA CDDs
ADJ(heat): 1.0787 adjustment factor to convert from Iowa average HDDs to Sioux City, IA HDDs
LF(elec): 0.0859 load factor (based on Residential Base – Cooling load shape)
LF(gas): 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 4.61 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  This measure is a direct install measure available in a single family audit to customers taking gas and electric service from MidAmerican who use gas for heating and electricity for cooling.

Residential Audit
Attic Insulation – Gas Heat

Description: Attic Insulation with Enhanced R-Value – Gas Heat
Baseline: Existing R-Value
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual Therms} = \left(\frac{1}{\text{RVAL(base)}} - \frac{1}{\text{RVAL(new)}}\right) \text{ x HDD x K(gas)x SQFT}$$

$$\text{Peak Therms} = \text{ Annual Therms x } \frac{1}{365} \div \text{LF(gas)}$$

RVAL(base): R-Value of existing insulation (from application … range = 3 to 24)
RVAL(new)*: R-Value of new insulation (from application … range = 49 to 70)
HDD: 7,706 normal heating degree days for Sioux Falls, SD
K(gas): 0.0002794 therm savings per HDD per square foot (calculated from Assessment)
SQFT: Total square feet of new insulation (from application … range = 50 to 12,000)
LF(gas): 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm *:

Total cost of insulation

Incentives:

All Installations: 60% of total cost
Incentive Cap: $1,000
Financing: none

Simple Payback:

Payback Pre-Incentive:	10.03 yrs
Payback Post-Incentive:	4.24 yrs
Incentive/Cost Ratio:	58%

Comments:

* Useful life and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is available as a follow up measure to a single family or multifamily audit to customers taking gas service only from MidAmerican.

Non-energy benefits of $17.38 to $20.74 per customer are assumed for cost-effectiveness purposes. These benefits approximate avoided electric costs per insulation installation based on results from the Attic Insulation – Gas Heat + Electric Cooling measure and adjusted for climate differences between Sioux Falls, SD and Sioux City, IA.

Maximum recommended and rebated RVAL(new) is 49. Values exceeding this maximum are recorded but not used in rebate determination.

Low-pitched roofs may only be able to meet R-38 in ceiling

1.5 story homes may only be able to meet R-24 in ceiling

Residential Audit
Attic Insulation – Electric Heating

Description: Attic Insulation with Enhanced R-Value – Electric Heating
Baseline: Existing R-Value
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{1}{\text{RVAL(base)}} - \frac{1}{\text{RVAL(new)}}\right) \text{ x HDD x K(elec)x SQFT}$$

$$\text{Peak kW} = 0$$

RVAL(base): R-Value of existing insulation (from application … range = 3 to 24)
RVAL(new): R-Value of new insulation (from application … range = 49 to 70)
HDD: 6,863 normal heating degree days for Sioux City, IA
K(elec): 0.0065503 kWh savings per HDD per square foot (calculated from Assessment)
SQFT: Total square feet of new insulation (from application … range = 50 to 12,000)

Incremental Cost Algorithm *:

Total cost of insulation

Incentives:

All Installations: 60% of total cost of lower of estimated or actual cost, maximum $1,000
Incentive Cap: $1,000
Financing: none

Simple Payback:

Payback Pre-Incentive: 6.43 yrs
Payback Post-Incentive: 2.57 yrs
Incentive/Cost Ratio: 60%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  This measure is available as a follow up measure to a single family or multifamily audit to customers taking electric service from MidAmerican.

  Low-pitched roofs may only be able to meet R-38 in ceiling

  1.5 story homes may only be able to meet R-24 in ceiling

  R-49 used to calculate energy savings

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of savings calculation

Residential Assessment
Attic Insulation – Electric Heat + Electric Cooling

Description: Attic Insulation with Enhanced R-Value – Electric Heat + Electric Cooling
Baseline: Existing R-Value
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left[\left(\frac{1}{\text{RVAL(base)}} - \frac{1}{\text{RVAL(new)}}\right) \text{ x HDD x K(elec)x SQFT}\right] + \left[\left(\frac{1}{\text{RVAL(base)}} - \frac{1}{\text{RVAL(new)}}\right) \text{ x CDD x K(elec)x SQFT }\right]$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF(elec) (based on cooling kWh only)}$$

RVAL(base): R-Value of existing insulation (from application … range = 3 to 24)
RVAL(new): R-Value of new insulation (from application … range = 49 to 70)
DD: 7,372 normal degree days for Iowa (system-wide weighted average for HDDs and CDDs combined)
K(elec): 0.0029941 kWh savings per DD per square foot (calculated from Assessment)
SQFT: Total square feet of new insulation (from application … range = 50 to 12,000)
LF(elec): 0.4653 load factor (based on Residential Heat – Cooling + Heating load shape)

Incremental Cost Algorithm:

CDD: 870 normal cooling degree days for Sioux City, IA
K(elec): 0.0023011 kWh savings per CDD per square foot (calculated from Assessment)
LF(elec): 0.0859 load factor (based on Residential Base – Cooling load shape)

Incentives:

All Installations: 60% of total cost
Incentive Cap: $1,000
Financing: none

Simple Payback:

Payback Pre-Incentive:	6.43 yrs
Payback Post-Incentive:	2.57 yrs
Incentive/Cost Ratio:	60%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  This measure is available as a follow up measure to a single family assessment to customers taking electric service from MidAmerican.

* R-49 used to calculate energy savings

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of savings calculation

Residential Audit
Attic Insulation – Gas Heat + Electric Cooling

Description: Attic Insulation with Enhanced R-Value – Gas Heat + Electric Cooling
Baseline: Existing R-Value
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{1}{\text{RVAL(base)}} - \frac{1}{\text{RVAL(new)}}\right) \text{ x CDD x K(elec)x SQFT}$$

$$\text{Annual Therms} = \left(\frac{1}{\text{RVAL(base)}} - \frac{1}{\text{RVAL(new)}}\right) \text{ x HDD x K(gas)x SQFT}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF(elec)}$$

$$\text{Peak Therms} = \text{ Annual Therms x } \frac{1}{365} \div \text{LF(gas)}$$

RVAL(base): R-Value of existing insulation (from application … range = 3 to 24)
RVAL(new): R-Value of new insulation (from application … range = 49 to 70)
CDD: 870 normal cooling degree days for Sioux City, IA
HDD: 6,863 normal heating degree days for Sioux City, IA
K(elec): 0.0023011 kWh savings per CDD per square foot (calculated from Assessment)
K(gas): 0.0002794 therm savings per HDD per square foot (calculated from Assessment)
SQFT: Total square feet of new insulation (from application … range = 50 to 12,000)
LF(elec): 0.0859 load factor (based on Residential Base – Cooling load shape)
LF(gas): 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm *:

Total cost of insulation

Incentives:

All Installations: 60% of total cost
Incentive Cap: $1,000
Financing: none

Simple Payback:

Payback Pre-Incentive:	12.71 yrs
Payback Post-Incentive:	5.08 yrs
Incentive/Cost Ratio:	60%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is available as a follow up measure to a single family or multifamily audit to customers taking gas and electric service from MidAmerican.

Low-pitched roofs may only be able to meet R-38 in ceiling

1.5 story homes may only be able to meet R-24 in ceiling

R-49 used to calculate energy savings

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of savings calculation

Residential Audit
Wall Insulation – Gas Heat

Description: Wall Insulation with Enhanced R-Value – Gas Heat
Baseline: Existing R-Value
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual Therms} = \left(\frac{1}{\text{RVAL(base)} + \text{EXIST}} - \frac{1}{\text{RVAL(new)} + \text{EXIST}}\right) \text{ x HDD x K(gas)x SQFT}$$

$$\text{Peak Therms} = \text{ Annual Therms x } \frac{1}{365} \div \text{LF(gas)}$$

RVAL(base): R-Value of existing insulation (from application … range = 0 to 19)
RVAL(new): R-Value of new insulation (from application … range = 10 to 25)
EXIST: 3.64 assumed R-Value of existing structural components
HDD: 7,706 normal heating degree days for Sioux Falls, SD
K(gas): 0.0001864 therm savings per HDD per square foot (calculated from Assessment)
SQFT: Total square feet of new insulation (from application … range = 50 to 6,000)
LF(gas): 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm *:

Total cost of insulation

Incentives:

All Installations: 30% of total cost
Incentive Cap: $1,000
Financing: none

Simple Payback:

Payback Pre-Incentive: 5.60 yrs
Payback Post-Incentive: 3.93 yrs
Incentive/Cost Ratio: 30%

Comments:

* Useful life and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is available as a follow up measure to a single family or multifamily audit to customers taking gas service only from MidAmerican.

Non-energy benefits of $33.14 to $39.54 per customer are assumed for cost-effectiveness purposes. These benefits approximate avoided electric costs per insulation installation based on results from the Wall Insulation – Gas Heat + Electric Cooling measure and adjusted for climate differences between Sioux Falls, SD and Sioux City, IA.

Residential Audit
Wall Insulation – Gas Heat + Electric Cooling

Description: Wall Insulation with Enhanced R-Value – Gas Heat + Electric Cooling
Baseline: Existing R-Value
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{1}{\text{RVAL(base)} + \text{EXIST}} - \frac{1}{\text{RVAL(new)} + \text{EXIST}}\right) \text{ x CDD x K(elec)x SQFT}$$

$$\text{Annual Therms} = \left(\frac{1}{\text{RVAL(base)} + \text{EXIST}} - \frac{1}{\text{RVAL(new)} + \text{EXIST}}\right) \text{ x HDD x K(gas)x SQFT}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF(elec)}$$

$$\text{Peak Therms} = \text{ Annual Therms x } \frac{1}{365} \div \text{LF(gas)}$$

RVAL(base): R-Value of existing insulation (from application … range = 0 to 19)
RVAL(new): R-Value of new insulation (from application … range = 10 to 25)
EXIST: 3.64 assumed R-Value of existing structural components
CDD: 870 normal cooling degree days for Sioux City, IA
HDD: 6,863 normal heating degree days for Sioux City, IA
K(elec): 0.0015354 kWh savings per CDD per square foot (calculated from Assessment)
K(gas): 0.0001864 therm savings per HDD per square foot (calculated from Assessment)
SQFT: Total square feet of new insulation (from application … range = 80 to 6,000)
LF(elec): 0.0859 load factor (based on Residential Base – Cooling load shape)
LF(gas): 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm *:

Total cost of insulation

Incentives:

All Installations: 30% of total cost
Incentive Cap: $1,000
Financing: none

Simple Payback:

Payback Pre-Incentive: 4.20 yrs
Payback Post-Incentive: 2.94 yrs
Incentive/Cost Ratio: 30%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is available as a follow up measure to a single family or multifamily audit to customers taking gas and electric service from MidAmerican.

Residential Audit
Rim/Band/Joist Insulation – Gas Heat

Description: R/B/J Insulation with Enhanced R-Value – Gas Heat
Baseline: No R/B/J Insulation
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual Therms} = \left(\frac{\text{RVAL(new)}}{10}\right) \text{ x HDD x K(gas)x LIN}$$

$$\text{Peak Therms} = \text{ Annual Therms x } \frac{1}{365} \div \text{LF(gas)}$$

RVAL(new): R-Value of new insulation (from application … range = 15 to 30)
HDD: 7,706 normal heating degree days for Sioux Falls, SD
K(gas): 0.0000170 therm savings per HDD per square foot (calculated from Assessment – R-10 assumed)
LIN: Total linear feet of new insulation (from application … range = 5 to 500)
LF(gas): 0.2107 load factor (based on Residential Heating load shape)

Incremental Cost Algorithm *:

Total cost of insulation

Incentives:

All Installations: $0.30 x LIN
Incentive Cap: 75% of total cost
Financing: none

Simple Payback:

Payback Pre-Incentive: 5.78 yrs
Payback Post-Incentive: 4.26 yrs
Incentive/Cost Ratio: 26%

Comments:

* Useful life and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is available as a follow up measure to a single family or multifamily audit to customers taking gas service only from MidAmerican.

Residential Load Management
Curtailment Event

Description: Residential Load Curtailment
Baseline: Normal Residential Load
Useful Life: 1 Year

Savings Algorithm:

kWh and Peak kW savings per curtailment event will be determined through MidAmerican's statistical model of normal residential loads on typical peak day afternoons. Estimation of curtailment savings will include consideration of average temperatures from 2 p.m. through 7 p.m. of the curtailment day.

Incremental Cost Algorithm:

N/A

Incentives:

$40 per summer for first year participants
$30 per summer for all other participants

Simple Payback:

N/A

Comments:

Residential Appliance Recycling
Refrigerators

Description: Removal of Secondary Refrigerator/Freezer Combo
Baseline: Existing Non-Efficient Refrigerator/Freezer Combo *
Useful Life: 5 Years *

Savings Algorithm:

$$\text{Annual kWh} = \text{UEC x PART}$$

$$\text{Peak kW} = \text{Annual kWh x } \frac{1}{8760} \div \text{LF}$$

UEC: annual energy consumption of the individual refrigerator being recycled
PART: portion of the year the unit would have operated if not recycled through this program
LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

UEC for each unit will be determined by the appliance recycling contractor on a case by case basis and will consider the following characteristics:

- Age (in years, or year of manufacture)
- Size (in cubic feet)
- Configuration (top freezer, bottom freezer, side-by-side, or single door)

Incremental Cost Algorithm:

Incremental Cost = cost of removal specified in the appliance recycling contractors contract.

Incentives:

Incremental cost (payable to the recycling contractor) plus $50 (payable to the customer).

Simple Payback:

	First Unit	Second Unit
Payback Pre-Incentive:	1.58 yrs	1.32 yrs
Payback Post-Incentive:	instant	instant
Incentive/Cost Ratio:	141%	149%

Comments:

* Baseline and useful life is taken from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Residential Appliance Recycling
Freezers

Description: Removal of Secondary Stand-Alone Freezer
Baseline: Existing Non-Efficient Secondary Stand-Alone Freezer *
Useful Life: 5 Years *

Savings Algorithm:

$$\text{Annual kWh} = \text{UEC x PART}$$

$$\text{Peak kW} = \text{Annual kWh x } \frac{1}{8760} \div \text{LF}$$

UEC: annual energy consumption of the individual freezer being recycled
PART: portion of the year the unit would have operated if not recycled through this program
LF: 0.9561 load factor (based on Residential Base – Baseload load shape)

UEC for each unit will be determined by the appliance recycling contractor on a case by case basis and will consider the following characteristics:

- Age (in years, or year of manufacture)
- Size (in cubic feet)
- Configuration (chest, upright)

Incremental Cost Algorithm:

Incremental Cost = cost of removal specified in the appliance recycling contractors contract.

Incentives:

Incremental cost (payable to the recycling contractor) plus $50 (payable to the customer).

Simple Payback:

	First Unit	Second Unit
Payback Pre-Incentive:	1.96 yrs	1.66 yrs
Payback Post-Incentive:	instant	instant
Incentive/Cost Ratio:	141%	149%

Comments:

* Baseline and useful life is taken from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Residential Appliance Recycling
Window Air Conditioners

Description: Removal of Secondary Window Air Conditioner
Baseline: Existing Secondary Non-Efficient Window Air Conditioner *
Useful Life: 3 Years *

Savings Algorithm:

Annual kWh = UEC x PART x ADJ

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

UEC: annual energy consumption of the individual window air conditioner being recycled
PART: portion of the year the unit would have operated if not recycled through this program
ADJ: 0.8614 adjustment factor to convert Iowa average CDDs to Sioux City, IA CDDs
LF: 0.0859 load factor (based on Residential Base – Cooling load shape)

UEC for each unit will be determined by the appliance recycling contractor on a case by case basis and will consider the following characteristics:

- Age (in years, or year of manufacture)
- Capacity (in MBTu)
- Efficiency rating (EER)

Incremental Cost Algorithm:

Incremental Cost = cost of removal specified in the appliance recycling contractors contract.

Incentives:

Incremental cost (payable to the recycling contractor) plus $25 (payable to the customer).

Simple Payback:

	All Units
Payback Pre-Incentive:	1.37 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	167%

Comments:

* Baseline and useful life is taken from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Nonresidential Equipment
Variable Speed Drive (VSD)

Description: Variable Speed Drive Controls
Baseline: Constant Speed Motor *
Useful Life: 15 Years *

Savings Algorithm:

$$\text{Annual kWh} = \left(\frac{\text{HP}}{\text{EFF(MOT)}}\right) \text{ x EFF(VSD) x CONV x LOADING x HOURS x SF}$$

$$\text{Peak kW} = \text{Annual kWh x } \frac{1}{8760} \div \text{LF}$$

HP: horsepower of the motor being controlled by VSD (from application)
EFF(MOT): efficiency rating of motor being controlled by VSD (from application … range = 0.500 to 0.980)
EFF(VSD): efficiency rating of the variable speed drive (from application … range = 0.800 to 0.980)
CONV: 0.746 horsepower to watts conversion rate
LOADING: 0.75 typical motor loading factor
HOURS: annual operating hours (from application … range = 3,000 to 8,760)
SF: 0.40 annual approximate savings factor for motors with an average loading rate of 0.75
LF: 0.9004 load factor (based on Small Industrial – Baseload load shape)

Incremental Cost Algorithm:

Full cost of the VSD.

Incentives:

All Units: $40 per HP
Incentive Cap: 75% of total cost
Financing: none

Simple Payback:

Payback Pre-Incentive: 2.59 yrs
Payback Post-Incentive: 1.76 yrs
Incentive/Cost Ratio: 32%

Comments:

* Baseline and useful life are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Nonresidential Equipment
Variable Speed Drive (VSD) – HVAC Applications

Description: Variable Speed Drive Controls
Baseline: Constant Speed Motor *
Useful Life: 15 Years *

Savings Algorithm:

$$\text{Annual kWh} = \left(\frac{\text{HP}}{\text{EFF(MOT)}}\right) \text{ x EFF(VSD)x CONV x LOADING x HOURS x SF}$$

$$\text{Peak kW} = \text{Annual kWh x } \frac{1}{8760} \div \text{LF}$$

HP: horsepower of the motor being controlled by VSD (from application)
EFF(MOT): efficiency rating of motor being controlled by VSD (from application … range = 0.500 to 0.980)
EFF(VSD): efficiency rating of the variable speed drive (from application … range = 0.800 to 0.980)
CONV: 0.746 horsepower to watts conversion rate
LOADING: 0.75 typical motor loading factor
HOURS: annual operating hours (from application … range = 3,000 to 8,760)
SF: 0.40 annual approximate savings factor for motors with an average loading rate of 0.75
LF: 5507.39 load factor (based on Small Industrial – Electric Inverse Cooling + Heating load shape)

Incremental Cost Algorithm:

Full cost of the VSD.

Incentives:

All Units: $40 per HP
Incentive Cap: 75% of total cost
Financing: none

Simple Payback:

Payback Pre-Incentive: 1.41 yrs
Payback Post-Incentive: 1.03 yrs
Incentive/Cost Ratio: 27%

Comments:

* Baseline and useful life are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Nonresidential Equipment
Central Air Conditioner (CAC) - Small

Description: Central Air Conditioners < 65 MBTu with SEER 14 and above
Baseline: Federal Standard 13 SEER *
Useful Life: 15 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{1}{\text{BASE}} - \frac{1}{\text{SEER}}\right) \text{ x CAP x CFLH x ADJ}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

BASE: baseline efficiency SEER 13.0
SEER: efficiency rating of new CAC (from application … range = 14.0 to 25.0)
CAP: capacity of new CAC in MBTu (from application … range = 8.0 to 65.0)
CFLH: 811 equivalent full load hours of cooling (calculated from Assessment)
ADJ: 0.8614 adjustment factor to convert Iowa average CDDs to Sioux City, IA CDDs
LF: 0.0899 load factor (based on Small Commercial – Cooling load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = \$9.935 \text{ x } (\text{SEER} - \text{BASE}) \text{ x CAP}$$

Incentives:

SEER 14-14.9:	$150 per ton (CAP / 12)
SEER 15-15.9:	$225 per ton (CAP / 12)
SEER 16 and above:	$300 per ton (CAP / 12)
Incentive Cap:	N/A
Financing:	none

Simple Payback:

Payback Pre-Incentive:	36.01 yrs
Payback Post-Incentive:	5.80 yrs
Incentive/Cost Ratio:	84%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Nonresidential Equipment
Central Air Conditioner (CAC) - Large

Description: Cooling DX > 65 MBTu with EER 11.2 and above
Baseline: Federal Standard 11 EER *
Useful Life: 15 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{1}{\text{BASE}} - \frac{1}{\text{EER}}\right) \text{ x CAP x CFLH x ADJ}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

BASE: baseline efficiency EER 11.0
EER: efficiency rating of new unit (from application … range = 11.2 to 16.0)
CAP: capacity of new unit in MBTu (from application … range = 65.0 to 235.0)
CFLH: 2,281 equivalent full load hours of cooling (calculated from Assessment)
ADJ: 0.8614 adjustment factor to convert Iowa average CDDs to Sioux City, IA CDDs
LF: 0.1251 load factor (based on Large Commercial – Cooling load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = \$11.444 \text{ x } (\text{EER} - \text{BASE}) \text{ x CAP}$$

Incentives:

EER 11.2-11.9:	$20 per ton (CAP / 12)
EER 12-12.9:	$40 per ton (CAP / 12)
EER 13 and above:	$60 per ton (CAP / 12)
Incentive Cap:	N/A
Financing:	none

Simple Payback:

Payback Pre-Incentive:	9.73 yrs
Payback Post-Incentive:	2.65 yrs
Incentive/Cost Ratio:	73%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of savings algorithm

Nonresidential Equipment
Furnace

Description: High Efficiency Furnace < 250 MBTu with AFUE 92% and above
Baseline: Federal Standard Efficiency Furnace < 250 MBTu with 90% AFUE *
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual Therms} = \left(\frac{1}{\text{BASE}} - \frac{1}{\text{AFUE}}\right) \text{ x CAP x HFLH x ADJ}$$

$$\text{Peak Therms} = \text{ Annual Therms x } \frac{1}{365} \div \text{LF}$$

BASE: baseline efficiency 0.9000 AFUE
AFUE: efficiency rating of new unit (from application … range = 0.9200 to 0.9800)
CAP: capacity of new unit in MBTu (from application)
HFLH: 69.355 equivalent full load hours of heating (calculated from Assessment)
ADJ: 1.2113 adjustment factor to convert Iowa average HDDs to Sioux Falls, SD HDDs
LF: 0.2039 load factor (based on Small Commercial – Heating load shape)

Incremental Cost Algorithm *:

Incremental Cost = $~~52,523~~ 654.9x (AFUE − BASE) x CAP

Incentives:

AFUE 0.920 – 0.939: ~~$10.00~~ $5.00x CAP
AFUE 0.940 – 0.959: ~~$15.00~~ $7.50x CAP
AFUE 0.96 and above: ~~$20.00~~ $10.00x CAP
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 9.01 yrs
Payback Post-Incentive: 4.63 yrs
Incentive/Cost Ratio: 49%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (03/31/2015):
Incentives: Revised incentive per SD PUC effective 4/10/2015

Nonresidential Equipment
Boiler

Description: High Efficiency Boiler with AFUE > 85% and above
Baseline: Federal Standard Efficiency Boiler 82% AFUE *
Useful Life: 20 Years *

Savings Algorithm *:

$$\text{Annual Therms} = \left(\frac{1}{\text{BASE}} - \frac{1}{\text{AFUE}}\right) \text{ x CAP x HFLH x ADJ}$$

$$\text{Peak Therms} = \text{ Annual Therms x } \frac{1}{365} \div \text{LF}$$

BASE: baseline efficiency 0.8200 AFUE
AFUE: efficiency rating of new unit (from application … range = 0.8500 to 0.9800)
CAP: capacity of new unit in MBTu (from application)
HFLH: 51.94 equivalent full load hours of heating (calculated from Assessment)
ADJ: 1.2113 adjustment factor to convert Iowa average HDDs to Sioux Falls, SD HDDs
LF: 0.1348 load factor (based on Large Commercial – Heating load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = \$148.43 \text{ x (AFUE} - \text{BASE) x CAP}$$

Incentives:

AFUE 0.850 – 0.899:	$3.00 x CAP
AFUE 0.900 – 0.949:	$5.00 x CAP
AFUE 0.95 and above:	$7.00 x CAP
Incentive Cap:	N/A
Financing:	none

Simple Payback:

Payback Pre-Incentive:	1.77 yrs
Payback Post-Incentive:	2.46 yrs
Incentive/Cost Ratio:	28%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Nonresidential Equipment
Window Air Conditioner

Description: ENERGY STAR high efficiency Window Air Conditioners
Baseline: Federal Standard 9.8 EER *
Useful Life: 9 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{1}{\text{BASE}} - \frac{1}{\text{EER}}\right) \text{ x CAP x CFLH x ADJ}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

BASE: from ENERGY STAR website
EER: efficiency rating of new unit (from rebate application … range = 10.0 to 11.8)
CAP: capacity of new unit in MBTu (from rebate application … range = 8.0 to 14.0)
CFLH: 868 equivalent full load hours of cooling (calculated from Assessment)
ADJ: 0.8614 adjustment factor to convert from Iowa average CDDs to Sioux City, IA CDDs
LF: 0.0899 load factor (based on Small Commercial – Cooling load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = \$3.468 \text{ x } (\text{EER} - \text{BASE}) \text{ x CAP}$$

Incentives:

All Units: $40 per unit
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 6.60 yrs
Payback Post-Incentive: 0.26 yrs
Incentive/Cost Ratio: 96%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

Description: Clarification of measure description
Savings Algorithm: Clarification of BASE factor

Nonresidential Equipment
Programmable Thermostat – Gas Heat

Description: Programmable Thermostat – Gas Heat
Baseline: Standard Thermostat – Gas Heat
Useful Life: 15 Years *

Savings Algorithm *:

Annual Therms = 160.29 x ADJ

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

ADJ: 1.2113 adjustment factor to convert from Iowa average HDDs to Sioux Falls, SD HDDs
LF: 0.2039 load factor (based on Small Commercial Heating load shape)

Incremental Cost Algorithm *:

Incremental Cost = $53.29

Incentives:

All Installations: $25 per thermostat
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 0.21 yrs
Payback Post-Incentive: 0.11 yrs
Incentive/Cost Ratio: 47%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

  Incremental cost is calculated as the full cost of a commercial programmable thermostat less the base cost of a standard residential thermostat.

  This measure is available to customers taking gas service only from MidAmerican.

  Non-energy benefits of $99.15 to $119.70 per customer are assumed for cost-effectiveness purposes. These benefits approximate avoided electric costs per programmable thermostat based on results from the Programmable Thermostat – Gas Heat + Electric Cooling measure and adjusted for climate differences between Sioux Falls, SD and Sioux City, IA.

Nonresidential Equipment
Programmable Thermostat – Gas Heat + Electric Cooling

Description: Programmable Thermostat – Gas Heat + Electric Cooling
Baseline: Standard Thermostat – Gas Heat + Electric Cooling
Useful Life: 15 Years *

Savings Algorithm *:

Annual kWh = 633.92 x ADJ(cool)

Annual Therms = 160.29 x ADJ(heat)

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF(elec)}$$

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF(gas)}$$

ADJ(cool): 0.8614 adjustment factor to convert from Iowa average CDDs to Sioux City, IA CDDs
ADJ(heat): 1.0787 adjustment factor to convert from Iowa average HDDs to Sioux City, IA HDDs
LF(elec): 0.0899 load factor (based on Small Commercial Base – Cooling load shape)
LF(gas): 0.2039 load factor (based on Small Commercial Heating load shape)

Incremental Cost Algorithm *:

Incremental Cost = $53.29

Incentives:

All Installations: $25 per thermostat
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 0.32 yrs
Payback Post-Incentive: 0.17 yrs
Incentive/Cost Ratio: 47%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Incremental cost is calculated as the full cost of a commercial programmable thermostat less the base cost of a standard residential thermostat.

This measure is available to customers taking gas and electric service from MidAmerican that use gas for heating and electricity for cooling.

Nonresidential Equipment
Natural Gas Water Heater

Description: High Efficiency Gas Water Heater ≥ 30 Gallons and Energy Factor 0.65 and above
Baseline: Standard Gas Water Heater ≥ 30 Gallons and Energy Factor = 0.59 (federal standard)
Useful Life: 13 Years *

Savings Algorithm *:

$$\text{Annual Therms} = [\text{EF(act)} - \text{EF(base)}] \times \text{UEC}$$

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

EF(act): Energy Factor of new water heater (from application … range = 0.65 to 0.90)
EF(base): Baseline Energy Factor 0.59
UEC: 3,883.04 Unit Energy Consumption factor (calculated from Assessment)
LF: 0.8971 load factor (based on Small Commercial Baseload load shape)

Incremental Cost Algorithm *:

$$\text{Incremental Cost} = [\text{EF(act)} - \text{EF(base)}] \times \$1{,}541.77$$

Incentives:

All Installations: $15 per unit
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 0.55 yrs
Payback Post-Incentive: 0.37 yrs
Incentive/Cost Ratio: 32%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Nonresidential Equipment
Metal Halide Fixtures – Pulse Start

Description: High Efficiency Metal Halide Fixtures – Pulse Start
Baseline: Standard High Density Discharge Lighting
Useful Life: 15 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{\text{WATT(base)} - \text{WATT(eff)}}{1000}\right) \text{ x HOURS}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

WATT(base): Wattage of baseline fixture based on 480 watts
WATT(eff): Wattage of efficient fixture (from application … range = 100 to 400)
HOURS: Annual fixture operating hours (from application … range = 1,000 to 8,760 hours)
LF: 0.7609 load factor (based on Small Commercial Baseload load shape)

Incremental Cost Algorithm *:

Incremental Cost = $111.48

Incentives:

All Installations: $30 per fixture
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 5.11 yrs
Payback Post-Incentive: 3.74 yrs
Incentive/Cost Ratio: 27%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of operating hours requirement

Nonresidential Equipment
LED Exit Light

Description: LED Exit Light
Baseline: CFL Exit Light
Useful Life: 11 Years *

Savings Algorithm *:

Annual kWh = 175.20

$$\text{Peak kW} = \text{Annual kWh x } \frac{1}{8760} \div \text{LF}$$

LF: 0.7609 load factor (based on Small Commercial Baseload load shape)

Incremental Cost Algorithm *:

Incremental Cost = $68.22

Incentives:

All Installations: $40 per fixture
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 6.24 yrs
Payback Post-Incentive: 2.58 yrs
Incentive/Cost Ratio: 59%

Comments:

* Baseline, useful life, savings, and incremental costs are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Nonresidential Equipment
T-5 High Bay Fluorescent Lighting

Description: Standard Lighting
Baseline: High Bay Fluorescent High Output Lighting
Useful Life: 15 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{\text{WATT(base)} - \text{WATT(eff)}}{1000}\right) \text{ x HOURS}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

WATT(base): See table below
WATT(eff): See table below
HOURS: Annual fixture operating hours (from application … range = 1,000 to 8,760 hours)
LF: 0.7609 load factor (based on Small Commercial Baseload load shape)

Length of Lamp (ft)	Number of Lamps	WATT(base)	WATT(eff)
4	3	295	179
4	4	458	234
4	5	458	296
4	6	458	351
4	7	850	410
4	8	850	468

Incremental Cost Algorithm *:

Full cost of the fixture.

Incentives:

All Installations: $11.50 per lamp
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 6.14 yrs
Payback Post-Incentive: 3.78 yrs
Incentive/Cost Ratio: 39%

Comments:

* Baseline and useful life are taken from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of operating hours requirement

Nonresidential Equipment
T-8 Fluorescent Lighting

Description: Standard Lighting
Baseline: Fluorescent Reduced Wattage Lighting
Useful Life: 13 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{\text{WATT(base)} - \text{WATT(eff)}}{1000}\right) \text{ x HOURS}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

WATT(base): See table below (averages of various manufacturers laboratory tests … ANSI)
WATT(eff): See table below (averages of various manufacturers laboratory tests … ANSI)
HOURS: Annual fixture operating hours (from application … range = 1,000 to 8,760 hours)
LF: 0.7609 load factor (based on Small Commercial Baseload load shape)

Length of Lamp (ft)	Number of Lamps	WATT(base)	WATT(eff)
2	1	28	20
2	2	56	33
4	1	43	31
4	2	72	59
4	3	115	89
4	4	120	93
8	1	75	58
8	2	160	109

Incremental Cost Algorithm *:

Full cost of the fixture.

Incentives:

All Installations: $8.50 per lamp
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 8.33 yrs
Payback Post-Incentive: 3.07 yrs
Incentive/Cost Ratio: 63%

Comments:

* Baseline and useful life are taken from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of operating hours requirement

Nonresidential Equipment
T-8 High Bay Fluorescent Lighting

Description: Standard Lighting
Baseline: High Bay Fluorescent High Output Lighting
Useful Life: 15 Years *

Savings Algorithm *:

$$\text{Annual kWh} = \left(\frac{\text{WATT(base)} - \text{WATT(eff)}}{1000}\right) \text{ x HOURS}$$

$$\text{Peak kW} = \text{ Annual kWh x } \frac{1}{8760} \div \text{LF}$$

WATT(base): See table below
WATT(eff): See table below
HOURS: Annual fixture operating hours (from application … range = 1,000 to 8,760 hours)
LF: 0.7609 load factor (based on Small Commercial Baseload load shape)

Length of Lamp (ft)	Number of Lamps	WATT(base)	WATT(eff)
4	3	295	112
4	4	458	151
4	5	458	189
4	6	458	226
4	7	850	264
4	8	850	301

Incremental Cost Algorithm *:

Full cost of the fixture.

Incentives:

All Installations: $11.50 per lamp
Incentive Cap: N/A
Financing: none

Simple Payback:

Payback Pre-Incentive: 3.01 yrs
Payback Post-Incentive: 1.85 yrs
Incentive/Cost Ratio: 39%

Comments:

* Baseline and useful life are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of operating hours requirement

Nonresidential Custom
Custom Measure

Description: Custom Energy Efficiency Measure
Baseline: Varies *
Useful Life: Varies *

Savings Algorithm *:

Annual kWh = Varies

Annual Therms = Varies

Peak kW = Varies

Peak Therms = Varies

Incremental Cost Algorithm *:

Incremental Cost = Varies

Incentives *:

Incentives are set at three times the customers estimated annual bill savings and will vary by project.

Incentives shall not exceed an amount that reduces the simply payback period for the project to be less than two years.

Simple Payback:

Payback Pre-Incentive: varies
Payback Post-Incentive: no less than two years
Incentive/Cost Ratio: varies

Comments:

* Baseline, useful life, savings, incremental costs, and incentives will be determined by MidAmerican's implementation contractors for the Nonresidential Custom program on a project by project basis and will be pre-approved by MidAmerican prior to approval of the project.

  All custom measures must be determined to be cost effective by MidAmerican prior to approval of the project. Cost effectiveness will be determined by the Total Resource Cost test, and all measures must have a TRC ratio of at least 1.00 in order to qualify for the Nonresidential Custom program.

Small Commercial Audit
Business Audit

Description: Business Audit
Baseline: N/A
Useful Life: N/A

Savings Algorithm:

No savings are associated with this measure.

Incremental Cost Algorithm:

Contract cost associated with conducting an audit.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: N/A
Payback Post-Incentive: N/A
Incentive/Cost Ratio: 100%

Comments:

Audits are limited to one per customer during the plan period.

Small Commercial Audit
Multifamily Audit

Description: Multifamily Audit
Baseline: N/A
Useful Life: N/A

Savings Algorithm:

No savings are associated with this measure.

Incremental Cost Algorithm:

Contract cost associated with conducting an audit.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: N/A
Payback Post-Incentive: N/A
Incentive/Cost Ratio: 100%

Comments:

Multifamily audits are available in all multifamily buildings in MidAmerican's service territory. Multifamily buildings generally are defined as four or more units or three or more stories, including apartments and condominiums.

Audits are limited to one per customer during the plan period.

Small Commercial Audit
Faucet Aerator – Business Electric

Description: Low Flow Aerator (0.5 gpm) - Business Electric
Baseline: Standard Aerator (3.0 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual kWh = 139.67

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

LF: 0.7609 load factor (based on Small Commercial Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.09 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a business audit.

Non-energy related benefits are included associated with saving 5,464 gallons of water per year (based on the water savings for residential faucet aerators and the increase in efficiency of commercial aerators) at $0.00484 per gallon, which equals $26.45 per aerator per year.

Small Commercial Audit
Faucet Aerator – Business Gas

Description: Low Flow Aerator (0.5 gpm) - Business Gas
Baseline: Standard Aerator (3.0 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 25.29

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 0.8971 load factor (based on Small Commercial Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.05 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a business audit.

Non-energy related benefits are included associated with saving 5,464 gallons of water per year (based on the water savings for residential faucet aerators and the increase in efficiency of commercial aerators) at $0.00845 per gallon, which equals $46.17 per aerator per year.

Small Commercial Audit
Kitchen Aerator – Business Electric

Description: Low Flow Aerator (0.5 gpm) - Business Electric
Baseline: Standard Aerator (3.0 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual kWh = 139.67

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

LF: 0.7609 load factor (based on Small Commercial Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.14 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a business audit.

Non-energy related benefits are included associated with saving 5,464 gallons of water per year (based on the water savings for residential kitchen aerators and the increase in efficiency of commercial aerators) at $0.00484 per gallon, which equals $26.45 per aerator per year.

Small Commercial Audit
Kitchen Aerator – Business Gas

Description: Low Flow Aerator (0.5 gpm) - Business Gas
Baseline: Standard Aerator (3.0 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 25.29

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 0.8971 load factor (based on Small Commercial Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.08 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a business audit.

Non-energy related benefits are included associated with saving 5,464 gallons of water per year (based on the water savings for residential kitchen aerators and the increase in efficiency of commercial aerators) at $0.00845 per gallon, which equals $46.17 per aerator per year.

Small Commercial Audit
Hot Water Pipe Insulation – Business Electric

Description: Hot Water Pipe Insulation (R-4) – Business Electric
Baseline: No Hot Water Pipe Insulation
Useful Life: 13 Years *

Savings Algorithm *:

Annual kWh = 18.64 x FT

$$\text{Peak kW} = \text{Annual kWh} \times \frac{1}{8760} \div \text{LF}$$

FT: Linear feet of insulation installed (from audit report … range = 1.0 to 6.0)
LF: 0.7609 load factor (based on Small Commercial Base – Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.77 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a business audit.

Small Commercial Audit
Hot Water Pipe Insulation – Business Gas

Description: Hot Water Pipe Insulation (R-4) – Business Gas
Baseline: No Hot Water Pipe Insulation
Useful Life: 13 Years *

Savings Algorithm *:

Annual Therms $=$ 3.92 x FT

Peak Therms $=$ Annual Therms x $\frac{1}{365} \div$ LF

FT: Linear feet of insulation installed (from audit report … range – 1.0 to 6.0)
LF: 0.8971 load factor (based on Small Commercial Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.32 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a business audit.

Small Commercial Audit
Low Flow Showerhead – Business Gas

Description: Low Flow Showerhead (2.0 gpm) - Business Gas
Baseline: Standard Showerhead (2.5 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 66.3

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 0.8971 load factor (based on Small Commercial Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive: 0.21 yrs
Payback Post-Incentive: instant
Incentive/Cost Ratio: 100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a business audit.

Non-energy related benefits are included associated with saving 3,650 gallons of water per year (based on the water savings for residential low flow showerheads and the decrease in efficiency of commercial showerheads) at $0.00845 per gallon, which equals $30.84 per aerator per year.

Reasons for Revisions (01/01/2014):

Savings Algorithm: Clarification of Annual Therms requirement

Small Commercial Audit
Faucet Aerator – Multifamily Gas

Description: Low Flow Aerator (1.5 gpm) - Multifamily Gas
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 2.07

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.22 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multifamily audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on water savings from the single family measure) at $0.00829 per gallon, which equals $12.68 per aerator per year.

Small Commercial Audit
Kitchen Aerator – Multifamily Gas

Description: Low Flow Aerator (1.5 gpm) - Multifamily Gas
Baseline: Standard Aerator (2.2 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 2.07

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.35 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multifamily audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on water savings from the single family measure) at $0.00829 per gallon, which equals $12.68 per aerator per year.

Small Commercial Audit
Low Flow Showerhead – Multifamily Gas

Description: Low Flow Showerhead (1.5 gpm) - Multifamily Gas
Baseline: Standard Showerhead (2.5 gpm)
Useful Life: 10 Years *

Savings Algorithm *:

Annual Therms = 14.82

$$\text{Peak Therms} = \text{Annual Therms} \times \frac{1}{365} \div \text{LF}$$

LF: 1.0288 load factor (based on Residential Base load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	0.64 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a multifamily audit.

Non-energy related benefits are included associated with saving 1,530 gallons of water per year (based on water savings from the single family measure) at $0.00829 per gallon, which equals $60.52 per aerator per year.

Small Commercial Audit
LED Exit Light

Description: LED Exit Light
Baseline: CFL Exit Light
Useful Life: 11 Years *

Savings Algorithm *:

Annual kWh $= 175.20$

Peak kW $=$ Annual kWh x $\frac{1}{8760} \div$ LF

LF: 0.7609 load factor (based on Small Commercial Baseload load shape)

Incremental Cost Algorithm:

Actual cost associated with providing this measure.

Incentives:

Incentives are set at 100% of cost.

Simple Payback:

Payback Pre-Incentive:	4.49 yrs
Payback Post-Incentive:	instant
Incentive/Cost Ratio:	100%

Comments:

* Baseline, useful life, and savings are taken from or calculated from the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential.

This measure is a direct install measure available in a business audit.