Compilation Notes:

- All comments and suggestions have been incorporated into this document using 'track changes'.
- Deletions are shown as ~~strikethrough (in red).~~
- General comments and questions are inserted as comments in the margin.
- No comments or changes are attributed to any individual; however, state departments are cited.
- When the same change has suggested by more than one person, that number has been indicated.
- Only substantive suggestions are shown. Format, spelling and grammatical errors have been implemented without further comment.
- See attached memo at end of this document for additional comments and suggestions. There was not room to clearly include all detail in the body of this document.

Energy Efficiency and Conservation Subcommittee

Summary List of Recommended Priority Policy Options for Analysis

Policy No.	Policy Option	CO2 Reduction 2012	CO2 Reduction 2020	Total 2009-2020	Net Present Value 2009-2020 ($M)	Cost ton ($/tCO$_2$e)	Status of Option
EEC-1	Demand-Side Management (DSM)/Energy Efficiency Programs for Electricity	0.99	7.21	37.57	-632.40	-16.83	Pending
EEC-2	Demand-Side Management (DSM) Energy Efficiency Programs for Natural Gas	0.41	2.37	12.52	-488.20	-38.98	Pending
EEC-3	Financial Mechanisms for Energy Efficiency	1.95	8.70	51.93	-884.93	-17.04	Pending
EEC-4	Improved Building Codes for Energy Efficiency	0.05	0.53	2.14	-51.61	-24.16	Pending
EEC-5	Incentive Mechanisms for Achieving Energy Efficiency	0.51	5.75	28.65	-464.61	-16.22	Pending
EEC-6	Promotion and Incentives for Improved Design and Construction in the Private Sector	0.00	0.15	0.48	-11.64	-24.09	Pending
EEC-7	Training and Education for Builders and Contractors	*Not quantifiable*					Pending
EEC-8	Focus on Specific Residential Market Segments	0.27	1.76	9.63	-337.04	-35.00	Pending
EEC-9	Midwestern Governors Association Energy Security and Climate Stewardship Platform	0.67	6.86	33.33	-554.34	-16.63	Pending
EEC-10	Energy Management Training/Training of Building Operators	*Quantification pending*					Pending
EEC-11	Rate Structures and Technologies To Promote Reductions	0.13	0.71	3.92	-66.42	-16.94	Pending
EEC-12	Consumer Education Programs	*Not quantifiable*					Pending
EEC-13	Government Lead-by-Example: Improved Design and Construction in New and Existing State and Local Government Buildings	0.01	0.07	0.34	1.17	3.41	Pending
EEC-14	More stringent appliance efficiency standards	*Quantification pending*					Pending

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

Policy Description

Demand-side management (DSM) /energy efficiency is a policy approach that requires actions that influence both the quantity and patterns of energy consumed by end users. This option focuses on demand-side management/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.

Policy Design

Goals: Invest in energy efficiency equal to 1.0% of retail electricity sales 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. Investor-owned utilities (IOUs) ~~IOUs~~ are starting at 0.8% ; municipal utilities and rural electric cooperatives start at varying levels.
- 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

Comment: Note what the 1%, 1.5% and 2% relates to. I believe we agreed it was retail sales. It may be useful and appropriate to provide a reference point regarding the inventory and forecast expected increases in electricity demand.

Comment: We also believe that the goals of this document should also take into account the starting places that different utilities are in (i.e., IOUs at 0.8% to 1.3% by 2013; munis are at 0.15-0.3% now, and RECs are at different levels.

Comment: Specific the year at which the percent savings will be attained, rather the elapsed time period.

Comment: of what?

Implementation Mechanisms

Possible policy mechanisms include:

- Iowa Utilities Board (IUB) 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.

- 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).

Investor-owned Electric Utilities

Iowa investor-owned utilities have a long history of conducting DSM/energy efficiency 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.

Municipal and Cooperative Electric Utilities

Although the rural electric cooperatives and municipal electric utilities were required to file biennial energy efficiency plans, , and many have historically conducted DSM programs legislation passed in 2008 requires each utility or group of utilities to assess energy efficiency potential to determine the maximum potential energy and capacity savings available from actual and projected customer usage through cost-effective energy efficiency measures and programs. Based on the assessment, each utility must establish an energy efficiency goal and a set of cost-effective energy efficiency programs designed to meet the energy efficiency goal. The process must be started by July 1, 2008 with a progress report submitted to the IUB by January 1, 2009 and a final report filed by January 1, 2010. The report must include the utility's cost-effective energy efficiency goal, and for each measure utilized by the utility in meeting the goal, the measure's description, projected cost, and the analysis of its cost-effectiveness. On January 1 of each even-numbered year, commencing January 1, 2012, utilities must file a report with the board identifying their progress in meeting the energy efficiency goal and any updates or amendments to their energy efficiency plans and goals. This requirement will take~~s~~ the place of the current energy efficiency plan filings.

- IOU business-as-usual electric efficiency investments equate to .8% of load in 2008 ~~and rise to 1.3%~~ Proposed energy efficiency plans, pending IUB determination, would achieve between 1.3% and 1.5% of load by 2012.

Comment: of retail load?

Comment: Wouldn't this be more appropriate in the implementation section? And couldn't this potentially be raised if there is consensus that there is more that is achievable?

Type(s) of GHG Reductions

TBD.

Estimated GHG Reductions and Net Costs or Cost Savings

Comment: I assume at this point that these calculations are place holders only since we do not yet have an updated inventory and forecast.

2012	2020	Units

GHG Emission Reductions	0.99	7.21	MMtCO2e
Net Present Value	-66.9	-632.4	$ Million
Cumulative GHG Reductions	1.97	37.57	MMtCO2e
Cost-Effectiveness	-33.95	-16.83	$/tCO2e

Data Sources:

- 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.
- Expert testimony in IUB Interventions filed relative to the Energy Efficiency Plan filings of the regulated utilities.

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.

Comment: Is there more current generation data to use or is the effort to link this back to the 2005 baseline?

Comment: It looks like these facilities can be sorted by owner. Does the generation data include only facilities used to serve Iowa?

Comment: Does the growth in generation contemplate the increase in renewable generation?

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 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.

Comment: Do these growth factors and emissions reflect changes in the type of generation and increasing renewables?

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 CO_2 = GWh × (Btu/kWh) × (tons CO_2/MBtu) × (% of that fuel in the fuel mix)** where (Btu/kWh) is the heat rate and (tons CO_2/MBtu) is the CO_2 emission factor. Similarly for CH_4 and N_2O, which are then converted to CO_2 equivalents [CO_2e] using global warming potentials (GWPs) of 21 for CH_4 and 310 for N_2O. The emission factors used for each GHG were the same as those used in the EPA State Greenhouse Gas Inventory Tool (SIT) software modules.

Comment: Same as previous question – does the generation data include only facilities used to serve Iowa?

Key Assumptions:

- The levelized costs of energy efficiency measures is $37.13/MWh in 2009. Source for capital costs is from: Quantec/Cadmus. (2008). This figure includes all utility and participant costs. Utility fixed costs are assumed to be 24% of the capital cost, based on MEC EE plan filing Docket # EEP-08-02. Vol II. pA1-8

- The levelized costs of peak electricity demand response measures is $37.13/MWh (2008 dollars). This figure includes all utility and participant costs. Utility fixed costs are assumed to be 24% of the capital cost, based on MEC EE plan filing Docket # EEP-08-02. Vol II. pA1-8

Comment: See comments and suggestions for changes appended to this document.

The levelized cost of $30 is from the joint assessment of potential study conducted by Cadmus (f/k/a Quantec) for the investor-owned utilities. This value includes only the incremental cost of the measures that are installed. It does not include the administrative costs to conduct programs. The administrative cost is the amount that is added to the incremental measure cost to obtain the cost side of the equation when a societal benefit-cost analysis of an energy efficiency program is conducted. An administrative cost needs to be added to the incremental measure cost to yield the "total social cost" referred to in cell B31 of tab ElecAssump of the Options spreadsheet. (See page 26 of IPL's Application in Docket No. EEP-08-1 for more explanation of the societal benefit-cost test.)

- Avoided cost of electricity in 2009 is $.3072/MWh (2008 dollars). Figure is from 2009–2013 Energy Efficiency Plan Interstate Power and Light Company Docket No. EEP-08-1 23-Apr-08, p. 33 Values base case without externality factor.
- Avoided cost of peak electricity in 2009 is $72/MWh (2008 dollars). Figure is from 2009–2013 Energy Efficiency Plan Interstate Power and Light Company Docket No. EEP-08-1 23-Apr-08, p. 33 Values base case without externality factor.
- Transmission and distribution losses are 7%. From IA_ES_Forecast.xls assumptions tab. Net average T&D losses 2005-2030.
- The energy efficiency programs begin in 2009 2010.
- Real Escalation rate for cost of energy efficiency programs: 2% annually
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
- Energy efficiency costs are expressed as levelized costs over the life of the energy efficiency options. The incremental costs (typically incurred in the first year of program implementation) are spread over all future years of the life of the energy efficiency measures.
- Assumptions to calculate IOU business as usual ~~statewide~~ efficiency investments: IOU Energy Efficiency Plans rise from .8% in 2008 to between 1.3% and 1.5% in the 2009-2012 period, 2013+ continue at 2012 levels
- Muni's and REC utilities achieve 50% of IOU efficiency investments (0.7% of load) beginning in 2012 and continue at this relative rate for 2013+ period.
- IOU electric sales comprise approximately 76% of statewide electricity sales over the planning period.
- Real rate at which costs are discounted annually: 5%

Key Uncertainties

Potential new generation

Potential retirement of existing generating units

Additional Benefits and Costs

Energy efficiency investments will probably not lead to utility rates being reduced. Rather energy efficiency typically results in reduced energy expenditures (bills) over the life of the investment for the consumer. Also, energy efficiency investments potentially avoid future utility cost increases.

Comment: While this value is accurate, it is a historical number. Suggested Change: Better data the EEC activity would be to use the avoided costs from the utilities' recent applications as provided by Gordon Dunn of the IUB Staff. In particular, IPL's electric avoided energy costs for years 2009 through 2018 are illustrated in Table 2.6 on page 30 of IPL's application. Note that these data have some features unique to Iowa proceedings, such as the externality factor in Chapter 35 of the Iowa Administrative Code. More details on the implications of these features are provided in Table 1.10 on page 33 of IPL's application.

Comment: This is a very general case; it seems like running a handful of scenarios, or having an acceptable range of avoided costs, would make us more comfortable. We are comfortable with further usage of the data from Gordon Dunn and the IUB Staff from recent EE plan applications from the IOUs.

Comment: Since we have energy efficiency and DSM programs in place already, what does this assumption mean?

Comment: Why does this begin in 2009, but the natural gas program in EEC-2 and some other EECs begin in 2010?

Comment: Shouldn't costs at least track with inflation? – Another comment: At minimum, this should match AEO inflation rates.

Comment: See comments and suggestions for changes appended to this document.
A long-term inflation rate of one percent seems low. The general inflation rate that IPL used its EEP application is 1.8 percent, which is based on the US Department of Energy's Energy Information Administration's "Annual Energy Outlook 2007." More problematic and more challenging is the recognition that energy efficiency programs have been offered for several years in some states such as Iowa. The more easily attained and cheaper energy efficiency gains have been realized, so additional gains, especially gains associated with aggressive goa ... [1]

Comment: Does this comment supposedly reflect our current "baseline" or "business as usual" progress, or is this a "goal" or "assumption" that we would have to meet, above and beyond "business as usual"? We would like to revisit this bullet once we have a better understanding of what this means.

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]

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

Policy Description

Demand-side management (DSM)/energy efficiency 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/energy efficiency programs run by gas utilities, and may be designed to work in tandem with other recommended strategies that can also encourage efficiency gains.

The 2008 session of the Iowa General Assembly passed legislation to require the establishment of energy efficiency savings goals for all Iowa's municipal gas utilities and one cooperative gas utility

Policy Design

Goals: Invest in energy efficiency equal to 1.0% of statewide retail gas sales 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.
- Expand the scope of utility activity that can contribute to achieving DSM goals to account for natural gas savings accruing when an ~~investor-owned~~ electric utility provides incentives for

Comment: This deletion is supported by two members.

installation of geothermal systems and building shell measures in an area in which natural gas service is available.

Comment: Essentially, municipal utilities as well as investor-owned utilities face this issue.

- 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 municipal and rural electric cooperative ~~investor-owned~~ utilities is not regulated. Most 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.

Comment: Yes, this should be changed to reflect gas utilities.

~~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).~~

Comment: This deletion recommended by two members.

Investor-Owned Natural Gas Utilities

Iowa investor-owned utilities have a long history of conducting DSM/energy efficiency 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 natural gas ~~electric~~ sales in Iowa.

Comment: Change submitted by two members

Municipal and Cooperative Natural Gas Utilities

Although municipal gas utilities were required to file biennial energy efficiency plans, and many have conducted DSM programs legislation passed in 2008 requires each utility or group of utilities to assess energy efficiency potential to determine the maximum potential energy and capacity savings available from actual and projected customer usage through cost-effective energy efficiency measures and programs. Based on the assessment, each utility must establish an energy efficiency goal and a set of cost-effective energy efficiency programs designed to meet the energy efficiency goal. The process must be started by July 1, 2008 with a progress report submitted to the IUB by January 1, 2009 and a final report filed by January 1, 2010. The report must include the utility's cost-effective energy efficiency goal, and for each measure utilized by

the utility in meeting the goal, the measure's description, projected cost, and the analysis of its cost-effectiveness. On January 1 of each even-numbered year, commencing January 1, 2012, utilities must file a report with the board identifying their progress in meeting the energy efficiency goal and any updates or amendments to their energy efficiency plans and goals. This requirement takes the place of the current energy efficiency plan filings.

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	Units
GHG Emission Reductions	0.41	2.37	MMtCO2e
Net Present Value	-38.5	-488.2	$ Million
Cumulative GHG Reductions	0.83	12.52	MMtCO2e
Cost-Effectiveness	-46.54	-38.98	$/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
- 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.

Comment: Why is electricity generation and fuel use a relevant data source for natural gas energy efficiency?

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:

- Levelized costs of gas are $5.45 MBTU (2008 dollars) from Quantec (2008).
- This figure includes all utility and participant costs. Utility fixed costs are assumed to be 24% of the capital cost, based on MEC EE plan filing Docket # EEP-08-02. Vol II. pA1-8
- Escalation rate for cost of energy efficiency programs: 2% annually
-
- Avoided cost of gas in 2009 is $9.49 MBTU (2008 dollars). Figure is from 2009–2013 Energy Efficiency Plan Interstate Power and Light Company Docket No. EEP-08-1 p. 31.

Comment: What is the assumption for the cost of energy efficiency programs?

Comment: We are checking on these, but they will likely be fine.

Comment: The comment about adding administrative costs to the levelized costs should also apply here.

Comment: See EEC-1 comment.

Comment: See EEC-1 comment.

- The energy efficiency programs begin in 2010.
- Real rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Energy efficiency costs are expressed as levelized costs over the life of the energy efficiency options. The incremental costs (typically incurred in the first year of program implementation) are spread over all future years of the life of the energy efficiency measures.
- Assumptions to calculate IOU statewide efficiency investments: IOU Energy Efficiency Plans rise from .8% in 2008 to between 1.3% and 1.5% in the 2009-2012 period, 2013+ continue at 2012 levels
- 2008 IOU assessment of potential does not evaluate potential from including natural gas transportation customers in funding and eligibility for DSM programs, nor does it evaluate potential from fuel switching.
- Muni's and REC utilities achieve 50% of IOU efficiency investments beginning in 2012 and continue at this relative rate for 2013+ period.
- IOU gas sales comprise approximately 90% of statewide gas sales over the planning period.

Comment: I may have missed this, but why are these programs starting in 2010 vs the 2009 start date in EEC-1?

Comment: See EEC-1.

Key Uncertainties

Energy efficiency investments will probably not lead to utility rates being reduced. Rather, energy efficiency typically results in reduced energy expenditures (bills) over the life of the investment for the consumer. Also, energy efficiency investments potentially avoid future utility cost increases.

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]

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% of retail sales 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; non-utility entities delivering financial mechanisms

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.
- $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

Type(s) of GHG Reductions

TBD.

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	Units
GHG Emission Reductions	1.95	8.70	MMtCO2e
Net Present Value	-131.9	-884.9	$ Million
Cumulative GHG Reductions	3.90	51.93	MMtCO2e
Cost-Effectiveness	-33.82	-17.04	$/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:

-
- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
- Levelized costs of energy efficiency and avoided costs come from EEC-1.

- The energy efficiency programs begin in 2010.
- Real rate at which costs are discounted annually: 5%
- Escalation rate for cost of energy efficiency programs: 2% annually
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.

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]

EEC-4. Improved Building Codes for Energy Efficiency

Policy Description

Buildings are significant consumers of energy and other resources. Adoption and enforcement of building energy and related codes ~~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.

[HTN: Moved this up from related policies] 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 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. This review will be undertaken by the new Commission on Energy Efficiency Standards and Practices, established by legislation enacted this year.
- Iowa Energy Code:
  - Residential—2006 International Energy Conservation Code (IECC)
  - Commercial—2006 IECC (including ASHRAE/IESNA [American Society of Heating, Refrigerating and Air-Conditioning Engineers/Illuminating Engineering Society of North America] 90.1-**2**004).
- 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 of ~~on~~ grid supplied "green power" and/or installing on-site off-grid low/no CO_2 emitting 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.

Comment: Does this get into an area of federal preemption under the National Appliance Energy Conservation Act?

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.

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.

Comment: See comments and suggestions appended to end of document.
It appears that these two options both would set standards for building performance where EEC-4 speaks to new construction and EEC-6 addresses existing facilities. Also, EEC-4 specifies goals in terms of usage per square foot whereas EEC-6 states goals in terms of total usage. Additionally, EEC-4 specifies years for achieving the goals and EEC-6 is silent other than to specify a start year.
Suggested Change: Revise EEC-6 Goal statement to the following: "Reduce energy consumption per square foot of existing residential and commercial buildings by the equivalent of 10% of retail electric sales and natural gas in residential and commercial buildings by 20XX." The year "20XX" can be set by the EEC. Maybe the start year is 2010 as suggested by the "Timing" part in the Policy Design section, although it is not clear what "compliance" means in the timing section when the Policy Description is phrased in terms of "targets" and "encourage." The Policy Description envisions a carrot while the Timing part assumes a stick.

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

Implementing Parties: Department of Public Safety (code adoption, enforcement), 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)~~

Comment: This deletion was included on comments by two members.

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 energy building code enforcement mechanisms and monitor compliance.
- Developing a training and certification program for code officials and contractors on energy efficiency codes and sustainable design standards.

Related Policies/Programs in Place

-

- Development of sustainable design standards for the state to be adopted by the Building Code Commissioner.

- Development of the Iowa Green Communities Initiative by the Iowa Department for Economic Development, establisheing "green development" standards for projects receiving funding from the Community Development Division of IDED.

- Extension of enhanced tax credits for "green development" of brownfields and grayfields, starting in 2009. The enhanced tax credits will require compliance with the sustainable design standards established by the Building Code Commissioner.

Type(s) of GHG Reductions

TBD.

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	Units
GHG Emission Reductions	0.05	0.45	MMtCO2e
Net Present Value	-3.6	-51.6	$ Million
Cumulative GHG Reductions	0.10	2.14	MMtCO2e
Cost-Effectiveness	-37.00	-24.16	$/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:

- Levelized costs and avoided costs are from EEC-1 and EEC-2
- The energy efficiency programs begin in 2010.
- New residential and commercial space grows at 1.3% and 1.4% per year respectively.

- Energy codes apply to 18.4% of residential electricity use and 54% of commercial electricity use.

Comment: Not clear to me where these numbers originate.

- Transmission and Distribution losses for electricity are 7%.
- Compliance with the this policy is assume to be 40% at the start of the program and rises to 90% by 2020 under the new compliance regime. For the portion of the new buildings (or retrofits) that don't comply, energy use in these structures is assumed to be 20% higher than the policy level.
- Building energy consumption is a function of IA's climate. According to the amount of heating degree days (HDD) and cooling degree days (CDD), IA is in the Residential Energy Consumption Survey climate zone 2. Source: 2001 RECS http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html#space

  HDD data from: http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/hdd.200507-200607.pdf

  CDD data from: http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/cdd.200501-200607.pdf
- New commercial buildings in climate zone 2 have higher electric intensity relative to existing stock, so are adjusted upwards by 24%. Source: Ratio of 1990-1999 buildings to all buildings total energy use . http://www.eia.doe.gov/emeu/cbecs/pdf/consumption_yearconst.pdf
- Escalation rate for cost of energy efficiency programs: 2% annually
- Code improvements result in differential efficiency gains for natural gas as for electricity.
  - Assumes code or efficiency improvement affects gas and electricity according to fuel usage
  - Residential: Electricity code improvement of x results in 2.23x gas improvement
  - Commercial: Electricity code improvement of x results in .63x gas improvement Source: CEBCS
- In each year, the new building stock is "treated" at the new efficiency goal (less noncompliance) and then joins the existing stock in the next year
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
- Energy efficiency costs are expressed as levelized costs over the life of the energy efficiency options. The incremental costs (typically incurred in the first year of program implementation) are spread over all future years of the life of the energy efficiency measures.
- Real rate at which costs are discounted annually: 5%

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]

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. The 2008 session of the Iowa General Assembly passed legislation that requires rural electric cooperatives and municipal electric utilities to establish energy efficiency savings goals. 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 demand side management (DSM)/energy efficiency 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: Equivalent of 5% of retail sales 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, and residential/commercial energy audit contractors.

Other: TBD.

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/energy efficiency 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.
- 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.
- 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.

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	Units
GHG Emission Reductions	0.51	5.75	MMtCO2e
Net Present Value	-16.6	-464.6	$ Million
Cumulative GHG Reductions	0.51	28.65	MMtCO2e
Cost-Effectiveness	-32.49	-16.22	$/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:

- Peak avoided costs and levelized costs are assumed to be the same as from EEC-1
- 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*.

Comment: These programs should begin in 2009 and not end

- Escalation rate for cost of energy efficiency programs: 2% annually
- Real rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
-
- Energy efficiency costs are expressed as levelized costs over the life of the energy efficiency options. The incremental costs (typically incurred in the first year of program implementation) are spread over future years of the life of the energy efficiency measures.

Key Uncertainties

TBD – [as needed and approved by the SCs]

Additional Benefits and Costs

Energy efficiency investments will probably not lead to utility rates being reduced. Rather, energy efficiency typically results in reduced energy expenditures (bills) over the life of the investment for the consumer. Also, energy efficiency investments potentially avoid future utility cost increases.

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]

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

Comment: See comments and suggestions appended to end of document.
It appears that these two options both would set standards for building performance where EEC-4 speaks to new construction and EEC-6 addresses existing facilities. Also, EEC-4 specifies goals in terms of usage per square foot whereas EEC-6 states goals in terms of total usage. Additionally, EEC-4 specifies years for achieving the goals and EEC-6 is silent other than to specify a start year.
Suggested Change: Revise EEC-6 Goal statement to the following: "Reduce energy consumption per square foot of existing residential and commercial buildings by the equivalent of 10% of retail electric sales and natural gas in residential and commercial buildings by 20XX." The year "20XX" can be set by the EEC. Maybe the start year is 2010 as suggested by the "Timing" part in the Policy Design section, although it is not clear what "compliance" means in the timing section when the Policy Description is phrased in terms of "targets" and "encourage." The Policy Description envisions a carrot while the Timing part assumes a stick.

Implementation Mechanisms

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, 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 floor space 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.

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	Units
GHG Emission Reductions	0.00	0.12	MMtCO2e
Net Present Value	-0.4	-11.6	$ Million
Cumulative GHG Reductions	0.00	0.48	MMtCO2e
Cost-Effectiveness	-201.71	-24.09	$/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 and continue through 2030.
- New residential and commercial space grows at 1.3% and 1.4% per year respectively.
- Code improvements result in the same efficiency gains for natural gas as for electricity
- Energy codes apply to 18.4% of residential electricity use and 54% of commercial electricity use.
- Transmission and Distribution losses for electricity are 7%.
- Compliance with the this policy is assume to be 40% at the start of the program and rises to 90% by 2020 under the new compliance regime. For the portion of the new buildings (or retrofits) that don't comply, energy use in these structures is assumed to be 20% higher than the policy level.
- Building energy consumption is a function of IA's climate. According to the amount of heating degree days (HDD) and cooling degree days (CDD), IA is in the Residential Energy Consumption Survey climate zone 2. Source: 2001 RECS
  http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html#space

  HDD data from: http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/hdd.200507-200607.pdf

  CDD data from: http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/cdd.200501-200607.pdf
- New commercial buildings in climate zone 2 have higher electric intensity relative to existing stock, so are adjusted upwards by 24%. Source: Ratio of 1990-1999 buildings to all buildings total energy use .
  http://www.eia.doe.gov/emeu/cbecs/pdf/consumption_yearconst.pdf
- Code improvements result in differential efficiency gains for natural gas as for electricity.
  - Assumes code or efficiency improvement affects gas and electricity according to fuel usage
  - Residential: Electricity code improvement of x results in 2.23x gas improvement
  - Commercial: Electricity code improvement of x results in .63x gas improvement Source: CEBCS
- New residential and commercial space grows at 1.3% and 1.4% per year respectively.
- In each year, the new building stock is "treated" at the new efficiency goal (less noncompliance) and then joins the existing stock in the next year
- Escalation rate for cost of energy efficiency programs: 2% annually
- Real rate at which costs are discounted annually: 5%

- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
-

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]

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, and code enforcement officials to encourage incorporation of energy-efficiency and greenhouse gas emissions-reduction measures into construction. These programs can train designers, builders ~~and~~ contractors and code officials 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~~

- Extension of energy codes to all commercial construction and all new one and trwo family residential construction (Senate File 517).
- Regular updating of State Energy Code.

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

Not quantifiable

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]

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: Improvement in energy efficiency equal to 15% of retail sales.

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 CFLs, 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.

Comment: I believe this would be an implementation mechanism rather than an existing policy/program

Comment: I believe this would be an implementation mechanism rather than an existing policy/program

Comment: I believe this would be an implementation mechanism rather than an existing policy/program

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.

Comment: I believe this would be an implementation mechanism rather than an existing policy/program

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	Units
GHG Emission Reductions	0.27	1.72	MMtCO2e
Net Present Value	-29.5	-337.0	$ Million
Cumulative GHG Reductions	0.54	9.63	MMtCO2e
Cost-Effectiveness	-54.94	-35.00	$/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,
- 31.6% of residential electricity use is eligible for federal assistance, and thus for the program.
- 34% of commercial space is non-owner occupied and thus can benefit from efficiency investments that are likely to have been missed given "owner-tenant" disincentives for efficiency.
- New residential and commercial space grows at 1.3% and 1.4% per year respectively.
- Code improvements result in the same efficiency gains for natural gas as for electricity

- Energy codes apply to 18.4% of residential electricity use and 54% of commercial electricity use.
- Transmission and Distribution losses for electricity are 7%.
- Compliance with the this policy is assume to be 40% at the start of the program and rises to 90% by 2020 under the new compliance regime. For the portion of the new buildings (or retrofits) that don't comply, energy use in these structures is assumed to be 20% higher than the policy level.
- Building energy consumption is a function of IA's climate. According to the amount of heating degree days (HDD) and cooling degree days (CDD), IA is in the Residential Energy Consumption Survey climate zone 2. Source: 2001 RECS http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html#space

  HDD data from: http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/hdd.200507-200607.pdf

  CDD data from: http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/cdd.200501-200607.pdf
- New commercial buildings in climate zone 2 have higher electric intensity relative to existing stock, so are adjusted upwards by 24%. Source: Ratio of 1990-1999 buildings to all buildings total energy use . http://www.eia.doe.gov/emeu/cbecs/pdf/consumption_yearconst.pdf
- Code improvements result in differential efficiency gains for natural gas as for electricity.
  - Assumes code or efficiency improvement affects gas and electricity according to fuel usage
  - Residential: Electricity code improvement of x results in 2.23x gas improvement
  - Commercial: Electricity code improvement of x results in .63x gas improvement Source: CEBCS
- New residential and commercial space grows at 1.3% and 1.4% per year respectively.
- In each year, the new building stock is "treated" at the new efficiency goal (less noncompliance) and then joins the existing stock in the next year
- Escalation rate for cost of energy efficiency programs: 2% annually
-
- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.Real rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2010.

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]

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

Policy Description

Electricity 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.

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.

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).

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

2012	2020	Units

GHG Emission Reductions	0.67	6.86	MMtCO2e
Net Present Value	-39.1	-554.3	$ Million
Cumulative GHG Reductions	1.17	33.33	MMtCO2e
Cost-Effectiveness	-33.45	-16.63	$/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:

- See EEC-1 for levelized and avoided cost assumptions.
- Iowa utilities begin reducing 2% of their annual retail sales in 2015 and continue through 2030.
- Escalation rate for cost of energy efficiency programs: 2% annually
- Real rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
-

Comment: According to the Accord, utilities are to reduce their annual retail sales BY 2015. I assume there would be a ramp up to achieve that 2% in the prior years.

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]

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

Comment: Legislation needed to establish the projected certification/licensure program would have to be enacted in 2009 for this to have any chance of happening by 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 or certification 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

Type(s) of GHG Reductions

~~TBD~~

The Building Operator Certification (BOC) is a program component of the Custom Rebate DSM program offered in partnership by the IOUs and the Midwest Energy Efficiency Alliance. As described by the IOUs, BOC is a nationally recognized competency-based training and certification program for operations and maintenance staff working in commercial, institutional,

or industrial buildings. BOC achieves energy savings by training individuals directly responsible for maintenance of energy-using building equipment and day-to-day building operations.

Estimated GHG Reductions and Net Costs or Cost Savings

Not quantified

IOU BOC program reports average energy savings achieved by program participants as 0.18 kWh and 0.71 therms per participant's squire foot of facility. Interstate Power and Light Company (IPL) caps program impacts at a maximum of 10 percent of the customer's 12 months' kWh and therm usage.

Data Sources: Not applicable.

IPL DSM Plan, Vol. I, pp. 100-101

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]

EEC-11. Rate Structures

Policy Description

This option could include various elements of utility rate design that are geared toward reducing greenhouse gas emissions (GHGs), 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.

The reduction of GHGs from changes in rate structures can come from two sources. The first is the reduction of absolute levels of energy use by consumers due to higher prices. Real time pricing and smart metering give consumers information about their energy usage that enables them to better rationalize their usage. Time of use pricing or other schemes to reflect rational pricing that result in price increases during peak periods potentially reduces demand by the estimated price elasticity of demand, typically -.20% to -.50% (US EIA, 2003) so that a 10% increase in prices would lead to a 2% to 5% reduction in demand. In a survey of experience with smart metering, Owen and Ward (2006) find energy savings of 0-10%.

The other source of GHG reductions from policies to reduce peak demand are energy efficiency measures that reduce demand during peak periods, such as high efficiency air conditioners and chillers. These measures are included in the existing demand side management (DSM) measures in EEC-1, and EEC-14 (appliance standards). These measures also reduce new generation capacity investments which is not quantified for GHG reductions. **[This element of this option is not quantified as it is covered under other options]**

The GHG impacts of other types of rate structures are more difficult to quantify. Curtailment programs that allow loads to be shifted during peak periods might result in different emissions profiles as these loads move from peak to shoulder or baseload periods. Overall CO_2 savings from these programs are also difficult to quantify. **[This element of this option is not quantified]**

Policy Design

Goals: Reduce electricity consumption through pricing by 2.0% of retail sales. **[HTN: is this an annual or cumulative 2% goal?]**

Timing: Compliance will begin on January 1, 2010.

Implementing Parties: All Iowa utilities and utility customers.

Other: TBD

Comment: This also applies to Key Assumption 1
•Is the 2.0 percent reduction a one-time change in 2010 or does it occur each year, so that 2011 is 2.0 percent lower than 2010 and so on? The latter seems implausible but the language needs more clarity.
•Is a 2.0 percent reduction by 2010 plausible, even as a one-time reduction? The Cadmus joint assessment of potential found cumulative levels of market potential for demand response programs in the range of 10 to 14 percent after ten years (2009-2018), and those level included significant amounts for existing programs (direct load control and interruptible). Note that the Cadmus study states potential in terms of demand (MW) and not sales (kWh). For the potential study see for instance Section 4 of IPL's Appendix J of the application, especially Tables 33. 34 and 35.

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 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.

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

	2012	2020	Units
GHG Emission Reductions	0.13	0.71	MMtCO2e
Net Present Value	-8.1	-66.4	$ Million
Cumulative GHG Reductions	0.25	3.92	MMtCO2e
Cost-Effectiveness	-32.49	-16.94	$/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.
- Owen and Ward. (2006). Smart meters :commercial, regulatory and policy drivers. Appendix 2. http://www.sustainabilityfirst.org.uk/docs/smartmeterspdfappendices.pdf
- US EIA. (2003). Price Responsiveness in the AEO2003 NEMS Residential and Commercial Buildings Sector Models. http://www.eia.doe.gov/oiaf/analysispaper/elasticity/

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:

- Peak avoided costs and levelized costs are assumed to be the same as from EEC-1. A host of measures could fall under this category from smart meters to interruptible load programs. These measures tend to have low capital costs and thus using the levelized costs estimates from Quantec is a conservative assumption.
- Escalation rate for cost of energy efficiency programs: 2% annually

- Real discount rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.
- Demand response measures are assumed to reduce electricity demand by 5%. This number is a midpoint from the survey in Ownes and Ward (2006) find energy savings from smart meters vary from 0-10%. This is consistent with what price elasticity of demand would predict. If peak price tariffs are 10-20% higher than non-peak tariffs, then demand reductions would range from 2.5% to 10% using price elasticities of -.20 to -.5%
- The installation of demand response measures increases from 2% of total sales in the beginning of the program to 40% by 2020 as the program gets implemented. Assuming a 5% demand reduction and 40% participation, then the program reaches the target of 2% of retail sales by year by 2020.
- Residential, commercial, and industrial customers all implement the program at the same rate.
- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
-

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

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]

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;

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.

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.

Type(s) of GHG Reductions

TBD

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]

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:~~ sustainable design standards, with increasingly more stringent requirements:

- **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.

Comment: The Department of Public Safety object very strongly to naming any brand of sustainable design standards prior to the adoption of these standards by the Building Code Commissioner. LEED Silver should not be a target at all.

- **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 their 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),~~ meet sustainable design standards established by the Building Code Commissioner at increasingly stringent levels 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 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.

Type(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	Units
GHG Emission Reductions	0.01	0.07	MMtCO2e
Net Present Value	0.0	1.2	$ Million
Cumulative GHG Reductions	0.01	0.34	MMtCO2e
Cost-Effectiveness	2.71	3.41	$/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.
- New government space grows at 1.4% per year.
- Code improvements result in the same efficiency gains for natural gas as for electricity

- Compliance with the this policy is assume to be 40% at the start of the program and rises to 90% by 2020 under the new compliance regime. For the portion of the new buildings (or retrofits) that don't comply, energy use in these structures is assumed to be 20% higher than the policy level.
- Building energy consumption is a function of IA's climate. According to the amount of heating degree days (HDD) and cooling degree days (CDD), IA is in the Residential Energy Consumption Survey climate zone 2. Source: 2001 RECS http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html#space

  HDD data from: http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/hdd.200507-200607.pdf

  CDD data from: http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/cdd.200501-200607.pdf
- New commercial buildings in climate zone 2 have higher electric intensity relative to existing stock, so are adjusted upwards by 24%. Source: Ratio of 1990-1999 buildings to all buildings total energy use . http://www.eia.doe.gov/emeu/cbecs/pdf/consumption_yearconst.pdf
- Energy codes cover 54% of electricity use.
- Transmission and Distribution losses for electricity are 7%.
- Wind and biomass are the types of renewables purchased by governments to meet the fossil fuel reduction targets given their relevant abundance in IA. Renewables purchases are assumed to be 80% wind and 20% biomass.
- Renewable electricity costs for wind and biomass in the analysis come from the levelized costs developed by the IA Clean and Renewable Energy Subcommittee

Comment: What is the basis for these numbers?

- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
- The escalation rate for the cost of the energy efficiency programs: 2% annually
- Real rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.
- Net present value is calculated beginning 2009.

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]

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.

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.

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

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:

- Demand Side Management / Energy Efficiency programs are assumed to displace marginal sources of generation (50% coal, 50% gas) through 2012. From 2013 on, the programs are assumed to displace the new-build mix of 83% coal, 16% renewables, and 1% gas.
- 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%.
- Assume that appliances account for 20% of total energy consumption.
- Escalation rate for the cost of the energy efficiency programs: 1% annually
- Rate at which costs are discounted annually: 5%
- Year dollars in which new present value is calculated: 2005.

- Net present value is calculated beginning 2009.

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]

APPENDIX A--Avoided Electricity Emissions for the Residential, Commercial, and Industrial (RCI) Sector

To estimate emissions reductions from policy options that are expected to displace conventional grid-supplied electricity (i.e., energy efficiency and conservation) a simple, straightforward approach is used. Through 2012, we assume that these policy options would displace generation from a "marginal" mix of fuel-based electricity sources of 50% coal and 50% gas. (We assume that sources without significant fuel costs would not be displaced, e.g., hydro or other renewable generation). After 2012, we assume that the policy options are likely to avoid a mix of new build capacity additions. The new build mix for the RCI sector is estimated to be 83% coal, 16% renewables, and 1% gas.

This approach provides a transparent way to estimate emissions reductions and to avoid double counting (by ensuring that the same megawatt hours (MWh) from a fossil fuel source is not "avoided" more than once). It can be considered a "first-order" approach; it does not attempt to capture a number of factors such as the distinction between peak, intermediate, and baseload generation; issues in system dispatch and control; impacts of nondispatchable and intermittent sources such as wind and solar; or the dynamics of regional electricity markets. These relationships are complex and could mean that policy options affect generation and emissions (as well as costs) in a manner somewhat different than estimated here. Nonetheless, this approach provides reasonable first-order approximations of emissions impacts and offers the advantages of simplicity and transparency that are important for stakeholder processes.

Additional Comments and Suggestions

These are imbedded above, but included here for clarity.

- The term of art of building codes is "building codes" not "building and trades codes," This change should be made throughout the POD.
- Several references to LEED, rather than to sustainable design standards or to "sustainable design standards adopted by the Building Code Commissioner" remained. It is recommended that these be changed. Any reference to a particular brand of sustainable design standards is inappropriate (and the suggestion of LEED Silver as a standard for any part of this process is, in my view, insufficiently rigorous).
- We asked for the addition of code enforcement officials to those projected to be trained; this is an absolutely critical component of any initiative to improve the efficacy of energy and related codes, and one the subcommittee appeared to be agreeable to when I raised it.
- "Iowa Energy Codes" is not a "Related Program or Policy" for EEC-4; it is the core of EEC-4.

GENERAL COMMENTS
Many of the specific comments below reference EEC-1. Generally those comments apply to other EEC options as well. A single option is referenced for clarity.

SPECIFIC COMMENTS

1. Fuel avoided by energy efficiency
Option: EEC-1
Item: Key Assumption 7, "The reduction in use of various fuel types as a result of the decreased energy demand is assumed to reflect Iowa's mix of thermal resources excluding nuclear."

Comment: This assumption is inconsistent with the manner that energy efficiency savings are evaluated in Iowa, at least with respect to IPL. This assumption only makes sense if all generation were reduced proportionately from the energy efficiency programs posited in EEC-1. EEC-1 assumes that energy efficiency programs will reduce total electric consumption (kWh) by 1.0 to 2.0 percent annually. If this kWh reduction were to occur, then the generation that does not operate is the last generating unit that is on line in a given hour. All generating units are not reduced output proportionately to serve the lower demand.

Suggested Change: Change the seventh assumption to "The reduction in use of various fuel types as a result of decreased energy demand is assumed to reflect the last generating unit, or marginal generating unit that is operating in each hour that operates at a lower level due to the option." For the Alliant Energy-Interstate Power and Light Company (IPL) share of the state of

Iowa, and perhaps for the rest of the state, this change is quantified by the analysis provided to the EEC on July 24, 2008, and repeated here. I recommend that we assume that 35 percent of the energy reduced is generated by coal and 65 percent is generated by natural gas. These numbers are based on an analysis that was done at Alliant for IPL using the current resource plan that IPL has provided in recent proceedings before the Iowa Utilities Board (Docket Nos. RPU-08-1 and EEP-08-1). These values are representative figures based on the 2010, 2013 and 2020 results in Table 1 below.

Table 1. Fuel Avoided by Energy Efficiency

Year	Generation Type at the Margin in a Given Year, Updated Base Case, for selected years					
		Coal	Gas-fired Combined Cycle	Gas-fired Simple Cycle	Total	Comment on year selection
2010	Number of Annual Hours	2,146	6,233	382	8,760	2010 is first year of impacts for many EEC options.
2010	Percent of Annual Hours	24%	71%	4%	100%	
2013	Number of Annual Hours	4,336	4,245	179	8,760	2013 is the first year of SGS 4 in service so a year with high percent of coal as a resource.
2013	Percent of Annual Hours	49%	48%	2%	100%	
2020	Number of Annual Hours	2,890	5,547	324	8,760	2020 is year featured in ICCAC reports; also, second coal unit is in service in 2019, so 2020 is also a high year of coal as resource.
2020	Percent of Annual Hours	33%	63%	4%	100%	

2. Cost of energy efficiency programs

Option: EEC-1

Item: Key Assumption 1, "Levelized costs of energy efficiency measures is $30 MWh. Source: Quantec. (2008)."

Comment: The levelized cost of $30 is from the joint assessment of potential study conducted by Cadmus (f/k/a Quantec) for the investor-owned utilities. This value includes only the incremental cost of the measures that are installed. It does not include the administrative costs to conduct programs. The administrative cost is the amount that is added to the incremental

measure cost to obtain the cost side of the equation when a societal benefit-cost analysis of an energy efficiency program is conducted. An administrative cost needs to be added to the incremental measure cost to yield the "total social cost" referred to in cell B31 of tab ElecAssump of the Options spreadsheet. (See page 26 of IPL's Application in Docket No. EEP-08-1 for more explanation of the societal benefit-cost test.)

Suggested Change: Use the EEP applications forwarded by Gordon Dunn of the IUB Staff to develop a composite energy efficiency administrative cost value. For instance, Appendix A of IPL's application depicts the costs and savings for various levels and types of program aggregation.

3. Escalation Rate of Energy Efficiency program costs

Option: EEC-1

Item: Key Assumption 4, "Escalation rate for cost of energy efficiency programs: 1% annually ."

Comment: A long-term inflation rate of one percent seems low. The general inflation rate that IPL used its EEP application is 1.8 percent, which is based on the US Department of Energy's Energy Information Administration's "Annual Energy Outlook 2007." More problematic and more challenging is the recognition that energy efficiency programs have been offered for several years in some states such as Iowa. The more easily attained and cheaper energy efficiency gains have been realized, so additional gains, especially gains associated with aggressive goals, will be more difficult and more costly. IPL struggled with how much more costly are aggressive goals when it did its analysis of the 1.5 percent of sales scenario its recent EEP application. The IUB instructed each utility to evaluate the implications of achieving energy efficiency plan savings of 1.5 percent of annual sales by 2011. IPL assumed achieving this scenario's targets would, at a minimum, require an even greater marketing effort and higher incentive amounts than the base case. Program costs were accordingly escalated at annual rates of 15 percent for planning, administration and marketing; 20 percent for incentives; and 5 percent for measurement and verification. (IPL Application, p. 22)

Suggested Change: Assume some higher inflation rate such as 1.8 percent for energy efficiency program costs in the general case. Evaluate the utilities' applications to obtain a composite estimate of more aggressive cases such as a 2.0 percent savings case.

4. Avoided Costs

Option: EEC-1

Item: Key Assumption 2, "Avoided costs of energy is $45.30."

Comment: While this value is accurate, it is a historical number.

Suggested Change: Better data the EEC activity would be to use the avoided costs from the utilities' recent applications as provided by Gordon Dunn of the IUB Staff. In particular, IPL's electric avoided energy costs for years 2009 through 2018 are illustrated in Table 2.6 on page 30 of IPL's application. Note that these data have some features unique to Iowa proceedings, such

as the externality factor in Chapter 35 of the Iowa Administrative Code. More details on the implications of these features are provided in Table 1.10 on page 33 of IPL's application.

5. Goal Statement

Option: EEC-1

Item: Policy Design, Goals

Comment and Suggested Change: Specific the year at which the percent savings will be attained, rather the elapsed time period.

6. Goals for Building Standards

Options: EEC-4 and EEC-6

Item: Policy Design, Goals.

Comment: It appears that these two options both would set standards for building performance where EEC-4 speaks to new construction and EEC-6 addresses existing facilities. Also, EEC-4 specifies goals in terms of usage per square foot whereas EEC-6 states goals in terms of total usage. Additionally, EEC-4 specifies years for achieving the goals and EEC-6 is silent other than to specify a start year.

Suggested Change: Revise EEC-6 Goal statement to the following: "Reduce energy consumption per square foot of existing residential and commercial buildings by the equivalent of 10% of retail electric sales and natural gas in residential and commercial buildings by 20XX." The year "20XX" can be set by the EEC. Maybe the start year is 2010 as suggested by the "Timing" part in the Policy Design section, although it is not clear what "compliance" means in the timing section when the Policy Description is phrased in terms of "targets" and "encourage." The Policy Description envisions a carrot while the
Timing part assumes a stick.

7. Specificity of EEC-11

Option: EEC-11

Item: Policy Design, Goal and Key Assumption 1.

Comment and Suggested Changes: The stated goal is "Reduce electricity consumption through pricing by 2.0% of retail sales." Key Assumption 1 states "Changes in pricing reduce retail sales by 2%—relative to 2009 sales—beginning in 2010 and continuing annually from the 2009 baseline through 2025." There are two comments and related suggestions:

- Is the 2.0 percent reduction a one-time change in 2010 or does it occur each year, so that 2011 is 2.0 percent lower than 2010 and so on? The latter seems implausible but the language needs more clarity.
- Is a 2.0 percent reduction by 2010 plausible, even as a one-time reduction? The Cadmus joint assessment of potential found cumulative levels of market potential for demand response

programs in the range of 10 to 14 percent after ten years (2009-2018), and those level included significant amounts for existing programs (direct load control and interruptible). Note that the Cadmus study states potential in terms of demand (MW) and not sales (kWh). For the potential study see for instance Section 4 of IPL's Appendix J of the application, especially Tables 33. 34 and 35.

Page 7: [1] Comment **K Pasko** **8/2/2008 11:05 AM**

See comments and suggestions for changes appended to this document.

A long-term inflation rate of one percent seems low. The general inflation rate that IPL used its EEP application is 1.8 percent, which is based on the US Department of Energy's Energy Information Administration's "Annual Energy Outlook 2007." More problematic and more challenging is the recognition that energy efficiency programs have been offered for several years in some states such as Iowa. The more easily attained and cheaper energy efficiency gains have been realized, so additional gains, especially gains associated with aggressive goals, will be more difficult and more costly. IPL struggled with how much more costly are aggressive goals when it did its analysis of the 1.5 percent of sales scenario its recent EEP application. The IUB instructed each utility to evaluate the implications of achieving energy efficiency plan savings of 1.5 percent of annual sales by 2011. IPL assumed achieving this scenario's targets would, at a minimum, require an even greater marketing effort and higher incentive amounts than the base case. Program costs were accordingly escalated at annual rates of 15 percent for planning, administration and marketing; 20 percent for incentives; and 5 percent for measurement and verification. (IPL Application, p. 22)