Energy Efficiency and Conservation Subcommittee

Summary List of Recommended Priority Policy Options for Analysis

Policy No.	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2009–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$) 2009-2020	Status of Option
		2012	2020	Total 2009-2020			
EEC-1	Demand-Side Management (DSM)/Energy Efficiency Programs for Electricity	1.~~2~~45	~~7.32~~8.60	39.8	–62.6	–1.56	Pending
EEC-2	Demand-Side Management (DSM) Energy Efficiency Programs for Natural Gas	0.43	2.76	~~13.9~~32.85	~~–2,145~~653.2	~~–153.3~~-46.92	Pending
EEC-3	Financial Mechanisms for Energy Efficiency	2.18	8.84	52.8	–93.6	–1.63	Pending
EEC-4	Improved Building Codes for Energy Efficiency	0.04	0.53	2.54	–35.0	–12.8	Pending
EEC-5	Incentive Mechanisms for Achieving Energy Efficiency	0.36	2.18	13.3	–3.9	–0.55	Pending
EEC-6	Promotion and Incentives for Improved Design and Construction in the Private Sector	1.27	3.76	24.7	–254	–180	Pending
EEC-7	Training and Education for Builders and Contractors	*Not quantifi*~~*ed*~~*able*					Pending
EEC-8	Focus on Specific Residential Market Segments	0.18	1.00	5.58	–84.0	–13.2	Pending
EEC-9	Midwestern Governors Association Energy Security and Climate Stewardship Platform	0	6.1	20.9	–1,026	–155.1	Pending
EEC-10	Energy Management Training/Training of Building Operators	*Not quantified* ***[Or not quantifiable?]***					Pending
EEC-11	Rate Structures and Technologies To Promote Reductions	2.2	8.8	52.8	–93.6	–1.6	Pending
EEC-12	Consumer Education Programs	*Not quantified* ***[Or not quantifiable?]***					Pending
EEC-13	Government Lead-by-Example: Improved Design and Construction in New and Existing State and Local Government Buildings	0.22	0.72	4.43	–113.5	–22.0	Pending
EEC-14	More stringent appliance efficiency standards	*Quantification pending*					Pending

Formatted: Font: Bold

Formatted: Font: (Default) Arial, 10 pt

EEC-1. Demand-Side Management (DSM)/ Energy Efficiency Programs for Electricity

Policy Description

Demand-side management (DSM) is a policy approach that requires actions that influence both the quantity and patterns of energy consumed by end users. This option focuses on electricity demand-side management programs run by utilities, and may be designed to work in tandem with other recommended strategies that can also encourage efficiency gains.

The current (2008) session of the Iowa General Assembly is considering proposed statutes that would establish energy efficiency savings goals for all Iowa utilities.

Policy Design

Goals: 1.0% per year w/in 3 years; 1.5% per year in 5 years; 2.0% per year in 7 years

Timing: Phase-in beginning in 2010

Implementing Parties:

- Extend the DSM obligations and goals to all electric utilities in Iowa. IOUs are starting at 0.8%
- Investor-owned utilities and the Iowa Utility Association, municipal utilities and the Iowa Association of Municipal Utilities, electric cooperatives and the Iowa Association of Electric Cooperatives

Other: TBD

Implementation Mechanisms

Possible policy mechanisms include:

- Iowa Utilities Board establishes DSM goals for investor-owned utilities.
- Revise existing statutes to incorporate prescribed energy efficiency goals.
- Change the determination of DSM cost-effectiveness by accounting for the estimated valuation of CO_2 emissions avoided by programs.
- Extend the DSM obligations and goals to all to all electric utilities in Iowa.
- Expand DSM measures eligible for program incentives.
- Expand the scope of utility activity that can contribute to achieving DSM goals to include actions that are on the utility side of the meter, so-called "infrastructure" investments to use term adopted in Minnesota in 2007.
- Recognize the contribution of increased building energy codes and equipment energy standards to the achievement of DSM goals.

Formatted: Font: (Default) Arial, 10 pt

- Include in the measurement of DSM goals the energy savings from renewable measures that are implemented on the customer side of the meter.

Related Policies/Programs in Place

Electric utilities in Iowa must offer cost-effective energy efficiency programs. Iowa Code §§ 476.6(14). The Iowa Utilities Board establishes energy efficiency goals for investor-owned electric utilities. Iowa Code § 476.6(16). DSM offered by non-rate-regulated utilities is not regulated. 476.6(16).

Iowa investor-owned utilities have a long history of conducting DSM programs, under statutes adopted in 1990 and modified in 1996. The Iowa Utilities Board conducts contested proceedings for the review of plans, programs and energy savings goals developed by investor-owned utilities. New plans will be filed in April of 2008, and the Iowa Utilities Board has directed the investor-owned utilities to include analyses of the effects of goals equivalent to saving 1.5% of retail electric sales in Iowa.

Types(s) of GHG Reductions

TBD.

Estimated GHG Reductions and Net Costs or Cost Savings

Formatted Table

	~~2012~~	~~2020~~	~~2050~~	~~Units~~
~~GHG Emission Savings~~	~~1.25~~	~~7.32~~	~~17.85~~	~~MMtCO2e~~
~~Net Present Value (2008-2050)~~	~~-3.7~~	~~-62.6~~	~~-491.1~~	~~$ Million~~
~~Cumulative Reductions (2008-2050)~~	~~2.13~~	~~39.76~~	~~501.7~~	~~MMtCO2e~~
~~Cost-Effectiveness~~	~~-1.74~~	~~-1.56~~	~~-0.56~~	~~$/tCO2e~~

	2012	2020	Units
GHG Emission Reductions	1.45	8.60	MMtCO2e
Net Present Value	-33.2	-505.4	$ Million
Cumulative GHG Reductions	2.54	46.25	MMtCO2e
Cost-Effectiveness	-13.08	-10.93	$/tCO2e

Data Sources:

Formatted: Bullets and Numbering

- Source: Quantec. (2008). Assessment of Energy and Capacity Savings Potential in Iowa. February Vol I.p. ES-3
- IUB. 2008. The Status of Energy Efficiency Programs in Iowa.p. 50.

Formatted: Font: (Default) Arial, 10 pt

Energy Consumption By Sector (billions of Btu)

- Historical energy consumption in the state, by sector, is from the U.S. DOE Energy Information Administration (EIA) State Energy Data available at http://www.eia.doe.gov/emeu/states/_seds.html. To calculate future projected energy consumption, growth factors were applied to the historical 2005 data to calculate projections through 2030. The growth factors are based on a combination of two parameters. One accounts for growth within the RCI sectors, with growth factors for residential based on projected population growth (from http://data.iowadatacenter.org/datatables/State/stpopest19002007.xls and http://data.iowadatacenter.org/browse/projections.html); growth in the commercial sector based on non-manufacturing employment growth projections; and industrial growth based on manufacturing employment. Employment projections were taken from the Iowa Workforce Information Network, Iowa Industry Projections, 2004 - 2014 (http://iwin.iwd.state.ia.us/pubs/statewide/indprojstatewide.pdf). The other factor is growth in electricity sales, which was calculated based on historical retail sales from 1990 to 2005 obtained from the EIA state electricity profile, in GWh, available from Table 8 at: http://www.eia.doe.gov/cneaf/electricity/st_profiles/iowa.html.

Power Station Electricity Generation (GWh) and Fuel Use (BBtu)

- Gross generation for 2005 was obtained from the EIA database (EIA-906/920) on fuel stocks at all electric power sector generating facilities, broken down by fuel type. Data for later years was projected from the 2005 figure based on projections of growth in generation for the Mid-Continent Area Power Pool (MAPP) region. The projected regional consumption and generation data are from the EIA Annual Energy Outlook (AEO) and can be accessed by downloading the "Electric Generation & Renewable Resource" file at http://www.eia.doe.gov/oiaf/aeo/supplement/index.html. On-site usage was subtracted from all generation figures.

Quantification Methods:

Heat Rates (Btu/kWh)

- Heat rates indicate how much fuel is used (Btu) to generate a given amount of electricity (kWh), and they vary greatly depending on the type of power stations and the fuel used. Heat rates are used to convert figures for electricity into figures for fuel use so the fuel use can be converted into GHG emissions using GHG emission factors. Heat rates for 2005 for each type of generation and fuel were calculated from 2005 fuel use (in BBtu) divided by 2005 generation (GWh). Projections for 2006 and beyond are based on annual combustion efficiency growth rates for the MAPP region. Combustion efficiency for a given year is calculated for each fuel type as the fuel use (in quadrillion Btu) divided by the electricity generated (in billion kWh), and the combustion efficiency growth rate applied to this value is based on the change in combustion efficiency from the previous year.

GHG Emissions Associated with End-Use Consumption (by Sector)

- **Historical** CO_2 data by sector (and further broken down by fuel type) was calculated by two EPA State Greenhouse Gas Inventory Tool (SIT) software modules: the Fossil Fuel Combustion Module and—for emissions from industrial sources—the SIT module for industry. Methane (CH_4) and nitrous oxide (N_2O) emissions were calculated by the

Formatted: Font: (Default) Arial, 10 pt

Stationary Combustion Module and—for emissions from industrial sources—the SIT module for industry.

- **Projected emissions** through 2030 were based on the 2005 data with growth factors compounded from year to year as discussed above in (A) for energy consumption.

GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels

- The projected data for each GHG was calculated for each fuel and generation type (e.g., non-lignite coal in a steam plant) as a direct product of the projected generation data (in GWh) described above in (B). Metric tons of CO_2 are calculated from generation as: **tons CO2 = GWh * (Btu/kWh) * (tons CO2/MBtu) * (% of that fuel in the fuel mix)** where (Btu/kWh) is the heat rate and (tons CO2/MBtu) is the CO_2 emission factor. Similarly for CH_4 and N_2O, which are then converted to CO_2 equivalents [CO_2(e)] using global warming potentials (GWPs) of 21 for CH_4 and 310 for N_2O. The emission factor used for each GHG were the same as those used in the EPA State Greenhouse Gas Inventory Tool (SIT) software modules.

Key Assumptions:

- Levelized costs of energy efficiency measures is $30 MWh. Source: Quantec. (2008).

Formatted: Bullets and Numbering

- Avoided costs of energy is $45.30. Source: IUB. 2008. The Status of Energy Efficiency Programs in Iowa.p. 50. Alliant values for summer mid peak
- The reduction in use of various fuel types as a result of the decreased energy demand is assumed to reflect Iowa's mix of fossil fuels.
- The energy efficiency programs begin in 2009 and end by 2031.

- ~~The annual cost to administer the program: $500,000~~
- Escalation rate for cost of energy efficiency programs: 1~~5~~% annually

- ~~Escalation rate for gross generation and associated CO_2 equivalent emissions beyond 2030: 0.0086 (0.86%)~~

- ~~Rate at which costs are discounted annually: 5%~~
- Year dollars in which new present value is calculated: 2005.

- ~~Assume fuel costs remain constant after 2030.~~
- Net present value is calculated beginning 2009.
- Generation capacity that is made available as the result of energy efficiency improvements will still be used to generate electricity for consumers outside of the traditional service territory.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Formatted: Font: (Default) Arial, 10 pt

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-2. Demand-Side Management (DSM)/Energy Efficiency Programs for Natural Gas

Policy Description

Demand-side management (DSM) is a policy approach that requires actions that influence both the quantity and patterns of energy consumed by end users. This option focuses on electricity demand-side management programs run by utilities, and may be designed to work in tandem with other recommended strategies that can also encourage efficiency gains.

The current (2008) session of the Iowa General Assembly is considering proposed statutes that would establish energy efficiency savings goals for all Iowa utilities.

Policy Design

Goals: 1.0% per year w/in 3 years; 1.5% per year in 5 years; 2.0% per year in 7 years

Timing: Phase-in beginning in 2010

Implementing Parties:

- Extend the DSM obligations and goals to all gas utilities in Iowa. IOUs are starting at 0.8%.
- Investor-owned utilities and the Iowa Utility Association, municipal utilities and the Iowa Association of Municipal Utilities, consumer cooperatives

Other: TBD

Implementation Mechanisms

Possible policy mechanisms include the following:

- Iowa Utilities Board establishes DSM goals for investor-owned utilities.
- Revise existing statutes to incorporate prescribed energy efficiency goals.
- Change the determination of DSM cost-effectiveness by accounting for the estimated valuation of CO_2 emissions avoided by programs.
- Extend the EE goals and obligations to all gas utilities in Iowa.
- Expand DSM measures eligible for program incentives.
- Extend investor-owned natural gas program funding requirements and eligibility to natural gas transportation customers.
- Account for natural gas savings accruing when investor-owned electric utility provides incentives for installation of geothermal systems and building shell measures.

Formatted: Font: (Default) Arial, 10 pt

- Expand the scope of utility activity that can contribute to achieving DSM goals to include actions that are on the utility side of the meter, so-called "infrastructure" investments to use term adopted in Minnesota in 2007.
- Recognize the contribution of increased building energy codes and equipment energy standards to the achievement of DSM goals.
- Include in the measurement of DSM goals the energy savings from renewable measures that are implemented on the customer side of the meter.
- The current (2008) session of the Iowa General Assembly is considering proposed statutes that would establish energy efficiency savings goals for all Iowa utilities.

Related Policies/Programs in Place

Natural gas utilities in Iowa must offer cost-effective energy efficiency programs. Iowa Code § 476.6(14). The IUB establishes energy efficiency goals for rate-regulated gas utilities. Iowa Code § 476.6(16). DSM offered by investor-owned utilities is not regulated. Natural gas transportation customers served by competitive commodity suppliers do not fund energy efficiency programs mandated in § 476.6(16) and are not eligible to participate in these programs.

Electric utilities in Iowa must offer cost-effective energy efficiency programs. Iowa Code §§ 476.6(14). The Iowa Utilities Board establishes energy efficiency goals for investor-owned electric utilities. Iowa Code § 476.6(16). DSM offered by non-rate-regulated utilities is not regulated. 476.6(16).

Iowa investor-owned utilities have a long history of conducting DSM programs, under statutes adopted in 1990 and modified in 1996. The Iowa Utilities Board conducts contested proceedings for the review of plans, programs and energy savings goals developed by investor-owned utilities. New plans will be filed in April of 2008, and the Iowa Utilities Board has directed the investor-owned utilities to include analyses of the effects of goals equivalent to saving 1.5% of retail electric sales in Iowa.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	Units
GHG Emission Reductions	0.43	2.76	MMtCO2e
Net Present Value	-46.9	-653.2	$ Million
Cumulative GHG Reductions	3.49	32.85	MMtCO2e
Cost-Effectiveness	-337.34	-46.92	$/tCO2e

Formatted: Font: (Default) Arial, 10 pt

Data Sources:

- Energy Consumption By Sector (billions of Btu) See EEC-1
- ~~Power Station Electricity Generation (GWh) and Fuel Use (BBtu) See EEC-1~~
-

Formatted: Bullets and Numbering

- Source: Quantec. (2008). Assessment of Energy and Capacity Savings Potential in Iowa. February Vol I.p. ES-3
- IUB. 2008. The Status of Energy Efficiency Programs in Iowa.p. 50.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1

Key Assumptions:

- Average avoided costs are $5.88/MBTU in 2006 and reflect changes to gas forecast in the Assumptions to the AEO 2008. IUB estimates in IUB (2008) were $5.60 MBTU.
- Levelized costs for each service category come from Quantec (2008).

Formatted: Bullets and Numbering

- ~~The reduction in use of various fuel types as a result of the decreased energy demand is assumed to reflect Iowa's mix of fossil fuels.~~
- The energy efficiency programs begin in 2009 and end by 2031.
- ~~The annual cost to administer the program: $500,000~~
- Escalation rate for cost of energy efficiency programs: 1~~5~~% annually
- ~~Escalation rate for gross generation and associated CO_2 equivalent emissions beyond 2030: 0.0086 (0.86%)~~
- Rate at which costs are discounted annually: 5%
- ~~Assume fuel costs remain constant after 2030.~~
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Formatted: Font: (Default) Arial, 10 pt

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-3. Financial Mechanisms for Energy Efficiency

Policy Description

This option refers to financial mechanisms that could increase energy efficiency provided by non-utility entities and investment by providing incentives to a variety of energy consumers to improve energy performance of buildings, equipment and residences. Some of the utilities active in Iowa have offered such financing mechanisms in other states and for specific market segments in Iowa. At least one Iowa utility has a pilot program for a nointerest revolving loan fund. The Iowa Energy Center has offered a revolving loan fund for renewable energy for a number of years.

Policy Design

Goals: Reduced electricity consumption across all end-user categories by 2% annually. End users include; public sector, industrial, commercial, multi-family residential and residential.

Timing: Initial 2% realized in 2010, with continued annual decline

Implementing Parties: all public sector, residential, commercial and industrial electricity consumers

Other: TBD

Implementation Mechanisms

These mechanisms include:

- Financial and technical assistance for energy audits
  - Currently the DNR has $600K to direct to public and non-profit facilities. Will focus on state facilities to provide energy audits and technical assistance to follow up on audit recommendations. New legislation allows for fees, so program should be self funding. Financing for improvements through the Treasurer's office in a lease/purchase agreement.
  - $1 million—Expand energy audit programs for industrial, commercial, and multi-family residential sectors and offer assistance for building and production facilities owners to follow up on audit recommendations.
  - $10 million Revolving low- or no-interest loan fund(s) through the Iowa Energy Center or IFA, for energy efficiency investments, potentially targeted at industrial, commercial, multi-family residential.
  - Performance contracting is a self-financing mechanism for improvements for energy efficiency. The money saved through less energy consumption is leveraged to pay to for financing, installing, operating, and maintaining the energy efficiency measures.
  - $10 million tax credits for purchasing appliances that meet energy star 2007 requirements.

Formatted: Font: (Default) Arial, 10 pt

- • $10 million in income tax credits to non-residential and multi-family buildings of at least 20 K square feet that are constructed or rehabilitated to meet criteria set forth by the USGBC or other criteria. Credits apply to three types of alternative energy sources; photovoltaics, wind turbines and fuel cells. Credits claimed only if they serve a green whole building, a green base building or green tenant space.

Related Policies/Programs in Place

The Midwest Governors' Stewardship Platform

Types(s) of GHG Reductions

TBD.

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	2050	Units
GHG Emission Savings	2.18	8.84	36.68	MMtCO2e
Net Present Value (2008-2050)	–9.0	–93.6	–710.0	$ Million
Cumulative Reductions (2008-2050)	3.98	52.84	733.8	MMtCO2e
Cost-Effectiveness	–2.19	–1.63	–0.59	$/tCO2e

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Key Assumptions:

- The reduction in use of various fuel types as a result of the decreased energy demand is assumed to reflect Iowa's mix of fossil fuels.
- The energy efficiency programs begin in 2010 and continue through 2050.
- The annual cost to administer the program: $500,000
- Escalation rate for cost of energy efficiency programs: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Assume fuel costs remain constant after 2030.

Formatted: Font: (Default) Arial, 10 pt

- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-4. Improved Building Codes for Energy Efficiency

Policy Description

Buildings are significant consumers of energy and other resources. Building energy codes can be an effective way to eliminate the least efficient energy approaches in new or renovated buildings. This policy sets a goal for reducing building energy consumption, to be achieved by increasing standards for the minimum performance of new and substantially renovated commercial and residential buildings through the adoption and enforcement of building codes. Building codes would be made more stringent via incorporation of aspects of advanced/next generation building designs and construction standards, such as sustainable design and green building standards.

Policy Design

Goals: Reduce energy consumption per square foot of floor space at new construction and renovated buildings by 15% by 2012 and 50% by 2025.

Timing: New codes become effective initially in 2010, and final goal is achieved by 2025.

Implementing Parties: Department of Public Safety, Local Governments**,** Builders, Contractors, Developers, Department of Public Safety (code adoption, enforcement); Trade Associations (Master Builders, Home Builders Association, architects, AIA-IA chapter, etc.); Local government (Iowa Association of Counties, League of Cities)

Other: TBD

Implementation Mechanisms

- Requiring the periodic and regular (no less than every 3 years) review and adoption of State and local building codes, particularly energy efficiency requirements, to ensure best management practices. At least every three years, the state will review (with opportunity for public comment) and adopt more stringent standards for energy efficiency.
- Develop more effective enforcement mechanisms
- Developing a training and certification program for code officials and contractors on energy efficiency codes and sustainable design standards.

Related Policies/Programs in Place

This policy sets a goal for reducing building energy consumption, to be achieved by increasing standards for the minimum performance of new and substantially renovated commercial and residential buildings through the adoption and enforcement of building and trade codes. Building codes should promote further reduction of greenhouse gas emissions through adoption of sustainable design or green building standards. Other aspects of the policy design include

- Undertaking a comprehensive review of existing State and local building and trades codes in Iowa to determine where increased energy efficiency can be achieved.

Formatted: Font: (Default) Arial, 10 pt

- Developing a training and certification program for code officials, builders, and contractors on energy efficiency and related sustainable design standards, and in code enforcement.
- Providing tools to state and local governments for measurement and tracking of cost savings.
- Targeting existing buildings for efficiency improvements during both major and minor renovation, through application and enforcement of building codes and with tax rebates or other incentives.
- Allowing compliance flexibility. New and substantially renovated buildings can utilize a combination of increased energy efficiency, switching to low and no carbon based fuels for previously carbon based end-uses, off-site purchases on grid supplied "green power" and/or installing on-site off-grid power generating equipment.
- Setting caps on consumption of energy per unit area of floorspace for new buildings.
- Requiring high-efficiency appliances in new construction and retrofits.
- Providing incentives, such as permitting and fee advantages, tax credits, financing incentives (such as "green mortgages"), or other inducements to encourage retrofit of existing residential and commercial buildings or for the development of non-traditional off-grid low and carbon neutral energy sources. The state can work with financial institutions to develop loan tools for these programs.

Advanced/next-generation building design requirements might include use of specific materials (e.g., local building materials), implementation of specific technologies (e.g., energy-efficient roofing materials and landscaping to lower electricity demand), or attainment of points under an advanced standard (e.g., green building or sustainable design). Energy-reduction targets should be periodically reassessed.

Potential measures supporting this policy can include outreach and public education, public recognition programs, improved enforcement of building codes, encouraging or providing incentives for energy tracking and benchmarking, performance contracting/shared savings arrangements, technical support resources for implementation, development of a clearinghouse for information on and access to software tools to calculate the impact of energy efficiency and solar technologies on building energy performance.

Types(s) of GHG Reductions

TBD.

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	2050	Units
GHG Emission Savings	0.04	0.53	6.28	MMtCO2e
Net Present Value (2008-2050)	0.08	–35.0	–633.8	$ Million
Cumulative Reductions (2008-2050)	0.05	2.54	114.6	MMtCO2e
Cost-Effectiveness	–13.3	–12.8	–3.3	$/tCO2e

Formatted: Font: (Default) Arial, 10 pt

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Key Assumptions:

- The energy efficiency programs begin in 2010 and end after 2025.
- The change to the building code improving energy efficiency by 15% takes effect in 2012, with another change occurring in 2025 to boost efficiency by 50% from baseline, with overall efficiency of building stock rising annually as new space is built to the new codes. Improvements in efficiency are assumed to be constant from 2013 until 2025.
- New building space, including that which has undergone major renovation, is assumed to grow by 6% annually in both the residential and commercial sectors.
- 40% of all energy consumption in Iowa is assumed to be attributed to buildings in the residential and commercials sectors.
- One-third of all building space in Iowa is assumed to be residential and one-third commercial.
- Building space in Iowa in 2008 is assumed to be 160 million square feet.
- The annual rate at which buildings will be demolished is assumed to be 3% in both the residential and commercial sectors.
- The standard life of a building is assumed to be 50 years.
- The annual cost to administer the program: $500,000
- Escalation rate for cost of energy efficiency programs: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Assume fuel costs remain constant after 2030.
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2010.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs].

Formatted: Font: (Default) Arial, 10 pt

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-5. Incentives for Energy Efficiency

Policy Description

The Iowa Utilities Board (IUB) is charged with responsibility for energy efficiency programs and energy efficiency plans by Iowa utilities. Investor-owned utilities conduct energy efficiency programs under plans which are reviewed and approved by the IUB. Consumer-owned utilities (municipal utilities and electric cooperatives) operate voluntary plans and programs, but must provide reports on their plans to the IUB. Energy efficiency plans in Iowa address both electric and natural gas use through a variety of programs.

Incentive approaches are of three types: (1) incentives offered by governing bodies to utilities to induce superior utility performance in implementing DSM programs, (2) incentives offered by utilities to customers to induce customers to participate in programs and make investments, and (3) incentives offered to other energy efficiency stakeholders.

Policy Design

Goals: 5% improvement in energy efficiency from Type 1 incentives and 5% improvement from Type 2, and 5% for Type 3.

Timing: Incentives offered and energy improvements realized beginning 2012.

Implementing Parties:

- Residential and commercial property owners and tenants
- Government housing and other state and federal government agencies
- Weatherization and energy service providers
- Local business associations
- Community Action Agencies/Human Resource Development Councils
- Non-governmental organizations such as Habitat for Humanity
- HVAC contractors
- Building contractors/design firms
- Lenders
- Retailers of energy efficient products and services
- Residential/Commercial energy audit contractors

Other: TBD.

Formatted: Font: (Default) Arial, 10 pt

Implementation Mechanisms

Type 1 incentives to utilities. Implementation of various incentives to utilities would likely require legislative action to reverse the statutory decision to terminate incentives to investor-owned utilities.

Type 2 incentives to utility customers. Incentives to customers of investor-owned utilities are reviewed and authorized by the Iowa Utilities Board in contested case proceedings for the review of energy efficiency plans. Proceedings are currently underway for the review of new (2009-2013) energy efficiency plans. Incentives to customers or members of municipal utilities and electric cooperatives are solely at the discretion of each customer-owned utility.

Type 3 incentives to other energy efficiency stakeholders such as retailers, contractors and designers. Incentives to these stakeholders from investor-owned utilities are implemented after review and authorization of utility plans by the Iowa Utilities Board. Incentives to these stakeholders that target customers or members of municipal utilities and electric cooperatives are solely at the discretion of each customer-owned utility. Incentives to these stakeholders from other entities such as units of state or local government would require action by those governing bodies.

Related Policies/Programs in Place

Type 1 incentives to investor-owned utilities. Iowa investor-owned utilities (IOUs) have a long history of conducting DSM programs, under statutes adopted in 1990 and modified in 1996. The original statutes enacted in 1990 authorized the Iowa Utilities Board to approve incentives for IOUs. The Iowa Utilities Board developed rules that permitted the IOUS to seek incentives, including:

- Carrying charges on energy efficiency program costs, which were deferred until final approval.
- Returns on costs approved for recovery, which were earned over a four-year amortization period.
- A reward mechanism based on the net societal benefits results of each IOUs' programs, up to as much as 25% of the net societal benefits.
- Opportunity to apply for recovery of net revenues reduced by DSM programs.

The revision of the energy efficiency statutes in 1996 removed all of these incentive mechanisms, and substituted an automatic adjustment mechanism for cost recovery, which accelerated IOUs' recovery of costs and eliminated the additional costs of incentives. Incentives are now back in discussion, based on the assumption that Iowa IOUs might improve their DSM performance very much beyond current levels of energy and capacity savings if they are given an incentive for doing so.

Potential mechanisms for incentives to IOUs could include the following:

- Decouple IOU revenues from sales of electricity or natural gas.

Formatted: Font: (Default) Arial, 10 pt

- Allow IOUs to rate-base their energy efficiency expenditures and earn returns on these investments.
- Allow IOUs to recover revenues which decrease due to DSM, net of utility system cost savings.
- Allow IOUs to implement a revenue normalization mechanism to recognize impacts of declining per customer sales due to DSM and other causes while also recognizing additional sales due to customer growth.
- Allow IOUs to offer all DSM programs as shared-savings or Pay-As-You-Go loan programs, with the interest or earnings on these loans retained as earnings by the IOUs.
- Offer the IOUs some form of monetary reward based on amounts of capacity and energy saved, recoverable from customers as part of DSM costs.
- Evaluate alternative rate regulation structures to better align utility interests with energy efficiency goals. For example, MidAmerican's revenue sharing mechanism incorporates an element of reward for energy efficiency because energy efficiency contributes to the utility's ability to sell electricity in the wholesale market and generate additional revenues that are, pursuant to the revenue sharing arrangement, allocated between the utility and its customers. Thus, the utility and its customers are rewarded for energy efficiency.
- Allow IOUs to "own" all or part of the "carbon credit" impact of capacity and energy saved by DSM programs, and allow the IOUs to retain as earnings any funds received from sale of credits based on these savings, above a certain level.
- Require IOUs to document performance and penalize IOUs which do not meet specific goals by certain dates, to the extent that there is inadequacy in the current Iowa statutes and rules requiring program documentation and allowing the Board to conduct prudence reviews and impose penalties.

Type 2 incentives, to utility customers.

Iowa IOUs offer incentives for participation in DSM programs to customers in many forms, including:

- Rate discounts or payments to participants in load management programs, for savings of peak load electric kW.
- Time-of-use rates to electric customers which offer lower rates off-peak and much higher rates during peak electric use periods.
- Free energy audits and simple on-site energy efficiency measures installed during audits.
- Advanced energy efficiency evaluation and design services, typically for nonresidential customers.
- Assistance to residential homebuilders in the form of training, inspection of homes, cash payments for meeting standards and certification/recognition of highly efficiency homes.
- Rebates to customers for purchasing energy-efficient appliances and equipment.
- Loans to customers for purchase of energy-efficient appliances and equipment.

Formatted: Font: (Default) Arial, 10 pt

- Customer education and training on energy efficient appliances and measures (including, but not limited to insulation, infiltration, building weatherization measures, and HVAC sizing and maintenance).

Other customer incentives may be possible.

Type 3 incentives, to other energy efficiency stakeholders

Another solution to the assumption that Iowa IOUs will not improve their DSM performance very much beyond current levels of energy and capacity savings is to transfer the administration of energy efficiency programs to an independent, third-party administrator. The independent third-party administrator would be subject to a performance-based compensation structure including incentives for superior performance.

Another means of overcoming the utilities' disincentive to aggressively promote DSM programs and achieve energy efficiency results is to replace the current system of utility administered incentives with a system that provides incentives directly to retailers of energy efficient products and services, energy efficient product lenders, and building contractors/designers. Some utilities currently offer these stakeholders incentives to promote energy efficient products, including training, free publicity and per-item restocking payments to dealers and sales people for promotion of energy efficient appliances and equipment. Similarly, incentives could be paid directly to marketing firms to advertise and educate consumers about energy efficient products and energy efficiency services.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	2050	Units
GHG Emission Savings	0.36	2.18	4.23	MMtCO2e
Net Present Value (2008-2050)	0.6	–3.9	–61.2	$ Million
Cumulative Reductions (2008-2050)	0.33	13.31	139.1	MMtCO2e
Cost-Effectiveness	0.68	–0.55	–0.33	$/tCO2e

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Formatted: Font: (Default) Arial, 10 pt

Key Assumptions:

- The reduction in use of various fuel types as a result of the decreased energy demand is assumed to reflect Iowa's mix of fossil fuels.
- The energy efficiency programs begin in 2012 and end after 2030.
- The three types of incentives will each improve efficiency by 5.0% *over the improvements made in EEC-1*.
- New building space, including that which has undergone major renovation, is assumed to
- The annual cost to administer the program: $500,000
- Escalation rate for cost of energy efficiency programs: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Assume fuel costs remain constant after 2030.
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-6. Promotion and Incentives for Improved Design and Construction in the Private Sector

Policy Description

This policy provides incentives and targets to induce the owners and developers of new residential and commercial buildings to improve the efficiency with which energy and other resources are used in those buildings, along with provisions for raising targets periodically and providing resources to building industry professionals to help achieve the desired building performance. This policy can include elements to encourage the improvement and review of energy use goals over time, and to encourage flexibility in contracting arrangements to encourage integrated energy- and resource efficient design and construction.

Policy Design

Goals: Reduce energy consumption by the equivalent of 10% of retail electric sales and natural gas in residential and commercial buildings.

Timing: Compliance will begin on January 1, 2010.

Implementing Parties: Building industry professionals, architects

Other: TBD

Implementation Mechanisms

Adoption of and changes to the state energy code are within the purview of the Building Code Commissioner.

Incentives for improved building construction are offered by various utilities. Incentives offered by investor-owned utilities are covered in the Types 2 and 3 incentives of EEC-5. Adoption of tax incentives or other government-funded incentives would likely require legislative action. These incentives to take the form of _____

Related Policies/Programs in Place

The Iowa Building Code Commissioner has initiated a practice of updating the State Energy Code every three years, as new editions of the International Energy Conservation Code are published. In addition, annual revisions have been and will continue to be made to the rules to improve enforcement.

During the 2008 session of the Iowa General Assembly, several pieces of legislation were enacted which will encourage greater energy efficiency, including Senate File 517, which extended the applicability of the State Energy Code, provides for the adoption of sustainable design standards for the state by the Building Code Commissioner, and revises provisions related to the Energy Bank administered by the Department of Natural Resources, and Senate File 2386,

Formatted: Font: (Default) Arial, 10 pt

which establishes a two-year commission to study and report on ways to improve energy codes and their enforcement in Iowa.

Iowa rate-regulated utilities have a long history of offering energy efficiency programs focusing on new construction practices, under statutes adopted in 1990 and modified in 1996. Programs have differentiated between the residential and non-residential sectors. In this decade the rate-regulated utilities have increased their efforts to offer coordinated programs that offer similar program design and program incentives in both sectors. The residential sector has seen multi-option programs with both builder option and Energy Star emphases. The non-residential sector has seen a multi-tiered approach focusing on design team assistance, design team incentives and owner incentives.

Additional potential elements of this option include:

- Target new, renovated, and/or existing buildings (retrofits).
- Set a cap on consumption of energy per unit area of floorspace for new buildings.
- Encourage building commissioning and recommissioning, including energy tracking and benchmarking.
- Set up a "feebate" program to encourage energy efficiency in building design.
- Provide incentives, in the form of tax credits, DSM program support, financing incentives (such as "green mortgages"), or other inducements for retrofit of existing residential and commercial buildings.
- Encourage the use of alternative and local building materials and practices.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	2050	Units
GHG Emission Savings	1.27	3.76	8.15	MMtCO2e
Net Present Value (2008-2050)	–278.2	–2,544	–17,462	$ Million
Cumulative Reductions (2008-2050)	2.59	24.67	213.5	MMtCO2e
Cost-Effectiveness	–181.8	–179.5	–175.4	$/tCO2e

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.

Formatted: Font: (Default) Arial, 10 pt

- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Key Assumptions:

- The energy efficiency programs begin in 2010 and continue through 2050.
- Since by definition sales can only be reduced by 100%, the reduction each year is calculated as 10% of the sales *remaining* in the prior year.
- 40% of all energy consumption in Iowa is assumed to be attributed to buildings.
- The distribution of building space in Iowa is assumed to be 60% residential, 35% commercial and 5% industrial.
- Building space in Iowa in 2008 is assumed to be 160 million square feet.
- New building space, including that which has undergone major renovation, is assumed to grow by 6% annually in all sectors.
- The annual rate at which buildings will be demolished is assumed to be 3% in all sectors.
- The standard life of a building is assumed to be 50 years.
- The annual cost to administer the program: $500,000
- The escalation rate for the cost of the energy efficiency programs: 5% annually
- The escalation rate for the cost of natural gas: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Assume fuel costs remain constant after 2030.
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2010.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Formatted: Font: (Default) Arial, 10 pt

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-7. Training and Education for Builders and Contractors

Policy Description

This option refers to an education and outreach program for building professionals, including builders and architects, to encourage incorporation of energy-efficiency and greenhouse gas emissions-reduction measures into construction. These programs can train builders and contractors on a variety of relevant energy efficiency issues, such as building shell design, insulation, proper heating and air conditioning sizing and installation, and can be supported by requirements that licensing requirements for design and building trade professionals address knowledge of techniques for reducing energy use and sustainable design.

Policy Design

Goals: Implement training and education of design and building trade professionals to ensure improvements in energy efficiency and conservation in new and existing buildings.

Timing: Training and education programs in place by 2010.

Implementing Parties: Department of Public Safety, Department of Natural Resources, Office for Energy Independence, local code enforcement agencies; Iowa Association of Building Officials, American Institute of Architects, Iowa Chapter, Iowa Engineering Society, Iowa Building Trades Council,; Master Builders of Iowa, Associated Building Contractors, Iowa Center for Sustainable Communities, code writing bodies, including the International Code Council, organizations sponsoring and promoting sustainable design, such as the U.S. Green Building Council, community colleges; universities.

Other: TBD

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

Not quantifiable

Data Sources: Not applicable.

Quantification Methods: Not applicable.

Formatted: Font: (Default) Arial, 10 pt

Key Assumptions: Not applicable.

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-8. Technology improvements in targeted markets

Policy Description

Energy efficiency programs, funds, or goals, such as improved weatherization and appliances/HVAC, that focus on specific market segments at rental properties and low income residential units. Targeting specific market segments can also be an effective component of a regional market transformation alliance.

Policy Design

Goals: 15% improvement in energy efficiency.

Timing: Improvements realized beginning in 2010 at 1% per year for 3 years, then 1.5% for 4 years, then 2% per year until achieved.

Implementing Parties: builders, contractors, landlords, and others TBD

Other: TBD

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Iowa's investor-owned electric and gas utilities since 1990 have been mandated to have separate low-income energy efficiency policies and before that date some companies had done so voluntarily. Another market segment that has unique challenges is rental property (both residential and commercial), where tenants pay energy bills but landlords maintain the facilities. Some policy approaches for these important segments include:

- Expanding Iowa's Weatherization Assistance Program to make the homes of low-income Iowans more energy-efficient.
- Develop minimum efficiency goals for rental properties, such as use of CFL's, and use of energy-efficient appliances. Evaluate each unit with the departure of current tenants via a pre-rental inspection program before a new tenant takes possession.
- Provide financial mechanisms to assist with the retrofitting of rental properties with energy-efficient appliances, insulation, and high efficiency furnaces.
- Establish a shared savings or zero-interest loan program to make energy-efficient appliances affordable for everyone.
- Design policies that allow paying for energy efficient appliances over time on residential utility bills.

Formatted: Font: (Default) Arial, 10 pt

Auction any emissions allowances made available in a regional cap-and-trade system and use the proceeds for renewable energy and efficiency investments and assistance for low income families.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	2050	Units
GHG Emission Savings	0.18	1.00	1.34	MMtCO2e
Net Present Value (2008-2050)	–6.7	–84.0	–311.3	$ Million
Cumulative Reductions (2008-2050)	0.36	5.58	40.98	MMtCO2e
Cost-Effectiveness	–18.6	–13.2	–3.3	$/tCO2e

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Key Assumptions:

- The energy efficiency programs begin in 2010, with energy efficiency improvements in rental properties and low-income residential units assumed to be 1% per year for 3 years, 1.5% for 4 years, then 2% per year until a cumulative reduction of 15% is achieved in the targeted buildings. With this trajectory, a 15% cumulative reduction is reached in 2019, after which the program ends.
- 40% of all energy consumption in Iowa is attributed to buildings.
- The distribution of building space in Iowa is assumed to be 60% residential, 35% commercial and 5% industrial.
- It is assumed that 2% of residential buildings are low-income housing, and half of both residential and commercials buildings are rentals.
- Building space in Iowa in 2008 is assumed to be 160 million square feet.
- New building space, including that which has undergone major renovation, is assumed to grow by 6% annually in all sectors.
- The annual rate at which buildings will be demolished is assumed to be 3% in all sectors.

Formatted: Font: (Default) Arial, 10 pt

- The standard life of a building is assumed to be 50 years.
- The annual cost to administer the program: $500,000
- The escalation rate for the cost of the energy efficiency programs: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Assume fuel costs remain constant after 2030.
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2010.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-9. Midwestern Governors Association Energy Security and Climate Stewardship Platform

Policy Description

In November 2007, Governor Culver signed on to the Midwestern Governors Association Energy Security and Climate Stewardship Platform. This policy is designed to address the energy efficiency goal of meeting at least 2% of the region's annual retail sales of natural gas and electricity through energy efficiency programs by 2015 and annually thereafter.

This policy option will require all of Iowa's utilities; investor owned, municipal and cooperatives to save at least 2% of their annual retail sales of natural gas and electricity through energy efficiency programs by 2015 and annually thereafter.

Policy Design

Goals:

- Translate regional goal of at least 2% of the region's annual retail sales of natural gas and electricity through energy efficiency by 2015 and annually thereafter into an IA-specific goal
- Reduce electricity consumption through efficiency measures in every year after 2015. Electric use has in Iowa has increased at 1.5% from 2000 to 2006 and consequently, efficiency can reduce any increase in demand.
- Natural gas increases have been greater than 2% recently. New goals must be considered to reduce natural gas increases.

Timing: See above.

Implementing Parties: All electric and gas suppliers; energy related centers at the state Regents institutions

Other: TBD

Implementation Mechanisms

TBD

Related Policies/Programs in Place

See Governor Culver's Executive Oder 6 (February 2008) and Governor Vilsack's Executive Order 41 (April 2005).

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

Formatted: Font: (Default) Arial, 10 pt

	2012	2020	2050	Units
GHG Emission Savings	0	6.1	45.3	MMtCO2e
Net Present Value (2008-2050)	0	–1,026.1	–36,132	$ Million
Cumulative Reductions (2008-2050)	0	20.9	772.2	MMtCO2e
Cost-Effectiveness	0	–155.1	–150.3	$/tCO2e

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Key Assumptions:

- The reduction in use of various fuel types as a result of the decreased energy demand is assumed to reflect Iowa's mix of fossil fuels.
- Iowa utilities begin reducing 2% of their annual retail sales in 2015 and continue through 2050.
- The annual cost to administer the program: $500,000
- Escalation rate for the cost of the energy efficiency programs: 5% annually
- Escalation rate for the cost of natural gas: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Assume fuel costs remain constant after 2030.
- Net present value is calculated beginning 2009.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Formatted: Font: (Default) Arial, 10 pt

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-10. Energy Management Training/Building Operators

Policy Description

In many facilities, utility bills can be significantly decreased through more efficient equipment and building operation. Administrative and technical training can inform and encourage energy managers, school officials, building operators, and others responsible for facility energy efficiency to utilize methods for minimizing unnecessary energy waste. This policy would increase education and demonstrate the benefits of energy efficient building operation through government "Lead-by-Example" of energy service contracting.

Policy Design

Goals: require energy managers and facility operators in all sectors to obtain certification for successful completion of the training program.

Timing: Starting in 2010

Implementing Parties: State and local entities, private energy managers and facility operators throughout the state

Other: TBD

Implementation Mechanisms

Specifically, this policy involves developing, implementing, and requiring a statewide energy efficiency and conservation education and training program for energy managers and facility operators to learn techniques for improving the efficiency of their steam, process heat, pumping, compressed air, motors, and other systems. Successful completion of this training would be required for energy managers and facility operators in all sectors (residential, commercial, industrial, and institutional) by a licensing requirement, which would need to be established. Continuing education credits would be required annually.

A key organization in implementing EE training for building operators would be BOMA (Building Owners and Managers Association). .

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

Not quantified

Data Sources: Not applicable.

Formatted: Font: (Default) Arial, 10 pt

Quantification Methods: Not applicable.

Key Assumptions: Not applicable.

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-11. Rate Structures

Policy Description

This option could include various elements of utility rate design that are geared toward reducing greenhouse gas emissions, often with other benefits as well, such as reducing peak power demand. The overall goal is to present rate structures so as to better reflect the actual economic and environmental costs of producing and delivering electricity as those costs vary by time of day, day of the week, season of the year and from year to year. In this way, rates provide consumers with information reflecting the impacts of their consumption choices.

Policy Design

Goals: Reduce electricity consumption through pricing by 2.0% of retail sales.

Timing: Compliance will begin on January 1, 2010.

Implementing Parties: All Iowa utilities and utility customers.

Other: TBD

Implementation Mechanisms

- Programs for customers of investor-owned utilities are reviewed and authorized by the Iowa Utilities Board (Board) in contested case proceedings for the review of energy efficiency plans. Proceedings—labeled EEP proceedings—are currently underway for the review of new (2009-2013) energy efficiency plans. The current plans of investor-owned utilities include two types of rate programs, residential direct load control programs and nonresidential interruptible programs.
- The relationship of EEP proceedings to traditional rate proceedings—labeled RPU proceedings—for rate and revenue design in programs besides direct load control and interruptible programs, such as those listed in the Related Polices section below, has not been taken up in Iowa. The other rate design options (beyond interruptible and direct load control), to the extent currently available, have been implemented through general rate case proceedings. The Board examines rate-regulated utilities' rate structures in rate proceedings to be sure that the rate structures in place send the appropriate price signals.
- Section 1252 of EPAct 2005 established PURPA Standard 14 entitled "Time-Based Metering and Communications," which directed the Board to consider adopting four types of time-based rate schedules: time-of-use pricing, critical peak pricing, real-time pricing, and load management programs. The Board declined to adopt PURPA Standard 14 in its entirety, finding that rate proceedings are the appropriate forum for many of these issues. (IUB Docket No. NOI-06-3 (Mar. 6, 2007). The Board intends to begin informal discussions with interested participants regarding these topics and potential pilot projects.
- Programs for customers or members of municipal utilities and electric cooperatives are solely at the discretion of each customer-owned utility. The Board hopes the consumer-owned

Formatted: Font: (Default) Arial, 10 pt

utilities will be active in ongoing discussions and potential pilot programs to test other rate design options beyond the well-established load management programs.

Related Policies/Programs in Place

Rate-regulated utilities have employed two types of rate structures for many years and in some cases for many decades:

- **Seasonal rates**, typically with higher prices in the season of the year when demand and prices are the highest. In Iowa the higher season is typically a summer period of three to four months duration.
- **Time-of-day (TOD) rates**, which typically price electricity higher at times of higher power demand, based on either a two- or three-tier time-differentiated structure, and thus better reflect the actual cost of generation, transmission and distribution. Time-of-use rates may or may not have a significant impact on total GHG emissions, but do affect on-peak power demand and thus both the need for peaking capacity and fuel for peaking plants.

Other possible policy mechanisms include several that have been offered on a much more limited basis:

- **Critical peak pricing** or extreme-day pricing refers to programs aiming to reduce system demand by encouraging customers to reduce their loads for a limited number of hours during the year. CPP programs integrate a pricing structure similar to TOD with the distinction of more extreme pricing signals for the critical events. (A price structure in which the extreme price is fixed by tariff reduces to a multi-tiered time-of-day rate.)
- **Real-time pricing** is a tariff structure for customers to pay electric rates tied to market prices for energy. The prices are typically posted by the utility based on day-ahead hourly prices but couple be posted on a real-time basis.
- **Inverted block pricing** (tiered/increasing peak) where rates for electricity and natural gas use include a rate for some base usage level and increased rates for higher levels of consumption.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	2050	Units
GHG Emission Savings	2.2	8.8	15.5	MMtCO2e
Net Present Value (2008-2050)	–9.0	–93.6	–495.0	$ Million
Cumulative Reductions (2008-2050)	4.0	52.8	476.8	MMtCO2e
Cost-Effectiveness	–2.2	–1.6	–55	$/tCO2e

Formatted: Font: (Default) Arial, 10 pt

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Key Assumptions:

- The reduction in use of various fuel types as a result of the decreased energy demand is assumed to reflect Iowa's mix of fossil fuels.
- Changes in pricing reduce retail sales by 2%—relative to 2009 sales—beginning in 2010 and continuing annually from the 2009 baseline through 2025.
- The annual cost to administer the program: $500,000
- Escalation rate for the cost of the energy efficiency programs: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Assume fuel costs remain constant after 2030.
- Net present value is calculated beginning 2009.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

There is uncertainty as to the benefits and costs of rate options and rate designs that are dependant on utility-wide implementation of real-time metering. IUB Docket No. NOI-06-3.

Additional Benefits and Costs

Metering and associated infrastructure investments needed to support real-time pricing offers the potential for additional cost savings to the utility.

Feasibility Issues

Identifying the cost of metering and associated infrastructure investment needed to support various pricing options

Designing rate programs that customers will embrace

Quantifying energy impacts associated with various rate options

Formatted: Font: (Default) Arial, 10 pt

Educating customers about pricing options in order to obtain anticipated energy benefits

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-12. Consumer Education Programs

Policy Description

The ultimate effectiveness of emissions reduction activities in many cases depends on providing information and education to consumers regarding the energy and GHG emissions implications of consumer choices. Public education and outreach is vital to fostering a broad awareness of climate change issues and effects (including co-benefits, such as clean air and public health) among the state's citizens. Such awareness is necessary to engage citizens in actions to reduce GHG emissions in their personal and professional lives. Public education and outreach efforts should integrate with and build upon existing outreach efforts involving climate change and related issues in the state. Ultimately, public education and outreach will be the foundation for the long-term success of all of the mitigation actions proposed in the climate change planning process, as well as those that may evolve in the future.

This option focuses on public education and outreach to stimulate decisions that yield energy efficiency savings. Consumer education is an integral component of most existing DSM programs offered by investor-owned and consumer-owned utilities.

Policy Design

Goals: Achieve 5% reduction in residential energy consumption.

Timing: 1% reduction beginning in 2010 and increased linearly to 5% in 2020

Implementing Parties: State energy office, community colleges, secondary schools, building professional trade groups, utilities.

Other: TBD

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Possible policy mechanisms include:

- Evaluate techniques for assessing the impact of various educational efforts and disseminate standard methodology to utilities, the IUB, and others.
- Use the 2007 Iowa Residential Energy Survey to guide educational programs and efforts.
- Implement Energy Districts
- Energy districts are based on the conservation district model of the 1930s and 40s that created a unique local-state-federal partnership to bring conservation technical and financial assistance to every farm. This locally-led process could make energy efficiency a highly-visible local economic development tool. Districts could participate in national programs;

Formatted: Font: (Default) Arial, 10 pt

partner with local business for a "distributed efficiency storefront"; develop agricultural energy initiatives with local conservation district, USDA, and Extension partners; develop a local carbon offset program with funds and offsets entirely within county; work with utilities to encourage local distributed generation.

- Work with the Center for Energy and Environmental Education at UNI, the Iowa Department of Education, and other appropriate agencies to better incorporate energy efficiency in education curricula. (If there is an official Iowa entity charged with the responsibility for developing energy-related curricula, it is the Center for Energy and Environmental Education at UNI (Pat Higby). We would be remiss not to include CEEE as a significant mechanism for consumer education.)
- Develop and present/distribute seminars and/or publications aimed at residential consumers about state/federal tax credits for investment in energy efficient technologies and practices, what renters can do to improve energy efficiency, availability of green mortgages, and sources for self-liquidating financing of energy efficiency technologies.
- Develop and present/distribute seminars and/or publications aimed at housing professionals (builders, architects, realtors, appraisers, bankers, landlords and others) to extend information about green mortgages, self-liquidating financing, Energy Star, NAHB and LEED home certification standards, and benefits of efficiency investments by landlords.
- Develop and present/distribute seminars and/or publications aimed at commercial and industrial consumers to extend information about tax credits, best practices (such as Google, 3M, Wal-Mart), and such available resources as Industrial Assessment Center (ISU), National Building Control Information Program, National Association of Home Builders, Iowa Energy Center, etc.
- Develop and present/distribute seminars and/or publications aimed at HVAC contractors. (Utilities are starting to require really high levels of service that many contractors just can't provide right now.)
- Display energy efficiency measures in retail outlets and other public settings
- Determine education efforts that will be needed to support other new/expanded energy efficiency initiatives, including but not necessarily limited to: 1) expanded Weatherization Assistance Program to make the homes of low-income Iowans more energy-efficient; 2) develop minimum energy efficiency standards and enforcement mechanism for rental properties; 3) develop financial incentives to more effectively encourage retrofitting of rental properties with energy efficient appliances and weatherization measures; and 4) develop financing mechanisms to make energy-efficient appliances affordable for everyone. [Suggestion: include reference to partnering with the Iowa Department of Economic Development, local conservation districts, USDA, ISU Extension, and the Center for Sustainable Communities, among others.]
- Utilize and promote Iowa State University's Industrial Assessment Center to extend information about energy efficiency to Iowa business and industry.
- Municipal utilities, through IAMU, have developed a new direct mail energy and environmental magazine called "Eco@Home." IAMU is also developing an energy-related "town meeting kit" for its members.

Formatted: Font: (Default) Arial, 10 pt

While utility energy efficiency plans must be cost-effective, the Iowa General Assembly (2007 session) amended Iowa Code section 476.6(14), which provides that educational programs and assessments of consumers' needs for information to make effective choices regarding energy use and energy efficiency need not be cost-effective. (Laws of the Eighty-Second G.A., H.F. 918).

- Low-income education programs delivered by CAP agencies through investor-owned energy efficiency programs;
- Energy efficiency curriculum developed by MidAmerican Energy;
- School energy efficiency kits (4^{th}-6^{th} Grade) distributed by Aquila.
- The Iowa Energy Center "shall cooperate with the state board of education in developing a curriculum which promotes energy efficiency and conservation." Iowa Code § 266.39C(4). After experiencing difficulties implementing a state-wide energy curriculum (see Feasibility issues below), the Energy Center has sponsored Iowa teachers (covering both conference and travel expenses) to attend NEED (National Energy Education Development) training conferences. With a range of sponsors and a core staff, NEED has materials available and continuously up to date. In recent years, the NEED training sponsorship has been extended to 4-H leaders.
- Iowa Energy Center devotes the largest portions of its funds on energy efficiency research, demonstration projects and education projects, addressing energy use in agricultural, industrial, commercial, municipal and residential settings. In the last several years, the Iowa Energy Center has developed the Residential Home Series Booklets, www.energy.iastate.edu/homeseries/index.htm. The Energy Center has reached cooperative agreements that allow for their reproduction and use in neighboring states.
- USDA's Section 9006 Renewable Energy & Energy Efficiency Program.
- Muscatine Power & Water has an energy efficiency curriculum they have used for several years with local schools.
- Some municipal utilities and RECs have educational programs or comprehensive curriculum in their service territories.
- Independence Municipal Utilities utilizes a new program from its power supplier, Wisconsin Public Power Inc.that may represent an emerging good practice for supporting development of customer-owned small-scale renewable generation.
- Wisconsin has a statewide comprehensive curriculum, KEEP, which could serve as a model for a similar program in Iowa.
- CEEE has many individual programs for encouraging energy education for students.
- Some utilities provide scholarships to Building Operator Certification training.

Additional resources: www.energystar.gov and www.energytaxincentives.org.

Types(s) of GHG Reductions

TBD

Formatted: Font: (Default) Arial, 10 pt

Estimated GHG Reductions and Net Costs or Cost Savings

Data Sources: Not applicable.

Quantification Methods: Not applicable.

Key Assumptions: Not applicable.

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-13. Government Lead by Example: Improved Design and Construction in New and Existing State and Local Government Buildings

Policy Description

The State of Iowa and Municipal and County Governments can provide leadership in energy efficiency by adopting policies that improve the energy efficiency of new and renovated public buildings. This option provides energy use targets to improve the efficiency of energy use in new and existing State and local government buildings that are much higher than code standards.

Policy Design

Goals:

- Mandate that all new construction and major renovations of government-owned buildings, including schools and publicly-owned hospitals, meet sustainable design standards:
- Starting in 2008: All new state buildings and major renovations shall be designed to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 50% of the regional average for that building type.
- The fossil fuel reduction standard for all new buildings shall be increased to:
  - 60% in 2010
  - 70% in 2015
  - 80% in 2020
  - 90% in 2025

All state buildings shall be carbon-neutral in 2030 (zero net energy, using no fossil fuel GHG emitting energy to operate).

Timing: See above.

Implementing Parties: State and local governments; Capitol Planning organization, all three Regents institutions, Iowa Association of Counties; League of Cities, Iowa Association of School Boards, Iowa State Education Association, School Administrators organization, private contractors, State Building Trades organization

Implementation Mechanisms

These goals can be made by a combination of demand reduction measures, on-site carbon neutral generation and grid based green power purchases. Green power purchases shall exceed the amount of green power purchases already provided by the utility.

- Mandate that all new construction and major renovations of government-owned buildings, including schools and publicly-owned hospitals, meet the following standards:
  - LEED™ Silver, for buildings that are constructed between 2009 and 2012;
  - LEED™ Gold, for buildings that are constructed between 2013 and 2016;

Formatted: Font: (Default) Arial, 10 pt

- LEED™ Platinum, for buildings that are constructed between 2017 and 2020.

- **Collect Data on State and Local Government Building and Facilities Energy Use.** A key implementation mechanism for this option will be to first provide a thorough assessment of the status and energy consumption of all existing State and local government buildings, including establishing a database of buildings and building attributes including floor area, insulation level, energy-using equipment, and history of energy consumption. This baseline, or "carbon footprint," will be used to assess program success.
- **Benchmark State Buildings:** Benchmarking is a process of using the data on building size, use, and energy use to quickly compare a building against others of similar size and use to get an idea of how efficiently the building is operating. It is an important step in identifying opportunities for savings and prioritizing work to be done.
- **Commission State Buildings:** Building commissioning is a process of reviewing and tuning up the operation of building systems and controls much like the tune-up of a vehicle. Potential targets for commissioning might include commissioning of state buildings upon completion of construction or renovation and whenever the energy use in a building shows an unexpected and unexplained increase in energy use.
- **Purchase Green Power:** Enter into agreements to purchase green power for a portion of the states electricity needs as laid out in Iowa Gov. Tom Vilsack's Executive Order 41 on Energy Efficiency and Renewable Energy on April 22, 2005 and Iowa Governor Chet Culver's Executive Order 6 on the same topic issued in February 2008. Increase purchases over time until 30% of power needs are met through direct use of renewable energy or green power purchased by 2030.
- **Energy Use Targets:** Set targets for energy use in the operation of state buildings, potentially including capping state and local building and facilities energy use per square foot. Motion sensors are a specific technology for reducing lighting energy use in government buildings that may have broad application.
- **Renovate State and Local Buildings and Facilities through a Buildings and Facilities Energy Program:** Renovate all state and local buildings and facilities with more than 5,000 square feet and smaller buildings identified through energy benchmark process as having a high potential for energy savings within 5 years. The State and locals buildings and facilities energy program will provide funds for energy audits, engineering analyses, and renovation costs.
- **Develop and Use Renewable Energy Resources:** Evaluate the potential for direct use of solar, wind, biomass, geothermal, and hydro power to meet the needs of state government operations. Take advantage of these renewable resources whenever it is cost-effective to do so, and as a means to lead by example in investing in these systems when it is practical to do so.
- **Carbon-Neutral Bonding:** Climate-neutral bonding will require that any building projects financed with the issuance of state, county, or local/municipal bonds result in no net increase in GHG emissions. If a new construction project is projected to result in an emissions increase, there must be GHG emissions offsets within the state or particular jurisdiction. Offsets could include onsite renewable energy development, renewable energy purchases,

energy efficiency (in existing state buildings), carbon sequestration (tree planting), and switching to cleaner or renewable fuels. Any GHGs emitted after the bond-financed project becomes operational will have to be offset. The new buildings could also offset their emissions by purchasing renewable electricity from their local utility. Paying a premium for what's known as "green pricing" electricity will usually be a more expensive offset option than energy efficiency. A community or state could install their own renewable energy project as a way to offset heir GHG emissions.

- **Monitoring and Verification:** conduct periodic reviews of building energy use over time.

Related Policies/Programs in Place

See Governor Culver's Executive Order 6. which requires State buildings to reduce energy use by 15% by 2015.

Elements of this policy include:

- Government buildings, facilities and related operations (please note this to include wastewater and water utilities) will be in operation for many years and should be designed in a manner that meets or exceeds private sector mandated building and trade energy efficiency. When life cycle cost are considered, the discount rate should be smaller and the assumptions of future energy prices should be higher than those commonly considered in the private sector in order that the state be seen as a leader in energy efficiency and workforce efficiency. All new State buildings and facilities, and renovations and additions shall be Leadership in Energy and Environmental Design (LEED) certified at the Silver, Gold or Platinum level (the stringency of this policy increases over time), and meet or exceed the energy efficiency and renewable energy goals below stated.
- Existing State and local government buildings shall be retrofitted for energy efficiency achieving 100% of cost-effective energy efficiency by the year 2015. To meet this goal, the State and local governments shall benchmark all buildings and facilities within the next 3 years.
- Audits of energy performance and operations of State and other government buildings (in tandem with an audit program). Audit results could be used to target and prioritize investments in improving government building energy efficiency.
- Improvement and review of efficiency goals over time, and development of flexibility in contracting arrangements to encourage integrated energy-efficient design and construction.
- Recommendations that the infrastructure for implementation (meters, accounting systems, staff, etc.) be established as soon as possible.
- Establishing "retained savings" policies whereby government agencies are able to retain funds saved by reducing energy bills for further energy efficiency/renewable energy investments or other uses.
- Require carbon neutral bonding for new construction and renovations and additions. A carbon neutral performance standard will require architects and engineers to design buildings to meet a climate-neutral requirement and built to meet or exceed the state's existing

Formatted: Font: (Default) Arial, 10 pt

sustainable building guidelines and will save the taxpayers money as life-cycle costs will yield lower operational costs.

- Focus incentives on specific technologies, including white roofs, rooftop gardens, and landscaping to lower electricity demand, and solar photovoltaics to provide electricity when demand in highest.

Potential supporting measures for this option include training and certification of building sector professionals but could also include surveys of government energy and water use, energy benchmarking, measurement, and tracking programs for municipal and state buildings.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

	2012	2020	2050	Units
GHG Emission Savings	0.22	0.72	4.12	MMtCO2e
Net Present Value (2008-2050)	–18.7	–113.5	–810.9	$ Million
Cumulative Reductions (2008-2050)	0.56	4.43	76.89	MMtCO2e
Cost-Effectiveness	–31.1	–22.0	–5.73	$/tCO2e

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Key Assumptions:

- The reduced GHGs from state buildings begins in 2008 with new buildings or major renovations emitting 50% less GHGs than older construction. Then emissions are reduced by 60% in 2010, 70% in 2015, 80% in 2020 and 90% in 2025. The reductions in each year are calculated relative to the business-as-usual baseline.
- 40% of all energy consumption in Iowa is attributed to buildings.
- The distribution of building space in Iowa is assumed to be 60% residential, 35% commercial and 5% industrial.

Formatted: Font: (Default) Arial, 10 pt

- It is assumed that the state government owns 5% of residential buildings, 20% of commercial buildings, and 30% of industrial buildings.
- Building space in Iowa in 2008 is assumed to be 160 million square feet.
- New government building space, including that which has undergone major renovation, is assumed to grow by 6% annually in all sectors.
- The annual rate at which buildings will be demolished is assumed to be 3% in all sectors.
- The standard life of a building is assumed to be 50 years.
- The annual cost to administer the program: $500,000
- The escalation rate for the cost of the energy efficiency programs: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Assume fuel costs remain constant after 2030.
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2010.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]

Formatted: Font: (Default) Arial, 10 pt

EEC-14. More stringent appliance efficiency standards

Policy Description

Appliance efficiency standards reduce the market cost of energy efficiency improvements by incorporating technological advances into base appliance models, thereby creating economies of scale. Appliance efficiency standards can be implemented at the state level for appliances not covered by federal standards, or standards can be jointly developed by multiple states.

Policy Design

Goal: achieve 10% in energy consumption from residential consumers, and 5% from commercial and industrial consumers via:

- 80% minimum efficiency standards for appliances not covered by federal standards as recommended by Appliance Standards Awareness Program[1] by 2010.
- 100% market penetration of Energy Star appliances in purchase transactions in which state funds are involved (e.g., state purchasing contracts, state grants or loans, etc.) by 2012.
- A doubling of market penetration of Energy Star appliances in purchases made in the residential, commercial and industrial sectors, where applicable, up to 100%, by 2017.

Timing: As noted above.

Implementing Parties: As noted above.

Other:

Implementation Mechanisms

In order to ensure that appliances purchased in the state will maximize the cost-effective potential for energy efficiency and minimize greenhouse gas emissions, the following policy prescriptions should be considered:

Improved appliance standards for appliances not regulated by federal standards.

More stringent appliance standards at the federal level. Require the preferential procurement of Energy Star products if available (equipment, appliance or technology) if state funds are involved (e.g., state purchasing contracts, state grants or loans, etc.)

State sales tax exemptions, whether temporary or permanent, for Energy Star certified products.

[1] See http://www.standardsasap.org/documents/a062_sc.pdf. The analysis recommends standards for the following products: bottle-type water dispensers, commercial boilers, commercial hot-food-holding containers, compact audio products, DVD players and recorders, liquid immersion distribution transformers, medium voltage dry-type distribution transformers, metal halide lamp fixtures, pool heaters, portable electric spas, residential furnaces and boilers, residential pool pumps, single voltage external AC to DC power supplies, state-regulated incandescent reflector lamps, and walk-in refrigerators and freezers.

Formatted: Font: (Default) Arial, 10 pt

State income tax credits to reduce the incremental cost of Energy Star appliances relative to standard appliances.

Related Policies/Programs in Place

There are existing federal standards for 17 residential products and 11 pieces of commercial equipment. Laws require the U.S. Department of Energy (US DOE) to set minimum appliance efficiency standards that are technologically feasible and economically justified. However, there are many appliances not covered by federal standards for which state standards can play a role.

Energy Star is a joint program of the US EPA and the US DOE designed to promote energy efficient products in the market place. Energy Star products and appliances exceed the energy efficiency mandated by minimum federal and state standards.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	2050	Units
GHG Emission Savings				MMtCO2e
Net Present Value (2008-2050)				$ Million
Cumulative Reductions (2008-2050)				MMtCO2e
Cost-Effectiveness				$/tCO2e

Data Sources:

- Energy Consumption By Sector (billions of Btu). See EEC-1.
- Power Station Electricity Generation (GWh) and Fuel Use (BBtu). See EEC-1.

Quantification Methods:

- Heat Rates (Btu/kWh). See EEC-1.
- GHG Emissions Associated with End-Use Consumption (by Sector). See EEC-1.
- GHG Emissions Associated with Electricity Generation From Different Technologies and Fuels. See EEC-1.

Key Assumptions:

- The reduction in use of various fuel types as a result of the decreased energy demand is assumed to reflect Iowa's mix of fossil fuels.
- Improved appliance standards begin to take effect in 2010, with full implementation by 2017. The energy reductions due to improved appliance efficiency is calculated relative to the business-as-usual baseline.
- Assume that the percent of appliances that are new purchases in any given year is 3%.

Formatted: Font: (Default) Arial, 10 pt

- Assume that appliances account for 20% of total energy consumption.
- Escalation rate for the cost of the energy efficiency programs: 5% annually
- Escalation rate for gross generation and associated CO_2-equivalent emissions beyond 2030: 0.0086 (0.86%)
- Rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Assume fuel costs remain constant after 2030.
- The annual cost to administer the program: $0
- Net present value is calculated beginning 2009.
- Assume all coal generation is from Iowa (no imports).

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

TBD – [as needed and approved by the SCs]

Feasibility Issues

TBD – [as needed and approved by the SCs]

Status of Group Approval

Pending – [until ICCAC moves to final agreement at ICCAC Meeting #6 or #7]

Level of Group Support

Pending – [blank until ICCAC Meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the ICCAC]