Let's Be Number One:
Improving Iowa's Utility-Run Energy Efficiency Programs

Andrew Johnson
Teresa Galluzzo

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The Iowa Policy Project
120 N Dubuque St #208 • Iowa City, Iowa 52245
(319) 338-0773 • www.iowapolicyproject.org

Authors and Acknowledgements

Andrew Johnson raises kids, farms, and consults near Decorah. He has worked in natural resources and sustainability, domestically and internationally, for many years.

Teresa Galluzzo has been a Research Associate at the Iowa Policy Project since November 2004. Her work focuses on Iowa environmental issues.

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List of Acronyms

ACEEE – American Council for Energy-Efficiency Economy

COU – Consumer Owned Utilities

DNR – Department of Natural Resources
DOE – Department of Energy

EE – Energy Efficiency
EPA – Environmental Protection Agency

GHG – Greenhouse Gases
GSP – Gross State Product

IOU – Investor Owned Utilities
IPL – Interstate Power and Light
IUB – Iowa Utilities Board

LM – Load Management

Munis – Municipal Electric Utilities
MWh – Megawatt Hour

OCA – Office of Consumer Advocate

RE – Renewable Energy
REC – Rural Electric Cooperatives

TOU – Time Of Use

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In the years around 1900 when electric poles were raised and lines were strung, Iowa's horizon changed. But that visual impact was small compared to the way it changed Iowans' lives. It must have seemed something of a miracle when electric lights were first switched on, bringing new, steady light to previously dark hours.

In a history of Iowa's electrification, Morain (2005) recounts the story of an Iowa woman who grew up on a farm. This woman remembers the evening that electric lines were connected to her family's home. She recalls her family standing in the yard to watch as her older brother switched on the new electric lights. And Morain says, "She remembers that her mother stood there crying. At the time, the woman thought her mother was happy because she would have electrical appliances to make her work easier. Many years later, she understood that it was much more than that. With electricity, her mother knew her daughter could choose to live on the farm and not have to live in a second-class home. With the coming of electricity, one of the big reasons farm families often wanted to leave the farm ended."

Electricity came first to population centers in Iowa. It took longer for rural Iowa to be connected because of the expense of running electrical lines where there were few customers. In 1935 less than 12 percent of U.S. farms had electricity. It wasn't until the creation of the federal Rural Electrification Administration in 1936 that farm homes began receiving electrical power in large numbers. During World War II, the high price of copper slowed the federal rural electrification effort. But after the war, rural areas were quickly brought online and by 1955, 93 percent of all U.S. farms had electricity (Rural Electrification Administration 1982).

Iowans' lives improved in many ways with electricity. Shortly following the purchase of electric lights, Iowans bought toasters, stoves, vacuum cleaners, fans and hot water heaters. Before long, electricity was so intertwined with Iowans' lives that we no longer gave a thought to the number of things we plug in and turn on each day.

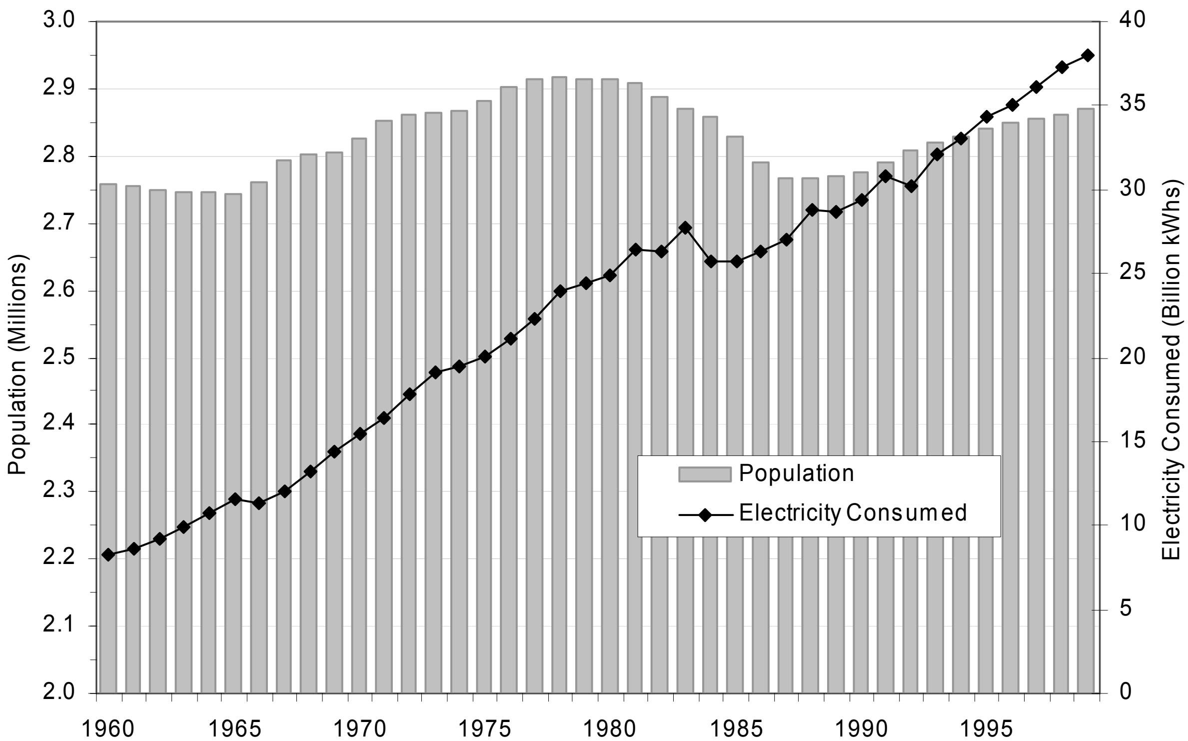
We are at a time, when thinking about our electricity use is absolutely vital. Our continuously growing energy consumption from fossil fuel sources is seriously affecting our climate and our pocketbooks. In this report we examine Iowa's electricity usage. We present background information on Iowa's electrical consumption and production over time, but the bulk of the report focuses on the role that energy efficiency (EE) can and must play in Iowa's future. To that end, we describe Iowa's laudable efforts to invest in EE and make suggestions for how to effectively carry these efforts further. *This report is limited to a discussion of our utility-run EE efforts, which are currently Iowa's largest efforts. Although we do not discuss other efforts such as building codes, combined heat and power, and transportation policy in this report, they are large and vital components of improving Iowa's EE and we plan to address these in a future report.

Electricity in Iowa

Consumption

The growth of electricity consumption in Iowa proceeded upward almost continuously from 1960 to 1999 increasing over 4.5 times (363 percent). See Figure 1. Electricity consumption declined in only six years of the 40-year period. The largest average annual growth rates occurred early on: in the 1960s consumption grew annually by an average of 6.5 percent; in the 1970s, 5.5 percent; in the 1980s, 1.7 percent; and in the 1990s, 2.9 percent. This growth in consumption far outpaced the growth of Iowa's population, which from 1960-1999 only grew 4 percent. The state actually lost population in 14 of those 40 years.

Figure 1. Iowa's Population and Electricity Consumption 1960-1999



Source: Energy Information Administration and U.S. Census Bureau

Looking at our more recent history, Iowa's electricity sales have slowed. See Figure 2. So far this decade, Iowa's average retail sales of electricity have grown by 1.8 percent annually. Similar to past decades, this increase continues to be considerably larger than our population growth, which has only averaged 0.3 percent from 2000 to 2006. Since 2000, Iowa's Gross State Product (GSP) has increased by an average of 2.8 percent. This means we are using less electricity per dollar of economic output.

Figure 2. Iowa Retail Electricity Sales, Population, and Gross State Product (GSP) 2000-2006

	2000	2001	2002	2003	2004	2005	2006	00-06 Average
Retail Sales of Electricity (millions of kWh)	39,088	39,444	40,898	41,207	40,903	42,757	43,337	
% Change		0.9%	3.7%	0.8%	-0.7%	4.5%	1.4%	1.8%
Population	2,926,324	2,930,031	2,931,084	2,935,991	2,946,009	2,955,587	2,972,566	
% Change		0.1%	0.0%	0.2%	0.3%	0.3%	0.6%	0.3%
GSP (millions of chained 2000 dollars)	$90,186	$89,360	$92,821	$95,254	$100,655	$103,648	$106,346	
% Change		-0.9%	3.9%	2.6%	5.7%	3.0%	2.6%	2.8%
Retail Sales of Electricity (kWh) per Capita	13,357	13,462	13,953	14,035	13,884	14,466	14,579	
% Change		0.8%	3.6%	0.6%	-1.1%	4.2%	0.8%	1.5%
GSP per Capita	$30,819	$30,498	$31,668	$32,444	$34,167	$35,068	$35,776	
% Change		-1.0%	3.8%	2.4%	5.3%	2.6%	2.0%	2.5%

Source: Energy Information Administration, U.S. Census Bureau and Bureau of Economic Analysis

While these numbers provide some context for Iowa across time, they do not help us understand how Iowa compares to the nation. To do this, we compare Iowa with the nation as a whole, with the six states that share Iowa's borders, and with 10 states besides Iowa that are leaders in implementing EE measures. Our neighbors are Minnesota, Wisconsin, Illinois, Missouri, Nebraska and South Dakota. The national leaders in EE are California, Connecticut, Massachusetts, Minnesota, New Jersey, New York, Oregon, Rhode Island, Vermont and Wisconsin.[1]

The United States' average per capita retail sales of electricity since the beginning of the new century have been 12,127 kWh. Per person consumption did increase over the six years, but only by 0.2 percent. See Figure 3. Iowa is above average in electricity consumption per capita, ranking 17th. Additionally our retail sales of electricity grew by 1.5 percent, considerably faster than the national average.

Iowa also stands out among our neighbors; only Nebraskans consume more electricity per person. The 10 states that lead in EE overall used considerably less electricity per capita than Iowa and their consumption grew more slowly, 0.3 percent. Iowa is likely to keep its status as a high electricity per capita state unless aggressive action is taken to slow this trend.

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[1] We considered states to be EE leaders if they ranked in the top 15 for both the Consortium for Energy Efficiency's planned per capita spending for electric EE in 2006 and the American Council for Energy-Efficiency Economy's (ACEEE) *State Energy Efficiency Scorecard for 2006*. ACEEE's *Scorecard* evaluates state spending on EE as well as other measures, such as progressive policies, strong building codes, tax incentives, and lead by example practices.

Figure 3. Retail Sales of Electricity (kWh) per Capita

	2000	2001	2002	2003	2004	2005	2006	00-06 Average
U.S.	12,158	11,906	12,038	12,029	12,100	12,372	12,284	12,127
% Change		-2.1%	1.1%	-0.1%	0.6%	2.3%	-0.7%	0.2%
Iowa	13,357	13,462	13,953	14,035	13,884	14,466	14,579	13,962
% Change		0.8%	3.6%	0.6%	-1.1%	4.2%	0.8%	1.5%
Average of Iowa's Neighbors	12,221	12,306	12,584	12,553	12,567	13,157	13,150	12,648
% Change		0.7%	2.3%	-0.3%	0.1%	4.7%	-0.1%	1.2%
Average of Top EE States	9,519	9,400	9,426	9,445	9,558	9,814	9,675	9,548
% Change		-1.2%	0.3%	0.2%	1.2%	2.7%	-1.4%	0.3%

Source: Energy Information Administration and U.S. Census Bureau

Production

Iowa utilities generated 45,483,462 megawatt hours (MWh) of electricity in 2006. See Figure 4. This is 1.1 percent of the United States' total electrical generation. To place this in context, our population comprises only 0.99 percent of the national population.

Figure 4. Iowa's Net Electricity Generation (MWh) and Percent of Total Generation by Source

	1990		1995		2000		2006	
Coal	25,751,941	85.7%	29,409,704	84.6%	35,067,093	84.4%	34,405,293	75.6%
Nuclear	3,011,572	10.0%	3,729,970	10.7%	4,452,884	10.7%	5,095,442	11.2%
Hydroelectric Conventional	875,114	2.9%	1,002,974	2.9%	904,010	2.2%	909,348	2.0%
Natural Gas	333,390	1.1%	479,889	1.4%	433,764	1.0%	2,399,949	5.3%
All Other Renewables	18,018	0.1%	64,530	0.2%	582,382	1.4%	2,454,720	5.4%
Petroleum	54,471	0.2%	65,861	0.2%	101,877	0.2%	208,285	0.5%
Other	0	0.0%	0	0.0%	0	0.0%	10,426	0.0%
Total	**30,044,506**		**34,752,928**		**41,542,010**		**45,483,462**	

Source: Energy Information Administration

Coal is Iowa's primary source of electricity generation. In 2006, more than 75 percent of Iowa's electricity was generated from burning coal. Iowa is considerably more dependent on coal than the rest of the nation; the national average was 49 percent in 2006. In fact, Iowa ranked 10^{th} in the share of its electricity generated from coal. Only one of our neighbors, Missouri, is more reliant on coal for its electrical generation. But even as we continue to burn a high proportion of coal, in recent years the state has diversified its power sources.

Nuclear power produced from Iowa's single plant has grown slowly but steadily over the last 16 years. In 2006, Iowa produced more than 11 percent of our electricity from nuclear. Hydroelectric power has provided a steady but small amount, between 2 and 3 percent, of Iowa's electricity. The production of electricity from natural gas has grown considerably in the last couple years and now provides more than 5 percent of our generation.

Renewable sources have been the other major growth spot in our generation mix. Renewable sources include biomass, geothermal, solar thermal, photovoltaic and wind. Because of this growth, in 2006 Iowa was fifth in the nation in the percentage of electricity generated from renewables. Of our neighbors, only Minnesota ranked higher. If we include generation from hydroelectric, in the renewable category Iowa falls to 15th in the nation.

Much of this growth in renewables is due to Iowa's gangbusters expansion of wind power in the last decade. Wind accounted for 5.1 percent of electric generation in Iowa in 2006 (Iowa Utilities Board 2007). In 1997, Iowa only had 3 MW of installed wind power; by 2007, that number had grown to 1273 MW. And the state has yet more potential; Iowa ranks 10th nationally in terms of wind resources (American Wind Energy Association 2008). With the increasing growth of renewable power, Iowa is moving towards sources of cleaner power that are available within its borders.

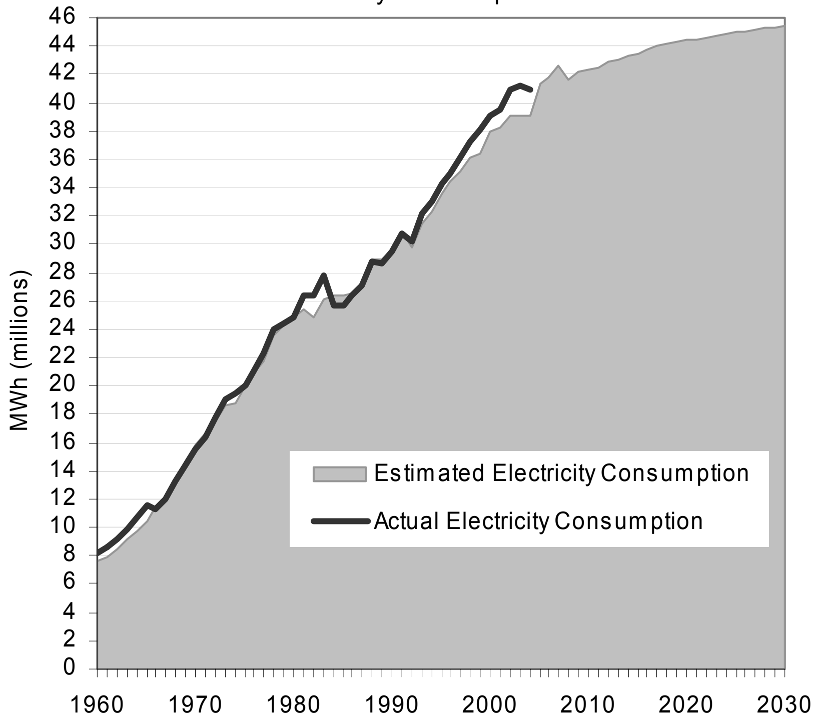
This brief overview of Iowa's electricity system makes several points clear. Electricity sales per capita are high relative to our neighbors and the nation. And they are growing faster than those of our neighboring states and the nation as a whole. Iowa is overwhelmingly reliant on coal even as our electricity sources are diversifying. This combination of consumption and production facts suggests Iowa could benefit from increases in EE.

Iowa's Future Electricity Use

The Energy Information Administration does not forecast electricity usage by state, only by region. However, we found that dividing the electricity consumed in Iowa's seven-state region by Iowa's population share produced consumption numbers fairly similar — an average difference of 3 percent — to actual electricity consumption from 1960 to 2004. See Figure 5. This finding gives us some confidence that doing a similar calculation for the Energy Information Administration's regional forecast through 2030 is a fairly accurate indicator of Iowa's electricity consumption in coming years.

The point of this exercise is not to precisely forecast our electricity consumption, but to show that Iowa's consumption will likely continue to rise and at a faster pace than expected population growth. By this estimation, Iowa in 2030 would be consuming 10 percent more electricity than in 2005, and yet, according to the United States Census our population will actually have declined by 0.01 percent.

Figure 5. Actual Electricity Consumption 1960-2004 and Estimated Electricity Consumption 1960-2030



Source: Energy Information Administration, U.S. Census Bureau, and Author's Calculation

These estimates are troubling because we are at a point when endless growth in electricity consumption drawn from traditional fossil fuel sources is no longer desirable. According to overwhelming scientific consensus, humans have drastically increased the amount of greenhouse gases (GHG) in the atmosphere, which has already begun to change the Earth's climate and is predicted to significantly alter it in coming years. According to the Intergovernmental Panel on Climate Change, to avoid the most disastrous effects of climate change, we need to reduce our emissions of GHG by at least 60 to 80 percent below current levels by 2050.

Although we need to reduce our greenhouse gas emissions, it is also true that as the Iowa Utilities Board (IUB) states, "Reliable supply of electricity is essential to economic development and human satisfaction" (Iowa Utilities Board 2003). Therefore, Iowa can take three important steps to ensure a reliable and productive supply of electricity: 1) reduce, or at least store, the carbon content of fuels with which we produce electricity, 2) further develop renewable, clean power sources, and 3) increase EE efforts. It is noteworthy that there is statewide support for taking such measures. According to a 2007 survey conducted for IUB, most Iowans feel global climate change is a serious issue and that strong action is needed.

The Energy Efficiency Answer

Just as the incandescent light bulb changed Iowa over the last century, the compact fluorescent light bulb now characterizes a modern and improved Iowa. It is perhaps the best-known symbol for EE. To meet the challenges we are facing, Iowa will certainly need to rely on a host of solutions, but increasing our efforts with the symbolic and effective compact fluorescent light bulbs as well as other EE measures can have a large, nearly immediate, and economically beneficial impact.

According to Pacala and Socolow (2004), improvements in efficiency and conservation provide the greatest potential for reducing greenhouse gas emissions. They state, "Improvements in energy efficiency will come from literally hundreds of innovations that range from new catalysts and chemical processes, to more efficient lighting and insulation for buildings to the growth of the service economy and telecommuting."

In addition to having significant potential to cut Iowa's emissions, EE is one of the quickest methods for reducing energy consumption. Electricity savings due to several efficiency measures can be attained in the very near term.

EE also has economic benefits. The cost of the services that replace the production of electricity are cheaper, which is especially important to Iowa's low-income families. Efficiency investments can reduce prices significantly for program participants, but they also reduce prices for all customers by decreasing electricity demand. Further, efficiency investments produce local economic benefits as new and old businesses create and implement efficiency measures.

Iowa's Energy Efficiency Efforts

Iowa has been an early leader in EE. In 1990 Iowa passed a landmark 1990 requiring the state's electric investor-owned utilities to spend the equivalent of 2 percent of their gross revenue on EE programs for their customers. When the law was passed, it was a very progressive mandate, although the spending requirement was removed six years later. In recent years, energy prices have increased and EE has become more common, meaning that the utilities' efficiency spending has been higher than the formerly mandated amount. Following is a brief description of Iowa's largest efficiency effort, its utility-run EE programs.

Iowa Code, Chapter 467.6(14) states, "Electric and gas public utilities shall offer energy efficiency programs to their customers through energy efficiency plans. An energy efficiency plan as a whole shall be cost-effective." 476.6(16b) goes on: "Gas and electric utilities required to be rate-regulated under this chapter shall file energy efficiency plans with the board. An energy efficiency plan and budget shall include a range of programs, tailored to the needs of all customer classes, including residential, commercial, and industrial customers, for energy efficiency opportunities."

Since Iowa began its statewide EE programs, its investor-owned utilities (IOUs) have delivered relatively comprehensive efficiency programs to ratepayers.[2] Regulatory oversight is provided by

[2] The 2007 Iowa Legislature passed HF 918, which directed the IUB to conduct a study of the status and effectiveness of all Iowa utility EE programs. Two comprehensive reports summarize the information submitted by the utilities, one compiled by the IUB itself (Iowa Utilities Board 2007) and one compiled by the Office of Consumer Advocate (OCA) (Perkins 2008).

the IUB, and program costs are recovered from ratepayers through an automatic adjustment mechanism (similar to a monthly bill rider) approved by the IUB in a contested case proceeding.

Iowa's consumer-owned utilities (COUs) include 136 municipal electric utilities (Munis) and 45 rural electric cooperatives (RECs). The COUs are not rate-regulated and operate voluntary EE programs. Iowa Code makes it clear that COUs are required to offer EE programs to their customers, but those plans do not require IUB review and approval, nor that they be "tailored to the needs of all customer classes."

Figure 6 shows that Iowa's IOUs provided for over 75 percent of Iowa's electricity sales. Therefore, one quarter of Iowans are not eligible for Iowa's mandated and reviewed EE programs.

Figure 6. Iowa's Electric Utilities (2006)

	Number	Retail Sales (MWh)	Percent of Electricity Sold	Retail Revenues
Investor-Owned	2	32,580,601	75.7%	$2,245,203,416
Municipals	136	5,406,789	12.6%	$354,993,403
RECs	45	5,053,567	11.7%	$427,557,606

Source: Iowa Utilities Board 2007b

Over two-thirds of Iowa electric retail sales are to non-residential customers. Residential EE programs provided by IOUs (and some COUs) include rebate/incentive programs (for appliances, lighting, weatherization, etc), and audit, new construction, low-income, and appliance recycling programs. Non-residential offerings include equipment programs (prescriptive and custom rebates), audits (small commercial, industrial, and performance bid), and new construction programs. Both IOUs and COUs also offer load management (LM) programs, designed not to reduce energy usage but rather to lower peak demand needs, within their EE programs.

Figure 7 shows the 2006 spending breakdown for the electric IOUs by electric EE and electric LM. LM programs contribute little or nothing to actual energy savings, yet result in about half the program costs of the mandated programs. If the current level of IOU spending were devoted to only EE, energy savings would be much larger.

Figure 7. 2006 IOU Spending for Electric EE and Electric LM

	Program	Spending
Alliant/IPL	Electric EE	$20,832,645
	Electric LM	$24,609,413
MidAmerican	Electric EE	$19,350,964
	Electric LM	$10,653,584

Source: Iowa Utilities Board 2007b

Figure 8 shows the 2006 spending breakdown by type of electrical utility for EE. (This includes both EE and LM for all utility types, although many Munis and some RECs have no LM programs.) One common method of analyzing efficiency programs is to measure efficiency spending as a percent of revenue and EE savings as a percentage of total retail sales. In 2006

IOUs spent 3.4 percent of their revenue on their efficiency programs (1.6 percent was spent on LM) and saved 0.8 percent of their electric sales. Munis spent 1 percent of their revenue and saved 0.15 percent of their electrical sales. Beginning in 2004, RECs significantly increased their efficiency efforts and in 2006 spent 2.7 percent and saved 0.6 percent.

Figure 8. Iowa's Electric Utilities Energy EE Efforts (2006)

	EE Spending	EE Spending as a Percent of Revenue	MWh Saved from EE	EE Savings as a Percent of Retail Sales	Cumulative MWh Saved from EE	Cumulative EE Savings as a Percent of Retail Sales
Investor-Owned	$75,466,606	3.4%	274,975	0.80%	1,881,382	5.90%
Municipals	$3,420,358	1.0%	8,355	0.15%	170,672	2.50%
RECs	$11,691,595	2.7%	31,921	0.60%	177,728	3.47%

Source: Iowa Utilities Board 2007b

Figure 8 also shows the cumulative efforts of Iowa's utilities. Due to previous years' EE efforts, in 2006 customers of IOUs purchased 5.9 percent less electricity, Munis, 2.9 percent less; and RECs, 3.5 percent less. Despite the cumulative effects of Iowa's EE efforts, as previously noted, Iowa's electricity per capita consumption growth is far outpacing the nation's.

In 2006 the average state with any electrical EE spending (excluding LM) spent $8.73 per capita on efficiency efforts. Iowa was well ahead of the average spending $13.04 per person, putting us in 9th-place (IUB 2007b).

Iowa's long tradition of EE is a proud accomplishment. However, Iowa is not meeting some of its stated efficiency goals. The 2001 Energy Policy Task Force convened by then-Governor Tom Vilsack, had the goal of meeting all of Iowa's future energy demand by increasing EE rather than increasing supply (Ritsema et al. 2003). More recently Governor Culver signed the Energy Security and Climate Stewardship Platform, calling for meeting at least 2 percent of annual retail sales of natural gas and electricity through EE improvements by 2015 and achieving an additional 2 percent of savings every year thereafter. Similarly, the legislatively appointed 2007 Energy Efficiency Study Committee suggested increasing annual energy savings to 1.5 percent of retail sales by 2012.

Further, due to recent lack of federal action on EE, states across the nation are increasing their EE efforts. In fact, states are now spending about three times as much as the federal government on efficiency programs (Eldridge et al. 2007). Some of Iowa's neighboring states in particular have become leaders and, in fact, have outpaced our efforts. Minnesota, which has an electrical system similar to Iowa's, not only spends more than Iowa on efficiency efforts per capita, but in 2006 Governor Tim Pawlenty called for 1.5 percent per year savings of electric sales, 1 percent of which must come from EE.

Due to the realities of climate change, Iowa's yet unmet efficiency goals, and the fact that our neighboring states are increasing their efforts and providing us with examples for big EE accomplishments, Iowa needs to seize this opportunity to become an even more energy efficient state. In that light, the following section analyzes the current utility programs and makes recommendations for achieving greater levels of EE. Iowa can build on its great tradition of energy efficiency and energy leadership by renewing its commitment to innovative and progressive efficiency policies.

Shortcomings in Iowa's Utility-Run Energy Efficiency Efforts

Programs are Confusing, Inconsistent, and Not Universally Available

Total Iowa energy use in 2004 was roughly 1.2 trillion Btu, of which 19.1 percent went to residential, 15.1 percent to commercial, 41.1 percent to industrial (including agriculture), and 24.6 percent to transportation (Iowa Department of Natural Resources 2007). Utilities don't generally provide energy to the transportation sector, so efficiency programs are naturally geared towards the residential, commercial and industrial sectors. The bulk of Iowa's energy use in residential and commercial sectors, and a good portion in the industrial sector, is used in buildings. Therefore, this is where the utility programs have traditionally focused the lion's share of their efforts.

A building is a system. It typically uses multiple energy sources for different end uses, and likewise has a wide variety of potential areas of energy savings. These can broadly be understood as savings related to the building envelope (a building's ability to retain or exclude heat), mechanical systems (the heating, cooling and ventilation, and water heating components), lighting systems, and variable internal demand (such as appliances and electronics). Common sense and extensive program experience (York et al. 2008) dictates that a serious approach to energy savings would analyze all these opportunities together, and provide a comprehensive, integrated, and proven set of solutions to all Iowans, linked to both technical and financial assistance mechanisms. Unfortunately, this is not the case. (Note the following discussion includes information about electric *and* natural gas utilities.)

- Four IOUs in Iowa serve over 1.1 million customers, while close to 200 COUs serve over 400,000 customers (Iowa Department of Natural Resources 2007) — each utility runs its own program with a separate set of offerings.

- Many of the most promising practices are simply unavailable to customers. Lighting, for example, represents over 40 percent of potential residential electrical savings (Perkins 2008), yet of the 58 COUs listed in the Office of Consumer Advocate (OCA) summary of incentive programs, only 21 offer incentives for high efficiency lighting.

- While IOUs generally offer audits, experience of the authors and others indicate they are often anything but comprehensive, with no standard procedure and no written report outlining recommended actions, potential energy and cost savings, or financial assistance opportunities.

- Many RECs do not offer residential audits, many that do, only do so via telephone or web sites, and possibly as few as six municipal electric utilities (out of 136) offer them (Perkins 2008).

• Residential customers are generally not eligible for audits under the IOU programs if they live in a mobile home, if their home is less than 10 years old (though newer homes often use *more* energy because of their size, and have tremendous energy savings potential), if they are renters (without permission from the owner), or if the utility does not provide the primary heat energy (leaving potentially tens of thousands of Iowa liquid propane customers ineligible) (Alliant Energy 2008) (MidAmerican Energy 2008).

• Residential customers are generally only eligible for financial assistance (rebates) on practices corresponding to energy use, so the aforementioned LP customers are often ineligible for weatherization, insulation, window/door replacement, or even new construction rebates. Even when a customer is lucky enough to have an in-home audit from their gas utility, the auditor will typically not provide compact fluorescent light bulbs, water heater blankets/water line insulation/low flow showerheads (when the water heater is electric), or even discuss electric savings, if the customer has a separate electricity provider.

Our Iowa programs lack comprehensive and universal appeal. COU offerings are least comprehensive, with many customers eligible for very little that would provide significant energy savings. IOU offerings are more comprehensive and standardized, but audits are not universally available, and customers served by separate electric and gas utilities must pursue different assistance and incentives through each.

One example of this confusion and resulting lack of participation is described by Sheldon Strom of the Minnesota Center for Energy and Environment (CEE)(2008). In Minnesota, Excel Energy had almost no participation in their small commercial program until they contracted with the CEE. CEE conducted outreach, developed a comprehensive but simple one-stop-shop approach, and now they're working with over 500 small commercial customers per year.

According to experts in the delivery of EE programs (Neme 2008), one of the greatest factors contributing to non-participation and even negative perception of EE programs is the piecemeal and confusing nature of programs. Individuals hearing through advertising or word of mouth about financial incentives only to realize they are not eligible not only can create negative perceptions, but represents a clear lost opportunity for actual energy savings. Other states have demonstrated leadership in developing mechanisms to provide more universal and comprehensive "one-stop-shop" services to all state citizens, and in moving towards a "foot-in-the-door" systems approach to holistic energy savings (Strom 2008) (York et al.2008).

Recommendation:

If EE programs remain with utilities, Iowa should establish a statewide working group to develop a set of tested and innovative best practices that will form the core of a unified EE program to be offered statewide by all utilities. A lead utility (most likely the electricity provider) should be identified to provide the "one-stop-shop" and offer the full range of technical assistance and financial incentives regardless of energy source. Comprehensive energy assessments analyses should be the starting point for building and system-wide energy planning and efficiency implementation. Any utility that chooses not to participate will have its EE funds and energy/GHG targets placed up for bid and competing utilities or third party entities may acquire.

Utilities' Duplication of Program Administration Costs Money

Any improvement in EE penetration must address the issues of administrative duplication. The IOUs report their efficiency program expenditures to the IUB under the headings: planning and design, program administration, advertising and promotion, incentives, and monitoring and evaluation (Iowa Utilities Board 2007). Of these, incentives are the funds expended for direct financial (largely rebates) or technical (such as audits) assistance. Beyond that, each of Iowa's near 200 utilities is charged with developing, promoting, administering and evaluating its own EE plans. It challenges the imagination to think there isn't a great deal of duplication of effort, and a great deal of potential cost savings.

To be fair, the large IOUs do achieve economies of scale in their programs, and they do cooperate on certain planning and design issues. And yet, Alliant/IPL's non-incentive spending as a percentage of total efficiency (excluding load management) plan expenditures was 26 percent in 2006, MidAmerican Energy's was 28 percent. Though administration costs are notoriously difficult to compare state to state due to differences in program structures, these numbers are "pushing or beyond the limits of reasonable" (Prindle 2008). COU non-incentive expenditures, with their less comprehensive offerings and minus economies of scale, were often well above 50 percent.

Recommendation:
The implementation of a uniform and comprehensive core EE program by all utilities in the state will reduce program planning and design costs considerably. To reduce marketing/promotion and evaluation, a small percentage of the EE ratepayer surcharge from all utilities should be pooled and used to bid out a statewide EE marketing campaign, and for the annual evaluation of the program as a whole.

Utilities Do Not Have Incentive to Push EE

States have struggled for decades with utility interests and motivation regarding EE. There is an inherent conflict of interest when a governing body not only directs an entity to encourage customers to buy less of their primary product (and hence reduce revenue), but also expects that entity to lead in developing innovative and increasingly effective ways to maximize those lost sales. For utilities (and especially regulated utilities) the problem is compounded, as explained by Harrington et al. (2007):

> In conventional "cost plus" utility regulation, utility revenues and profits are linked to unit (kW, kWh, mcf or therms) sales. Under this system, loss of sales due to successful implementation of energy efficiency will lower utility profitability, and the effect may be quite powerful. For example, a 5 percent decrease in sales can lead to a 25 percent decrease in net profit for an integrated utility. … This basic sales incentive is at odds with a requirement to invest in cost-effective energy efficiency. Policies can, instead, align utilities' profit motives with acquisition of all cost-effective energy efficiency.

As shown by the Environmental Protection Agency's (EPA) *National Action Plan for Energy Efficiency* (Jensen 2007), the existence of a conflict of interest in utility-run efficiency programs is not in dispute. What is more difficult to demonstrate, however, is the additional efficiency savings that *could be achieved* when utility interests are effectively aligned with maximizing EE gains. This can be difficult to determine, but the OCA (Perkins 2008) points to a couple of examples, including the fact that of 38 RECs, only 15 offer rebate programs for lighting and/or appliances, where over 60 percent of energy savings potential resides.

> The majority of REC investment in rebate measures in 2006 occurred in the Geothermal Heat Pumps, High Efficiency Water Heater and Air Source/Heat Pump Rebate programs. … An electric-only utility seeking to maintain or expand its load by preventing the loss of a heating customer to a competing fuel is more likely to aggressively promote efficiency measures that will serve to maintain or grow load.

This fundamental conflict has caused many states to evaluate different approaches to the administration of state-level EE programs (Blumstein et al. 2003). Some states, such as Vermont and Wisconsin, have adopted a third-party, private-sector program administrator. Others such as New York have chosen a "third-party" governmental administrator, while still others (Oregon, Washington, Idaho and Montana) have banded together to form a regional administrator, the Northwest EE Alliance.[3]

Recommendation:
Whether or not ratepayer funded EE programs remain with utilities, Iowa must take legislative and administrative action to better align utility financial interests with EE and distributed renewable energy (RE). As outlined in Jensen (2007) and Harrington et al. (2007), these mechanisms generally fall under the categories of decoupling a utility's revenue from its sales, developing mechanisms whereby utilities are allowed to recover net revenue lost to efficiency gains, and providing incentives such as allowing utilities to share in the net society benefits provided by EE. The vast majority of states (including many without significant statewide EE programs, and all states recognized as leaders in the field) have implemented utility alignment, mostly focusing on decoupling or a combination of decoupling and incentives (Jensen 2007). It is high time Iowa takes action.

Utilities and State Policy Fail to Prioritize EE

In 1989 Amory Lovins, of the Rocky Mountain Institute, coined the term "negawatt" as a powerful metaphor for EE. As opposed to a megawatt, which is power that must be generated using an energy source, a negawatt is power that is "generated" through processes, actions, and technologies that accomplish the same task using less power. This principle — that energy savings, or efficiency, is a resource that can be acquired — is the foundation for most EE programs today (Harrington et al. 2007).

[3] Blumstein et al. (2003) identify four principles to follow in the determination of an appropriate EE program administrator: 1. compatibility with public policy goals (including legitimacy, accountability, and resiliency); 2. effectiveness of the incentive structure (including the removal of inherent disincentives, and intra-organizational factors); 3. ability to realize economies of scale and scope; and 4. contribution to the development of an EE infrastructure (including both the development of human capital within the institution and the development of institutions and firms — both for and nonprofit — capable of delivering EE services).

Utilities, like all businesses, must plan for the future. In order to plan for meeting future energy needs of its customers, a utility must — among other issues — project those future energy needs. If projections indicate growing demand, the utility must plan how to meet that demand. Traditionally, growing demand was met through "supply side" management: increasing the generation and supply of energy. But the advent of EE as a resource opens up the possibility of "demand side management:" acquiring efficiency (or energy/capacity savings) from end users as a way to offset demand growth.

Neither code nor rules requires that utility assessments treat EE as a resource on par with supply-side resources, as integrated resource planning would do. See footnote for explanation of integrated resource planning.[4] The IUB and DNR work to establish standards for each utility, but there is no statewide EE resource standard, and no requirement that the utility-specific standards take advantage of all, or even a high percentage, of cost-effective EE potential. And there is requirement for utilities to first acquire such potential before pursuing supply-side resources to meet future power demands, as there is in Minnesota (U.S. EPA 2006).

What are the consequences? By failing to effectively implement least-cost integrated resource planning and efficiency standards, Iowa has limited its flexibility on energy production choices and let utilities off the hook in fully examining future energy needs. For example, Mr. Parker, a consultant who testified to the IUB found that Interstate Power and Light's (IPL), resource planning process is "fatally flawed" (Parker 2007). He stated: "IPL does not believe it is required

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[4] In the 1980s and 90s, Integrated Resource Planning (IRP) became commonplace in states with EE programs (U.S. EPA 2006). Utilities were directed to conduct comprehensive analyses of all supply and demand-side resources, often including life-cycle cost assessments, and to include air quality and other environmental or societal costs or benefits in the process. States then took IRP a step further and began to incorporate acquisition "loading orders" into policy. California's *Energy Action Plan*, for example, states, "First, the agencies want to optimize all strategies for increasing conservation and energy efficiency to minimize increases in electricity and natural gas demand. Second, recognizing that new generation is both necessary and desirable, the agencies would like to see these needs met first by renewable energy resources and distributed generation." (Harrington et al. 2007) Other states, including Minnesota, have moved in this direction.

The logical conclusion of this progression from EE as a resource, to least cost integrated resource planning and loading orders, is the development of specific EE goals, expressed as EE resource standards (EERS) or EE portfolio standards (EEPS). Current analyses of EE potential routinely show opportunities to meet significant percentages of future energy needs from efficiency (Elliot et al. 2007). At least 14 states now have EE standards or goals (Federal Energy Regulatory Comission 2007), some integrated with renewable portfolio standards (RPS).

Iowa's utility-run EE programs, though achieving very significant expenditure levels and energy savings over the years, do not operate under an "EE-as-resource" principle, an integrated resource planning approach with efficiency as a resource, a loading order, or an EERS (U.S. EPA, 2006). Iowa Code chapter 476.6(14) requires that "Electric and gas public utilities shall offer energy efficiency programs to their customers through energy efficiency plans. An energy efficiency plan as a whole shall be cost-effective." Chapter 476.6(16b) goes on to state:

> A gas and electric utility required to be rate-regulated under this chapter shall assess potential energy and capacity savings available from actual and projected customer usage by applying commercially available technology and improved operating practices to energy-using equipment and buildings. The utility shall submit the assessment to the board. Upon receipt of the assessment, the board shall consult with the department of natural resources to develop specific capacity and energy savings performance standards for each utility. The utility shall submit an energy efficiency plan which shall include economically achievable programs designed to attain these energy and capacity performance standards.

to treat DSM [demand side management, including EE] as a resource on equal footing with generation. … Instead, it views the level of DSM to be delivered as a regulatory determination that, once settled by the Iowa Utilities Board, absolves IPL of any obligation to consider higher levels of DSM as a cost-effective alternative to more traditional supply options." In support of this assessment, he quotes directly from IPL's 2005 Energy Plan approved by the IUB:

> Because IPL does not explicitly model DSM as a resource to be selected in the IRP {integrated resource planning} modeling, the question remains whether the amount of DSM implemented by IPL is an optimum amount from the resource planning perspective.

Other energy experts testifying before the IUB regarding IPL's planning process showed that IPL failed to adequately account for both wind power potential (Fagan 2007) and likely future carbon emission costs (Schlissel 2007). Taken together, this evidence strongly suggests that if Iowa utilities were operating under a least-cost integrated resource planning mandate and a prioritizing the acquisition of EE/RE, our energy future would look much different than it does today.

A comprehensive 2004 evaluation, for example, showed that during 2000 and 2001, leading EE states (including Connecticut, Massachusetts, Rhode Island, Vermont) were achieving electrical EE savings of 0.7 percent to 1 percent of retail sales, and California achieved 2 percent (Nadel et al. 2004), while during the same period Iowa was achieving 0.4 percent annual savings (Iowa Utilities Board 2007). In recent years, increased spending has brought Iowa savings (though only for Iowa IOUs) up substantially to 0.7 or 0.8 percent (Parker 2007) (Iowa Utilities Board 2007), while other states are identifying potential, setting standards, and aggressively moving towards 1.5 percent to 2 percent annual savings (Federal Energy Regulatory Commision 2007).

This may be in part because specific integrated resource planning and EE requirements over both near and long-term require not only EE resource acquisition strategies (essentially "buying" EE through rebates and other programs) but also market transformation strategies. "Market transformation is a process whereby EE innovations are introduced into the marketplace and over time penetrate a large portion of the eligible market" (Geller and Nadel 1994). Whereas EE resource acquisition is in general highly measurable and success is determined over relatively short timeframes, market transformation depends upon changing behavior of manufacturers, retailers, professionals/industry, and consumers. It is a longer-term proposition, energy savings are less measurable, and overall success is more difficult to assess. Though market transformation is arguably more important over time than resource acquisition, these reasons demonstrate why utility programs generally are not especially interested in or effective at market transformation, and why aligning both short and long-term utility interests with EE is so critical regardless of actual EE program administration.

One obvious example of market transformation is the U.S. Department of Energy's (DOE) Energy Star program. Energy Star has become a brand many consumers look for because they understand the value of energy savings, and hence retail outlets carry more Energy Star products — by default increasing their market penetration. Figure 9 (see Appendix A) is a compilation of Energy Star market saturation levels for selected appliances and 14 states (including EE leaders and our neighboring states) from 2000 to 2006, derived from sales data available on the Energy Star website (U.S. EPA 2008). It shows Iowa consistently ranking well below other EE leaders, including our neighbors Wisconsin and Minnesota. Iowa utilities have provided rebates for Energy Star appliances for years, but apparently have not implemented effective consumer education campaigns, retail partnerships or other strategies to successfully increase adoption beyond the financial incentives.

Recommendation:
Iowa has spent more on EE than most states. But we should not be content with the status quo as other states aggressively experiment with best practices, pursue maximum efficiency gains, and reap the economic and environmental benefits. The Legislature or IUB should mandate least cost resource planning that treats EE resource acquisition on par with supply options for meeting electricity demand. They should require the acquisition of all cost-effective EE/RE prior to the addition of new central station generating capacity or growth in energy imports. And the Legislature should authorize the IUB/OCA to contract directly with outside energy efficiency experts for a biennial assessment of the utility's resource plans, EE potential, and their progress in achieving that potential.

Misplaced Emphasis on Peak Load Management

Load management is designed to reduce peak load use during the few hours of the year when energy demand (and hence delivered value) is high and the delivery system reliability is in jeopardy. The ultimate goal is to avoid the construction of additional "peaker plants" that run only a few hours each year, save the utility and ratepayers that added expense, and reduce the negative environmental effects of such plants.

Load management strategies have traditionally been categorized as either load response (including direct control or interruptible control) or price response (including real-time and seasonal pricing, time of use rates and demand bidding) (Peak Load Management Alliance 2002). A third strategy, long undervalued, is using EE as a demand response (synonymous with load management) resource (New England Demand Response Initiative 2003). Iowa's IOUs offer only load response practices in their load management programs.

Iowa IOUs spent over $35 million on electric load management in 2006 (IUB 2007). The residential program involved direct cycling controls on customer's air conditioner units. This included over 97,000 participants (about 10 percent of total) and saved over 74 MW of capacity, for a total cost of over $5 million. The non-residential interruptible program offer rate discounts or credits to large customers in return for the obligatory reduction of agreed-upon load when notified, typically for just a few hours each summer. This program involved 277 customers (about 0.1 percent of total) and saved over 426 MW, at a total cost of over $29 million. Iowans spend (through the state EE programs) significantly more than any of the other 20 states that implement load management, at $11.70 per capita, over three times the third position state of Hawaii (Iowa Utilities Board 2007). Meanwhile, our spending on electric EE — excluding load management — ranks us at No. 9 out of 33 states with programs, at $13.04 per capita.

There is no question that demand response is an important component of utility planning efforts, and that effective programs save both utility and ratepayer dollars. But valid questions about the Iowa programs include: Why do Iowa IOUs spend so much more per capita, and relative to EE programs, than other states? Is there a better way (including both cost-effectiveness and environmental impacts) for our utilities to acquire demand response resources? Should load management programs be part of EE programs, or separate endeavors?

At least part of the answer to the first question can be found in the OCA report:

> Load management differs from traditional energy efficiency measures in that it does not conflict with a utilities' interest in generating revenues from the sale of electricity. Utilities do not need to plan to meet the needs of interruptible load in the way that they do firm load, and interruptible load does not produce the long-term and sustained energy and demand reductions associated with more pure energy efficiency measures. Hence, load management programs have existed and will likely continue to exist irrespective of state energy efficiency mandates.

The fact that Iowa administrative rules allow utilities to treat load management as EE in their energy plans (and receive the same program cost recovery for those programs), that Iowa has had no true EE resource acquisition goals or integrated resource planning mandates for utilities, and the "negotiated" process by which Iowa IOUs establish energy plans certainly all have contributed to the current state of load management spending.

Is there a better way to meet demand response resource needs? It is difficult for a relatively cursory report such as this to answer that question with authority, but a very important point to understand is that load management "does not yield sustained kWh energy reductions and associated benefits that other energy efficiency programs provide" (Easler and Murphy 2007). In fact, the widely accepted result of load management is often either load shifting (such as air conditioners that run more heavily once the curtailment period ends, or industrial processes that simply postpone activity to a later time) or industrial customers shifting back-up generation (Iowa Utilities Board 2007) (Neme 2008). Back-up generators typically run on diesel fuel, and load shifting, ironically, results in avoiding the peak power provided by natural gas peaker plants but ultimately using more electricity produced from coal-fired base-load generating plants. However you slice it, load response as carried out in our EE programs is economically beneficial to ratepayers and utilities, relatively neutral in overall energy consumption (and so a loss relative to the gains that could have been achieved through EE), and quite possibly a negative in the arena of GHG emissions and air quality.

We are unclear why Iowa IOUs have not implemented any price response mechanisms to reduce load. True, time-of-use (TOU) and related pricing programs require advanced metering, but why haven't we moved in that direction when it is widely accepted to be the future of the provider-customer interface (Wisconsin has achieved over 40 percent advanced metering penetration, while Iowa, only single digits) (Federal Energy Regulatory Commission 2006)? Load management studies have long recommended that states move in this direction, even to the point of requiring utilities to adopt smart meters that enable TOU pricing (Kirby and Staunton 2002). Even without advanced metering, however, seasonally differentiated rates can provide strong market signals to good effect, and "combining energy efficiency program offerings with inverted block rates and seasonal rates (where costs justify them) is a highly synergistic strategy and a reasonable proxy for TOU rates." (Harrington et al. 2007)

This last point is a very important one. Though load response provides economic savings but little if any energy savings, EE can provide both quite effectively. A recent report in Texas found that, with population growth estimated at 1.7 percent and economic growth at 3.2 percent through 2023, peak demand would grow between 40 and 50 percent by 2023 (Elliot et al. 2007). "The state's rapidly growing peak electric demand and electricity consumption have led ERCOT [The Electric Reliability Council of Texas] and utilities to suggest that Texas should take actions to change the mix of electric generating resources and lean heavily on building new coal-fired power plants." The authors found that instead, a mix of EE, renewable generation and demand response could meet the entire peak load growth cost-effectively. Most importantly for this discussion, EE alone holds potential to meet roughly half of total peak load growth, while the other half would come from a combination of renewable energy (RE) and demand response. The issue is not whether we need demand response — we need it and we need a more robust mix of it — but the appropriate level of emphasis placed upon each. EE saves energy, reduced emissions, and lowers peak demand, while demand response in general accomplishes only the latter.

Recommendation:
Not only does peak load management fail to reduce overall energy use or GHG emissions, it also bloats our "efficiency" spending per capita, ballooning the overall size/cost of the program and making it difficult to place reasonable expectations on improvement and growth in the true efficiency programs. We propose that the Legislature and/or IUB pursue means to remove eligibility of load response activities from the rate-payer funded EE programs, keep the bulk of the funds with the efficiency programs (as they were originally intended) and incorporate them into integrated resource planning with a focus on the EE practices that provide the greatest long-term peak load reduction potential. The Legislature, IUB and OCA should then work with utilities to adopt a more robust suite of market-based demand response tools, including advanced metering and price response approaches. Iowa Code chapter 476.17 gives the IUB authority to "promulgate rules pursuant to chapter 17A which require or authorize a public utility to establish peak load management procedures."

Conclusion

We have identified weaknesses in the current utility-administered, ratepayer-funded energy efficiency programs, and provided recommendations that will help to address those weaknesses should the programs remain with the utilities. Ultimately, however, we believe experience of other states is demonstrating that progress will be greatest with some form of third-party administration. We recommend the current rate surcharge be replaced by a uniform public benefits charge on all IOU and COU ratepayers, and the bulk of the resulting public benefits fund be used to establish a third-party, comprehensive, statewide energy efficiency program.

This statewide program could be bid out largely to a statewide administrator, or a locally-led "energy district" partnership could be developed as we explain in Appendix B. If the bulk of funds are used to bid out a statewide program, we recommend directing a percentage (starting at 10 percent and rising over time) of the public benefits fund towards a coordinated, guided matching grant program for local (countywide) EE/RE initiatives to harness the power of local creativity, community pride, economic self-interest and personal responsibility. And we recommend another 20 percent be divided between concerted statewide efforts to 1) bring all new construction in Iowa up to current energy code, and 2) develop a robust incentives program to move new construction in Iowa well beyond code, and towards net-zero energy buildings as rapidly as possible.

Guiding Principles

Iowa has the potential to move beyond the shortcomings we described, and more efficiently invest in EE programs so that our state realizes its true efficiency potential. Perusing EE can generate positive economic returns and every moment that we wait to increase our efficiency we are losing opportunities and wasting energy.[5] Other states across the country, including our neighbors are making big strides and Iowa should too. To do this we recommend that Iowa's leaders think boldly and establish policies that meet the following principles:

- *Align energy efficiency, renewable energy, and greenhouse gas reduction goals with utility financial interests through legislative and administrative actions.*

- *Provide universal and comprehensive EE and renewable energy programs and services to all Iowa residents through a public benefits fund created from sales on all energy sources.*

- *Treat energy efficiency as a resource in an integrated resource planning process, establish aggressive EE/RE standards, and require all Iowa utilities to acquire cost-effective EE and RE prior to new fossil fuel generation.*

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[5] As a recent authoritative overview of national GHG reduction potential demonstrates (Creyts et al. 2007), reductions can be cost-effective, but concerted action is required across the economy. The report goes on to say:

> **Almost 40 percent of abatement could be achieved at "negative" marginal costs**, meaning that investing in these options would generate positive economic returns over their lifecycle. The cumulative savings created by these negative-cost options could substantially offset (on a societal basis) the additional spending required for the options with positive marginal costs. Unlocking the negative cost options would require overcoming persistent barriers to market efficiency …
>
> **Pursue energy efficiency and negative-cost options quickly**. Many of the most economically attractive abatement options we analyzed are "time perishable": every year we delay producing energy-efficient commercial buildings, houses, motor vehicles, and so forth, the more negative-cost options we lose. The cost of building energy efficiency into an asset when it is created is typically a fraction of the cost of retrofitting it later, or retiring an asset before its useful life is over. In addition, an aggressive energy efficiency program would reduce demand for fossil fuels and the need for new power plants. These energy efficiency savings are not being captured today, however, suggesting that strong policy support and private sector innovation will be needed to address fundamental market barriers. Policy support might consist of standards, mandates and/or incentives to promote carbon-efficient buildings, appliances, and vehicles. Mechanisms to better align all stakeholders (e.g. end users, manufacturers, utilities, and supporting businesses) should also be considered.

- *Set aggressive greenhouse gas reduction goals, and incorporate them into all energy-related planning and programs, including peak load management programs and the prioritization and cost-benefit analyses for statewide EE.*

- *Ensure just and fair policy effects and implementation across the economic spectrum*.

Together, Iowans can do anything we set our minds to. In no state has EE yet become as American as apple pie, but with our deep reserve of common sense and the relatively untapped power of local leadership and personal responsibility, Iowa just might yet show the country how it’s done.

References

Alliant Energy. (2008). *Home Energy Audit and Insulation*. Retrieved February 24, 2008, from Alliant Energy: http://www.alliantenergy.com/docs/groups/public/documents/pub/p014678.hcsp

American Wind Energy Assocation. (2008, January 16). *U.S. Wind Energy Projects – Iowa*. Retrieved February 16, 2008 from American Wind Energy Association: http://www.awea.org/projects/projects.aspx?s=Iowa

Appliance Standards Awareness Project. (2008). *Federal Standards*. Retrieved February 23, 2008, from Appliance Standards Awareness Project: http://www.standardsasap.org/federal.htm

Blumstein, C., Goldman, C., & Barbose, G. (2003). *Who Should Administer Energy Efficiency Programs.* Berkely: University of California Energy Institute.

Creyts, J., Derkach, A., Nyquist, S., Ostrowski, K., & Stephenson, J. (2007). *Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?* www.mckinsey.com: McKinsey and Company.

deLaski, A. (2008, February 19). Executive Director of the Appliance Standards Awareness Project. *personal communication* .

Easler, J., & Murphy, J. (2007). *Response to the Legislative Interim Committee on Energy Efficiency.* Des Moines: Iowa Office of Consumer Advocate.

Eldridge, M., Prindle, B., York, D., & Nadel, S. (2007). *The State Energy Efficiency Scorecard for 2006.* Washington, DC: American Council for an Energy Efficient Economy.

Elliot, R. N., Eldridge, M., Shipley, A. M., Laitner, J., & Nadel, S. (2007). *Potential for Energy Efficiency, Demand Response, and Onsite Renewable Energy to Meet Texas's Growing Electricity Needs.* Washington, DC: American Council for an Energy Efficient Economy.

Fagan, R. M. (2007, October 22). Senior Associate, Synapse Energy Econonomics. *Direct Testimony and Exhibits of Robert M. Fagan, Synapse Energy Economics, Inc., Before the Iowa Utilities Board, Docket GU-07-01* . Iowa Utilities Board.

Federal Energy Regulatory Commissioin. (2007, June 7). *Electric Market Overview: Energy Efficiency*. Retrieved February 21, 2008, from Federal Energy Regulatory Commission: http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-eeps.pdf

Federal Energy Regulatory Commission. (2006). *Assessment of Demand Response and Advanced Metering: Staff Report, Docket Number: AD-06-2-000.* Washington, DC: U.S. Department of Energy, FERC.

Geller, H., & Nadel, S. (1994). *Market Transformation Strategies to Promote End-Use Efficiencies.* Washington, DC: American Council for an Energy Efficient Economy.

Harrington, C., Murray, C., & Baldwin, L. (2007). *Energy Policy Toolkit.* Montpelior, Vermont: The Regulatory Assistance Project.

Iowa Department of Natural Resources. (2007). *Energy Information Report.* Des Moines: Iowa Deparment of Natural Resources.

Iowa Department of Natural Resources. (2008). *Iowa Energy Bank*. Retrieved february 23, 2008, from Iowa DNR Energy: http://www.iowadnr.com/energy/ebank/index.html

Iowa Utilites Board. (2003, December). *Facts Concerning the Consumption and Production of Electric Power in Iowa*. Des Moines: Iowa Utilties Board.

Iowa Utilites Board. (2007). *Iowa's Electric Profile as of December 31, 2006*. Retrieved February 16, 2008 from Iowa Utilites Board: http://www.state.ia.us/government/com/util/energy/electric_profile.html

Iowa Utilities Board. (2007b). *The Status of Energy Efficiency Programs in Iowa.* Des Moines: Iowa Utilities Board.

Jensen, V. R. (2007). *National Action Plan for Energy Efficiency; Aligning Utility Incentives with Investment in Energy Efficiency.* Washington, DC: U.S. Environmental Protection Agency.

Kirby, B., & Staunton, R. (2002). *The Technical Potentialf for Peak Load Management Programs in New Jersey.* Oak Ridge, TN: Oak Ridge National Laboratory.

Klassen, C. (2008, february 22). Energy Resource Station Manager. (A. Johnson, Interviewer)

MidAmerican Energy. (2008). *Energy Efficiency*. Retrieved February 24, 2008, from MidAmerican Energy: http://www.midamericanenergy.com/html/energy3g.asp

Morain, Tom. (2005). *Electricity*. Iowa Public Television: Iowa Pathways. Retrieved March 10, 2008, from Iowa Public Television: http://www.iptv.org/iowapathways/mypath.cfm?ounid=ob_000052

Nadel, S., Monis Shipley, A., & Elliot, R. N. (2004). The Technical, Economic, and Achievable Potential for Energy Efficency in the United States: A Meta-Analysis of Recent Studies. *Proceedings of the 2004 ACEEE Summer Study on Energy Efficiency in Buildings* (p. 9). Washington, DC: American Council for an Energy Efficient Economy.

Neme, C. (2008, February 18). Director of Planning and Evaluation Services, Vermont Energy Investment Corporation. *personal communication* .

New England Demand Response Initiative. (2003). *Dimensions of Demand Response: Capturing Customer Based Resources in New England's Power Systems and Markets.* New England Demand Response Initiative.

Otto, D., & Imerman, M. (2005). *Analysis of Energy Supply and Usage in the Iowa Economy.* Ames: Iowa State University.

Palcal, S. and Socolow, R. (2004, August 13). "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies." *Science*: Vol 305.

Parker, S. (2007, October 22). Energy Consultant, Scudder Parker Consulting Services. *Prepared Direct Testimony and Exhibits of Scudder Parker, in Interstate Power and Light Company Docket Number GCU-07-01* . Iowa.

Peak Load Management Alliance. (2002, November). *Demand Response: Design Principles for Creating Customer and Market Value.* Retrieved February 22, 2008, from Peak Load Management Alliance: http://www.peaklma.com/files/public/CustomerPrinciples.pdf

Perkins, J. R. (2008). *The Status of Energy Efficiency Programs in Iowa.* Des Moines: Office of Consumer Advocate.

Prindle, B. (2008, February 15). Deputy Director, ACEEE. (A. Johnson, Interviewer)

Ritsema, M., Edelman, M., and Otto, D. (2003, April). *Renewable Power and Energy Efficiency: Polices in Iowa and Other States*. Iowa Policy Project. Retrieved February 16, 2008 from Iowa Policy Project: http://www.iowapolicyproject.org/2002-2004docs/030501-energy-full.pdf

Rural Electrification Administration. (1982). Retrieved March 10, 2008, from A Brief History of the Rural Electric and Telephone Programs. USDA Rural Development: www.rurdev.usda.gov/rd/70th/rea-history.pdf

Schlissel, D. A. (2007, October 22). Senior Consultant, Synapse Energy Economics, Inc. *Direct Testimony of David A. Schlissel on Behalf of the Office of the Consumer Advocate; Docket GCU-07-01* . Iowa Utilities Board.

Strom, S. (2008, February 15). Executive Director, Minnesota Center for Energy and Environment. *personal communication* .

U.S. DOE. (2008). *The Energy Policy Act of 2005*. Retrieved February 23, 2008, from U.S. Department of Energy: http://www.energy.gov/taxbreaks.htm

U.S. EPA. (2006). *Clean Energy-Environment Guide to Action; Chapter 6 Portfolio Management Strategies.* Washington, DC: U.S. EPA.

U.S. EPA. (2006). *EPA Clean Energy-Environment Guide to Action: 3.4 Funding and Incentives.* Washington, DC: U.S. EPA.

U.S. EPA. (2006). *EPA Clean Energy-Environment Guide to Action: 4.3 Building Codes for Energy Efficiency.* Washington, DC: U.S. EPA.

U.S. EPA. (2008). *Resources for Appliance Manufacturers and Retailers*. Retrieved January 25, 2008, from Energy Star: http://www.energystar.gov/index.cfm?c=manuf_res.pt_appliances

U.S. EPA. (2006). *U.S. EPA Clean Energy-Environment Guide to Action: 4.4 State Appliance Efficiency Standards.* Washington, DC: U.S. EPA.

York, D., Kushler, M., & Witte, P. (2008). *Compendium of Champions.* Washington DC: American Council for an Energy Efficient Economy.

York, D., Kushler, M., & Witte, P. (2008). *Compendium of Champions: Chronicling Exemplary Energy Efficiency Programs from Across the U.S.* Washington, DC: American Council for an Energy Efficient Economy.

Appendix A.

Figure 9. Energy Star Market Saturation for Select Appliances 2000-2006*

Room Air Conditioner	2006 %	2006 Rank	2004 %	2004 Rank	2002 %	2002 Rank	2000 %	2000 Rank
RI	57%	1	48%	8	41%	11	18%	15
VT	55%	2	61%	1	61%	1	22%	4
CT	55%	3	52%	5	51%	4	26%	1
MA	53%	4	55%	4	46%	9	19%	10
NY	52%	5	51%	6	51%	3	20%	8
NJ	52%	6	50%	7	46%	7	19%	11
MN	41%	7	60%	2	46%	8	20%	9
U.S.	**36%**	**8**	**35%**	**15**	**36%**	**15**	**19%**	**13**
WI	34%	9	55%	3	50%	5	22%	3
IL	26%	10	41%	9	41%	10	23%	2
OR	24%	11	38%	13	48%	6	22%	5
SD	22%	12	40%	11	54%	2	21%	6
CA	21%	13	40%	10	37%	14	18%	14
IA	18%	14	36%	14	39%	13	21%	7
NE	18%	15	39%	12	41%	12	15%	16
MO	14%	16	30%	16	27%	16	19%	12

Clothes Washer	2006 %	2006 Rank	2004 %	2004 Rank	2002 %	2002 Rank	2000 %	2000 Rank
VT	60%	1	49%	1	34%	2	23%	1
MN	55%	2	44%	2	26%	3	13%	5
WI	53%	3	41%	4	26%	4	11%	8
OR	50%	4	40%	5	34%	1	16%	4
CT	48%	5	44%	3	25%	5	18%	2
MA	47%	6	39%	6	25%	6	18%	3
CA	46%	7	36%	7	23%	7	12%	7
SD	46%	8	35%	10	16%	13	8%	13
IA	43%	9	35%	9	18%	10	12%	6
NJ	42%	10	33%	11	20%	8	9%	12
NY	42%	11	32%	12	18%	9	9%	10
RI	41%	12	35%	8	17%	11	10%	9
IL	41%	13	27%	13	14%	14	7%	14
NE	39%	14	27%	15	13%	15	6%	15
U.S.	**38%**	**15**	**27%**	**14**	**16%**	**12**	**9%**	**11**
MO	33%	16	21%	16	11%	16	5%	16

Dishwasher	2006 %	2006 Rank	2004 %	2004 Rank	2002 %	2002 Rank	2000 %	2000 Rank
VT	99%	1	86%	3	28%	13	8%	14
WI	98%	2	85%	5	24%	14	12%	6
MN	98%	3	88%	1	28%	11	14%	2
OR	97%	4	85%	4	34%	5	8%	13
NE	96%	5	83%	8	23%	15	12%	4
IA	95%	6	82%	10	28%	12	10%	11
IL	95%	7	81%	11	33%	9	13%	3
CT	94%	8	87%	2	38%	3	10%	10
NY	94%	9	84%	7	34%	8	8%	15
RI	94%	10	85%	6	39%	2	11%	7
MO	93%	11	80%	13	34%	7	11%	8
CA	93%	12	81%	12	39%	1	15%	1
SD	93%	13	79%	15	21%	16	7%	16
U.S.	**92%**	**14**	**78%**	**16**	**36%**	**4**	**11%**	**9**
NJ	91%	15	82%	9	33%	10	9%	12
MA	91%	16	80%	14	34%	6	12%	5

Refrigerator	2006 %	2006 Rank	2004 %	2004 Rank	2002 %	2002 Rank	2000 %	2000 Rank
VT	54%	1	46%	1	25%	4	31%	3
WI	46%	2	44%	3	21%	9	25%	14
MN	45%	3	45%	2	22%	8	28%	6
CT	40%	4	42%	4	26%	1	33%	2
CA	40%	5	41%	5	26%	2	28%	7
SD	40%	6	37%	10	17%	14	27%	11
OR	37%	7	40%	6	23%	6	34%	1
IL	35%	8	34%	13	20%	10	20%	16
MA	35%	9	39%	7	25%	3	27%	10
NY	35%	10	38%	8	23%	5	27%	9
RI	34%	11	34%	11	20%	12	22%	15
NJ	33%	12	38%	9	23%	7	26%	12
IA	32%	13	34%	12	16%	16	29%	4
U.S.	**31%**	**14**	**33%**	**14**	**20%**	**11**	**27%**	**8**
NE	30%	15	32%	15	16%	15	28%	5
MO	28%	16	30%	16	18%	13	25%	13

*This is a compilation of sales data received from ENERGY STAR national retail partners. Within-year comparison is more meaningful than between-year comparison, because 1) the retail partners that submitted sales data to the ENERGY STAR program may change year to year, and 2) Energy Star standards were changed in 2001 and 2004.

Appendix B.

Statewide Ratepayer-funded Energy Efficiency: Locally-led Hybrid Partnership Option

Utility run programs (and state-level third party programs) have made great strides in EE. But no state program has yet harnessed — to any great degree — the power of local economic self-interest, of community pride and competitive spirit, or of individual responsibility and ethics inspired by changing social values and expectations.

This option would decouple EE programs from the utilities entirely, and would address all six of our guiding principles. With its emphasis on the locally-led technical assistance process, the public-private partnership, and its foundation in the power of individual responsibility and community initiative, it would be a first-in-the-nation approach. It holds enormous potential for taking EE to the next level (and linking EE, RE, and GHG efforts), but it also must be recognized that creating the institutions and completing the shift would be a challenging process. It would have to be done carefully and with attention to quality and accountability, while simultaneously encouraging local innovation and initiative.

This hybrid partnership would have three components, as described below:

1. The statewide responsibility for financial management (rebate administration) and marketing (advertising and promotion of all kinds) would be placed up for bid to a private third party. Wisconsin and Vermont are just two examples of programs that have decoupled entirely from utilities and assigned or bid out their programs to private third party administrators, though in this case only the prescriptive and marketing portions of the program would be up for bid.

• Prescriptive (rebate) programs represent the bulk of all dollars currently spent in the programs, excluding load management. One statewide administrator could save a great deal of overhead costs relative to dozens of separate rebate processing offices.

• A single state-level marketing effort could likewise avoid much duplicative (and even counterproductive) advertising and promotion, dramatically increasing visibility and awareness of opportunities statewide for less cost than the sum of current utility marketing campaigns.

• Statewide market transformation efforts with large retail chains would be possible to a much greater degree than under the current fractured approach.

• This state efficiency coordinating organization would maintain close ties and work seamlessly with the other two branches of the partnership.

2. On-the-ground implementation would be accomplished through locally-led, county-level "energy districts." Community energy efforts are not new, but they have been largely independent, focused on education, lacked universality and comprehensiveness, and often not provided long-term, measurable, sustained and growing results. Alternatively, we envision a coordinated, statewide network of county-level initiatives, funded in part through the state efficiency program, which would provide the key missing link in how we currently envision and accomplish energy and GHG reduction objectives.

• Energy “districts” would be based on the conservation district model of the 1930s and 40s, which created a unique local-state-federal partnership to not only bring conservation technical and financial assistance to every farm, but to achieve a level of individual and community responsibility for the stewardship imperative.

• Energy districts could take many forms, ideally county-level nonprofits (allowing for creative establishment of local funding mechanisms) that accept the state-level charter and establish working agreements (and possibly broad-based advisory boards) with local partners

• Energy districts would provide whole-household, business, or institution-level technical assistance, audits/analyses, development of energy plan with detailed job sheets, linkage to all available financial incentives (state, federal, and even local), and follow-up.

• Energy districts would build strong local connections with energy technology retailers and with building trades and energy-related contractors, possibly contract out portions of technical assistance (especially for large commercial and industrial) and help build local energy services infrastructure.

• Local education/awareness and targeted technology campaigns can garner high visibility and motivate large numbers of volunteers and community level action.

• Energy districts would be accountable through a combination of local customer-tracking databases and county-level participation results linked to a statewide financial incentives program (for prescriptive program participation).

• Locally-led process makes EE a highly-visible local economic development tool, creates opportunities for unique, local funding mechanisms to supplement state/federal per local priorities, and allows dynamic innovation at the local level in competition with other counties for additional financial incentives and recognition.

• The range of possible approaches that local districts could take (beyond the state-level suite of prescriptive practices) is unlimited: 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; and the list goes on and on.

3. The final piece of the puzzle would be a technical services group at the state level. This could be established via an innovative Iowa State University-Extension partnership (between engineering and agriculture), in the DNR Energy Bureau, or in another manner. The technical services group would:

• Lead the financial incentives working group (to include representatives from the third-party manager, the local districts, the IUB and OCA, the Iowa Finance Authority, the utilities, and out-of-state consultants) in the development of the most innovative, effective, and least-cost programs and practices for EE and GHG reduction. These practices would then form the foundation of the state-level financial incentives program.

• Develop appropriate tools for implementation of these programs and practices through the local districts, such as software allowing onsite whole-building, whole-household (or business/institution) assessment of energy use, estimation of costs and savings (in dollars and GHG) for various practices and suites of practices, templates for the development of an energy plan (with detailed “job sheets” and evaluation tools), and immediate linkage of customer to all available financial incentives for practices included in the plan, with detailed explanation of how to pursue and acquire them.

• Develop corresponding methodology for robust assessment and tracking of energy savings for state-level programs/practices, and in support of innovative and experimental local initiatives.

• Develop training programs for local district personnel, and also for builders, contractors and other energy-related private and public professionals. Possibly provide highly trained personnel for large commercial, institutional, or industrial projects in areas where local qualified resources are insufficient.

This new partnership would take time and involve the development (in part) of new EE infrastructure. But it would also make important progress in meeting all guiding principles discussed earlier, and perhaps most importantly, the locally-led process could position Iowa to lead the nation for the coming decades in the development of an energy ethic at the individual and community level.

An important final point to make on this hybrid alternative is that the entire delivery partnership could equally well implement renewable energy programs that focus on smaller-scale distributed generation throughout the state, and quite possibly even play a key role in other state programs such building standards, tax incentives, combined heat and power promotion, and more. Contrary to the current situation, fundamental motivations and interests of local efforts, especially when part of a statewide network, would be perfectly aligned with state EE/RE/GHG goals.