Chapter 3
Energy Efficiency and Conservation

Overview of Greenhouse Gas Emissions

Activities in the residential, commercial, and industrial (RCI) sectors produce greenhouse gas (GHG) emissions when fuels are combusted to provide space heating, process heating, and other applications. In 2005, combustion of oil, natural gas, coal, and wood in the RCI sectors contributed about 26% (about 24 million metric tons of carbon dioxide equivalent [$MMtCO_2e$]) of Iowa's gross GHG emissions. In 2005, this sector was the second largest source of GHG emissions in the state, following the electricity supply sector (37 $MMTCO_2e$).[1] In addition, industrial process (nonfuel use) emissions are forecasted to nearly double by 2020, primarily due to the increasing use of hydrofluorocarbons as substitutes for ozone-depleting chlorofluorocarbons. Together, industrial process emissions, including cement production and chemical manufacturing, will account for an additional 5.6% of Iowa's gross GHG emissions (8.14 $MMtCO_2e$).

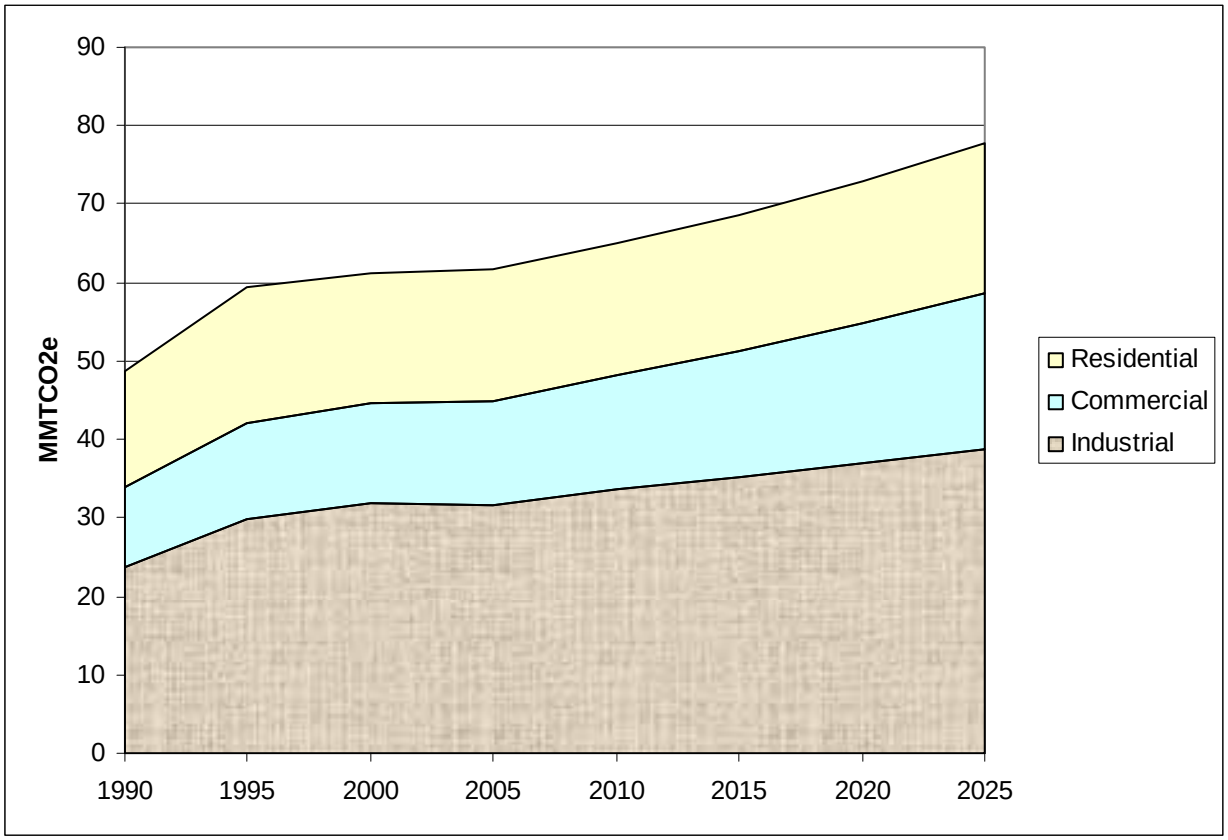
Considering only the direct emissions that occur within buildings and industries, however, ignores the fact that nearly all electricity sold in the state is consumed as the result of RCI activities. If the emissions from all three subsectors of RCI are included (i.e., direct fuel use, emissions associated electricity consumption, and industrial processes), they total about 70% of the state's gross GHG emissions in 2005. Therefore, the state's future GHG emissions will depend heavily on future trends in the consumption of electricity and other fuels in these sectors.

Figure 3-1 shows the growth in GHG emissions by sector through 2025, including electricity use. For the 15-year period from 2005 to 2020, GHG emissions are expected to grow the fastest in the electricity sector, which is forecasted to grow at a 1.0% annual rate. GHG emissions in the residential sector are expected to grow at 0.6%, the commercial sector at 2.2%, and the industrial sector at slightly more than 1% a year.

Much of the growth in GHG emissions over the period can be attributed an average 1.9% annual growth in electricity demand over the 2005–2020 period for the RCI sectors. However, electricity-related GHG emissions are projected to grow by only 1.0% per year, due to the addition of significant wind generation resources in the reference case.

[1] Emissions associated with the electricity supply sector (discussed in Chapter 4) have been allocated to each of the RCI sectors for comparison of those emissions to the emissions associated with direct fuel consumption. Note that this comparison is provided for information purposes, and that emissions estimated for the electricity supply sector are not double counted in the total emissions for the state.

Figure 3-1. Historical and projected residential, commercial, and industrial greenhouse gas emissions by sector in Iowa: 1990–2025*

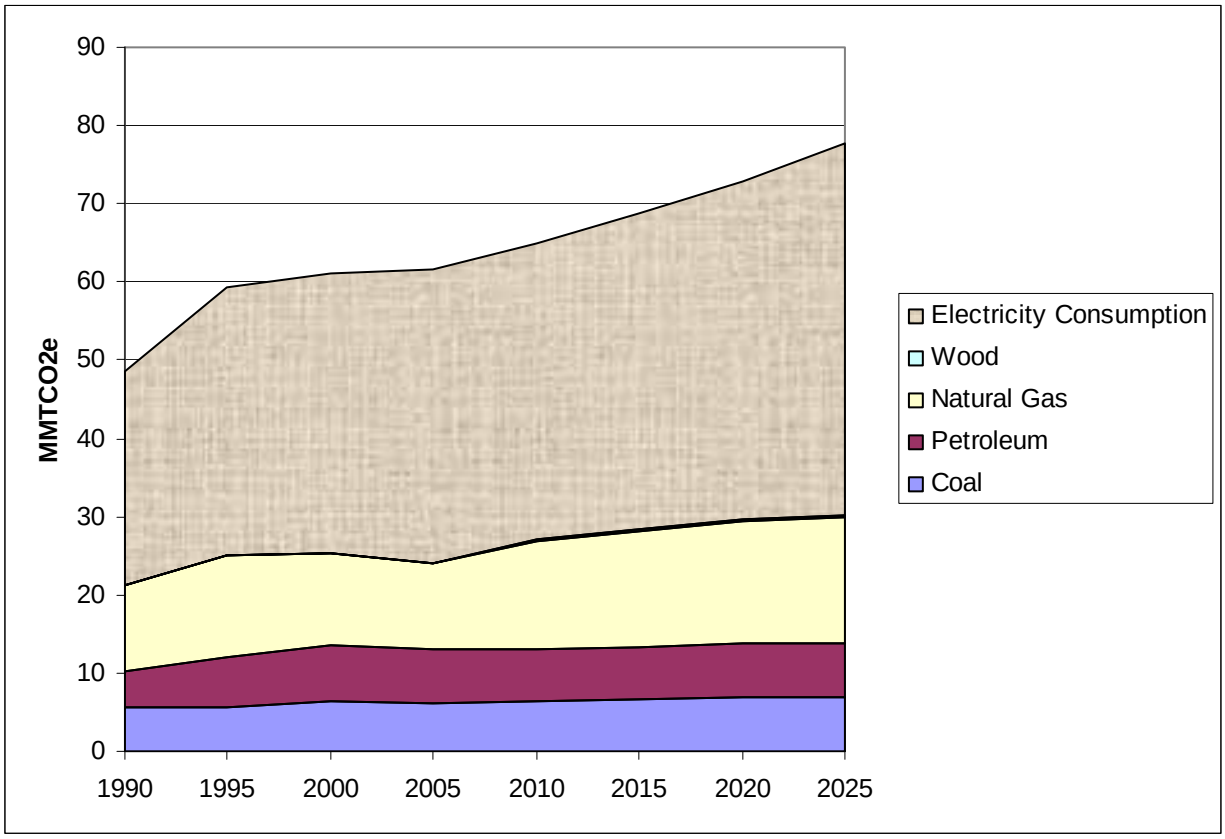


$MMtCO_2e$ = million metric tons of carbon dioxide equivalent

* Emissions associated with the direct use of natural gas, petroleum, coal, and wood and the consumption of electricity.
Sources: Tables 3a, 4a, and 5a of Final Iowa Greenhouse Gas Inventory and Reference Case Projections 1990–2025. Available at: http://www.iaclimatechange.us/ewebeditpro/items/O90F20404.pdf.

Figure 3-2 shows the growth in GHG emissions by fuel type through 2025. For the 15-year period 2005–2020, emissions in the sector are dominated by electricity supply, which rise by 15% from 37 $MMtCO_2e$ in 2005 to 43 $MMtCO_2e$ in 2020. Direct emissions from coal are forecasted to increase slightly at a rate of 0.6% per year (not including coal use for electricity generation). Emissions from natural gas explode, rising 2.9% per year. The emissions data from natural gas mask large differences in the growth of the use of this fuel. Residential natural gas consumption is expected to stay nearly constant from 2005 to 2020, while commercial and industrial gas use is expected to increase by 3.3% and 4.6% per year, respectively.

Figure 3-2. Historical and projected residential, commercial, and industrial GHG emissions by type of fuel in Iowa, 1990–2025*



$MMtCO_2e$ - million metric tons of carbon dioxide equivalent

* Emissions associated with the direct use of natural gas, petroleum, coal, and wood and the consumption of electricity. Wood-related GHG emissions are too small to be distinguished. Source: Tables 3a, 4a, and 5a of Final Iowa Greenhouse Gas Inventory and Reference Case Projections 1990-2025. Available at: http://www.iaclimatechange.us/ewebeditpro/items/O90F20404.pdf.

Key Challenges and Opportunities

The principal means to reduce RCI emissions include improving energy efficiency, substituting electricity and natural gas with lower-emission energy resources (such as biomass and wind), and implementing various strategies to decrease the emissions associated with electricity production (see Chapter 4, Clean and Renewable Energy [CRE]). The state's aggressive pursuit of energy efficiency in recent years gives stakeholders valuable experience with policymatic efforts to reduce emissions through programs and initiatives to improve the efficiency of buildings, appliances, and industrial practices. While the gas and electricity sectors in Iowa have been securing energy efficiency supplies that are the cheapest source of new resources, recent reports indicate that there is still untapped "low-hanging fruit" remaining in the form of low-cost energy efficiency opportunities in the RCI sectors. Programmatic efforts to harvest these resources are likely to create significant green collar jobs scoping, implementing, and evaluating energy efficiency projects.

Electric utilities in Iowa are required by law to offer cost-effective energy efficiency programs (Iowa Code §§ 476.6(14)). Also, Iowa investor owned utilities (IOUs) have a long history of conducting demand-side management (DSM) programs, under statutes adopted in 1990 and modified in 1996. Municipal and rural electric cooperatives have a more mixed history offering energy efficiency programs. The Iowa Utilities Board is reviewing IOU plans on the effects of goals equivalent to saving an additional 1.5% of retail electric sales in Iowa annually. Currently, IOUs achieve new (incremental) savings equivalent to 0.8% of electricity and natural gas sales.

The Iowa Climate Change Advisory Council (ICCAC) —through the work of its Energy Efficiency and Conservation (EEC) Subcommittee—has identified significant opportunities for reducing GHG emissions growth attributable to the RCI sectors in Iowa. These include expanding or launching energy efficiency programs for electricity, natural gas, and other direct-use fuels; regularly updating building codes; expanding the use of combined heat and power applications; and requiring state and local governments to implement beyond-code building practices. The ICCAC has also identified significant opportunities to reduce GHG emissions through policies addressing electricity production, such as tapping into the state's large biomass and wind potential (detailed in Chapter 4).

Overview of Policy s and Estimated Impacts

The ICCAC presents, with varying levels of support, a set of 14 policies for the RCI sectors that offer significant, cost-effective GHG emissions reductions within the state. These options and results are summarized in Table 3.1. The GHG emission reductions and costs per ton of GHG reductions for 14 of these policies were quantified. The quantified policy options could lead to emission savings from reference case projections of:

- 8.5 $MMtCO_2e$ per year by 2020, and a cumulative savings of 43 $MMtCO_2e$ from 2009 to 2020, and
- Net cost savings of over $1.0 billion through 2020 on a net present value basis.[2] The weighted-average costs of these policies are a net savings of nearly $25/$MMtCO_2e$.

Because most energy use occurs in buildings, the recommended policies center on improving energy efficiency in buildings. There is overlap among the policies as to the types of activities and equipment they cover, but the text following Table 3-1 provides general guidance on how the policies complement each other.

Energy Efficiency and Conservation (EEC) policy option EEC-1 increases the human capital component of energy efficiency by providing education and training for energy users across the state. Similarly, EEC-7 trains builders and developers in the use of energy efficiency technologies and building practices. EEC-2 and EEC-12 are the most general recommended policies that deploy DSM natural gas measures and energy efficiency across all types of energy use: space conditioning, windows, appliances, and water heating and other end uses and technologies. Efficiency improvements occur through improvements in building shells (EEC-4,

[2] The net cost savings, shown in constant 2005 dollars, are based on fuel expenditures; operations, maintenance, and administrative costs; and amortized, incremental equipment costs. All net present value analyses here use a 5% real discount rate.

EEC-6, EEC-13) or enhancing the efficiency of energy-consuming equipment within the buildings (EEC-14, EEC-12).

Table 3-1. Summary List of ICCAC Options

No.	Policy Option	CO_2 Reduction 2012	CO_2 Reduction 2020	Total 2009–2020	Net Present Value 2009–2020 (Million $)	Cost/Ton ($/t$CO_2$e)	Level of Support
EEC-1	Consumer Education Programs	*Not quantified*					Unanimous
EEC-2	Demand-Side Management (DSM)/Energy Efficiency Programs for Natural Gas	0.08	1.24	5.43	–$191.77	–$35.29	Super Majority (4 objections)
EEC-3	Financial Mechanisms for Energy Efficiency	1.62	6.11	36.81	–$805.05	–$21.87	Super Majority (1 objection)
EEC-4	Improved Building Codes for Energy Efficiency	0.05	0.40	1.89	–$46.27	–$24.44	Super Majority (5 objections)
EEC-5	Incentive Mechanisms for Achieving Energy Efficiency	0.35	3.29	16.33	–$350.79	–$21.48	Unanimous
EEC-6	Promotion of and Incentives for Improved Design and Construction in the Private Sector	0.00	0.12	0.46	–$11.36	–$24.57	Super Majority (1 objection)
EEC-7	Training and Education for Builders and Contractors	*Not quantified*					Unanimous
EEC-8	Focus on Specific Residential Market Segments	0.09	0.98	4.83	–$122.53	–$25.37	Unanimous
EEC-9	Midwestern Governors Association Energy Security and Climate Stewardship Platform	0.13	4.13	17.14	–$375.69	–$21.92	Majority (9 objections)
EEC-10	Energy Management Training/Training of Building Operators	0.10	1.29	5.48	–$129.49	–$23.63	Super Majority (1 objection)
EEC-11	Rate Structures and Technologies To Promote Reductions	0.04	0.21	1.20	–$25.73	–$21.45	Unanimous
EEC-12	Demand-Side Management (DSM)/Energy Efficiency Programs for Electricity	0.39	4.38	20.33	–$444.81	–$21.88	Super Majority (4 objections)
EEC-13	Government Lead by Example: Improved Design, Construction, and Energy Operations in New and Existing State and Local Government Buildings	0.08	0.36	1.97	1.04	0.53	Majority (6 objections)
EEC-14	More Stringent Appliance Efficiency Standards	0.94	2.20	17.33	–$708.15	–$40.85	Super Majority (2 objections)
	Sector Total After Adjusting for Overlaps	**1.1**	**8.6**	**43.2**	**–$1,064.5**	**–$24.7**	
	Reductions From Recent Actions: EISA (2007) and Executive Orders #6 and 41	**0.44**	**1.42**	**9.19**			
	Sector Total Plus Recent Actions	**1.6**	**10.0**	**52.3**			

CO_2 = carbon dioxide; DSM = demand-side management; NPV = net present value; $/t$CO_2$e = dollars per metric ton of carbon dioxide equivalent; EISA = Energy Independence and Security Act (2007).

Negative values in the Net Present Value and the Cost-Effectiveness columns represent net cost savings.

The numbering used to denote the above policy options is for reference purposes only; it does not reflect prioritization among these important policy options.

The policy options also differ among the customer classes they target. EEC-13 requires government to lead the rest of the state by example by requiring that new construction and retrofits of existing building stock meet high-performance building requirements. EEC-8 targets low-income residential customers and tenants who typically have less efficient capital equipment and appliances, but are typically hard to reach for utility energy efficiency programs.[3]

There are varying degrees of overlap between policy options which are discussed in more detail in Appendix F. Government high-performance building standards (EEC-13) typically have little overlap with utility efficiency programs because government efficiency improvements are usually implemented via executive orders and procurement standards that might not capture utility incentives.Peak-demand reductions through smart metering (EEC-11) does not overlap with other programs that might reduce peak demand through efficient air conditioners under EEC-12. However, there is overlap in the expected emission reductions and costs among some of the policies within the RCI sectors, as well as between policies in the RCI and energy supply (ES) sectors.

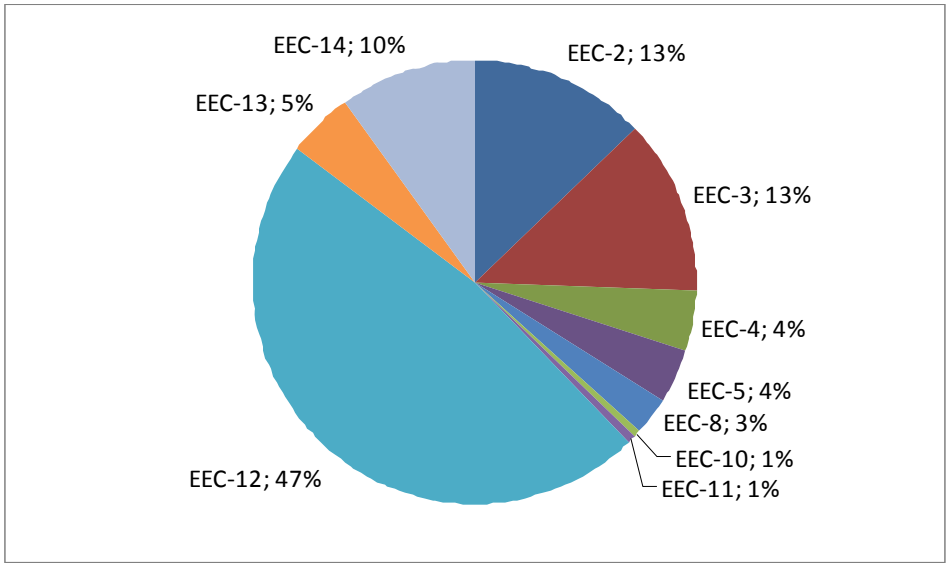
For example, EEC-9, the Midwestern Governors Association energy efficiency target, mirrors the reductions targeted under EEC-2 and EEC-12, so its reductions are eliminated from the adjusted totals. Also, EEC-8 provides energy efficiency investments for low-income residential customers. Well-designed utility and nonutility energy efficiency/DSM programs will target these populations, but not at the level identified under this policy option; therefore, EEC-8 is assumed to overlap with EEC-2 and EEC-12. Also, incentives to purchase ENERGY STAR appliances under EEC-14 are expected to overlap with utility and nonutility incentive programs under EEC-2 and EEC-12.

There is also a potential interaction between the RCI and ES sector policies concerning the clean energy portfolio components in policy option CRE-8 (Midwestern Governors Association renewable portfolio standard [RPS]). Under EEC-12, electricity demand in 2020 is reduced by almost 5,000 gigawatt-hours (GWh) versus the reference case. CRE-8b assumes a 20% RPS by 2020, which is 4% more renewable energy sources (as a percentage of retail sales) than is forecasted under the reference case. Therefore, the implementation of EEC-12 would require 200 GWh fewer of renewable resources to meet the RPS target. Using the renewable energy cost assumptions for CRE-8b, the reduced spending on renewables that cost more than reference case generation in 2020 would result in savings of $0.3 million in that year.

Figure 3-3 shows the cumulative emission reductions from the policy options that have been quantified and produce reductions net of overlaps for the entire planning period for 2009–2020.

[3] See WGA. (2005). Figure III-1. Comparison of the Market Penetration of Energy Efficiency Measures in Owner-Occupied and Rental Housing in California. P. 19.

Figure 3-3. Aggregate (Cumulative) GHG emission reductions, 2009-2020*



*These are the reductions from the Energy Efficiency and Conservation (EEC) policy options, *net of overlaps between options*. Each option number is followed by a semicolon and the percent of total reductions that it represents.

The policy options for the EEC sectors are affected by both state and federal policies that incentivize or mandate more efficient use of energy. The federal Energy Independence and Security Act (EISA) of 2007 was signed into law in December 2007. This law contains several requirements that will reduce GHG emissions as they are implemented over the next few years. During the ICCAC process, sufficient information was identified (e.g., implementation schedules) to estimate GHG emission reductions associated with implementing energy efficiency requirements for new appliances and lighting in Iowa under Title III of the EISA.

The net effect of these reductions was estimated at 1,300 GWh of electricity and 1,300 billion British thermal units of natural gas savings in Iowa by 2020. The associated GHG reductions for these savings are projected to be 1.1 $MMtCO_2e$ for 2020 using the EEC carbon dioxide (CO_2) methodology. Note, however, that GHG emission reductions associated with the EISA Title IV (Energy Savings in Buildings and Industry) and Title V (Energy Savings in Government and Public Institutions) requirements have not been quantified because of the uncertainties about how they will be implemented. It is expected that these requirements will overlap with some of the RCI policy options, especially EEC-4 and EEC-13.

As mentioned in the text below, Iowa utilities have been pursuing energy efficiency programs for some time. These investments are not quantified in the analysis because EEC subcommittee members indicated that the energy impacts from these efficiency programs are already incorporated into the utility load growth forecasts which were used for the reference case inventory and forecast (eg they are already in the baseline). The assumed incremental (new) statewide energy efficiency investments are equal to 0.82% of retail natural gas sales, and 0.69% of electricity sales over the planning period. These investments are deducted from each of the relevant energy efficiency targets in the individual policy options. For example, energy

efficiency target in EEC-12 (culminating at 2% of retail sales) is reduced by 0.69% to an incremental 1.31% of new investments by 2020. This approach avoids double counting reductions from existing programs in the policy options. Assuming incremental energy efficiency investments from existing actions in Iowa remained unchanged from 2006 levels, Iowa's cumulative electric energy efficiency deployment would be approximately 15% of sales in 2020. For natural gas, Iowa's cumulative natural gas energy efficiency deployment would be approximately 19% of sales in 2020. When using the levelized cost estimate assumptions developed for the EEC sector, total utility and participant spending on energy efficiency/DSM from existing actions in the reference case is estimated at $270 million in 2020.

The Iowa Utilities Board is reviewing investor-owned utility plans to increase incremental electricity and natural gas investments to 1.5% of natural gas and electricity sales. These plans have not been approved and are therefore not included in the quantitative analyses. However, these targets are similar to those of options EEC-2 and EEC-12 for natural gas and electricity with the primary difference that the two ICCAC options escalate to investments equal to 2% of sales later in the planning period.

Iowa's Executive Orders #41 (Governor Vilsack)[4] and #6 (Governor Culver)[5] to reduce energy use in state buildings will also have an impact on future GHG emissions. The avoided electricity and natural gas GHG emissions are estimated at about 0.30 $MMtCO_2e$ in 2020. The policy options described briefly below, and in more detail in Appendix F, not only result in significant emission reductions and costs savings, but also offer a host of additional benefits as well. These benefits include savings to consumers and businesses on energy bills, which can have macroeconomic benefits; reduction in spending on energy by low-income households; reduced peak demand, electricity system capital and operating costs, risk of power shortages, energy price increases, and price volatility; improved public health as a result of reduced pollutant and particulate emissions by power plants; reduced dependence on imported fuel sources; and green collar employment expansion and economic development.

For these policies recommended by the ICCAC to yield the levels of savings described here, they must be implemented in a timely and thorough manner. This means, for example, not only putting the policies themselves in place, but also attending to the development of "supporting policies" that are needed to help make the recommended policies effective. While the adoption of the recommended policies can result in considerable benefits to Iowa's environment and consumers, careful, comprehensive, and detailed planning and implementation, as well as consistent support, of these policies will be required if these benefits are to be achieved.

[4] State of Iowa, Executive Department. *Executive Order Number Forty-One*. Available at: http://publications.iowa.gov/2619/1/EO_41.pdf.

[5] State of Iowa, Executive Department. *Executive Order Number Six*. February 2008. Available at: http://publications.iowa.gov/6275/1/06-080221%5B1%5D.pdf.

Energy Efficiency and Conservation Policy Descriptions

EEC-1 Consumer Education Programs

With a unanimous vote, the ICCAC presents a broad climate change and GHG reduction education program. The ultimate effectiveness of emission reduction activities in many cases depends on providing information and education to consumers regarding the energy and GHG emission implications of their choices. Public education and outreach, through such implementing organizations such as the Iowa Energy Center, 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. 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. The goal of the program is to achieve a 5% reduction in residential energy consumption by 2020 implemented by the Iowa Office of Energy Independence, community colleges, secondary schools, building professional trade groups, and utilities.

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

By a super majority vote, the ICCAC presents the option that Iowa increase the efficiency of natural gas use in the state through a goal of deploying new energy efficiency and DSM natural gas measures equal to 1.5% of retail sales by 2015 and 2.0% by 2017. This policy involves implementing new or expanding existing energy efficiency programs for all sectors, including the RCI sectors. Iowa's IOUs are currently conserving 0.8% of sales with new energy efficiency and DSM measures and have plans to double this to 1.5% by 2015. This measure then expands those plans to 2.0% in 2017.

EEC-3. Financial Mechanisms for Energy Efficiency

By a super majority vote, the ICCAC presents an option for modernizing the financial mechanisms that could increase energy efficiency provided by relevant utilities and nonutilities. Incentives for a variety of energy consumers can 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 no-interest revolving loan fund. The goal of the option is to reduce consumption of electricity, natural gas, and heating fuels across all end-user categories by 2% of retail sales annually. End users include public-sector, industrial, commercial, multifamily residential, and residential users. Note that the GHG reductions and costs of or benefits from natural gas and heating fuels are not quantified in the summary table for this option.

EEC-4. Improved Building Codes for Energy Efficiency

By a super majority vote, the ICCAC presents the option of setting 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. Building codes should promote further reduction of GHG emissions through adoption of sustainable design or green building standards. Buildings are significant consumers of energy and other resources. Adoption and enforcement of building energy and related codes can be an effective way to eliminate the least efficient energy approaches in new or renovated buildings. The goal of this option is to reduce energy consumption per square foot of floor space at newly constructed and renovated buildings by 15% by 2012 and 50% by 2025. The new codes become effective initially in 2010, and the final goal is achieved by 2025.

This policy also included undertaking a comprehensive review of existing state and local building codes in Iowa to determine where increased energy efficiency can be achieved. This review will be undertaken by the new Commission on Energy Efficiency Standards and Practices, established by legislation enacted this year. Second, the policy aims for increasing the stringency of the Iowa Energy Code and developing a training and certification program for code officials, builders, and contractors on energy efficiency and related sustainable design standards, and in code enforcement.

EEC-5. Incentives for Energy Efficiency

By a unanimous vote, the ICCAC presesnts the option of changing the incentive structures in Iowa to deploy energy efficiency. The goal of this policy is to reduce consumption by 15% of retail sales by 2020. Energy efficiency plans in Iowa address both electric and natural gas use through a variety of programs. New incentive approaches are of three types:

Potential Type 1 Incentives to IOUs

- Decouple IOU revenues from sales of electricity or natural gas.
- Allow IOUs to rate-base their energy efficiency expenditures and earn returns on these investments.
- Allow IOUs to recover revenues that decrease due to DSM, net of utility system cost savings.
- Allow IOUs to implement a revenue normalization mechanism to recognize the 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 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 that 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 allow the IUB to conduct prudence reviews and impose penalties.

Potential Type 2 Incentives to Utility Customers

- Rate discounts or payments to participants in load management programs, for savings of peak load electric kilowatt (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 and loans to customers for purchasing energy-efficient appliances and equipment.
- Customer education and training on energy-efficient appliances and measures (insulation, infiltration, building weatherization measures, HVAC sizing and maintenance, etc.).

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 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.

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

By a super majority vote, the ICCAC presents this option, which provides incentives and targets to induce the owners and developers of new and reused (major retrofitted) residential and commercial buildings to improve the buildings' efficiency for using energy and other resources, 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. The goal of the policy is to reduce energy consumption by the equivalent of 10% of retail electric sales and natural gas in residential and commercial buildings beginning January 1, 2010.

EEC-7. Training and Education for Builders and Contractors

By a unanimous vote, the ICCAC presents the option of an education and outreach policy for building professionals and code enforcement officials to encourage incorporation of energy efficiency and GHG emission reduction measures into construction. These programs can train designers, architects, builders, contractors, and code officials on a variety of relevant energy efficiency issues, such as building shell design, insulation, and proper heating and air conditioning sizing and installation, and can be supported by licensing requirements for design and building trade professionals that address knowledge of techniques for reducing energy use and sustainable design. The policy is to be in place by 2010.

EEC-8. Technology Improvements in Targeted Markets

By a unanimous vote, the ICCAC presents an option incorporating 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. Low-income customers typically have less energy-efficient equipment due to informational barriers and a lack of access to capital. Also, there is a split incentive in rental markets where the tenant pays the energy bills, so the owner has no incentive to install energy-efficient technologies. Specific approaches that the policy could take include:

- Expand 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 compact fluorescent light bulbs and 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.

Targeting specific market segments can also be an effective component of a regional market transformation alliance.

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

By a majority vote, the ICCAC presents the option that Iowa participate in the development and implementation of the Midwestern Governors Association Energy Security and Climate Stewardship Platform, signed in November 2007 by Governor Culver.[6] 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.

EEC-10. Energy Management Training/Building Operators

By a super majority vote, the ICCAC presents as an option the training of building energy managers and operators. 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 "leading by example" of energy service contracting. The goal of the policy is to require energy managers and facility operators in all sectors to obtain certification for successful completion of the training program starting in 2010.

EEC-11. Rate Structures and Technologies To Promote Reductions

Passed by a unanimous vote, this policy option affects various elements of utility rate design that are geared toward reducing GHG 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, by day of the week, by season of the year, and from year to year. In this way, rates

[6] Midwestern Governors Association. 2007. *Energy Security and Climate Stewardship Platform for the Midwest.* Midwestern Energy Security & Climate Stewardship Summit. Available at: http://www.wisgov.state.wi.us/docview.asp?docid=12495.

provide consumers with information reflecting the impacts of their consumption choices. The goal of the policy is to reduce electricity consumption through pricing by 2% of retail sales, with compliance beginning on January 1, 2010. Options for implementation include seasonal rates, time-of-day rates, critical peak pricing, and real-time pricing of electricity.

EEC-12. Demand-Side Management (DSM)/ Energy Efficiency Programs for Electricity

By a super majority vote, the ICCAC presents as and option a DSM/energy efficiency policy to invest in energy efficiency equal to 1.0% of retail electricity sales per year by 2013, 1.5% per year by 2015, and 2.0% per year by 2017. DSM/energy efficiency is a policy approach that requires actions that influence both the quantity and the patterns of energy consumed by end users. This policy option focuses on DSM/energy efficiency programs run by electric utilities, and may be designed to work in tandem with other recommended strategies that can also encourage efficiency gains. The DSM obligations and goals apply to all electric utilities in Iowa. IOUs are starting at 0.8% of retail sales; municipal utilities and rural electric cooperatives start at varying levels.

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

By a majority vote, the ICCAC presents an option that the state of Iowa and municipal and county governments and school districts provide leadership in energy efficiency by adopting policies that improve the energy efficiency of new and renovated public buildings, and the equipment and appliances used therein. This policy option provides targets to improve the efficiency of energy use in new and existing state and local government buildings that are much higher than code standards. The goals for the policy are as follows:

- Require 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 will be designed to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 50% of the regional average for that building type.
- All state and local governments will require the procurement of energy-efficient equipment, including lighting, office equipment, and other appliances, such as ENERGY STAR. (This goal element is quantified under EEC-14.)
- The fossil fuel reduction standard for all new buildings will be increased to:
    - 60% in 2010
    - 70% in 2015
    - 80% in 2020
    - 90% in 2025
    - All state buildings will be carbon neutral in 2030 (zero net energy, using no fossil fuel GHG-emitting energy to operate).

Implementing parties include state and local governments, the 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 of Iowa, private contractors, and the Iowa State Building & Construction Trades Council.

EEC-14. More Stringent Appliance Efficiency Standards

By a supermajority vote, the ICCAC presents an option increasing the efficiency of appliances in the state. Appliance 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. The goal of the policy is to achieve 5% reduction in energy consumption from residential, commercial, and industrial consumers via:

- 80% minimum efficiency standards by 2010 for appliances not covered by federal standards;
- 100% market penetration of ENERGY STAR appliances in purchase transactions in which state funds are involved (state purchasing contracts, state grants or loans, etc.) by 2012; and
- 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.