

City of Ames Sustainability Plan for Electrical Consumption Reduction

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This plan is the result of the discussions and recommendations made by a Task Force, representing seven community sectors (building contractors/developers, business, civic organizations, faith-based organizations, non-city government, residential, and schools) and charged by the City Council to develop specific and targeted individual sector plans as well as an overarching community plan to reduce electrical consumption.

A compilation
of the work of
the City of
Ames
Sustainability
Task Force

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EXECUTIVE SUMMARY

A City of Ames Sustainability Task Force, representing seven community sectors, was convened during FY11 through action of the City Council. The Task Force was given the charge of addressing the electrical consumption of the Ames community and identifying goals and resources toward collective reduction.

The resulting City of Ames Sustainability Plan for Electrical Consumption Reduction has a two-fold approach toward collective reduction.

First, all seven community sectors represented on the Task Force, through work in subcommittees, developed sector sustainability plans. These plans include goals and action steps specifically focused on assisting sector members to collectively reduce the sector's electrical consumption. Each sector plan includes action steps that the sector members have already committed to implement within their sector alone or through partnerships with other sectors and community groups, as well as action steps that will require some additional assistance and resources from the City. Plans are included in this report for the following sectors: Building Contractors/Developers, Business, Civic Organizations, Faith-based Organizations, Non-City Government, Residential, and Schools.

Second, consideration was given to all of the individual sector plans in finding commonalities, overarching needs, and action steps for the Ames Community as a whole to create a collective City of Ames Sustainability Plan for Electrical Consumption Reduction.

Sector commonalities included the following:

- The interest in and dedication to ensuring that a sustainable future is important to the Ames community. In all of the seven highlighted sectors, at least some planning, goal-setting, education, and implementation is in place or planned for the future.
- There is an abundance of resources currently available and in place to assist and guide all sectors' members in achieving significant and immediate reductions in electrical consumption. All sectors agreed that there are a multitude of very informative and useful resources related to increasing electrical efficiency currently available to all sector members.
- Reduction goals are embraced by all sectors. Although there are no overarching specific percentage and timeline reduction goals that can be summarized among the sectors, an overarching commitment to electrical reduction is a part of every sector plan.
- In spite of the interest in sustainability and the available resources, there are still considerable challenges throughout the Ames community in engaging sector members in electrical consumption reduction initiatives, activities, and programs and sustaining involvement on an ongoing basis. Challenges include funding, motivating participation of sector members, and impediments in City ordinances.

From these commonalities, the following overarching needs were identified in achieving community electrical consumption reduction:

- The need for an increased and enhanced focus on education and awareness resources and campaigns.
- The need for an increased and enhanced focus on engaging, motivating, and sustaining participation.
- The need for an increased and enhanced focus on sustainability-minded planning and policies.

In considering these community-wide needs, the following action steps are proposed for the consideration and support of the Ames City Council. These action steps will not only assist the community of Ames as a whole in reducing electrical consumption, they will offer support to each of the sectors in achieving their individual goals and implementing their action items. A detailed discussion of the participants, timelines, and applicability to sector plans of the action items listed below is included in the full report document.

1. The Establishment of an Electrical Efficiency Education Committee

The focus of this committee is to take a collective look at the educational resources noted in this report (as well as other relevant resources as determined by the Committee) and offer recommendations related to increasing the accessibility, availability, and utilization of these resources. Besides considering currently available resources, this committee would also consider the need for additional resources and implement steps for their development and completion. Multiple sectors noted (and in some cases included) the work they had already been doing toward providing educational resources they felt would be beneficial to their sector members. Best Management Practices for Electrical Consumption Reduction and an Electrical Reduction Tracking Website are two resources that would be suggested as priorities for this committee.

2. The Establishment of an Electrical Efficiency Engagement and Recognition Committee

The focus of this committee is to create a recognition program specifically related to achievements and engagement in electrical consumption reduction by members (individuals and organizations) in the Ames Community. For some sectors, in particular businesses, there is already an established recognition system in place through the Mayor's Green Team that could be evaluated and enhanced to increase participation. The opportunity also seems apparent and logical to diversify the Mayor's recognition program in order to be inclusive yet unique for all sectors.

3. Establishment of a Review Team of Current Policies Related to Electrical Efficiency

The focus of this review team would be to consider and evaluate current policies and provide recommendations to the City Council related to planning and policy considerations that should be undertaken and/or implemented to offer further assistance and incentives for electrical consumption reduction. Policy areas that were identified in the sector reports and prioritized as action steps included rate base determination, electrical efficiency requirements for building codes, and rebate systems for large end users.

BACKGROUND

Discussion of State and National Efforts: The consideration of and commitment to sustainability in policies and practices of businesses, organizations, educational institutions, and governments has become increasingly ubiquitous over the past decade, particularly within the last five years. Efficiency, waste reduction, return on investment, best management practices, and cost/benefit analysis are terms that are included in most business plans and support a very thoughtful, efficient, and sustainable way of managing operations and serving customers.

Faced with limited resources, rising populations, increased concerns of national security, and ongoing challenges facing the health and stability of the environment, our societies, and the economy, focus has turned to considering sustainability from an overarching systems standpoint, as well as a day-to-day functional standpoint. This shift is not diminishing the commitment and passion that is in place and growing; rather, it is creating collective synergy to build momentum, provide focus, and further establish common ground within communities. To that end sustainability is recognized and prioritized as a collective balance of the environment, society, and the economy.

In the United States, what started as a handful of cities exploring sustainability opportunities is now becoming a significant number of communities committing to dedicated sustainability programs and planning. In a recent study completed by a City of Ames intern in 2009, in a sample of 126 cities, identified by specific parameters in order to be comparative to Ames, 70 cities (55%) had made visible efforts to promoting sustainability (Davis, 2009). In the years since, national interest in and commitment to sustainability at the community level has continued to grow at an impressive rate.

In Iowa alone, three cities have hired sustainability directors and have completed or have committed to the completion of a community sustainability plan (Rankin, 2010). In addition, a number of cities have prioritized sustainability and are engaged in discussions, resource collection, and research in order to determine the “best fit” for engaging their communities and committing their policies, practices, and visioning to include sustainability.

City of Ames Sustainability Efforts: The City of Ames has begun its journey toward a sustainable future in a number of ways and, as multiple cities across the United States, is taking care to carve a pathway that considers the current generation of constituents and is mindful of our future generations. As is the case for any city being mindful of best management practices and good fiscal policy, the City of Ames has been cognizant and engaged in conserving resources, increasing energy efficiency, and reducing landfilled waste for a number of years. However, increased interest and engagement by constituents and customers toward more

collective and encompassing policies, programs, and initiatives, has provided leadership with different and diverse considerations for planning, visioning, and goal setting. As is noted on the City of Ames website, “There is a growing movement in the Ames community to promote conservation of limited resources as a means to achieving a greater global good – a more sustainable future.” (Gwiasda, 2011). Leadership is taking notice, and although at a different pace and in a different form than other cities, work is being done, momentum is building, and commitment is being made.

One prominent and significant commitment toward a sustainable future that has been taken by the City of Ames is Mayor Campbell becoming a signatory to the Mayor’s Climate Action Agreement. Currently 1,054 mayors from all 50 states and the District of Columbia and Puerto Rico, representing a total population of over 88,499,854 citizens, join Ames in this commitment. Thirty-three Iowa mayors join Mayor Campbell in this commitment. (Palmer, D. H., & Cochran, T., 2009). Under this agreement, participating cities commit to take the following three actions:

- Urging their state governments, and the federal government, to enact policies and programs to meet or beat the greenhouse gas emission reduction target suggested for the United States in the Kyoto Protocol -- 7% reduction from 1990 levels by 2012;
- Striving to meet or beat the Kyoto Protocol targets in their own communities, through actions ranging from anti-sprawl land-use policies to urban forest restoration projects to public information campaigns; and
- Urging the U.S. Congress to pass the bipartisan greenhouse gas reduction legislation, which would establish a national emission trading system.

The City of Ames, with the support and direction of the Ames City Council, has further built upon the commitment to the Climate Action Agreement by dedicating efforts in establishing Ames as a “Cool City” and increasing greenhouse gas emission reduction targets for city operations to 15% by 2014. The City’s “Cool City” committee is made up of representation from several different departments including Electric Services, Water & Pollution Control, the Resource Recovery Plant, and the City Manager’s Office.

To further support this initiative and engage the community as well as city government, EcoSmart, an education and awareness initiative, was developed in order to inform the community about the City of Ames' comprehensive strategy to reduce energy consumption and decrease its carbon footprint. A facet of EcoSmart, particularly relevant and applicable to the focus of this report is the Smart Energy program that was unveiled in July 2007. Smart Energy is the Ames Electric Services demand-side management program (intended to assist all electrical customers) that brings together a suite of energy programs and resources focused on improving comfort, reducing electrical consumption, lowering monthly energy bills, and contributing to the reliability and capacity of the electric system (Gwiasda, 2011).

In 2010, the Ames City Council continued to build upon the City’s sustainability commitment and visioning by adopting the following as one of its goals:

GO GREEN TO PROMOTE ENVIRONMENTAL SUSTAINABILITY

Promote and educate Ames residents about community-wide sustainability

Increase availability of alternative forms of transportation

This collective and multi-faceted focus on and commitment to sustainability by city leadership, provides the foundation upon which to build a community-wide initiative and vision for a sustainable future.

NEED FOR A COMMUNITY SUSTAINABILITY PLAN ON ELECTRICAL CONSUMPTION REDUCTION

In considering objectives that best support a goal of going green and promoting environmental sustainability, there are a number of relevant yet diverse options. Energy conservation, water quality, carbon and greenhouse gas emissions, alternative energy, environmentally-preferred purchasing, waste management and reduction, alternative transportation, etc. can all be applicable areas of focus and concentration. Though dedicated efforts within each area would be beneficial, the City Council felt it important to hone in on one primary area on which to initially focus – the reduction of electrical consumption.

In terms of relevance, every community member, either through their residence, business, or both, pays for electric utilities. With this in mind, a change in consumption of electricity through active engagement (changing light bulbs, replacing inefficient appliances, adjusting consumption behavior, etc.) has a direct and immediate personal impact for every community member via their monthly utility bill, and they personally have the ability to make that impact in the timeframe they choose. In addition, through the City of Ames’ already established EcoSmart Initiative and Smart Energy Program, a number of resources have already been developed and City employees are already in place to provide assistance – a good foundation from which to grow and focus.

From the standpoint of current City of Ames sustainability goals, beginning with an initial focus on electrical consumption reduction offers a relevant connection and long-term impact toward the goals of the Mayor’s Climate Action Agreement. As the City of Ames receives its electric utilities through fuel sources including coal, every reduction that can be made in electrical demand has a direct impact on the amount of coal that is burned in the City’s power plant as well as the associated carbon emissions.

For example, information from Ames Electric Services estimates that if the City of Ames’ 24,229 electric utility customers met 5%, 10%, and 15% electrical consumption reduction levels, kWh consumption would decrease annually by 28,384,259 kWh, 56,768,518 kWh, and

85,152,777 kWh respectively. In addition, carbon emissions would decrease annually by 23,276 tons, 46,550 tons, and 69,825 tons respectively. Table 1 (Appendix A) more fully illustrates the impact electrical consumption reduction would have on electrical consumption as well as emissions for each customer class, based on a 5%, 10%, and 15% reduction by the Ames community.

Electric Utility Capacity is another relevant consideration when considering the need for a Community Sustainability Plan for Electrical Consumption Reduction. Electric Services estimates (based upon current population growth and electric demand trends) that the need to consider building additional electrical capacity would be delayed by 5 years if demand was reduced by 5%, 10 years for 10%, and >15 years for 15%, thus providing additional and sustained savings to residents above and beyond the savings on their monthly utility bill.

TASK FORCE CHARGE AND PROCESS

The charge that the Ames City Council enacted that specifically guides this plan (Appendix B) designates a task force that will put together a sustainability plan to address the following:

- Prepare a baseline electrical consumption resource for the various sectors;
- Recommend electrical energy reduction targets and develop strategies to achieve these targets for the various sectors and the community;
- Provide a list of “best practices” that have been proven successful in reducing energy consumption for the various sectors and the community;
- Create an educational strategy for the community as to the importance of electrical energy reduction and offer actions that the various sectors and the community can take to reduce consumption;
- Identify any impediments to electrical energy reduction targets that exist in City ordinances.

To accomplish this charge, the City Council directed that a Sustainability Task Force be appointed by the Mayor that included representatives of the primary electrical consumption sectors of the Ames community. Seven sectors were designated with a specified number of representatives.

Building Contractors/Developers – 2 members

Business – 3 members

Civic Organizations – 2 members

Faith-Based Organizations – 2 members

Non City Government – 2 members

Residential – 3 members

School Districts – 2 members

ISU Government of the Student Body Sustainability Director – 1*

*It should be noted that although an eighth sector category (ISU Government of the Student Body Sustainability Director) is noted above, this was not considered a separate category in the accomplishment of this charge. After considerable thought and discussion, the ISU Government of the Student Body Sustainability Director joined with the Residential Sector and assisted in their subcommittee work. This was done with the recognition of the number of students living off-campus and being customers of the City of Ames Electric Services Department.

Community members interested in assisting in the Council's sustainability charge were offered various options of involvement in addition to serving as a member of the Task Force. These options included serving as a sector subcommittee member or a sector consultant. As is common procedure for other City boards and commissions, interested community members were required to complete an application (Appendix C), which included their preference of involvement, for the Mayor's review and approval. A listing of Task Force members, sector subcommittee members, and sector consultants can be found in Appendix D. In total, 35 community members offered their assistance and expertise to this process and the resulting plan.

Through a collaborative agreement between the City of Ames and Iowa State University, the University's Director of Sustainability, Merry Rankin, was contracted to facilitate the completion of the Task Force Charge. Ms. Rankin's role as Iowa State University's Director of Sustainability is to connect, support, assist, and further all of the University's sustainability efforts, initiatives, and goals.

In accomplishing their charge, Task Force representatives attended two-hour monthly meetings with the facilitator. City Manager Steve Schainker and at least one representative from Ames Electric Services were also in attendance. The first meeting held on October 27, 2010, and featured guest speaker Eileen Horn, Sustainability Director for Lawrence, Kansas. Meetings throughout the year included presentations from sustainability and electrical efficiency experts. As with all City boards and commissions, meetings were open to the public and all minutes and agendas were posted on the City of Ames website.

DISCUSSION OF INDIVIDUAL SECTOR PLANS

Although this document offers a comprehensive consideration of electrical consumption reduction for the City of Ames community collectively, the foundation for this plan and the overall recommendations that are proposed are a result of the plans each sector subcommittee developed. Each of the plans in their entirety can be found in Appendix E. To offer context and framework for the Recommendations for Community Electrical Consumption Reduction section provided below, a summary of each sector plan follows. It is important to note that in order to nurture the implementation and success of a comprehensive plan, sector action steps have been streamlined and only the top two prioritized action steps are highlighted within the discussion below. A full listing of all sector action steps are included in full sector reports included in the appendices.

Building Contractors/Developers Sector Plan

Description of Sector: The Building Contractors/Developers Sector, for purposes of this charge, is defined in terms of those organizations who are engaged in the design and development of planned and future projects that will consume electricity, rather than existing projects and customers. With that in mind, the sector subcommittee primarily focused on the consideration of policies that govern energy efficiency considerations and impacts at the design and development stage, specifically within commercial buildings.

Sector Initiatives: The initiatives the sector took in putting together their plan focused considerably on research. Research was first completed on current state and local energy codes that guide and govern the building contractors and developers, and researchers then considered additional independent energy standards and guides including LEED, ASHRAE, and Energy Star. Extensive research was also completed on plans, incentives, goals, and action items that have been put into place in other communities around the nation specifically related to commercial design and development.

Goals: Sector goals focused on increasing education and building and diversifying incentives, toward the design, development, and construction of more energy efficient commercial properties.

Action Steps: In achieving these goals, six action steps are proposed and prioritized according to opportunity and need. The top two action steps proposed for immediate consideration are:

1. **Provide energy cost rebate incentives (as is done currently with the Smart program) to building developers to adopt energy design that exceeds the State of Iowa's baseline standard** (as defined by IECC 2009 or ASHRAE 90.1 2007) by 15%, and greater rebates at 30% (standards which mimic thresholds set by the Energy Cooperatives in Iowa through their commercial new construction programs).

This would be confirmed using the DOE's Comcheck or Rescheck software. Although this standard does not differentiate between electrical or gas efficiency improvements, improvements to envelope, lighting and air conditioning equipment are measured and will directly benefit electrical efficiency. This standard can also apply to existing building alterations (Ashrae Standard 90.1 requires energy efficient upgrades only to equipment and building components being altered.)

2. **Development of incentives to "go beyond" energy savings design by incorporating a 3rd party green building guideline or rating system, such as LEED, Green Globes, or Designed for Energy Star.**

Green Building principles provide a general public benefit including reducing greenhouse gas emissions, but also directly benefit the City by reducing electrical consumption, water consumption and waste management resources, to name a few. Thus, additional investment by the city can be qualified. Incentives could be as simple as promoting a

“Green Business Leaders” club where companies are awarded for their green leadership, at a public event, and given marketing space on the City’s website and around town.

Business Sector Plan

Description of Sector: The Business Sector, for purposes of this charge, is defined in terms of those organizations that are considered a business customer by Ames Electric Services. With this in mind, the sector determined four primary business types for the focus of their work: businesses whose functions focus within office, restaurant, retail, and manufacturing settings. In addition, to differences associated with business setting, the sector subcommittee also recognized the diversity that exists among business sector members in terms of business building size, electrical needs, and ability to impact consumption as related to building ownership.

Sector Initiatives: The initiatives the sector took in putting together their plan focused on a case study investigation of determining the most relevant and beneficial opportunities for the Ames business community, in terms of electrical consumption reduction, and evaluating the resources and incentives currently available for and targeted to them specifically. In completing this investigation, the sector subcommittee members worked through the City of Ames to complete a free energy audit for their businesses. The results from their audits were compiled and goals were identified.

Goals: The sector subcommittee proposes the following short-term and long-term goals for the Ames Business Community:

- Reducing electrical consumption by 5% in 2 years.
- Reducing electrical consumption by 10% in 5 years.
- Reducing electrical consumption by 15% in 10 years.

Action Steps: Two action steps are proposed toward achieving these goals. These action steps focus on increasing education and awareness related to available resources targeted toward reducing electrical consumption and increasing opportunities for business sector members to share ideas and successes and discuss challenges.

1. Creation of a Business Conservation Kit

These kits would mimic the current Conservation Kits the City of Ames provides to residents; however, they would incorporate items and resources specifically targeting the primary opportunities for electrical consumption reduction related to business operations.

2. Planning and Completion of a Business Energy Symposium.

This Symposium would offer an education and awareness event, similar Ames Eco-Fair that is offered to the Ames community, but would be specifically designed, planned, and implemented for Ames businesses.

Civic Organizations Sector Plan

Description of Sector: The Civic Organizations Sector, for purposes of this charge, is defined in terms of those organizations that are non-profit organizations but do not include government, healthcare, or religious groups. Similar to the Business Sector, the sector subcommittee recognized the diversity that exists among civic organizations sector members in terms of organization mission, building size, electrical needs, and ability to impact consumption as related to building ownership.

Sector Initiatives: The initiatives the sector took in putting together their plan focused on identification and consideration of the diversity and availability of electrical consumption reduction resources and assistance available to the Civic Organization Sector, yet not effectively utilized. Noting that resources and assistance are in place, the subcommittee's work centered on motivating and sustaining utilization of them.

Goals: The sector subcommittee proposes the following short-term and long-term goals for the Ames Civic Organization Community:

- Reducing electrical consumption by 5% in 1 year.
- Reducing electrical consumption by 15% in 3 years.
- Sustaining the accomplishment of the short-term goals.

Action Steps: Two action steps are proposed toward achieving these goals. These goals focus on increasing education and awareness related to easily implemented and impactful electrical consumption reduction practices and procedures and increasing engagement in electrical consumption reduction through marketing and recognition efforts.

1. Development of a Checklist of Best Management Practices

This checklist will include a simple, yet comprehensive “check list” of changes that can be implemented in any office environment and make significant impact toward reducing electrical consumption. The sector subcommittee envisions this checklist would not just be specific for civic organizations, but rather applicable to any office environment.

2. Creation of an Incentive and Rewards Program for Electrical Consumption Reduction

This program would be voluntary, aimed at providing regular feedback to participants regarding their progress in meeting their electrical consumption reduction goals in order to assist them in staying engaged and accountable. In addition, through coordination with the Ames Tribune, the sector subcommittee envisions the opportunity to celebrate participant successes through monthly “spotlight features”.

Faith-Based Organizations Sector Plan

Description of Sector: The Faith-Based Organizations Sector, for purposes of this charge, is defined as the 38 religious institutions which own and operate houses of worship within the service area of the City of Ames Electric Department. Institutions that worship in commercial or public space not specifically built as a house of worship have been excluded within the focus of the sector subcommittee with the idea in mind that there are areas of overlap in the action steps of the Business Sector and Civic Organization Sector that will be more applicable.

Sector Initiatives: The initiatives the sector took in putting together their plan focused on an in-depth investigation of current opportunities for electrical consumption reduction with the sector, the electrical consumption reduction initiatives currently in place, and challenges in achieving further electrical consumption reduction. Information was gathered through a survey distributed to all sector members. The results from the surveys were compiled and goals were identified.

Goals: The sector subcommittee proposes the following short-term and long-term goals for the Ames Faith-Based Community:

Within 1-5 years:

- City-sponsored energy audits requested and completed by a number of institutions equivalent to at least 50% of the total KWh/day consumed by the Faith-Based Organizations Sector.
- City-sponsored energy audits requested and completed by at least 27 (70%) of the Faith-Based Organizations Sector.
- Reduce the average daily kWh usage per sq. ft. of the Faith-Based Organizations Sector by 10%.
- Reduce the average high demand of the top 10 consumption sector members by 15%.

By 2021:

- Reduce the average daily kWh usage per sq. ft. of the Faith Based Organizations Sector by 18%.
- Reduce the average high demand of the top 10 consumption sector members by 15%.

Action Steps: Two action steps are proposed toward achieving these goals that focus on increasing and sustaining communication between sector members as related to accomplishing electrical consumption reduction goals and increasing opportunities for business sector members to share ideas and successes and discuss challenges.

1. Follow-up Communication with Sector Members in Spring and Summer 2011

This communication, already starting to be implemented, includes information about resources and assistance provided by the City of Ames, as well as other organizations (including sector members), to assist sector members in achieving the above noted goals.

2. Form the Interfaith Creation Care of Ames (ICAA) Organization

The ICAA would serve as a forum for exchange of information about electrical consumption reduction, as well as other sustainability practices and initiatives in the context of various faith traditions. The ICAA would be formed through initiative of the current sector subcommittee and in partnership with the AMOS Environmental Research Team.

Non-City Government Sector Plan

Description of Sector: The Non-City Government Sector, for purposes of this charge, is defined in terms of those organizations who are free-standing agencies under the jurisdiction of the President of the United States, Governor of Iowa, and Story County Board of Supervisors. Even though these organizations are customers of the City of Ames Electric Services Department, they are subject to different mandates and budgetary requirements and restrictions than city agencies, faith-based organizations, schools, businesses, building contractors/developers, and residents. In terms of electrical consumption and other best management practices that support sustainability, both federal and state governments have executive orders in place which provide goals and guidance as relevant to long and short-term planning and initiatives.

Sector Initiatives: The initiatives the sector took in putting together their plan focused gleaning policy and procedural insight and ideas as related to these established and functioning mandates. As well as completing research on the various mandates and executive orders, the sector

subcommittee convened a sustainability focus group discussion with non-city government agency representatives from agencies in Ames and Story County.

Goals: As each of the members of the Non-City Government Sector have already established and are benchmarking and tracking their sustainability goals (inclusive of electrical consumption reduction), sector goals focused on creating opportunities and venues in which to share successes, challenges, and resources with other sectors as well as considering additional assistance that could be offered to these agencies in order to assist them in achieving their mandated goals.

Action Steps: In achieving these goals, four action steps are proposed and prioritized according to need and requirements for implementation. The top two action steps prioritized for immediate consideration are:

1. Create a Tiered System of Rebates for Large Energy Users

This system would be designed to complement and build upon current utility rebates with specific focus on establishing a guaranteed rebate structure for high end users.

2. Develop Economic Partnerships with the City that Would Share the Cost of Installing Alternative Energy Systems at the Agencies

This would allow an opportunity for organizations to consider cost-prohibitive alternative energy systems that, if implemented, could result in a considerable decrease of the electrical utility demand provided by City of Ames capacity.

Residential Sector Plan

Description of Sector: The Residential Sector, for purposes of this charge, encompasses all Ames residents who are customers of, through their place of residence, of Ames Electric Services. Included in this sector are single and multiple family dwellings inclusive of houses, duplexes, condominiums, and apartment complexes. Similar to the other sectors, the sector subcommittee recognized the diversity that exists among residential sector members in terms of residence size, electrical needs, and ability to impact consumption as related to residential ownership.

Sector Initiatives: The initiatives the sector took in putting together their plan focused on a concerted case study investigation of determining the most relevant and beneficial opportunities for the Ames residential community to reduce electrical consumption based upon current usage patterns as related to specific residential consumption activities. In partnership with a residential energy auditor for the City of Ames, the sector subcommittee compiled data on electrical consumption patterns and averages for residential customers who have completed audits. With

an enhanced understanding of how Ames residential customers consume electricity, goals and action steps were identified.

Goals: The sector subcommittee proposes the following overarching goals to assist the Ames Residential Community in reducing their electrical consumption:

- Create an on-line, self-guided data system to track personal electrical usage and compare usage to similar households.
- Enable and facilitate informed investment and participation in electrical (and other energy) efficiencies.
- Invest in a marketing campaign focused on establishing the relevance of and opportunity for increasing electrical consumption reduction efforts within the Residential Sector.
- Change current utility rate structures.
- Establish base-line data on actual end use consumption.

In achieving these goals, five action steps are proposed and prioritized according to opportunity and need. The top two action steps prioritized for immediate consideration are:

1. Creating an On-line, Self-guided Data System to Track Personal Electrical Usage and Compare Usage to Similar Households.

This data system (Ames Home Energy Yardstick) would be a modification to the web interface currently available for Ames Electric Utility customers. The modification would allow customers to see energy consumption information on a relative basis, comparing themselves to other customers with similar household space and electrical need.

2. Enabling and Facilitating Informed Investment and Participation in Electrical (and other energy) Efficiencies.

This action step focuses on education and awareness efforts toward increasing empowerment of residents in investing and participating in energy efficient products, systems, and practices.

Schools Sector Plan

Description of Sector: The Schools Sector, for purposes of this charge, is defined in terms of the Ames Community School District and all of the facilities it operates. With this in mind, the sector subcommittee recognizes the diversity of operations that take place within the Schools Sector facilities (and their corresponding electrical demands) including office space, classrooms, gymnasiums, computer and science labs, and a swimming pool. Similar to the Non-City

Government Sector members, the Ames Community School District has established its own set of guidelines and policies related to energy efficiency and sustainability.

Sector Initiatives: The initiatives the sector took in putting together their plan focused the consideration of current policies and initiatives related to electrical consumption reduction and identifying and evaluating additional opportunities to increase, enhance, and diversify efforts beyond current levels. Because there is such breadth and depth associated with currently adopted and ongoing policies and procedures, the sector subcommittee concentrated most of their efforts on benchmarking and tracking progress and accomplishments as well as investigating opportunities to augment current activities.

Goals: With this in mind, the goals proposed by the sector subcommittee are primarily focused on ongoing achievement of currently established goals. However, one long-term goal is highlighted within their plan that is related to the anticipated increase in square footage of school district facilities:

- Achieving net zero electrical consumption.

Action Steps: As with the sector goals, the action steps to achieve them have also been established and are currently being tracked. Although the sector subcommittee encourages an ongoing consideration and incorporation of action steps that further builds upon current goals, their plan does not propose any specific action steps beyond those currently in place within their established plan.

RECOMMENDATIONS FOR A COMMUNITY SUSTAINABILITY PLAN FOR ELECTRICAL CONSUMPTION REDUCTION

Findings: In reviewing the individual sector plans and considering the above noted sector plan highlights, some common findings can be noted.

1. The interest in and dedication toward ensuring a sustainable future is important to the Ames community.

In all of the seven highlighted sectors at least some planning, goal-setting, education, and implementation is in place currently and has been considered in the future. In other words, there is collective awareness and interest related to the importance of ensuring the needs of future generations as well as current ones are accounted for and met.

2. There is an abundance of resources currently available and in place to assist and guide all sectors' members in achieving significant and immediate reductions in electrical consumption.

All sectors agreed that there are a multitude of very informative and useful resources currently available to all sector members as related to increasing electrical efficiency.

3. Reduction goals are embraced by all sectors.

Although there are no overarching specific percentage and timeline reduction goals that can be summarized among the sectors, an overarching commitment to electrical reduction is a part of every sector plan. As is highlighted above and noted in the individual sector plans, some sectors have made definitive commitments with regard to reducing electrical consumption by a certain percentage within a certain timeframe. In other cases, sectors have simply noted reduction goals as a commitment to ongoing and sustained reduction rather than specific dates and percentages. However, these sector subcommittees noted that committing to specific dates and percentages was not an indication of concern in not meeting the suggested 5, 10, and 15% goals provided by Electric Services, but rather a consideration of the ability of all of their members to adhere to a specific timeline. This is particularly true for the Non-City Government, Building Contractors/Developers, and Schools Sectors who all identified and prioritized action items that address challenges related to policy impediments.

4. In spite of the interest in sustainability and the available resources, there are still considerable challenges throughout the Ames community in engaging sector members in electrical consumption reduction initiatives, activities, and programs and sustaining involvement on an ongoing basis.

Though challenges vary among sectors depending upon their prioritized action steps, all sectors do share similar challenges.

- **Funding** – Each sector subcommittee identified funding to be a challenge. In some cases, as was noted by the Building Contractors/Developers and the Non-City Government Sectors, funding determines the ability for a sector member to even consider pursuing an efficiency project or initiative, for example, the incorporation of renewable energy sources.

In other cases, as was noted by the Business, Residential, and Civic Sectors, funding is more a limiting factor as far as expanding energy efficiency efforts. Moving from changing light bulbs to increasing the efficiency of a building envelope is one example.

Finally, as noted by the Schools and Faith-Based Sectors, funding often becomes the primary prioritization factor. Rather than being able to prioritize projects by

return on investment or impacts on efficiency, they most often find themselves having to make decisions based on initial cost.

- **Motivating Participation of Sector Members** – Getting the interest and engagement by their sector members was another challenge identified by each sector subcommittee. In some cases, sectors felt the primary challenge was in making participation simple and relevant. Subcommittees for the Civic Organizations, Business, Faith-Based, and Residential Sector all noted that motivating participation was not due to a lack of resources or assistance available to sector members, but rather the ease in finding and connecting to them. That being said, these sector subcommittees also found that there was still opportunity to increase the relevancy of participation among their sector members through specific resources. These resources are further discussed in the action steps noted below.

For the Building Contractors/Developers Sector, participation was impacted by a need for additional resources and assistance. As the subcommittee outlined in their sector plan, while there are cities and governments that have incorporated and are incorporating increased efficiency into building codes and standards, moving beyond current codes is still in progress. With that in mind, sector members are in need of resources and assistance (which include policy considerations) in order to increase and expand their participation.

The Non-City Government Sector also noted a participation challenge among its sector members, but noted it more as a challenge of human inertia. As was noted in the above discussion, members of the Non-City Government Sector already have in place a guiding process and system for sustainability – through plans, executive orders, etc. For these members, it’s not a matter of having to find the resources and determine best management practices to put into place; that is already established. For this sector, the challenge lies in keeping the inertia to participate in an established system.

The Faith-Based Sector also noted human inertia is a challenge. Energy conservation is in competition with other needs of the congregation, community, and world that staff and volunteers try to address as part of their mission. While inertia can also be a challenge for other sectors, particularly in the Business, Faith-Based, and Civic Organizations Sectors, once a program, policy, or system is in place, participation was considered more of an immediate challenge.

- **Impediments in City Ordinances** – Though challenged within varying degrees, all sector subcommittees identified challenges related to current city ordinances as

being an obstacle toward reaching electrical consumption reduction goals. The two sectors who noted their members were most impacted by this challenge were the Non-City Government and Building Contractors/Developers Sector. In the case of the Building Contractors/Developers Sector, challenges were focused around the current minimum requirements for building codes. Although, sector members can choose to build above current code requirements, without a code-directed motivation to do so, priorities including cost, time, and availability of resources most often take precedent. As well as directly impacting the Building Contractors/Developers Sector, the Schools Sector is also indirectly impacted through challenges experienced by the engineering and construction teams that are contracted to design and construct their buildings and facilities. This is particularly applicable as this sector pursues their long-term goal of achieving a net-zero electrical consumption building.

For the Non-City Government Sector, challenges are multi-faceted and include the consideration of a tiered-system of rebates for large energy users, the opportunity for the development of economic partnerships to offer city cost share options for sector members, and group purchasing opportunities. While assisting in expanding current efforts and the level of participation in electrical efficiency, addressing these challenges would also significantly assist with funding challenges for this sector, as noted above.

The Business, Civic Organizations, and Residential Sectors find challenge with ordinances primarily through the incorporation of renewable energy technologies. The process itself for installation approval is noted to have improved substantially and be considerably more streamlined. However the current rebate program does not adequately address the much higher installation cost of renewable energy technologies as compared to something with a lower cost such as CFLs. As noted for the Non-City Government Sector, while assisting in expanding current efforts and level of participation in electrical efficiency, addressing this challenge would also significantly assist with funding challenges for this sector.

The Faith-Based Sector finds its members sharing all of the above noted challenges as related to City ordinances. As they complete construction projects as well as renovations and remodels, they will be impacted by the challenges faced by their contractors. With one sector member, the Ames Unitarian Universalist Fellowship, having already invested in renewable energy technologies through the installation of solar panels, there is most definitely interest and opportunity for more members to consider making this investment.

Themes: Though sharing some overlap, there is a diversity of action items that have been proposed within sector plans toward achieving reduction goals. In spite of this diversity, there are overarching themes between sectors on which to base some comprehensive action steps. With that in mind, three themes can be identified that encompass all seven sectors.

- The need for an increased and enhanced focus on education and awareness resources and campaigns.
- The need for an increased and enhanced focus on engaging, motivating, and sustaining participation.
- The need for an increased and enhanced focus on sustainability-minded planning and policies.

Action Steps: To support the above noted themes three action steps, that will collectively assist and further all of the prioritized sector action steps discussed above, are proposed for City Council consideration and action.

1. The Establishment of an Electrical Efficiency Education Committee

Focus: The focus of this committee is to take a collective look at the educational resources noted in this document (as well as other relevant resources as determined by the Committee) and offer recommendations related to increasing the accessibility, availability, and utilization of these resources. For example, the City of Ames Electric Services Department currently has an impressive and thorough collection of electrical efficiency resources on their website. Unfortunately, most members of the Sustainability Task Force were unaware of them or had experienced difficulty in trying to navigate the City of Ames website in order to find them.

Besides considering currently available resources, this committee would also consider the need for additional resources and implement steps for their development and completion. Multiple sectors noted (and in some cases included) the work they had already been doing toward providing educational resources they felt would be beneficial to their sector members. Best Management Practices for Electrical Consumption Reduction and an Electrical Reduction Tracking Website are two resources that would be suggested as priorities for this committee.

Participants: Proposed committee members include, but are not limited to: current Task Force members and/or sector subcommittee members and sector consultants, City of Ames Public Relations and Communication and Electric Services staff, and representatives from the Tribune and the Chamber of Commerce to assist with dissemination of resources.

Timeline: This is not anticipated to be a long-standing committee. Rather, it is anticipated that this committee will determine a timeline that will facilitate completion and ensure sustainability of the above noted focus.

Applicability to Sector Plans: As well as increasing overall education and awareness as related to electrical efficiency and consumption, this action step also specifically addresses the following sector priorities:

- Creation and dissemination of a “Checklist of Best Management Practices for Office Environments,” as previously discussed and proposed in the Civic Organizations Sector Plan.
- Creation of “Business Conservation Kits” and the completion of a “Business Energy Symposium” as discussed and proposed in the Business Sector Plan.
- Creation of an on-line, self-guided data system (Ames Home Energy Yardstick) and the facilitation of informed investment and participation in electrical efficiency as previously discussed and proposed in the Residential Sector Plan.
- Creation of a “Care and Share Listing” and the creation of the Interfaith Creation Care of Ames (ICCA) as earlier discussed and proposed in the Faith-Based Sector Plan.

2. The Establishment of an Electrical Efficiency Engagement and Recognition Committee

Focus: The focus of this committee is to create a recognition program specifically related to achievements and engagement in electrical consumption reduction by members (individuals and organizations) in the Ames Community. For some sectors, in particular businesses, there is already an established recognition system in place through the Mayor’s Green Team that could be evaluated and enhanced to increase participation. The opportunity also seems apparent and logical to diversify the Mayor’s recognition program in order to be inclusive, yet unique for all sectors. However, the committee will ultimately have responsibility of identifying a recognition program that is relevant and meaningful for the Ames Community.

Participants: Proposed committee members include, but are not limited to: current Task Force members and/or sector subcommittee members and sector consultants, City of Ames Public Relations and Communication and Electric Services staff, and representatives from the Tribune and the Chamber of Commerce to assist with dissemination of information.

Timeline: This is not anticipated to be a long-standing committee. Rather, it is anticipated that this committee will determine a timeline that will facilitate completion and ensure sustainability of the above noted focus.

Applicability to Sector Plans: As well as increasing overall marketing efforts to motivate and sustain participation in electrical efficiency and consumption and support the educational efforts and initiatives noted under the first action step, this action step also specifically addresses the following sector priorities:

- Creation of an “Electrical Efficiency Incentive and Rewards Program” as highlighted above and proposed and discussed in the Civic Organizations Sector Plan.
- Development of an “Above and Beyond Energy Savings Design Incentives Program” as previously discussed in the Building Contractors/Developers Sector Plan.

3. The Establishment of a Review Team of Current Policies Related to Electrical Efficiency

Focus: The focus of this review team would be to consider and evaluate current policies and provide recommendations to the City Council as related to planning and policy considerations that should be undertaken and/or implemented to offer further assistance and incentive as related to electrical consumption reduction. Policy areas that were identified in the sector reports and prioritized as action steps included rate base determination, electrical efficiency requirements for building codes, and rebate systems for large end users.

Participants: As the policy areas are diverse, there is not really one team that can fully accomplish this focus. With that in mind, proposed team members for focus areas including electrical rates and incentives could include, but are not limited to: current Task Force members and/or sector subcommittee members and sector consultants, City of Ames Electric Services’ staff, and members of the Electric Utility Operations and Review and Advisory Board (EUORAB). Proposed team members for focus areas including building code changes could include, but are not limited to: current Task Force members and/or sector subcommittee members and sector consultants, City of Ames Electric Services and Housing Department staff, representatives from the Iowa Homebuilders Association, American Institute of Architects Iowa Chapter, and representatives from other related professional affiliations and organizations.

Timeline: This is not anticipated to be a long-standing team. Rather, it is anticipated that this team will determine a timeline that will allow completion and ensure sustainability of the above noted focus. Implementation of recommendations or actions this team offers to the City Council may lead to the formation of another group or committee. That will be the determined at a later time.

Applicability to Sector Plans: As well as supporting the opportunity for increased electrical efficiency through planning, projects, and initiatives within all sectors, this action step also specifically addresses the following sector priority:

- Enhancement of energy cost rebate incentives for building contractors and developers as discussed and proposed in the Building Contractors/Developers Sector Plan.
- Creation of a tiered system of energy rebates for large energy users and development of cost share partnerships with the city as discussed and proposed in the Non-City Government Sector Plan.

LOOKING AHEAD

As is illustrated in the above discussion as well as attached appendices, the Ames Community has considerable opportunities with respect to furthering sustainability and specifically reducing electrical consumption. Through currently available resources, assistance, and incentives, a considerable amount of effort and priority has already been placed on electrical efficiency. And as is evidenced in the work of the Task Force sector members and sector subcommittees, a considerable amount of thought, dedication, and enthusiasm has been put forth to motivate and inspire enhanced, diversified, and sustained efforts and accomplishments. In other words, there is no shortage of opportunities available to the Ames community to achieve success in reducing our electrical consumption.

There are certainly challenges that come with these opportunities as has been discussed in some detail above and within the individual sector reports. That being said, the solutions to these challenges have also been illustrated in the above discussion as well as in the attached appendices. The sector subcommittees have taken a very pragmatic and strategic approach in their recommendations in being cognizant of not only identifying needs and challenges, but offering specific action items to address them.

In considering the opportunities we have before us, the City of Ames and the Ames community seem poised and motivated to make a proactive and visionary commitment to a sustainable future through supporting and encouraging the recommendations proposed in this plan.

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APPENDICES

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APPENDIX A.

**CITY OF AMES KILOWATT HOUR CONSUMPTION AND CO2
EMISSIONS REDUCTION OPPORTUNITIES BY CUSTOMER CLASS
WITH 5%, 10%, AND 15% kWh REDUCTION TARGETS**

Table 1 - City of Ames Kilowatt Hour Consumption and CO2 Emissions Reduction Opportunities by Customer Class with 5%, 10%, and 15% kWh Reduction Targets (N= 24,229 and Total Annual Consumption = 694,654,804 kWh)

Residential Customers (n=21,263)		Based on total annual electrical consumption of 24,843,120 kWh.				
kWh Reduction Targets	Annual Reduction in Consumption (kWh)	Monthly Reduction in Consumption (kWh)	Monthly Reduction Per Customer (kWh)	Annual Tons CO2 Emissions Reduction	Monthly Tons CO2 Emissions Reduction	Monthly Tons Emissions Reduction per Customer
5%	8,204,987	683,749	32	6,728	561	0.03
10%	16,409,975	1,367,498	64	13,456	1,121	0.05
15%	24,614,962	2,051,247	96	20,184	1,682	0.08
Small Commercial Customers (n=2,543)		Based on total annual electrical consumption of 7,877,999 kWh.				
kWh Reduction Targets	Annual Reduction in Consumption	Monthly Reduction in Consumption	Monthly Reduction Per Customer	Annual CO2 Emissions Reduction	Monthly CO2 Emissions Reduction	Monthly Emissions Reduction per Customer
5%	2,571,505	214,292	84	2,109	176	0.07
10%	5,143,010	428,584	169	4,217	351	0.14
15%	7,714,515	642,876	253	6,326	527	0.21
Large Commercial Customers (n=420)		Based on total annual electrical consumption of 34,638,906 kWh.				
kWh Reduction Targets	Annual Reduction in Consumption	Monthly Reduction in Consumption	Monthly Reduction Per Customer	Annual CO2 Emissions Reduction	Monthly CO2 Emissions Reduction	Monthly Emissions Reduction per Customer
5%	11,295,842	941,320	2,241	9,263	772	1.84
10%	22,591,684	1,882,640	4,482	18,525	1,544	3.68
15%	33,887,526	2,823,961	6,724	27,788	2,316	5.51
Industrial Customers (n=3)		Based on total annual electrical consumption of 19,471,825 kWh.				
kWh Reduction Targets	Annual Reduction in Consumption	Monthly Reduction in Consumption	Monthly Reduction Per Customer	Annual CO2 Emissions Reduction	Monthly CO2 Emissions Reduction	Monthly Emissions Reduction per Customer
5%	6,311,925	525,994	175,331	5,176	431	143.77
10%	12,623,849	1,051,987	350,662	10,352	863	287.54
15%	18,935,774	1,577,981	525,994	15,527	1,294	431.31

****This table is based on City of Ames Kilowatt Hour Usage by Customer Class from October 2009-October 2010 and serves as general information that can be utilized for planning and goal-setting. It is understood that this information will not be applicable to each customer within the customer classes. This information should be used as a guide to assist in general understanding and awareness. Customers are encouraged to contact Ames Electric Services 239-5177 for assistance as they form their specific plans and goals.**

APPENDIX B.
TASK FORCE CHARGE

AMES COMMUNITY SUSTAINABILITY TASK FORCE CHARGE

While the concept of Sustainability includes a broader vision for environmental, economic, and social issues, the initial charge for the Task Force is to assist the Ames City Council in achieving cost-effective energy reductions in the various sectors of our community through the focus on electrical energy consumption (and the associated carbon emissions).

While the City Council has established an internal goal to reduce carbon emissions in our City operations by 15% by the end of 2014, there has been no formal effort on the part of the City to motivate the actions of other sectors of our community to reduce their energy consumption.

In order to achieve energy reductions throughout the community, the Task Force is being asked to focus externally (non-City operations) on the various sectors represented on the Task Force and to develop a plan that includes the following action items:

- Prepare a baseline electrical consumption resource for the various sectors;
- Recommend electrical energy reduction targets and develop strategies to achieve these targets for the various sectors and the community;
- Provide a list of “best practices” that have been proven successful in reducing energy consumption for the various sectors and the community;
- Create an educational strategy for the community as to the importance of electrical energy reduction and offer actions that the various sectors and the community can take to reduce consumption;
- Identify any impediments to electrical energy reduction targets that exist in City ordinances.

The Task Force shall be represented by the following community sectors with the number of members designated below for each sector who will be appointed by the Mayor with the consent of the City Council:

Business – 3 members

Building Contractors/Developers – 2 members

Residential – 3 members

Faith-Based Organizations – 2 members

Civic Organizations – 2 members

School Districts – 2 members

Non-City Government – 2 members

ISU Government of the Student Body Sustainability Director - 1

APPENDIX C.
TASK FORCE APPLICATION



Ames Community Sustainability Task Force – Application for Appointment

The Ames Community Sustainability Task Force is charged with assisting the Ames City Council in developing a plan to achieve cost-effective energy reductions in the various sectors of our community through the focus on electrical energy consumption (and associated carbon emissions). It is anticipated that the work of this task force will begin in late August, 2010 and be completed by August, 2011. The full task force charge is on Page 4 of this application.

For purposes of this committee, sectors are designated as the following:

- Business – 3 representatives
- Building Contractors/Developers – 2 representatives
- Residential – 3 representatives
- Religious Organizations – 2 representatives
- Civic Organizations – 2 representatives
- School Districts – 2 representatives
- Non City Government – 2 representatives
- Government of the Student Body Director of Sustainability – 1 representative

There are multiple ways to take part in the Ames Community Sustainability Task Force:

1. Task Force Sector Representative
 - Attends bimonthly Task Force meetings – 2nd and 4th Wednesday of the month, 7-8:30pm.
 - Attends additional working or informational meetings as determined by the Task Force facilitator and membership
 - Chairs a subcommittee of sector representatives - Identifies a subcommittee of sector representatives and facilitates (minimum) one monthly meeting of the subcommittee
 - Assumes active role in fulfilling the sector-specific action items of the Task Force charge
2. Sector Subcommittee Representative
 - Attends (minimum) monthly meetings of the Sector Subcommittee
 - Attends additional working or information meetings as determined by the Sector Subcommittee Chair and membership
 - Assumes active role in assisting the Sector Subcommittee Chair to fulfill the sector-specific action items of the Task Force charge
3. Sector Consultants
 - Assists in an “as needed” capacity to provide expertise and assistance to Sector Subcommittee in fulfilling the sector-specific action items of the Task Force charge

To indicate your interest in any of the above opportunities, complete the form below and email it, or print and return by hand or fax, to:

City Clerk’s Office	jripperger@city.ames.ia.us
515 Clark Avenue	
Ames IA 50010	FAX: (515) 239-5142

Ann H. Campbell, Mayor

Date: _____

Name: _____

Are you a resident of Ames? _____ If a resident, how many years have you lived in Ames? _____

Home Address: _____

Do you own your home? (Yes/No): _____

Work Address: _____

E-mail: _____

FAX: _____

Home Phone: _____

Occupation: _____

Work Phone: _____

Highest Level of Education: _____

Check the sectors you feel you are qualified to represent for this Task Force.

- | | |
|---------------------------------------|---------------------------|
| _____ Business | _____ Civic Organizations |
| _____ Building Contractors/Developers | _____ School Districts |
| _____ Residential | _____ Non City Government |
| _____ Religious Organizations | |

For each of the sectors you have checked, note the number of years you have been actively involved in that sector.

- | | |
|---------------------------------------|---------------------------|
| _____ Business | _____ Civic Organizations |
| _____ Building Contractors/Developers | _____ School Districts |
| _____ Residential | _____ Non City Government |
| _____ Religious Organizations | |

Indicate your preference for Task Force involvement (1=highest preference, 3=lowest preference).

- _____ Task Force Sector Representative
- _____ Sector Subcommittee Representative
- _____ Sector Consultant

Please describe your leadership experience in the sectors you have a desire to represent.

Please describe any particular qualifications, expertise, or experience you have that you believe are relevant and beneficial to the charge of this Task Force.

Please discuss your involvement in community organizations and/or other ways you give back to your community.

Why do you want to be involved in the completion of this Task Force's charge?

Please discuss your interest and involvement in sustainability.

Please read the following section carefully before submitting the form.

In accordance with Section 362.5, Code of Iowa, goods and services shall not be purchased from any City officer, or from the spouse or immediate family member of a City officer, or from any business in which a City officer, or the spouse or immediate family member of a City officer shall own an interest. This prohibition does not apply to:

- (a) contracts made by competitive bidding in writing, publicly invited and opened.
- (b) contracts in which a City officer has an interest solely by reason of employment if the contract is for professional services not customarily awarded by competitive bid, if the remuneration of employment will not be directly affected as a result of the contract, and if the duties of employment do not directly involve the procurement or preparation of any part of the contract.
- (c) a contract in which a City officer has an interest if the contract was made before the time the officer was elected or appointed.

(d) a contract with a corporation in which a City officer has an interest by reason of stockholdings when less than five percent of the outstanding stock of the corporation is owned or controlled directly or indirectly by the officer, or the spouse, or immediate family of such officer.

(e) contract not otherwise permitted by this section, for the purchase of goods or services by the City, which benefit a City officer, if the purchases benefiting that officer do not exceed a cumulative total price of one thousand five hundred dollars in a fiscal year.

Officers include Task Force Sector Representatives

I certify that the information supplied herein is correct and that any applicable conflicts of interest, in accordance with the above section of this application, are noted below.

Ames Community Sustainability Task Force Charge

While the concept of Sustainability includes a broader vision for environmental, economic, and social issues, the initial charge for the Task Force is to assist the Ames City Council in achieving cost-effective energy reductions in the various sectors of our community through the focus on electrical energy consumption (and the associated carbon emissions).

While the City Council has established an internal goal to reduce carbon emissions in our City operations by 15% by the end of 2014, there has been no formal effort on the part of the City to motivate the actions of other sectors of our community to reduce their energy consumption.

In order to achieve energy reductions throughout the community, the Task Force is being asked to focus externally (non-City operations) on the various sectors represented on the Task Force and to develop a plan that includes the following action items:

- Prepare a baseline electrical consumption resource for the various sectors;
- Recommend electrical energy reduction targets and develop strategies to achieve these targets for the various sectors and the community;
- Provide a list of “best practices” that have been proven successful in reducing energy consumption for the various sectors and the community;
- Create an educational strategy for the community as to the importance of electrical energy reduction and offer actions that the various sectors and the community can take to reduce consumption;
- Identify any impediments to electrical energy reduction targets that exist in City ordinances.

APPENDIX D.
TASK FORCE MEMBERSHIP

BUILDING CONTRACTORS/DEVELOPERS SECTOR

Sustainability Task Force Representative	Sustainability Task Force Subcommittee Representative	Sustainability Task Force Consultant
Adam Papesh		
Andrew Tulp		

BUSINESS SECTOR

Sustainability Task Force Representative	Sustainability Task Force Subcommittee Representative	Sustainability Task Force Consultant
Daniel Krohn	Nathan Easter	
Jennifer Malone	Carla Sacco	
Monte Streit	Brian Strobel	

CIVIC ORGANIZATIONS SECTOR

Sustainability Task Force Representative	Sustainability Task Force Subcommittee Representative	Sustainability Task Force Consultant
Eve Doi		
Tom Elston		

FAITH-BASED ORGANIZATIONS SECTOR

Sustainability Task Force Representative	Sustainability Task Force Subcommittee Representative	Sustainability Task Force Consultant
Mary Jean Baker	Simone Skowronek	
James Gaunt	Doug Sumerford	
	Don Wall	

NON-CITY GOVERNMENT SECTOR

Sustainability Task Force Representative	Sustainability Task Force Subcommittee Representative	Sustainability Task Force Consultant
Irina Bassis		
Carolyn Raffensperger		
John Rodillosso		

RESIDENTIAL SECTOR

Sustainability Task Force Representative	Sustainability Task Force Subcommittee Representative	Sustainability Task Force Consultant
Erv Klaas	Jim Clark	Joyce Emery
Christopher Knorowski	Josh Kriz	Hugo Franzen
Corey Metzger	Steve Libbey	
	Rachael Olive	

SCHOOLS SECTOR

Sustainability Task Force Representative	Sustainability Task Force Subcommittee Representative	Sustainability Task Force Consultant
Gerry Peters	Mary Wells	
Karen Shimp		

GOVERNMENT OF THE STUDENT BODY SECTOR

Sustainability Task Force Representative	Sustainability Task Force Subcommittee Representative	Sustainability Task Force Consultant
Matt Santee		

SUPPORT

Task Force Coordinator	Task Force Liaisons	
Merry Rankin, ISU/City of Ames	Steve Schainker, City Manager	
	Steve DuVall, Assistant Director of Water & Pollution Control	
	Donald Kom, Director of Electric Services	
	Susan Gwiasda, Public Relations Officer	
	Brenda Swaim, Deputy Assessor	
	Mike Wheelock, Utility Accounts Supervisor	
	Steve Wilson, Energy Services Coordinator	

OTHER COMMUNITY SUPPORT

Ames Chamber of Commerce

Volunteer Center of Story County

PRESENTERS

Tim Borich, Assoc. Professor & Assoc. Dean for Outreach, Community & Regional Planning, Iowa State University

Cori Brubach, Sustainable Community Coordinator, Dubuque, Iowa

Jim Clark, Home Energy Audit Specialist, Sustainable Living Solutions, Ames, Iowa

Bill Diesslin, Assistant Director, Environmental Health and Safety, Iowa State University

Bill Good, Chief Operations Officer, Des Moines Public Schools

Eileen Horn, Sustainability Director, Lawrence, Kansas

Don Kom, Fill-In

Daniel Krohn, Sustainability Director, Becker Underwood, Ames, Iowa

Brenda Nations, Environmental Coordinator, Iowa City, Iowa

Emily Rice, Business Development Manager, The Energy Group, Des Moines, Iowa

Scott Timm, Sustainability Coordinator, Fairfield, Iowa

APPENDIX E.
SECTOR PLANS

APPENDIX E1

BUILDING CONTRACTORS/DEVELOPERS SECTOR PLAN

BUILDING CONTRACTORS/DEVELOPERS SECTOR PLAN

BACKGROUND

Description of Sector: In discussions with Merry Rankin, and in reviewing the charge of related Task Force Sectors, it became apparent that the Building Contractors/Developer Sectors contained overlap with respect to directly investigating the representative segment within Ames. Most specifically, the Residential sector would be engaged in determining and developing ideas around electrical energy use within the residences in Ames, and the Business Sector would do the same within the business community, yet both of these community groups could be said to be within the scope of the Building Contractors/Developer Sector.

Thus, to avoid overlap and repetitive scope, the Sector charge was focused on design/development, rather than existing, operational electrical usage. Additionally, it should be noted that the Building Contractors/Developers Sector focused its research and work on Commercial Buildings. Commercial Buildings, as delineated by current *International Building Code* standards, includes all commercial buildings and dwellings larger than one or two families.

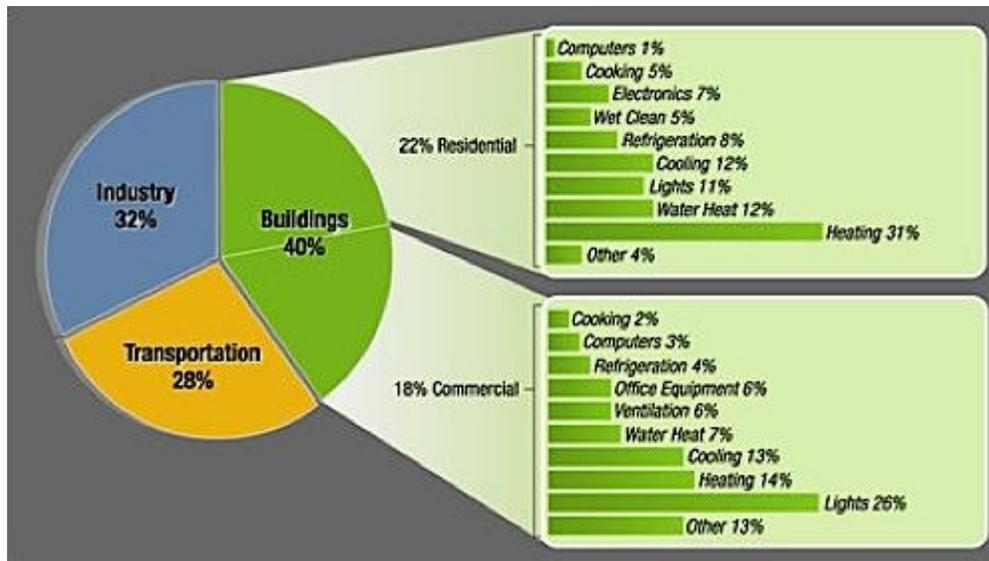
Baseline Data: Since the focus of this plan is on policies and guidelines for planned rather than existing projects, baseline data, as presented in other Sector plans, is not available.

Sector Initiatives: Specifically, this plan investigates existing communities within the US that have adopted policies affecting building energy use, specifically electrical energy, through design guidelines. The plan also reviews the current codes or guidelines available through such recognized sources as ASHRAE, and USGBC. Finally, the plan discusses potential ways the City of Ames might integrate electrical consumption and, additionally, green building consideration into its own design and development guidelines and approvals process.

Evaluation of Current City of Ames Commercial Electrical Efficiency Programs:

The City of Ames currently promotes commercial energy efficiency through its Smart Energy program. This program is designed generally to attract businesses in existing facilities to incorporating energy efficient behavior, and especially to investing in efficient processes, appliances, and lighting through financial rebate incentives.

As can be seen by the accompanying DOE graphic, commercial energy use is mostly affected by Ventilation, Air Conditioning, and Lighting--all of which are predominantly electric loads.



Source: <http://www.jetsongreen.com/2009/08/breaking-down-building-energy-use.html>
 Original data from USDOE. Energy Information Administration Annual Energy Review 2005.

The City’s programs appear to adequately cover the spectrum of these electrical consuming building elements, including upgraded HVAC equipment through either the Appliance Rebate, or the Commercial Custom Rebate. Lighting, likewise, is directly targeted with a specific rebate program.

However, each of these incentives only addresses individual existing building elements. For instance, the Commercial Custom Rebate requires a comparison of electrical usage before and after facility improvements are made. The program does not appear to have been directly developed to incorporate efficient design. The precursor and partner to all electrical efficiency rebate programs should be energy efficient design considerations. While the scope of this Task Force is only Electrical Energy use, current energy efficient design strategies involve a holistic approach, including not only targeting efficient equipment, but incorporating building siting, orientation, insulation and daylighting strategies to develop the greatest economical cumulative energy use benefits (IE Natural Gas and Electrical efficiency).

Comparison of Current State and Local Energy Codes:

State of Iowa Energy Code: The current Iowa Energy Code requires all private and public commercial buildings in the State of Iowa to comply with the current International Energy Conservation Code, by the International Code Council. This code in turn references the current ASHRAE 90.1 standard. At the time of writing, the State of Iowa references IECC 2009, and by connection ASHRAE 90.1 2007. The state energy code defines a minimum energy standard for all Commercial buildings in IA, and typically, this standard is revised at each code update cycle to be more stringent than the previous version.

With respect to meeting energy standards in new construction, most existing buildings with HVAC equipment older than 10-15 years are not designed to anything near these levels, thus simply requiring new construction or renovations to meet current energy code is a positive step towards energy efficiency.

City of Ames Requirements: All commercial new construction in the State of Iowa must comply with the Iowa Energy Code requirements, regardless of location. The City of Ames follows the same requirement. In its simplest form, this can be confirmed with the USDOE's ComCheck software which confirms whether a buildings components will meet or exceed the IECC or ASHRAE 90.1's prescriptive or trade-off approaches.

Research of Current Independent Energy Standards and Guides:

(LEED New Construction 2009 (also generally applies to LEED Core and Shell, and LEED Commercial Interiors), by the United States Green Building Council): As a comprehensive Green Design approach, the LEED series incorporates energy use concerns, as well as a larger range of Green considerations such as brownfield redevelopment, water use, resource use, and indoor air quality. The energy specific LEED for New Construction (NC) guidelines mostly fall within the "Energy and Atmosphere" sections, and base their energy targets on Ashrae 90.1 2007, or the Ashrae AEDG series, or the New Buildings Institute Core Performance Guide. Energy Savings by percentage over the standard are progressively rewarded a higher point rating. LEED for Existing Buildings uses Energy Star as a benchmark system for existing building performance.

ASHRAE 90.1 *Energy Standard for Buildings Except Low-Rise Residential Buildings* (published in 1999, 2004, and 2007, 2010, and planned for regular updates).

ASHRAE 90.2 *Energy Standard for Low-Rise Residential Buildings*: This standard is the current industry-wide energy design benchmark. It includes required energy performance rating levels for building envelope components, lighting and HVAC. Each successive published standard has generally demanded greater energy efficiency than its predecessor. Design performance levels can be met prescriptively, by using a trade-off approach, or by using a comprehensive computer energy modeling approach. The DOE's Comcheck software can be used to measure the prescriptive and trade-off approaches.

International Green Construction Code with ASHRAE Standard 189.1 2009: This is the most recent effort by a number of parties with similar goals, and is a joint effort of the International Code Council, ASHRAE, AIA and others. This model code was developed to allow jurisdictions to invoke a green building code, including elements involving energy efficiency. It was developed to demand energy efficiency beyond the current standard 90.1 and ASHRAE Advance Energy Design Guides (AEDG).

ASHRAE (AEDG) Advanced Energy Design Guides, including AEDG for Small Retail Buildings, AEDG for Small Office Buildings, and AEDG for K-12 Schools, AEDG for Small Warehouses, AEDG for Medical): These documents are freely available, and are not intended as standards or codes, but as resource guides for building designers and owners. They suggest building configurations and elements that will aid in achieving energy efficiency. All these guides are similar, and are based on 30% improvements on Ashrae 90.1 1999. Because they are based on a relatively old standard, they are becoming outdated, as the current Ashrae 90.1 standards begin to exceed the requirements in the original AEDG series. However, a new series, targeting 50% improvements over 90.1 2004 is currently planned. Nonetheless, these remain current standards, and for instance, are referenced in the LEED NC 2009 as the basic prerequisites to achieve any LEED Certification.

US DOE and EPA Energy Star, EPA Target Finder, and “Designed to Meet Energy Star”:

The Energy Star program is familiar to many because it is an energy use rating system for many home appliances. But the program is also used to rate the energy performance of existing buildings. With the use of the program’s “Portfolio Manager”, actual energy use data is submitted to the program, and with 3rd party review, a building can be granted the Energy Star label if it meets the energy star target rating of 75 or greater. (A rating of 50 indicates that the building, from an energy consumption standpoint, performs better than 50% of all similar buildings nationwide, while a rating of 75 indicates that the building performs better than 75% of all similar buildings nationwide, based on DOE nationwide research.) The program does not prescribe design paths to achieve this target, but does assist designers with a parallel rating program called “Designed to Earn the Energy Star”. In this way it attempts to bridge the design and operational aspects of buildings, which is something that LEED has been criticized for in its current manifestation. To achieve a label, a building must be in operation for a year, and utility bills are used to verify the design Target. LEED EB uses an Energy Star Portfolio rating above 75, which is the Energy Star building rating minimum, as a compliance path.

Alliant/Mid American Energy Commercial New Construction Program (designed to provide incentive for improvements of 15% or 30% greater than State Energy Code): These are energy design incentive programs for commercial building currently offered by Iowa’s energy cooperatives. Typically these programs offer design assistance and stipends to the design teams, to offset design time used to investigate “packages” of energy saving building elements. These building elements are compared, using a computer model, to a baseline building model and evaluated for total cost and projected energy cost savings including payback period. Where improvements of 15% minimum are projected, the owner is eligible for rebates from the energy company. These can amount to tens of thousands of dollars per year for some companies.

With regard to commercial design incentives, and payback, recent firsthand experience with the Commercial New Construction Rebate programs has suggested that while the programs have a successful approach, not all commercial institutions will incorporate energy efficient design elements into a building plan, if the return on investment does not occur within a very short time frame, such as 5 years or less, including the Energy Company rebates.

Research on Existing Communities:

In our research of other community’s codes and ordinances, pertaining to energy usage and sustainability, it was discovered that many other communities across the country have implemented electrical usage guidelines for commercial and multifamily residential units. Many of these ordinances deal with guidelines that go above and beyond the adopted building code and energy code.

Communities of all sizes were included in our research. Below are some examples of electrical and energy efficiency paths other communities have implemented. Some of these items are general in nature while others are specific. Generally, it can be said that most communities with electrical and energy consumption concerns have developed, as a precursor, a wholistic sustainability vision.

City of Austin, TX

Population – 790,390

Developed the following Energy Efficiency Action Plan:

Homes and Buildings Plan:

- Update building codes to make all new single-family homes capable of meeting 100% of their energy needs with on-site generation of renewable energy by 2015.
- Enhance building codes to increase energy efficiency in all other new buildings by 75% by 2015.
- Require disclosure of historic energy use and cost-effective energy efficiency improvements upon the sale of all buildings.
- Enhance technical assistance, standards, and incentives for Austin Energy's Green Building program.
- Mandatory energy audits for all apartment complexes and commercial properties. Results of these audits must be shared with current and prospective tenants. This audit will review the energy usage of the building and make recommendations for cost-effective efficiency improvements.

Fort Collins, CO

Population – 143,000

Fort Collins, CO, has a philosophy that sustainability is more than just city policies, more than just community programs, and more than just talk. Being sustainable means considering the environmental, financial, and human impacts of all decisions. It means recognizing new challenges that result from finite resources. It means considering the long term impacts of our actions. The City of Fort Collins offers nearly 60 different programs to help reduce impact on the environment. Here are some of the programs that are available now that deal with energy efficiency and/or building designs:

- Energy Savings
 - AC Load Management Program – participating customers receive \$20 in bill credits over the summer and help reduce the City's electric load by agreeing to have their air conditioners cycled on and off during hot days.
 - Green Energy Program – residents can purchase clean, renewable energy for an additional 1 cent per kilowatt-hour (kWh).
 - Hot Shot for Water Heaters – participating customers receive monthly bill credits (\$50/year) and help reduce the City's electric load by agreeing to have their electric water heaters cycled on and off during system peaks or times of high use.
 - Refrigerator and Freezer Recycling and Rebates – get a \$35 bill credit for recycling inefficient, working refrigerator or freezer.
 - Residential Lighting Program – the City works with local retailers to offer discounts on CFL bulbs and various special events throughout the year.
- Green Building
 - Colorado New Home Choices – This Web site, co-sponsored by City of Fort Collins and E-Star Colorado, includes a wealth of information about new home choices related to energy efficiency, comfort, healthy indoor air and durability.

- Green Building Resolution - Fort Collins City Council voted to raise the bar on energy efficiency and environmental design by adopting a resolution stating all new construction of city-owned buildings will achieve LEED "Gold" certification. Fort Collins became only the third city in the nation to set this high standard, joining Scottsdale, AZ and Portland, OR.
- Green Building Roadmap - Green building means better buildings for people, prosperity and the planet. Green buildings demonstrate a reduced carbon footprint, energy efficiency, water conservation, waste minimization, resource-efficient materials, pollution prevention and improved indoor air quality to conserve natural resources and improve environmental quality—both indoors and out.
- Business Programs
 - Business Environmental Program Series - A series designed to increase knowledge about the latest technologies and awareness of City environmental services and programs.
 - Climate Wise - a voluntary, city-run program that is dedicated to helping local business reduce their impact on the environment and tackle modern-day business challenges that impact bottom lines.
 - ElectriConnect - Free online access to your electric meter data to manage electricity use and control energy costs
 - Energy Efficiency Program – designed to support building efficiency improvements, save money and lower electric bills. Cash incentives are provided for upgrades that reduce electric demand and energy use.
 - Green Energy Program – businesses can purchase clean, renewable energy for an additional 1 cent per kilowatt-hour (kWh).
 - Integrated Design – financial incentives and free technical support to those interested in delivering high-performance buildings that exceed building code requirements for energy performance.
 - Key Accounts Customer Luncheons – These luncheons are held several times a year and are designed to provide input to customers regarding electric, water, storm water and wastewater rates, policies and other pertinent information.
 - LIGHTENUP – provides cash incentives for lighting retrofits in existing buildings, helping reduce electric bills and improve lighting quality.
 - Zero-Interest Loans – zero interest loans to fund the addition of insulation, replace a furnace, repair or replace leaking water lines, remove old wood stoves, add radon mitigation systems, and other conservation efforts.

City of Portland, Oregon
Population – 583,776

Developed the following Energy Efficiency Action Plan:

Energy Efficiency in Residential Buildings:

The City shall encourage energy efficiency in existing residences, focusing on the most energy-wasteful units, by helping to develop and promote public/private partnerships, utility, local, State, and Federal programs. The City also shall promote energy efficient new housing by enforcing the energy saving standards in the State building code.

Two-Year Action Plan

- Facilitate the weatherization of 8,000 low-income, multi-family units through the City's Multi-Family Weatherization Program by 1992.
- Expand the Multi-Family Weatherization Program to include single-family rental homes, when funding is available.
- Actively promote utility-sponsored energy efficiency programs for Portland homeowners.
- Identify ways to meet the weatherization needs of elderly residents. Provide services in conjunction with agencies that serve the elderly.
- Better serve low-income households, including Section 8 recipients, by coordinating with social service agencies and utilities through programs such as Block-By-Block Weatherization Program and the Low-Income Energy Assistance Program. Investigate ways to share costs with property owners.
- Promote energy efficient new construction by actively supporting the inclusion of cost-effective residential energy-saving measures for all home heating fuels in the State Building Code. The code should be similar to the Northwest Power Planning Council's Model Conservation Standards.
- Support the development of a uniform home energy rating system to provide information on the energy performance of new and existing homes.
- Investigate requiring energy audits for any residential structure receiving financing from the Portland Development Commission.
- Avoid lost conservation opportunities by encouraging property owners to install all cost-effective weatherization measures from weatherizing their rental properties.

Long-Term Plan

- Identify ways to encourage local lenders to promote energy-efficient homes by counting future energy savings as income when determining the size of a home loan.
- Investigate options for time-of-sale weatherization for residential properties.
- Facilitate the weatherization of 20,000 low-income multi-family units by the year 2000.

Energy Efficiency in Commercial and Industrial Facilities:

The City shall encourage energy efficiency in existing commercial buildings and institutions by facilitating utility, local, State, and Federal financial and technical assistance.

Two-Year Plan

- Help Portland businesses access existing utility, State, and Federal financial and technical assistance programs
- Actively support utility programs for commercial and industrial energy efficiency.
- Support the amendment of the ODOE Business Energy Tax Credit program to offer up-front energy efficiency tax credits for businesses, similar to the incentive offered to multi-family building owners.
- Continue to promote the inclusion of cost-effective commercial energy saving measures in the State building code, similar to the Northwest Power Planning Council's Model Conservation Standards, and require that commercial building designers submit energy code compliance forms with their applications for building permits.

- Train Bureau of Buildings plans examiners to review plans for compliance with the commercial energy code with emphasis on lighting code requirements.

Long-Term Plan

- Provide information to developers, architects, builders, and others interested in improving energy efficiency in new construction.
- Help local schools, hospitals, and other public and non-profit groups to participate in State, Federal, and utility-sponsored energy efficiency programs.
- Help set up training for businesses, schools, and institutions on operation and maintenance, energy accounting, life-cycle costing and other energy efficient management practices. Target small and medium businesses and major energy-using buildings.
- Explore opportunities for promoting solar energy use and daylighting in commercial buildings.
- Work with industry to identify opportunities for improving energy efficiency in process applications, including waste-heat recovery for cogeneration and district heating and cooling. Promote applicable State, Federal, and utility programs or incentives.
- Study the impacts of reducing Multnomah County personal property tax for new investments in energy efficient equipment.
- Encourage district heating and cooling, and renewable resources in new commercial and institutional buildings.
- Study and provide information to the development community on the costs and benefits of certification of commissioning of air balancing, controls, and HVAC equipment in commercial buildings. (Commissioning means that energy systems in new buildings are certified to work the way they were designed in the original plans.)

City of San Antonio, Texas

Population – 1.33 million

- Develop plans for the adoption and implementation of energy provisions that result in energy savings of 15% or greater than the currently adopted code.
- Provided information on sustainable building practices and incentives to encourage residential and commercial developers to exceed minimum code requirements.
- Coordinated education awareness with other agencies or organizations that include workshops, trainings, and seminars which will provide sustainable building practices for residential and commercial buildings that exceed minimum code requirements.
- Evaluated the feasibility of offering a property tax exemption for new homes and tax abatement or phase-in for new commercial buildings that achieve high energy performance levels, including participation in a third party verified green rating system addressing residential and commercial building. Such considerations may include a minimum HERS score for residential buildings.
- Evaluated the feasibility of offering an additional amount of property tax abatement or phase-in for new homes and commercial buildings that utilize on-site renewable energy.
- The City of San Antonio Office of Environmental Policy promoted an annual San Antonio Green Leadership awards program to recognize all new residential and commercial builders, architects, and others that significantly exceed the minimum code and to post those names on the City's website and through additional public media outlets.

- Beginning January 1, 2010, energy usage in one-and two-family and multi-family dwellings, 3 stories or less, must achieve an efficiency rate of 15% above the current City of San Antonio energy code that was in effect in 2008 (IECC 2000 with 2001 supplement and ASHRAE 90.1 1999) by complying with any of the following options:
 - IECC 2009 (as approved and/or amended by the City of San Antonio and/or Energy Systems Laboratory (ESL)). This meets the 15% standard referenced above.
 - Energy Star Certification Compliance. This meets the 15% standard referenced above.
 - Software or energy modeling tools or prescriptive building packages approved by the City of San Antonio Building Official and/or ESL. A demonstrated passing score satisfies the 15% standard referenced above.
 - Approved compliance methods as adopted by the State of Texas and/or Energy Systems Lab (ESL). A demonstrated passing score satisfies the 15% standard referenced above.
 - Build San Antonio Green, USGBC LEED-H, or other third-party certification program that meets or exceeds the energy requirements as approved by the Code Official shall be considered in compliance. This meets the 15% standard referenced above.
- Beginning January 1, 2010, buildings not covered in (b) above must achieve an efficiency rate of 15% above the current City of San Antonio energy code that was in effect in 2008 (IECC 2000 with 2001 supplement and ASHRAE 90.1 1999) by complying with any of the following options:
 - COMcheck or other software as approved by Planning and Development Services based on existing codes (ASHRAE 90.1 1999 & IECC 2000 with 2001 supplements) showing 15% or above the passing score.
 - COMcheck based on ASHRAE 90.1 2007. A passing score satisfies the 15% standard referenced above.
 - COMcheck based on IECC 2009 (when IECC 2009 is available and approved by ESL). A passing score satisfies the 15% standard referenced.
 - ASHRAE 90.1 2007 energy modeling analysis approved methods. This meets the 15% standard referenced above.
 - ASHRAE Advanced Energy Design Guidelines. This meets the 15% standard referenced above.
 - Software or energy modeling methods or prescriptive building packages as adopted by the City of San Antonio Building Official and/or ESL. A demonstrated passing score satisfies the 15% standard referenced above.
 - Approved compliance methods that meet the new energy requirements herein as adopted by the State of Texas. A demonstrated passing score satisfies the 15% standard referenced above.
 - USGBC LEED or other third-party certification program that meets or exceeds the energy requirements as approved by the Code Official shall be considered in compliance.
 - Performance rating calculations and documentation shall be in accordance with the International Building Code, "Performance Rating Method", and shall be submitted with each application for a building permit. Documentation, including calculations, shall be prepared by a registered design professional.

City of Temple, New Hampshire
Population – 1,366

Developed an energy efficiency plan incorporating the following resolutions:

- Adopt energy conservation and efficiency measures for municipal buildings and operations. This could include creating local energy building requirements that exceed the State Energy Code.
- Reduce barriers to, and promote the development and installation of appropriate thermal and electric renewable energy sources in all sectors of the community.
- Implement a municipal buying strategy of Energy Star equipment and eco-friendly office products, as costs permit, and implement awareness campaigns to encourage the consumption of such equipment and products within the broader community.
- Join with nearby towns to form a single, eco-friendly purchasing contract to provide economy of scale for all.
- Create an Energy Savings Trust Fund to be used in the future for energy saving initiatives within a 5 year payback. Submit this Fund for majority vote at a Town Meeting.
- Promote voluntary efforts to weatherize and insulate homes and businesses.
- Encourage residents to reduce, reuse, recycle, compost, replace incandescent bulbs with CFLs, and use clotheslines and wooden drying racks to reduce the energy usage of clothes dryers.

From our research it is apparent that many communities already have Energy Efficiency (electrical usage) ordinances in place that create guidelines for new construction projects. Many of these are incentive or rebate type programs that help suggest what should be included in these new projects to achieve the energy ratings and usages the city wants. Many city's also include ordinances that stated new project designs must exceed the current codes by anywhere from 10-75% on energy usage and suggest ways to achieve this standard.

VISION

The City of Ames is perhaps most similar to Fort Collins, from the subset of communities selected above. The City of Fort Collins has embarked on a deliberate path toward energy use reduction and sustainable development. Many of these programs above are already an option in the City of Ames. Others provide additional areas of consideration for the city's sustainable development concerns.

GOALS

As this Sector focus is not on existing projects or established operations, our goals focus on investigating and implementing (as applicable) new resources, programs, and initiatives, and are not necessarily categorized as long-term or short-term. Areas for investigation are noted below.

1. Building Upon Existing Educational Resources:

Colorado New Home Choices - This Web site, co-sponsored by City of Fort Collins and E-Star Colorado, includes a wealth of information about new home choices related to energy efficiency, comfort, healthy indoor air and durability.

Something very similar to this could be established for the State of Iowa and the City of Ames. This website, as described above, could have resources for people to review during the design process of commercial and multifamily buildings. These resources could deal with choices related to energy efficiencies in these types of buildings. This appears to be a good source for educating the public on these types of decisions they would need to make during the design and construction process of a new building.

2. Nurture and Support Alternative Efficiency Opportunities:

Green Energy Program – residents can purchase clean, renewable energy for an additional 1 cent per kilowatt-hour (kWh).

The purchasing of “green” energy could help reduce the overall load on the city’s power plant as we know today. The city has secured some wind energy that would fall into this program. The purchasing of more wind energy, could add to the effect and help reduce the overall electrical usage.

3. Increase and Diversify Incentives for Electrical Efficiency Design and Construction:

Integrated Design – financial incentives and free technical support to those interested in delivering high-performance buildings that exceed building code requirements for energy performance.

This idea could be very beneficial to the city and the design of new construction. This could be opened up for commercial buildings as well as the multifamily apartment buildings in town. Having a place to go for information and financial assistance for the design of higher efficiency systems in new construction could be endless. Designing these systems to be more energy efficient could reduce the overall electrical load each building would use and overall, reduce the amount of energy used by this sector.

ACTION STEPS

In achieving these goals, the following action items are suggested and prioritized.

1. Provide energy cost rebate incentives (as is done currently with the Smart program) to building developers to adopt energy design that exceeds the State of Iowa’s baseline standard (as defined by IECC 2009 or ASHRAE 90.1 2007) by 15%, and greater rebates at 30% (Standards which mimic thresholds set by the Energy Cooperatives in Iowa through their commercial new construction programs). This would be confirmed using the DOE’s Comcheck or Rescheck software. Although this standard does not differentiate between electrical or gas efficiency improvements, improvements to envelope, lighting and air conditioning equipment are measured and will directly benefit electrical efficiency. This standard can also apply to existing building alterations (Ashrae Standard 90.1 requires energy efficient upgrades only to equipment and building components being altered.)
2. Development of incentives to “go beyond” solely energy savings design as developed in the Rebates program by incorporating a 3rd party green building guideline or rating system, such

as LEED, Green Globes, or Designed for Energy Star. Green Building principles provide a general public benefit including reducing greenhouse gas emissions, but also directly benefit the City by reducing electrical consumption, water consumption and waste management resources, to name a few. Thus additional investment by the city can be qualified. Incentives could be as simple as promoting a “Green Business Leaders” club where companies are awarded for their green leadership, at a public event, and given marketing space on the City’s website and around town.

3. Incorporate Energy Star building operations component award in addition to the design award. An Energy Star Target level of 75 or greater should be a benchmark level above which owners are afforded an award. An element of business to business competition and monetary award could be incorporated into the public event.
4. Develop a Green Building Codes Technical Advisory Committee from stakeholder groups, with subcommittees to review commercial and residential Green Codes, to investigate the potential for and propose appropriate code language toward the potential adoption into city code within a 5-7 year window.
5. Develop an education program incorporating opportunities such as a Green Building Kickoff public event, holding Green Building seminars reviewing specific examples of low rise residential, small commercial, and large industrial projects specifically requesting building owners and developers to attend in addition to architects, engineers, and builders.
6. Adopt a resolution to pursue energy savings and green projects for City of Ames buildings as examples and demonstrations for residents and building stakeholders.

OPPORTUNITIES AND CHALLENGES

Opportunities: As is evident from the completed research and the noted goals and suggested action items, opportunities for building contractors and developers are varied and abundant.

Challenges: With these opportunities is the challenge -- “Is Ames a forefront sustainable community (on the level of Greensburg KS, Austin TX, and others), or a concerned, but cautious player?” Should Ames be a leader in the green community movement, or is following a prescriptive path more desirable? In other words, should we be striving towards developing mandatory requirements for green design standards, developing non-mandatory green design incentives, or following the current IA Energy Code (which can be defined as progressive in its own right, because of the increasing requirements of the ASHRAE 90.1 standard, and IA’s continued adoption of the newest standard)? These are all part of the spectrum of sustainable design opportunities and all have associated challenges.

LOOKING AHEAD

The basis of this Task Force, and this Sector report is the belief in Ames’ desire to define a sustainable vision. This sector report attempts a cautious, but deliberate path toward a “Green Building Initiative.”

RESOURCES

Not applicable.

APPENDIX E2
BUSINESS SECTOR PLAN

BUSINESS SECTOR PLAN

BACKGROUND

Description of Sector: The Business Sector has several different sizes of buildings which vary in power use. There are office type businesses, restaurants, retail and manufacturing. With this being noted, there is an extreme variance in the type of power needs for each business along with their hours of operation. In addition, there is variance in building ownership with some owned by the occupant and some rented from a building owner.

Baseline Data:

The following information represents data from the City of Ames Electrical Department. The information refers to kilowatt hour usage from October 2009 – October 2010. The data is broken down into 3 categories of businesses:

Small Commercial with 2543 customers

Large Commercial with 420 customers

Industrial with 3 customers.

City of Ames Kilowatt Hour Usage by Customer Business Class - October 09 - October 10		
Customer Business Class	Total Usage	Mo. Avg.
Small Commercial kWh	63,023,994	7,877,999
Large Commercial kWh	277,111,245	34,638,906
Industrial kWh	155,774,602	19,471,825

Sector Initiatives:

After looking at the data, the Business Sector Subcommittee felt the best way to understand where the energy usage is coming from for the Small Commercial Customer Class was to participate in the free energy audits the City of Ames offers. Three businesses from the subcommittee – Café Diem, Hunziker on S. Duff, and Bolton-Menk – participated in the free energy audit. These businesses represented one restaurant, one office space owned by the company and one office space which is leased. The common result was that between 45-50% of the power needs were from equipment which is “plugged in” verses lighting, heating, and cooling. With the large number of businesses that rent their space, we believe that the greatest savings opportunity for all businesses to concentrate on is the “plugged in” area of power usage.

VISION

According to Energy Star at www.energystar.gov “energy efficiency is a sound business practice that improves profitability, reduces greenhouse gas emissions, and conserves resources.” To promote businesses to action the focus for energy reductions is the benefit it adds to their individual business. By saving energy businesses save money in operating costs. By providing public recognition to those businesses that are making sustainability changes they can pull in customers that will value the same philosophy.

GOALS

Our goals take into consideration that some businesses may have made steps toward energy reduction and some will need significant capital investing to achieve reductions.

Short-Term Goals (1-5 years) (2012-2016)

1. Reduce energy electrical consumption within the Business Sector by 5% in 2 years.
2. Reduce electrical consumption within the Business Sector by 10% in 5 years. (A 10% decrease in energy costs has an equivalent impact on operating income as a 1.26% increase in sales for the average retail store. www.energystar.gov)

Long-Term Goals (by 2021)

1. Reduce electrical consumption within the Business Sector by 15% in 10 years.

The following chart is a breakdown of kilowatt hour reduction based on percentage of reduction for each of the business customer classes in the Ames community.

Small Commercial (2543 customers)			
	Annual Reduction in Consumption	Monthly Reduction in Consumption	Monthly Reduction Per Customer
kWh Reduction Targets			
5%	2,571,505	214,292	84
10%	5,143,010	428,584	169
15%	7,714,515	642,876	253

Large Commercial (420 customers)			
	Annual Reduction in Consumption	Monthly Reduction in Consumption	Monthly Reduction Per Customer
kWh Reduction Targets			
5%	11,295,842	941,320	2,241
10%	22,591,684	1,882,640	4,482
15%	33,887,526	2,823,961	6,724

Industrial (3 customers)			
	Annual Reduction in Consumption	Monthly Reduction in Consumption	Monthly Reduction Per Customer
kWh Reduction Targets			
5%	6,311,925	525,994	175,331
10%	12,623,849	1,051,987	350,662
15%	18,935,774	1,577,981	525,994

Focused Efforts on Reduction Targets:

To reach the 5% goal in 2 years, the most effective targets are lighting and plug load. Our educational strategy will address opportunities for increasing lighting efficiency as well as rebate assistance.

Plug load represents on average 40 -50% of businesses electrical usage. By addressing behaviors and change habits, we hope to encourage positive attitudes toward energy efficiency. Our educational strategy will increase awareness and understanding of using power strips to turn off office computers, monitors, and printers and timers for coffee makers and other similar equipment.

To reach the 10% goal in 5 years, marketing and education efforts will need to focus on changing personal habits, such as shutting off lights when leaving a room and turning off power strips. Our educational strategy will provide marketing tools to assist in behavioral change.

It is also recommended that each business appoint a coordinator to help implement the suggested items. Although it may take some time to get everything in place, the coordinator could start to track the changes in electrical usage and publicize the progress and successes. Businesses with that appoint coordinators or monitors help encourage and remind coworkers to make these habit changes, and offer a personal connection for sharing ideas and successes, motivating involvement, and creating a synergy to move ahead toward other areas of sustainability.

To reach the 15% goal in 10 years, it will be important for businesses to invest in capital improvements to increase efficiencies. This planning would need to start early during the initial years so that business could save and be ready to make the investments and understand the payback

time. Our educational strategy includes information on rebates that can assist in capital improvement planning and completion.

ACTION STEPS

In achieving the goals, the following action steps are identified and prioritized. All action items are focused within education and marketing.

1. Business Conversation Kits.

To start the education process, Business Conservation Kits will be assembled that contain products and resources to assist in decreasing electrical use in an office environment. Suggested items include a power strip, velcro strips to mount the power strips for ease of use, CFL light bulbs, draft protectors, reminder stickers to “Turn Off the Lights” and “Turn Off the Power Strip”, equipment timers, an electrical usage “education wheel” related to office equipment, rebate information, and commercial audit information. Instructions for items that need more explanation will also be included in the box.

The items listed above would be utilized as follows:

Each computer workstation should have all components plugged into a power strip. At the end of the work day, the computer should be shut down, and the power strip switch turned to the off position to completely stop the flow of electricity. To make this as convenient as possible, the power strip can be attached to the underside of the desk surface within easy reach by velcro strips.

The CFL light bulbs can replace incandescent light bulbs in areas such as bathroom vanities and lamps. Draft protectors are placed inside the outlet covers on outside walls to stop the wind from blowing into the office space.

The reminder stickers are easy reminders while employees are developing new habits. The stickers will be placed in areas that are easily visible to employees.

Appliances can be put on a timer, such as microwaves and some coffee pots. During the non-work hours, the appliances can be shut down completely this way, yet be ready for use during regular work hours.

The electrical usage wheel is an important resource employees can refer to in order to be more informed and aware of how much electricity common office items, such as personal refrigerators and personal printers, can use.

Rebates and free Commercial Energy Audits are offered by the City and including the forms in the kits will make them more accessible.

After the Business Conservation Kits have been distributed, a survey will be filled out by the participants to find out what the offices actually implemented from the suggestions, and how easy and how helpful the items were.

This information can be used to determine whether any changes are necessary to the box of items and to future events.

2. Business Energy Symposium.

A Business Energy Symposium will be used to kick off the distribution of the Business Conservation Kits. The announcement will be sent to all of the businesses in Ames, and open to any position a business wants represented. Marketing information on the event will include a list of vendors, the speakers that will be presenting, and an opportunity to send in questions for speakers before the event. The event will include a free lunch for one person from each office, plus more lunch spots available for a small price.

Booths will be set up with people demonstrating and answering questions about the various items in the Conservation Kits. The event will also include other related vendor displays. The emphasis at the event will be to inform companies on how to get the biggest reduction in electrical use for the least amount of money.

Speakers will be a part of this event. Some suggestions are Peter Orazem (Professor of Economics, City Council Member) and Bill Diesslin (Associate Director of Environmental Health and Safety), who both are involved with reducing energy use at Iowa State. They have practical, useful methods that they have successfully tested and implemented at ISU.

OPPORTUNITIES AND CHALLENGES

Opportunities: Ames as already made “green” living a focus, for example the eco transit busses. There are many business and organizations that are already addressing energy reduction and other “green” initiatives. This is an opportunity for the city to support these initiatives by gleaned their research and educational strategies. With the city’s support and leadership, Ames can become a leader in “green living.”

Challenges: During this process these are the following challenges we have experienced:

1. Difficult/time consuming to find energy saving areas on City’s website. Once they are found, they can be difficult to understand.
2. Business energy audit process is lengthy. This does not refer to the actual time of the on-site audit, but the time from initial call, to filling out forms, to someone showing up, to receiving the report.
3. The energy audits did not focus on plug load as a standard auditing area. Businesses need suggestions before knowing to address equipment usage. These suggestions should include behavior modifications like turning off office equipment with the use of power strips and should be identified in the energy audit.
4. Awareness of energy savings/rebates/audits is low. Many businesses (including most subcommittee members) weren’t aware that energy audits were available for businesses.
5. Many buildings are rented by businesses. This creates issues as to who is paying for improvements, who receives benefits, and who should even obtain an energy audit. Who is responsible?
6. Many businesses will not even consider making a capital investment that reduces energy if the pay back is not within 3 years or less.

LOOKING AHEAD

The Business Sector believes that if the above-noted prioritized steps are implemented with the support of the City Council, in combination with the formation of a voluntary network (noted below), we can see our energy reduction targets accomplished. Listed below are the success steps of our vision:

1. Business Conservation Kits

These kits, described above, should be assembled and distributed to all businesses.

2. Business Energy Symposium

This event, described above, would be a great way to kick off the initiative of electrical reduction and welcome all the businesses to help in this community goal.

3. Green Business Network

This group, consisting of a volunteer representative from each of the businesses, would meet on a regular basis to provide continuous information and resource-sharing to support ongoing energy efficiency and other “green” business practices.

RESOURCES

Best Management Practices Resources for Office Energy Conservation: These practices are meant to be easy-to-implement, low-cost solutions for Ames offices to adopt. The categories are divided among eight sections. The reason to implement any or all of them is to optimize the energy we consume and thus our electric bill. In addition, incorporating these practices offers additional sustainability benefits related to carbon emissions, waste reduction, and community engagement.

Policy

- Publicize environmental policies and goals in employee updates and other communications. Then, track and report the energy/utility/waste/water usage to identify trends and changes in usage.
- Post reminder signs in visible areas to employees to keep this initiative in their mind.
- Provide a feedback mechanism, such as a suggestion box, for new ideas and improvements.
- Appoint a coordinator to help implement the suggested items within their business. Although it may take some time to set up the suggested items, the coordinator could start to track the changes in electrical usage and provide this information to the people involved.

Lighting

- Put in place energy efficient lighting practices and an awareness program, including signage. Ceiling lighting options include CFLs, LEDs, T5, and T8 applications. Motion detectors, occupancy sensors, timers, and zone or individual workspace lighting control options are ways to decrease electrical usage by using zone lighting.
- Consider double-pane windows with shades for increasing day lighting.

- Use LED lights in exit signs.
- Label switches when one switch plate has multiple switches. Turning on just the one light that is needed is much more efficient than turning on all of the lights.

Equipment

- Adopt energy efficient office equipment uses and practices, including Energy Star products (<http://www.energystar.gov/>), and turning off or unplugging computers and non-essential office equipment at the end of the work day and on weekends.
- Program computers and non-essential office equipment so auto power down and standby modes to take effect within 30 minutes of inactivity.
- Put timers on appliances that cannot be easily unplugged.
- Reduce personal office equipment in favor of communal equipment (printers, scanners, coffee pots, refrigerators, etc.), and work stations with multiple devices are powered through power strips are turned off at the end of the work day and on weekends. You can velcro the power strips in easily accessible locations.

Indoor Environment

- Put in place indoor environmental quality practices and programs. HVAC energy efficiency operations plan and programmable thermostats or thermostat adjustment plan should be part of the program.
- Put a date on furnace filters to know when to change them. This also decreases the need for electricity-driven air purifiers.
- If you have a central air conditioner, sign up for Prime Time power load management system (Prime Time power load management.)

Outdoor Environment

- Incorporate environmental quality and energy efficiency practices into outdoor activities and practices.
- Consider shorter parking lot poles to illuminate areas with less energy
- Use LEDs for exterior building lights and sidewalk lighting.
- Utilize timers for automatic and timed shut-off.

Purchasing

- Adopt sustainability-minded purchasing processes and products.
- Purchase products that are made from recycled content, reusable, recyclable, green manufactured, local, energy efficient, utilize reduced packaging, and have a green certification (Green Seal, Energy Star, etc.), on-site recycling, “swap” opportunities for office supplies and equipment, donation policy for unneeded office supplies and equipment, leasing options for new equipment, and paperless procurement and inventory system.

Carbon Footprint

- Optimize electrical usage by decreasing use by a minimum of 5%. Since much of our electricity is coal-based, this impacts the carbon imparted to the atmosphere.
- Complete a carbon footprint assessment and put together a carbon emission reduction plan. Time-sensitive goals and action step requirements should be included in the plan.

Customer Education

- Include customer awareness and education into any organizational awareness program. Examples include discounts for reusable bag use, minimal product packaging, paperless ordering, return, and/or accounting, environmentally-conscious products/merchandise (recycled content, reusable, recyclable, green manufactured, local, energy efficient, etc.), on-site recycling, and education and awareness resources about green business practices (website, in-store/business signage, public events, newsletters, publications, etc.).
- Offer collaborative community opportunities related to sustainability-minded activities and awareness. Opportunities include events (hosting, planning, facilitation, or volunteerism), education materials in businesses conservation kits and resources, charitable contributions (in-kind or monetary), and community service.

INFORMATIONAL RESOURCES

Websites:

www.energystar.gov - This site sponsored by the US Department of Energy and the Environmental Protection Agency is a good resource for businesses. This site provides resources and references for planning, funding, building, renovating and managing buildings as well as the Energy Star Portfolio Manager that allows businesses the opportunity to compare building performance with similar buildings, evaluate cost of improvements, and track progress.

www.cityofames.org – The City of Ames offers many opportunities for businesses to save energy and money through its Smart Energy program.

www.greenseal.org – Green Seal is a non-profit, third-party certifier and standards development body in the United States. Since 1989, it has provided independent, objective, science-based guidance to the marketplace and to consumers. Green Seal is a non-profit, US-based ecolabeling organization and meets the criteria of the United States Environmental Protection Agency as a Third-Party Certifier, the requirements of ISO 14020 and 14024, and the standards of the Global Ecolabeling Network.

APPENDIX E3
CIVIC ORGANIZATIONS SECTOR PLAN

CIVIC ORGANIZATIONS SECTOR PLAN

BACKGROUND

Description of Sector: The Civic Organizations Sector is essentially comprised of the non-profit organizations in Ames that do not include government, healthcare or religious groups. This sector is important to include because of its diversity. For the purposes of creating a plan to encourage these organizations to reduce energy consumption, this sector sub-committee derived a list from non-profit organizations that are members of the Ames Chamber of Commerce. While this is not a comprehensive list of all the Civic Organizations in the community, it includes 22 entities including twelve (12) in human services, six (6) non-profits, two (2) in art/culture, one (1) retirement community, and one (1) management organization. The list not only varies in organization mission, but also in size and electrical use.

Baseline Data: The following data provided by the City of Ames Municipal Electric Services shows the monthly and peak rates for each of the organizations listed below for the past three years. The meter sizes range from 20c to 200c. This size is 80% of the maximum amps passing through that meter. The actual consumption column below represents a monthly average from the past three years. The actual demand column is also an average for the last three years and represents the highest kilowatt (KW) reading on that meter for the month.

Organization	Meter Size	Actual Consumption	Actual Demand
Worldly Goods	100c	1111.08	--
Planned Parenthood	200c	2884.6	--
Octagon Center	200c	475.24	--
Consumer Credit Counseling	100c	602.93	--
Center for Creative Justice	200c	1559.4	--
Big Brothers/Sisters	100c	576.9	--
Ames Comm. Pre School	200c	731.41	--
Main St. Cultural District	100c	239.75	--
American Red Cross	200c	6097.85	21.06
Ames Chamber of Comm.	200c	1282.73	10.08
Ames Historical Society	320c	2786.98	11.15
Boys and Girls Club	20c	5666.66	27.97
CTR Addictions Recovery	20c	4029.87	17.84
Heartland Senior Services	20c	13016.3	21.82
Lutheran Social Services of Iowa	20c	32322	88.59
Mainstream Living	200c	6085.69	24.14
1200 Mainstream Living	200c	3471.8	22.33
Octagon	20c	6743.98	37.8
Richmond Center	--	160.72	0.74
United Way of Story Co.	200c	1970.88	10.27
Windsor Oaks	20c	5880.5	22.95
Youth & Shelter Services	20c	20881.68	62.45

VISION

In reaching out to the Civic Organizations, the plan to reduce energy consumption involves establishing baseline data, providing practical applications, and assuring both short-term and long-term benefits to the energy user.

GOALS

Short-Term Goals (1-5 years) (2012-2016)

1. Reduce electrical consumption for Civic Organizations Sector by 5% in 1 year.
2. Reduce electrical consumption for Civic Organizations Sector by 15% in 3 years.

Long-Term Goals

1. Sustaining the accomplishments of the short-term goals.

ACTION STEPS

The participation of the organizations is the key to success. The incentive of reducing energy consumption alone may not be enough for some organizations to participate. Our action steps involve promoting easy-to-implement energy-consumption practices, along with tangible, short-term benefits, to increase the incentive for organizations to take part and achieve reduction goals.

Our prioritized Action Steps include the following:

1. Educational Strategy.

Information on how any organization can make changes – small or large – that will help reduce consumption will be created and disseminated to Sector members.

- A. In collaboration with the Sustainability Task Force, a simple, but comprehensive, “check list” of changes that can be implemented in any office environment that will result in conservation will be developed.

One check list has already been developed by earlier efforts amongst the City of Ames, Iowa State University, and the Ames Chamber of Commerce. A second, simpler list is included in the Resources Section.

- B. To disseminate the checklists, commitments have been secured with the Ames Chamber of Commerce and *The Tribune* to publish the information.

Other media and organizations will also be contacted to offer assistance in sharing the information with their contacts.

2. Marketing Strategy.

In order to encourage organizations to get involved and be accountable to their commitment to reduce electric consumption, an “incentive and rewards program” should be put into place.

A. All organizations who wish to track their energy savings over the course of a (trial) year can sign up to receive quarterly statements/newsletters.

Their first correspondence will include their electric consumption average of the past 3 years. Their (assigned) goal will be to show a 5 percent reduction by the anniversary date of their registration. Once their 5 percent goal has been reached they will strive for a 15 percent reduction within 3 years. Each quarter the business will receive a statement of the average of the last few months of electric usage along with a newsletter filled with useful tips on sustainability in the office.

B. Participating organizations will also be put into regular “drawing.”

Each month, one of the organizations will be selected to be highlighted in *The Tribune* with a profile of their business, a photo, and some of the changes they are actively implementing to reduce electric usage. These profiles provide free advertising/promotion for the participating organization, as well as provide encouragement and success stories for other businesses in the community.

We believe that a year is the right length to ask for a commitment from these organizations initially. While more dramatic results will be seen with longer commitments, it is long enough to gain some measurables, but short enough to not be too overwhelming a commitment. Once the participants experience the ease of reducing their consumption within the first year, they will have the opportunity to continue toward the goal of a 15 percent reduction.

OPPORTUNITIES AND CHALLENGES

Opportunities: The opportunities are as great as the number of participants we recruit. However, it is believed that once the program is started and benefits are realized, more and more will follow the examples of neighbors and like-minded businesses/organizations.

Challenges: There are challenges in beginning any new program. The biggest challenge will be maintaining interest, support, and administration of the program. The functions highlighted in this plan would be new tasks.

LOOKING AHEAD

The next step will be to decide who carries out the plan, and introducing the Action Steps to the organizations themselves.

Support is requested from the City Council in the creation of educational materials as a collaborative effort of the current City of Ames Sustainability Task Force. While it seems to make the most sense for these functions to be facilitated by the City of Ames Electric Services, it certainly may be an imposition to ask their current staff to take on additional responsibilities.

RESOURCES

Best Management Practices Resources for Non-Profit Offices:

Office/Break Room

- Reprogram the thermostat. Each degree warmer you leave the thermostat in the summer, and each degree cooler you set it in the winter can save 6-8% in energy costs.
- Consider establishing a printer/printing policy for your board and committee meetings. Many organizations print agendas, minutes, and other meeting materials for all their board members each month. Instead, ask your board members to bring laptops or print their own copies.
- Turn off any equipment that doesn't need to be left on when you're not in the office. Unplug when possible.
- Use scanners to email documents instead of faxing. Email uses considerable less energy than fax machines.
- Keep office refrigerators at 36-40 degrees (Fahrenheit) and freezers at 0-5 degrees. 10 degrees lower on a fridge and 5 degrees lower on a freezer can cost 20-25% more in energy consumption.

Lighting

- Switch to CFLs which save roughly 70% on energy consumption.
- Use lower wattage light bulbs in locations where lights are always on. For example, using a 25w bulb in a stairway will save roughly 67% over a 75w bulb in the same location.
- Install a photo-sensor to automatically turn on lights when entering a room. It is estimated you will see measurable results in 2 months.

Heating and Cooling

- Reflective film on the windows can block 40-60% of heat coming in and has a payback period of 3 to 5 years.
- Replace aging desktop computers with laptops instead. Laptops can use up to 70% less electricity and generate less heat.

APPENDIX E4

FAITH-BASED ORGANIZATIONS SECTOR PLAN

FAITH-BASED ORGANIZATIONS SECTOR PLAN

BACKGROUND

Description of Sector: For the purposes of this plan, the faith community in Ames consists of the 38 religious institutions which own and operate houses of worship within the service area of the City of Ames Electric Department. Excluded are institutions that worship in commercial or public space not specifically built as a house of worship. Also excluded is one institution which is located within the city limits of Ames but is outside the service area of the Electric Department.

Baseline Data: According to the Story County Assessor's records as of November 2010, the 38 institutions of the Ames faith community occupied a total built space of **736,569 ft²**. The faith community had an average electrical load of **6905 kWh per day** during the 58-month period from January 2006 through October 2010, representing an overall electricity usage of **2.427 kWh/ft²/year**. The ranges and medians (mid-points) of building size and electrical load are presented below:

	<u>Low</u>	<u>Median</u>	<u>High</u>
Building Size (ft ²)	2,240	16,314	63,714
Load (kWh/day)	7	108	639
kWh/ ft ² /year	0.82	2.72	6.50

A table presenting data for all of the institutions in the Ames faith community can be found under Resources Section in this report. Institutions are identified with their Ames Electric Department customer number.

Half of the institutions use 85% of the electricity used by the entire faith community and 51% of the electricity is used by seven institutions. These seven institutions also have the largest buildings, each being larger than 39,000 ft², which is more than double the median building size in the faith community.

The above analysis of the electricity use of the Ames faith community is a static snapshot of a dynamic situation. During the 58-month base period, some institutions made capital improvements and operational changes that changed their electricity use. While individual billing records show such changes over time, they are masked in the analysis of the aggregate data presented above.

Consideration was also given to demand billing and the impact high demand during funerals, conferences, etc., can have on the City's need for capacity. Therefore, demand (kW) for the 10 congregations using the most electricity (kWh) was examined. As can be seen below, high demand tended to be closely related to consumption. There was wide variation when looking at high demand versus size of the building.

Account #	Consumption (kWh/day)	Avg. Demand (kW)*	High sq. ft.	Avg. High Demand (kW) per1000 sq. ft.
229	639	138	52,904	2.6
579	582	135	37,895	3.6
533	581	134	63,714	2.1
581	522	122	39,321	3.1
173	498	95	49,744	1.9
675	383	83	36,329	2.3
167	341	68	39,722	1.7
71103	297	88	16,678	5.3
31581	280	53	22,192	2.4
12547	252	44	24,724	1.8
Median	440	92	43,036	2.4

*Average High Demand = the average of the six highest readings during 2009 and 2010 combined.

All high demands occurred during the cooling season. Although demand readings for five years were available, only readings for the last two years were averaged because data suggested that some of these congregations had taken steps to lower their demand.

Sector Initiatives: To gauge a more thorough awareness of the individual impacts and initiatives of Sector members as related to electrical consumption, a questionnaire was developed.

Survey questionnaires were hand-delivered or mailed to all 38 institutions. Fourteen were completed and returned. The respondents account for 45% of the kWh used by this Sector. The responding institutions represented a fairly even distribution of building sizes, as well as a good representation of small, medium, and large users of electricity.

The subcommittee felt that electricity use should also be evaluated with regard to how intensely a building is used. Therefore, the subcommittee recommended each institution calculate occupancy data (person-hours for a month of their choosing) to use as part of their own baseline data. An institution can compare person-hours for the same month in years to come.

Seven institutions reported person-hours for a month on their questionnaires. These seven represent 18% of the institutions in the faith community, 18% of the faith community's square footage, and 20% of the electricity usage. While the limited response and variation in months selected restrict the conclusions that can be drawn, larger buildings with higher occupancy rates appear to be more effective users of electrical power than smaller buildings with lower occupancy rates.

All congregations responding had taken steps toward reducing their energy consumption. Some had taken large steps. Reported projects and practices included the following:

Projects and Practices Completed by Multiple Congregations:

- Two organizations have a “Green Team” in place
- Five had energy audits performed
four by Alliant
one by the city's private contractor.

- Three have an active conservation program.
- All have switched or are in the process switching to more efficient lighting.
- One has signed up for Ames Prime Time Power and at least one did not realize that churches could be eligible.
- Six have switched to LEDs in illuminated exit signs.
- Eight have purchased energy efficient appliances.
- Five reported sealing gaps in windows, doors, etc.
- Five have added insulation.
- Five have installed automatic shut-off lights.
- Five have cleaned refrigerator/freezer coils.

Additional Projects and Practices:

- Three organizations installed programmable and or zoned thermostats.
- One repaired and sealed the roof.
- One installed solar panels.
- One repaired and installed storm window inserts.

Projects and Practices Congregations Found Most Effective:

- Replacing furnaces/AC
- Changing lighting
- Adding insulation
- Adding programmable/zoned thermostats
- Educating members

Highlighted Congregations: One reporting institution, Ames Unitarian Universalist Fellowship, has established a Green Team to propose, investigate, plan, and realize a collection of practices in the areas of worship and celebration, religious education, environmental justice and sustainable living leading to designation as a Unitarian Universalist Association Green Sanctuary. One of the outcomes of this activity has been solar panel installation and interaction with the City of Ames for policy governing net metering.

The First Christian Church has hosted a Cool Congregations workshop. First Christian also uses the Low Carbon Diet as a small group program.

VISION

The Ames faith community's commitment to sustainability arises from fundamental faith traditions which call believers to care for God's creation. While the way in which this commitment is expressed varies among religious traditions, the core principle is that we may use, but not despoil, that which God has created. The following excerpts come from a wide range of religious sources.

U.S. Catholic Conference

“The web of life is one. Our mistreatment of the natural world diminishes our own dignity and sacredness, not only because we are destroying resources that future generations of humans need, but because we are engaging in actions that contradict what it means to be human. Our tradition calls us to protect the life and dignity of the human person, and it is increasingly clear that this task cannot be separated from the care and defense of all of creation.” *Justice, Peace and Human Development: An Invitation to Reflection and Action on Environment in Light of Catholic Social Teaching; A Pastoral Statement of the United States Catholic Conference, November 14, 1991; Sec. I.A.*

Muslim World League

“Allah, in His Wisdom, appointed humans, the creatures that He has conferred with the faculty of reason and with free will, to be His vice regents on earth. And while Allah has invited people to partake of the fruits of the earth for their rightful nourishment and enjoyment, He has also directed them not to waste that which Allah has provided for him—for He loveth not wasters.

“Furthermore, Allah has also ordered humans to administer his responsibilities with Justice. Above all, people should conserve the balance of Allah’s creation on Earth...” *Mahasneh, Hyder Ihsan, in Palmer, Martin (2003) Faith in Conservation: New Approaches to Religions and the Environment; World Bank, Washington, D.C.*

Central Conference of American Rabbis

“Our tradition teaches us to respect and protect nature's diversity as a means of developing a spiritual connection with our Creator, reminding us that, "The Earth is the Lord's and the fullness there of" (Psalm 24.1)....

“... To truly fulfill the obligations of our faith, we must act as stewards of Creation, making its care one of our core responsibilities.” *Adopted by the 107th Annual Convention of the Central Conference of American Rabbis, Philadelphia, PA; March, 1996.*

National Association of Evangelicals

“We are not the owners of creation, but its stewards, summoned by God to “watch over and care for it” (Gen. 2:15). This implies the principle of sustainability: our uses of the Earth must be designed to conserve and renew the Earth rather than to deplete or destroy it.” *For the Health of the Nation: An Evangelical Call to Civic Responsibility; National Association of Evangelicals, 2004*

Conserving electricity is one of many ways in which people of faith can care for God's creation.

GOALS

According to Energy Star for Congregations at www.energystar.gov, April, 2011, “Most congregations can cut energy costs by up to 30% by investing strategically in efficient equipment, facility upgrades and maintenance.” Some religious institutions in Ames have already made some changes to save energy. More participation in the city-sponsored energy audit program would likely result in significant electricity savings. The goals for reductions in electrical use are based on examinations of the raw data, survey results, and our experience.

With this in mind, the Faith-Based Sector subcommittee proposes the following Sector goals:

Short-Term Goals (1-5 years) (2012-2016)

1. City-sponsored energy audits to be requested and completed by a number of institutions to be equivalent to at least 50% of the total kWh/day consumed by the 38 institutions.
2. City-sponsored energy audits to be requested and completed by at least 27 (70%) of the 38 institutions.
3. Reduce average daily kWh usage per sq. ft. of the 38 institutions by 10%.
4. Reduce the average high demand of the top 10 user institutions by 10%.

Long-Term Goals (by 2021)

1. Reduce average daily kWh usage per sq. ft. of the 38 institutions by 18%.
2. Reduce the average high demand of the top 10 user institutions by 15%.

ACTION STEPS

In achieving these goals, the following Action Steps have been identified and prioritized:

1. Follow up with the religious institutions in Spring and Summer, 2011.

A. Send letters to all of the institutions, via e-mail or personal delivery when possible, via US mail to the others. The letters include information about energy audits by the city of Ames, Prime Time Power for institutions, and an invitation to be included in the Care and Share listing described below. The letter is accompanied by lists of best management practices and of web sites about energy efficiency and environmental education included in the Resources Section part of this report. Some follow-up contacts have already begun.

B. Prepare and distribute a Care and Share listing which would list religious institutions which are willing to show and share information about equipment, projects, and/or practices that promote Care of Creation. Contact information would be listed for each institution that is willing to provide it, as well as a listing of its highlighted projects and practices.

2. Form a New Organization: *Interfaith Creation Care of Ames (ICCA)*.

ICCA would serve as a forum for exchange of information about energy conservation and other green practices in the context of various faith traditions.

The mission of Interfaith Creation Care of Ames (ICCA) is to promote sustainable practices within the Ames faith community and to implement the action steps recommended by the Ames Sustainability Task Force. ICCA will provide a forum for exchange of information, technical expertise, and best practices for environmental sustainability among religious institutions. This may be accomplished by means of educational materials in printed and electronic form, meetings, training sessions, workshops, promotions, and other educational events for religious institutions and their members. The general public would be welcome to attend educational activities. ICCA's primary role would be to provide on-going information regarding energy usage.

The Faith-Based Organizations Sector Subcommittee would begin to organize ICCA until representatives of the institutions create an organizational structure they deem appropriate to advance the mission. Partnering with the AMOS (A Mid-Iowa Organizing Strategy) Environmental Research Team may assist with organizing as needed.

We propose ICCA would do the following:

- A. Organize a Creation Care Fair. This Fair would feature things kids and adults can do. For example, kids could demonstrate how to use a Kill a Watt device. There would be samples of curriculum resources for Creation Care and videos such as *The Cost of Cool*.
- B. Update the *Care and Share* listing and keep it current.
- C. Publish a twice yearly electronic newsletter. The content for this newsletter could include eco-projects institutions are working on or completing, as well as other updates about care of creation.

OPPORTUNITIES AND CHALLENGES

Sector representatives see both opportunities and challenges when focusing efforts on reducing electrical use.

Opportunities:

1. Religious and Moral Influence

Ames religious institutions have the moral and spiritual authority, based on their scriptures and traditions, to lead their members to adopt sustainable lifestyles in ways that meet present needs without preventing future generations from meeting future needs and without interfering with the natural balance of creation.

2. Diverse Audience

The variety of religious institutions serves peoples of various cultures. In addition, they offer education and nurture to the whole spectrum of ages from childhood through old age. Thus the generations can reinforce one another in care of creation.

Challenges:

1. Funding

In corresponding with representatives of the Faith-Based Sector, the most often mentioned challenge was money. The regular budget of a religious institution typically allocates most of the available funds for personnel costs, building operation and maintenance, and congregational programs and missions. Personnel and property costs often account for most of the available funds and are commonly considered non-discretionary costs. Most religious faiths involve an imperative for programming and for service to those outside the institution. Therefore, nearly all funds beyond personnel and property costs are devoted to programs and missions.

An ideal budget would allocate planned contributions to a property reserve fund that would pay for capital improvements, but such expenses are most often funded by special appeals and capital campaigns. While appeals for urgent needs such as replacing a leaking roof or a failing boiler may result in a generous response from institution members, securing major funding for energy conservation or sustainability projects that do not involve remedying an urgent problem may be more challenging.

For example, survey responses noted several organizations have a “wish list” for future projects and note funding as the prime barrier preventing them from proceeding with these energy saving improvements. At least one reporting institution mentioned a desire to replace a tank water heater with on-demand heaters. Two want to fund moving to buildings that are more efficient and better meet their needs (through multi-functional rooms, etc.).

In addition, special handling and upgrading requirements for hazards, including asbestos, further challenge funding.

2. Payback Time

For religious institutions, acceptable payback times are likely to be limited to a relatively small number of years because of the difficulties of raising capital funds described above. As a result, religious institutions may be likely to forgo energy saving improvements with large capital costs and longer payback times because of limited availability of capital funding.

3. Competing Priorities for Time and Energy

Religious institutions are critically dependent upon the volunteer efforts of their members to operate their programs and missions. Energy-saving and sustainability efforts require additional time and energy from an institution's members and are in competition with the other needs of the church, community, and world. While an institution may recognize the value of managing energy consumption and its relationship to the religious imperative for care of creation, finding enough motivated and competent volunteers to work on this – in addition to everything else that goes on in a religious institution – might be problematic.

LOOKING AHEAD

As noted, the Faith-Based Sector subcommittee has been moving forward on our goals and action steps. Although our specific action items do not require any action by the City Council, any efforts to support and increase marketing and educational tools will be beneficial.

RESOURCES

Best Management Practices for Energy Use by Houses of Worship in Ames: Following are recommendations for houses of worship from the US Department of Energy and the US Environmental Protection Agency in the Energy Star web site shown below. Tips from our own experience are presented in brackets.

The practices in each category are arranged from easy and inexpensive to complex and costly. Before investing in new equipment, consult the document called *Putting Energy into Stewardship* in the “congregations” section of www.energystar.gov. The document provides more details and many links to additional information.

General Steps

- Use space wisely, (small meetings in small rooms, etc.)
- Keep vents, radiators, and heaters clean and uncovered.
- Caulk non-movable windows, cracks, around electrical openings, where floor meets the wall, etc.
- Weather strip drafty windows and doors.
- Look for the Energy Star rating when buying new equipment.
- Think “Life Cycle” cost, not just initial cost when purchasing new things.

Lighting

- Place simple “Turn off light if you are last to leave” sign by switch in class/meeting rooms or where appropriate.
- Don’t over light. Use daylight when possible. It may require developing a habit or installing adjustable shades.
- Where the light is often on 15 minutes or more, replace incandescent bulbs with CFLs in areas. Payback for frequently use light is about 9 months. They are now available in a variety of colors from warm to cool. Most CFLs do not work well in enclosed fixtures.
- Retrofit illuminated exit signs with LEDs. Replacement inserts use a 2-watt LED. Payback is about 1 year.
- Convert T-12 fluorescent lighting to T-8 or other more efficient lighting. (T-12 tubes are scheduled to be phased out in 2012.) To reduce costs, tubes and ballasts can be replaced without replacing fixtures. New tubes should have a color rendering index of 85+ and a color temperature of 3500 Kelvin. Rooms lit 15 hours/week or more will usually see a payback period of 3 years or less
- In general avoid halogen lights. High performance “Infrared” (IR) lamps are available, but are less efficient than some other options for high ceilings.
- Use timers or sensors (daylight, motion) to turn off lighting when not needed in halls and restrooms. Some motion sensors, photo cells, and electronic dimmers are not designed to work with CFLs. Check instructions from the control manufacturer and CFL packing for compatibility.
- [LED room general lighting is becoming available, including screw-in bulbs.]

Note: Both spent fluorescent tubes and CFLs are to be kept out of trash. Deliver them to the Resource Recovery Center. In case of breakage, clear the area and turn off the air handler for about 15 minutes. www.EPA.gov provides a description of how to clean up.

Thermostats

- Set thermostats for the desired temperature. Setting them higher for heating or lower for cooling will not hurry up the process.
- Install 7-day programmable thermostats. Payback is about six months. Be sure they are sited to sense representative temperature. Insulate thermostats on an unusually warm or cold wall. [Congregations anticipating a building program should look into using a computer system with sensors rather than a collection of individual thermostats.]
- Set-back temperatures of nearly 45 F in winter and 80 F in summer are recommended by greenfaith.org., 55 F and 85 F are often used.
- [Protect the thermostats from unauthorized use (a major complaint in many institutions). Some institutions cover them with a locked plastic cover. Some seven day thermostats have

lockout features that can be changed only if a code is entered. Some institutions place sensors in the occupied spaces and connect them to thermostats or a control system elsewhere.]

- [Areas that receive intermittent unscheduled use, such as libraries, can have sensors or thermostats with a timed override. Occupants can initiate heat/cool for a limited amount of time.]

Heating/Ventilation/Air Conditioning (HVAC)

- Have regular HVAC professional maintenance. Be sure condensers are clean and unobstructed and filters are clean.
- Turn off gas pilot lights during the warm months.
- Inspect ducts and piping for leakage or damaged insulation. Apply duct sealer, tape, and insulation as needed.
- Repair old valves and steam traps.
- Use fans and natural ventilation when possible. The more air movement there is, the higher the cooling set-point (target) can be.
- Cool the needed areas before people arrive for large events such as weddings, Sunday services, or conferences. A lot of heat is gained as people enter. Phasing in cooling before the event rather than turning on all the coolers at once will help keep the demand down.
- Consider controlling direct summer sun through windows by way of solar films, shades, and or outside plantings.

Sanctuary

- Consider installing ceiling fans. Many institutions are putting them in for use in winter and summer. If they are the same color as the ceiling, they don't detract from the beauty of the sanctuary. [Do consider how fans will affect the music. Low hanging fans may "chop up" the sound.]
- Pipe organs are safe at temperatures as low as 45 degrees F. Humidity is more of an issue for them.
- Consider installing clear glass/plastic storm windows outside the stained glass to add an extra layer of protection against energy loss. However, without proper ventilation, this technique may cause damage by trapping moisture and damaging the lead. Talk with an experienced professional.
- Consider optimizing lighting in various circuits by way of bi-Level switching, dimmers, photo cells, and/or occupancy sensors.

Offices

- Turn off power when leaving computer for an hour or more.
- [Establish policies for turning on and off computers, copiers, etc. Leave in writing for volunteers.]
- If the equipment has a power saving feature, be sure the software has been activated.
- Reduce use of paper. Its manufacture is one of the largest sectors of energy use in the country. Many institutions are using electronic announcements and newsletters, and using both sides of a paper.
- Look for Energy Star rating before leasing or buying equipment.

Kitchen and Restrooms

- Clean refrigerator and freezer coils about twice a year.
- Replace refrigerator or freezer door gasket if a dollar bill slips out easily when the door is closed.
- [Establish criteria for accepting “gifts” such as old refrigerators or keeping them.] Payback for buying a new refrigerator or freezer to replace one that predates 1993 is about 5 years.
- Energy Star qualified commercial food service equipment is available.
- Stop leaks.
- Where practical, install aerators or restrictors on faucets and showerheads. When replacing faucets, consider ones with sensors.
- Set water temperature only as hot as needed to prevent scalds and save energy. (Check local codes for specific temperatures.)
- Put a blanket on older water heaters. Insulate the first 3 feet of the heated water “out” pipe on both old and new units.
- If buying a new water heater, buy the most efficient model possible. In areas of infrequent water use, consider “tankless” water heaters to reduce “standby” storage costs and waste.
- Consider a solar water heater. Payback is 4 – 8 years.

Construction, Renovation, and Major Upkeep Projects

- [Know your building use and how it behaves. If a model is used to calculate expected savings, study the calculations carefully. Many models do not work well for religious buildings. Contractors may assume less frequent occupancy than what you have.]
- Do not oversize equipment.
- Consider radiant barriers and roof insulation when installing a new roof.
- [Look into the ways DDC (Direct Digital Control) can improve control, including off-site monitoring and control.]
- Specify NEMA (National Electrical Manufacturers Association) premium motors on HVAC equipment.
- Consider installing Variable Speed Drives on fans or pumps.
- Consider installing Demand Controlled Ventilation (DCV). Often outside air exceeds the amount really needed when occupancy of a space is low. A DCV has carbon dioxide sensors in the return air in order to determine how much outside air needs to be pulled in.
- Consider installing an economizer (draws in outside air to cool inside).
- Divide space into multiple zones for greater energy control.
- Payback for geothermal heating/cooling for many applications is about 5 years.
- Sun tubes are a way to bring in outside light.
- Low-E insulated glass and thermally improved frames are available for many stained glass applications.

Funding Resources:

Utilities

The City of Ames (www.cityofames.org) and Alliant Energy (www.alliantenergy.com) offer incentives.

Bequests

Members of religious institutions often bequeath significant sums of money to their congregations. Often, these gifts are designated for capital improvements. The Unitarian Universalist Fellowship of Ames received a bequest which paid for installing a photovoltaic solar array on their roof.

Religious Organizations

There may be special funding through the denomination or faith branch. Check with your denomination to find out.

Congregation Involvement and Engagement Resources: There are many resources in the Websites Resources part of the Resources Section that offer tips for integrating energy management into the work of the congregation and building green ministries. One general outline, starting with the worship building, is included below.

1. Form a “green team” or maintain a team or pool of persons committed to energy efficiency. This group should be accountable to the appropriate board or committee.
2. Get a free energy audit from the city of Ames. This audit is more comprehensive than other free audits. Begin to address the recommendations with what is easily doable and prioritize the rest.
3. Involve the whole congregation.
An idea exchange works well. Invite representatives of all groups, departments, or ministries to hear about the audit and to suggest behavioral ways to improve efficiency. Be sure all groups are informed of decisions.
4. Appoint an energy steward to oversee conservation efforts.
5. Work with staff to include sermons, lectures, lessons, and/or news articles about conservation of resources. Share news of progress with congregation.

Informational Resources:

Websites:

www.energystar.gov - This site sponsored by the US Dept. of Energy and the Environmental Protection Agency provides much advice for congregations. There are helps and references for planning, funding, building, renovating and managing the building. The site provides links to other energy-related resources and to religious resources. Energy Star Portfolio Manager allows a congregation to compare its building performance with similar buildings, evaluate cost of improvements, and track progress.

www.cityofames.org – The City of Ames offers many opportunities for congregations to save energy and money in its Smart Energy program.

www.interfaithpowerandlight.org – Interfaith Power and Light provides a way for congregations of Christian, Jewish, Muslim, and other faiths to become “Cool Congregations”. Participants in this stewardship program reduce their CO² emissions and costs. ShopIPL offers IPL members energy saving products at a discount.

www.greenfaith.org - Green Faith offers statements from many religions and resources including tips for how to form an effective green team.

www.webofcreation.org – Web of Creation offers instructions and resources for putting creation care into the full life and mission of the congregation.

www.nccecojustice.org – The National Council of Churches offers numerous tips on how to promote care of the natural environment, plus many printed resources.

www.creationcare.org – The Evangelical Environmental Network publishes a quarterly magazine called Creation Care and provides other informational and devotional resources.

www.coejl.org – The Coalition on Environment and Jewish Life offers many ways to take action including tips for Lo-Watt Shabbat.

www.irms.org – The Iowa Religious Media Service offers a large variety of environment-related videos and other resources to lend to subscribing congregations.

Ames Faith Community Electrical Usage Table (by customer account number):

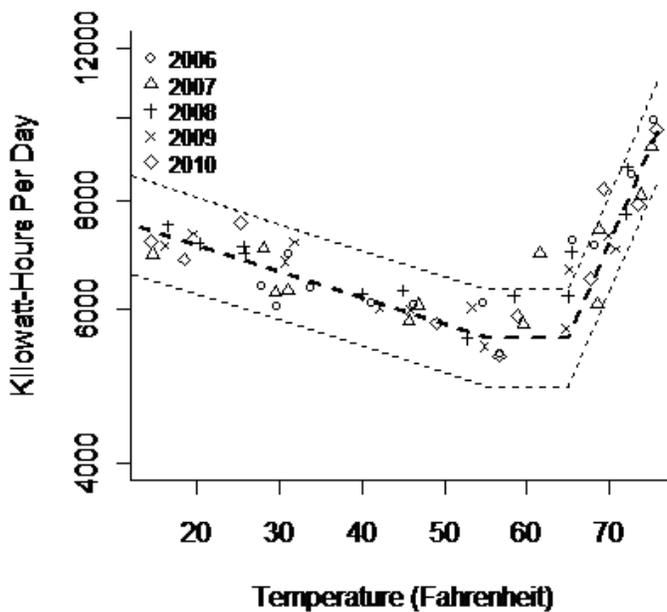
Acct #	order	kWh/day	% total kWh	order	sq. ft.	order	kWh/ft ² /yr
229	1	639.28	9.3	2	52,904	8	4.411
579	2	582.30	8.4	6	37,895	2	5.609
533	3	581.74	8.4	1	63,714	15	3.333
581	4	522.39	7.6	5	39,321	4	4.849
173	5	498.42	7.2	3	49,744	11	3.657
675	6	383.05	5.5	7	36,329	9	3.849
167	7	340.97	4.9	4	39,722	17	3.133
71103	8	296.80	4.3	19	16,678	1	6.496
31581	9	280.42	4.1	11	22,192	7	4.612
12547	10	251.53	3.6	10	24,724	10	3.713
5513	11	233.83	3.4	8	27,210	16	3.137
515	12	232.13	3.4	16	18,144	6	4.670
535	13	202.60	2.9	13	20,802	13	3.555
4499	14	200.93	2.9	22	13,738	3	5.338
3359	15	153.47	2.2	9	26,194	27	2.139
6415	16	134.64	1.9	14	20,122	22	2.442
517	17	133.42	1.9	18	17,048	19	2.857
30291	18	118.95	1.7	15	18,236	24	2.381
20815	19	109.57	1.6	26	11,764	14	3.400
103153	20	107.35	1.6	24	12,598	18	3.110
171235	21	105.41	1.5	20	15,951	23	2.412
12573	22	96.01	1.4	17	17,486	28	2.004
29239	23	89.58	1.3	21	15,146	26	2.159
21285	24	85.50	1.2	25	12,043	20	2.591
3609	25	84.47	1.2	29	8,598	12	3.586
111617	26	78.73	1.1	23	12,931	25	2.222
12541	27	49.12	0.7	12	21,001	37	0.854
21103	28	47.11	0.7	31	6,850	21	2.510
110573	29	46.50	0.7	36	3,584	5	4.736
10215	30	43.21	0.6	28	10,004	32	1.577
55809	31	37.28	0.5	30	6,930	29	1.964
24255	32	28.95	0.4	32	6,716	33	1.573
31583	33	27.10	0.4	33	5,124	30	1.930
22757	34	22.87	0.3	27	10,158	38	0.822
19759	35	19.94	0.3	34	5,025	35	1.448
4603	36	18.07	0.3	35	4,304	34	1.532
26887	37	15.09	0.2	37	3,399	31	1.620
20749	38	6.65	0.1	38	2,240	36	1.084
Total:		6905.38			736,569		
Median:		108.46			16,314		

Normalization for Weather of Baseline Electrical Use for the Ames Faith Community

Procedure: The following describes the procedures used to provide an electrical usage baseline that has incorporated consideration of weather and daily temperatures. Although this is completed for the Faith-Based Sector, it can be transferrable to any Sector.

Electricity Use Increases in Hot Weather and Cold Weather

Electricity use by the Ames religious community was totaled for each monthly billing period for the 58-month period from January 2006 through October 2010. Total average kWh/day were plotted as a function of average daily temperature. The best-fit lines for electricity consumption (kWh) vs. temperature (°F) in both the heating and cooling seasons were computed using linear regressions. The equation is given below. The heating and cooling base temperatures were 55°F and 65°F, respectively. Between these temperatures, temperature had no identifiable impact on electricity use. Electricity use for the Ames religious community increases linearly as temperatures warm above 65°F or cool below 55°F. The impact of temperature on electricity consumption is about seven times stronger in the cooling season than in the heating season.



[Dashed lines are the best-fit linear regressions and the dotted lines are 95% confidence intervals.]

Evaluating Future Performance

The following equations, derived from the 58-month base period, described above, enable one to calculate, based on the measured cooling degree days or heating degree days in a later billing period, the kWh the Ames faith community would have been expected to consume in that period assuming that no equipment or operational changes had been made that would influence electrical consumption. The equations use the known influence of temperature on the community's electricity consumption and the measured temperatures during the period in question to correct the result for weather. If the actual electricity usage is less than that predicted by the calculation, it can be assumed that actions were taken within the community to conserve electricity.

First,

$$y = \log_{10}(\text{kWh/day}) = 3.746 + (0.0220)(\text{CDD}_{65}) + (0.00303)(\text{HDD}_{55})$$

where CDD_{65} , cooling degree days, is the sum of the differences between the actual temperatures and 65°F for each day in the billing period (temperatures not exceeding 65°F count as zero cooling degree days);

and HDD_{55} , heating degree days, is the sum of the differences between 55°F and the actual temperatures for each day in the billing period (temperatures of 55°F or higher count as zero heating degree days).

Then,

$$\text{antilog } y = 10^y = \text{kWh/day in the billing period, corrected for weather.}$$

Using the measured CDD_{65} and HDD_{55} in a later billing period in the above equations and multiplying the calculated kWh/day by the number of days in that billing period gives the theoretical electricity use of the Ames faith community in that later billing period (with a standard deviation of about ± 500 kWh/day). If the actual electricity use in that future billing period were to be less than the theoretical (as calculated above), that would mean that the Ames faith community is using less electricity than otherwise expected for those temperatures – and the use of effective conservation measures could be inferred.

Weather Normalization for Individual Institutions

Calculations similar to the above can be done for individual religious institutions or, in fact, for any customer of the Ames Electric Department. An equation representing electricity use as a function of average daily temperature can be derived for any electrical account using an appropriate base period. Applying that equation plus the average daily temperatures of a later billing period following the installation of energy saving capital improvements or changes in operations can determine the effectiveness of those improvements or changes, regardless of whether temperatures were hotter or colder than the base period. Since doing this requires mathematical expertise as well as access to electricity use and temperature data, the FBO Sector Subcommittee has shared these techniques and computer programs with the Ames Electric Department, which can help individual consumers of electricity evaluate the effectiveness of their electricity conservation measures.

APPENDIX E5
NON-CITY GOVERNMENT SECTOR PLAN

NON-CITY GOVERNMENT SECTOR PLAN

BACKGROUND

Description of Sector: The Non-City Government Sector was charged with examining present and future electricity consumption of federal, state and county governmental agencies located in Ames. Because these are free-standing agencies under the jurisdiction of the president, governor and Story county board of supervisors, they follow the sustainability mandates of those executives, not the city. This means that the relationship to the city is complex: they are located within the city and buy electricity from the city but they are subject to different laws and budgets than city agencies, the faith community, schools, builders, or residents.

The Story County Board of Supervisors functions as both the legislative and administrative body for the county. So they have a unitary approach to legislation and regulation which streamlines their ability to make county law in a similar fashion to executive orders.

The federal agencies located in Ames are USDA and the Post Office. The state agency located in Ames is the Iowa Department of Transportation. Story County has buildings in Ames as well. Mary Greeley Medical Center is the final governmental body that falls within the scope of this report.

Sector Initiatives: On May 24, 2011, the subcommittee met in a City Hall conference room with representatives from various agencies to discuss what was already being done, what had worked to reduce consumption, and plans for the future.

VISION

There are opportunities to take win-win action that will greatly reduce the carbon footprint of this Sector, reduce peak load, and provide financial benefits to both the City and the agencies.

GOALS

Both the federal and state governments have executive orders in place that compel agencies to reduce energy consumption. With these overarching plans in place, goals are also in place to support their completion and success. The goals for each agency vary according to their operations. State and federal sustainability executive orders are included in the Resources Section of this plan.

ACTION STEPS

All the agencies have taken steps to reduce their electricity consumption. As with goals, action steps are varied and diverse among agencies. There are three primary reasons they have done this.

- Most of the agencies have a mandate to do so. The mandates are generally found in the executive orders.

- All the agencies have people who care passionately about reducing their ecological footprint because they believe it is the morally right thing to do.
- All the agencies are under budget constraints and reducing electricity consumption means saving money. The agencies generally have good data on things like how much they save if they turn off computers at night or switch to LED lights or high efficiency cooling systems.

In terms of Action Steps that could be implemented to offer assistance and support to all agencies in the Non-City Government Sector, collectively and individually, the following action steps are identified and prioritized:

1. **Create a tiered-system of rebates for large energy users.**
Agency personnel reported that when they negotiated with the utility over installations of energy saving equipment, the utility said they would decide later what rebate to provide. This is unsatisfactory. A larger and guaranteed rebate system for these high end users would be a good incentive to install energy-saving equipment.
2. **Develop economic partnerships with the city that would share the cost of installing alternative energy systems at the agencies.**
For instance, Mary Greeley is planning to expand its facility. They have a large space over the parking garage that could be used for a solar energy system. However, the cost is prohibitive. If the city could calculate how much it would save by having Mary Greeley building solar into its expansion and share the cost, this would be a win-win.
3. **Explore multi-governmental group purchasing options for energy saving technologies to reduce the transaction costs.**
4. **Hold a city-hosted energy round-table with agencies and possibly large businesses and industries that show-case solutions to various energy problems.**
For instance, what are the best practices for guaranteeing that computers are shut down at night?

OPPORTUNITIES AND CHALLENGES

Opportunities: Because of the policies that these agencies have in place (through executive orders), there are many opportunities to help organizations and businesses in the Ames community in their planning, and, in turn, continuing to build upon their successes.

Challenges: There are three primary challenges to agency reduction of electrical consumption.

1. **Inertia**

Human inertia is a considerable challenge for agencies. For example, John Rodilloso, the facilities manager of Mary Greeley, and co-chair of the non-city governmental subcommittee, reported that they had calculated the annual savings if computers were turned off at night and on weekends. IDOT did the same thing. At first compliance was good. But gradually people left their computers on. The reason was that they couldn't access their desktop from home to either work from home or

get their email at night. It takes regular discipline to turn lights and computers off and make it the norm in offices.

2. Technology

Technology poses another challenge to agencies because it is: 1) costly to replace with more efficient equipment; or 2) may not yet exist or; 3) agencies lack of information and may not know there are alternative technologies that can solve certain problems.

Most of the agencies have considered wind or solar power. But when they evaluated the return on investment and the fact that putting in solar would take 40 years to be cost-effective, none of them felt they could spend public money that would not be repaid for such a long period.

In some cases the IT departments use night hours to download updates into computers. This requires that the computers be left on at night. IDOT had found software that allows the computers to be awakened, download updates and put them back to sleep. There was a discussion about whether sleep mode actually saves energy. But the group noted that the problems of leaving computers on for technical reasons was complex but could be solved. There is no best practice on night-use of computers that is known to the agencies in Ames.

Many of the agencies are waiting for technology to be developed that will fit large institutional needs and be cost-effective. The next generation of solar is of particular interest to all of the agencies.

3. Money

The final challenge is money. All of the agencies want to save money and reduce their carbon footprint. All of them see this as just being the right thing to do. But the structure of city incentives is not suited for large institutions. Current options to choose green energy is paradoxically more expensive but the agencies don't trust that they are actually getting that green energy, further reducing the willingness of these entities to choose it.

LOOKING AHEAD

The federal, state and county agencies located within Ames are good citizens with a strong interest in the care of the community and future generations. There are barriers that can be dismantled so that the agencies can do what they really want to do and what needs to be done to reduce our greenhouse gas emissions. We believe there are opportunities for the city to partner with these agencies and be proactive in this important work.

RESOURCES

Executive Orders and Sustainability Plans:

http://www.responsiblepurchasing.org/UserFiles/File/Iowa%20ex_ord_6.pdf

Executive Order Number Six of the State of Iowa is focused on the Green Government Initiative and making Iowa a national leader in energy efficiency, renewable energy technology deployment, and alternative fuel production.

http://about.usps.com/what-we-are-doing/green/sspp/2010/sspp_overview.pdf

This website features the sustainability plan of the U.S. Postal Service. The plan outlines the U.S. Postal Service's strategic sustainability framework, including performance goals and implementation initiatives.

http://www.usda.gov/documents/fy2010_omb_scorecard_on_sustainability_energy.pdf

This website outlines the seven indicators of the U.S. Department of Agriculture's scorecard on sustainability and energy. Scoring for FY 2010 is also included.

www.greening.usda.gov

This website highlights the multiple sustainable operations of the U.S. Department of Agriculture and includes information on projects, initiatives, and accomplishments.

APPENDIX E6
RESIDENTIAL SECTOR PLAN

RESIDENTIAL SECTOR PLAN

BACKGROUND

Description of Sector: For purposes of this plan, the Residential Sector consists of all residential customers of the City of Ames Electric Services Department. The purpose of this plan, as outlined by the council’s charge, is to develop targeted savings in electrical energy consumption within the Residential Sector of the City of Ames.

Base-line Data:

Residential Statistics and Energy Consumption Information

- According to the 2010 U.S. Census, the population of the City of Ames is about 58,965, an increase of 16.2 percent since the 2000 census.
- An average of 564,835,000 kWh is consumed by all sectors in the City of Ames per year.
- An average of 158,400,000 kWh is consumed by the residential sector in the City of Ames per year.
- The residential sector accounts for an average of 28% of all electricity consumption in the City of Ames.
- Currently, there are approximately 21,260 residential customers, having a metered account, in the City of Ames.
- Free Energy Audits have been completed for approximately 500 residences – this leaves approximately 20,760 residences that are eligible for this program.
- Possible Savings Goals:

Residential Sector			
kWh Reduction Targets	Annual Reduction in Consumption	Monthly Reduction in Consumption	Monthly Reduction per Customer (household)
5%	7,919,596	659,966	31
10%	15,839,193	1,319,933	62
15%	23,758,789	1,979,899	93

Electricity consumption by the residential sector within The City of Ames continues to increase due to multiple factors, including population growth, more electrical devices in the home, changes in lifestyle, etc. The increases that have been observed to date may pale in comparison to those that could come in the near future with changes in technology of transportation and the advent of commercially available electric vehicles. While the future of this technology is uncertain, there are some facts that are certain:

- The Ames Electric Utility does not have unlimited power generation capabilities.
- As consumption increases, more power generation will be required.
- Some factors, particularly population growth, have a direct relationship with increased consumption.

Sector Initiatives: In the course of this sub-committee’s work, it has become apparent that specific, accurate data related to end uses for electricity in the residential sector is not currently available for The City of Ames. More specifically, we do not have data breaking down percentage of electricity consumption related to each end use (e.g., lighting, space cooling, refrigeration, cooking, entertainment and plug loads, etc.). Because this data is not readily available, it is difficult to estimate potential energy savings within the community for a specific strategy with a high level of confidence. Information based on what appears to be a representative group of homes which have completed the free energy audit program has been obtained, and is utilized in this report to analyze potential savings strategies. This information is included below.

Ames Data (Approximated):

Residential average annual end use electrical consumption information is based on energy audits conducted by Jim Clark as part of the City of Ames free energy audit program.

	Cost	Energy Use	Electricity	Reduction goals (kWh)		
Category	\$	% by class (cost)	KWh	Reductions (kWh)	Future kWh	Dollar Savings
Air conditioning & dehumidifiers	\$192	23.41%	1,744	35.00%	1134	\$67
Refrigerators and freezers	\$144	17.56%	1,308	50.00%	654	\$72
Lights	\$108	13.23%	986	75.00%	246	\$81
Cooking & dishwasher	\$108	13.23%	986	5.00%	936	\$5
TV's, computers, etc.	\$108	13.23%	986	7.00%	917	\$8
Laundry	\$79	9.67%	720	5.00%	684	\$4
Other	\$79	9.67%	720	5.00%	684	\$4
Total	\$820		7,450		6,372	\$241

Note: Estimated savings are calculated based on approximate energy savings that can be achieved by replacing technology from 2000 or before with new, EnergyStar or energy efficient technologies, the energy consumption data in this table is the best available to the sub-committee at this time.

VISION

The vision of the Residential Sector Committee is to help residents in the City of Ames improve the way they use and conserve electricity through cost-effective behavioral and infrastructure changes. We believe it is important for Ames to become a leading community in terms of energy efficiency and emissions with respect to electricity consumption. Reducing electrical consumption will save

money for the consumer, and delay or even offset the need for an additional generator in our municipal utility. We are already seeing creative efforts in other Iowa communities, such as Osage, Dubuque and Iowa City. In achieving meaningful reductions in electrical consumption it is important that a large percentage of the community embrace the recommendations outlined in this plan. To achieve a high level of adoption, the strategies outlined in this plan must be creatively and engagingly communicated to all residents of the community in a clear and concise fashion, and in any available venue.

GOALS

In keeping with the overall vision of this plan, we have grouped goals into several broad categories:

1. Create an on-line, self-guided data system to see one's electrical usage and compare to similar households (Ames Home Energy Yardstick).
2. Enable and facilitate informed investment and participation in electrical (and other energy) efficiency.
3. Invest in a marketing campaign targeting three age groups and, more specifically, three types of lifestyle.
4. Make changes to utility rate structures.
5. Establish base-line data on actual end use consumption.

ACTION STEPS

In achieving the above noted goals, the following strategies and action steps are identified and prioritized:

1. Create an on-line, self-guided data system to see one's electrical usage and compare to similar households (Ames Home Energy Yardstick)

A modification to the web interface for Ames Electric Utility customers is being considered. This modification would provide a section of the website that would allow individual customers to see energy consumption information on a relative basis, comparing them to similar customers and households. The goal of the Ames Home Energy Yardstick is to assist Ames residents in understanding how their consumption compares to others within the same community, without having to understand what a kilowatt hour is. This interface may also encourage improvement for customers because of a desire to meet or exceed the performance of the average customer in their comparison group. Based on the customer's performance, results based links and information can be provided to help find strategies to reduce consumption further.

Challenges: There is a cost associated with development of the Ames Home Energy Yardstick website and gaining acceptance and participation is critical to achieving success.

2. Enable and facilitate informed investment and participation in electrical (and other energy) efficiency

There are many actions that can be taken by residential users to reduce electrical consumption. Examples include the following:

2A. Short-Term Payback Opportunities

These require little or no upfront cost and will provide monetary and electrical savings in the very short-term. These could be described as “no-brainers” or low-hanging fruit and warrant advocating.

- Scheduling a Home Energy Audit.
- Converting to Compact Fluorescent Lighting.
- Installing Programmable Thermostats.
- Changing temperature setpoints – cooler in winter and warmer in summer (augment air conditioning with fans and other techniques to reduce air conditioning use).
- Installing occupancy sensors for lighting.
- Filling the dishwasher before running loads (also related to savings in natural gas consumption, since 95% of water-heating relies on natural gas).
- Washing clothes in cold water (also related to savings in natural gas consumption, since 95% of water-heating relies on natural gas).
- Reducing temperature set point on domestic hot water heater (also related to savings in natural gas consumption, since 95% of water-heating relies on natural gas).
- Eliminating garage refrigerators/freezers in summer.
- Using of dehumidifiers in summer coupled with increased air conditioner thermostat setpoint.
- Reducing use of electrical space heaters.
- Utilizing timers or sensors for outdoor lights so that they are only utilized when needed.

Focused Descriptions of Short-Term Investment and Participation Opportunities

Energy Audits

The City of Ames has completed roughly 500 audits for residences leaving almost 21,000 still eligible. These audits are free to residents and are an excellent opportunity to identify most effective savings opportunities.

Challenges: The system for scheduling audits has been confusing or difficult for some citizens. The City should act immediately to allow people to directly schedule audits – then they should roll out the program anew. Secondly, some people are resistant to having an in-house audit due to a wide range of potential fears. There will always be some resistance, but awareness of this issue can help inform the continued promotion of an extremely cost-effective program.

Convert to CFL or LED

This conversion is beginning to happen due to federal phase out of incandescent; however, it can be accelerated through proven programs such as rebates, audits, and education. CFL consume dramatically (roughly 75%) less electricity than incandescent bulbs and provide a clear life-time savings.

Challenges: As more people switch to CFLs the issue of the small amount of mercury in each ballast may become a waste management issue and people will need to be informed about proper disposal.

2B. Medium-Term Payback

Other investments require slightly longer-term payback periods and/or slightly larger investments and, can be described as medium-term, but good payback.

Medium-Term Payback “Good Ideas”

- Replacing old appliances (refrigerators, freezers, furnaces, air-conditioners, etc.).
- Replacing older clothes washers with energy-efficient front load models (they spin the clothes much drier, resulting in less use of electric clothes dryers).
- Utilizing LED lighting (where applicable).
- Adding insulation to attic spaces.
- Incorporating data comparability resources.

Replacing old appliances and/or clothes washers

Outdated appliances represent one of the larger categories of electrical consumption and thus offer opportunities for significant savings.

The savings of replacing an old refrigerator, for example, can be calculated at Energy Star (<http://www.energystar.gov/index.cfm?fuseaction=refrig.calculator>)

This could be encouraged through something similar to “Cash for Clunkers” in as much as, if there is a rebate or other financial incentive, it should be connected with an assurance that the old appliance actually goes off-line and not merely into the basement.

Challenges: Replacing appliances requires a greater up-front investment as well as a life change – a deep freezer that has been in the house (or garage) for years holds a certain nostalgia.

LED Lighting

LED lights are quickly becoming more available, affordable, and effective. Given the rate of change in the industry and the efficiency of LED lights, encouraging use where applicable should not be overlooked.

Challenges: There are technical constraints, but worth encouraging where applicable. Future lighting will move in this direction as the technology progresses and the costs drop.

Data Comparability Resources

Research shows that people moderate behavior to comply with local norms. Providing information about how electrical consumption compares to others in the area has been shown to motivate people to moderate use. Installing smart meters, like Dubuque is doing, would be one step along that route, another would be to provide real time monitors, which would (appear to) be less challenging to realize and less costly. In addition to people being able to see how much they are using is, of course, for them to be able to see how much others in the community are using.

Challenges: Obviously, this could run into significant investment and, as always, not all customers are going to choose to participate. Implementing these items will be most difficult for rental housing and apartments as there is little incentive for landlords to invest significant capital when they will not see the benefits of monetary savings generated by reduced electrical and energy consumption of the tenants.

2C. Long-Term Payback Opportunities

Infrastructure changes will result in permanent, on-going savings, but can require significant long-term investments. Additionally, internal system changes are difficult to realize, but would institutionalize long-term savings.

Long-Term Payback “Think About It”

- Adding insulation to walls.
- Replacing windows (extremely long payback, especially if you’re only considering electrical use).
- Replacing newer, less efficient, appliances (refrigerators, freezers, furnaces, air conditioners, etc.).
- Installing solar panels.
- Designing and building to highest efficiency (for electric and other efficiencies).

Focused Descriptions of Long-Term Investment and Participation Opportunities

Adding insulation, replacing windows and appliances, and designing efficiently

These strategies are more aggressive measures for those who are determined to minimize their resource consumption. They may also be appropriate when considering appliances that have exceeded expected useful lives. Most of this class of customer is likely to be self-educated; however, noting the option in educational materials may encourage some in this direction.

Additionally, it would be important to ensure that our local builders and remodelers are well-versed on the values and benefits of efficiency and realize that they can market their skills in being able to provide advice and product(s) to potential clients.

Challenges: It is important to remember that these are long-term opportunities and, often require significant investment and commitment, and payback is extended. Implementing these items will be most difficult for rental housing and apartments as there is little incentive for building owners to invest significant capital when they will not see the benefits of monetary savings which are generated by reduced electrical and energy consumption of the tenants.

Residential Solar Energy

The City of Ames has recently streamlined the process for getting solar panel installations approved. There have also been significant improvements in both installed costs of solar panel installations, and of output per unit area from installed solar panels. As the typical electrical peaks for the Ames Electric Utility are witnessed on hot summer days, there may be opportunities to limit the peak load seen by the power plant through large scale adoption

of residential photovoltaic systems. It is critical that City regulations and zoning reasonably allow for structural changes required to achieve this.

Challenges: Even with improvements in efficiency and cost, the investment necessary to install solar systems with the ability to offset a large percentage of a household's peak electrical consumption is substantial. This cost is enough to discourage most homeowners from considering the technology. More analysis of percentages of peak loads coming from the residential sector could help the City of Ames determine if rebates or other incentives would be appropriate to support the installation of residential solar energy systems.

3. Invest in a marketing campaign targeting three age groups and, more specifically, three types of lifestyle

Wearing a seat belt is a safety precaution which is simple and effective at reducing death in automobile accidents. Yet, modifying the general populous behavior to wear seat belts took enormous effort on the part of the department of transportation. As a result of their work wearing seat belts is at an all time high and deaths from automobile accidents have dropped dramatically. Short term strategies for electrical energy reduction are similar to the above example in that they are simple behavioral changes which can have a dramatic effect on collective energy usage. We use this example because all of the short term strategies are well-known, just as wearing a seat belt was known to protect your own life, and we should take the DOT efforts as guidance in or attempts to overcome a stigma and hope that it is possible for us to change public behavior patterns for the better.

Challenges: Our primary challenge, as it stands, is that being informed and reducing energy consumption is as simple as looking the information up online or in a library. Yet, much of the public has not taken advantage of these opportunities to educate themselves or to change their behaviors. There are many reasons for this from disinterest, to lack of information, to the fact that these tend to be relatively hidden costs i.e., costs people are not commonly alert to or for which they receive insufficient feedback. Consequently, these basic savings need creative promotion through a variety of avenues. Since the residential sector contains over 50,000 people we are faced with an obstacle of delivering this information in a meaningful way. However, we are also in a unique position where collaborative efforts with other sectors can be mutually beneficial.

In considering the opportunities within the Residential Sector, three main groups would be of specific focus and targeted:

- Children
- Renters, Small Home Owners
- Large Home Owners, Family Residences

In targeting these audiences, a number of marketing efforts can be identified.

- **Incorporate new developments into education** – an example would be to encourage participation in the Ames Home Energy Yardstick website by introducing it to all children in certain grade of Ames Schools, and offering extra credit, pizza party, etc. to children and families for participating

- **Work through faith based groups and community/civic organizations to identify new developments** – if comparison website is developed, have coordinated roll-out at all houses of worship on same weekend, and reach as many local organizations (Rotary, Kiwanis, Lions, Elks, Jaycees, etc.) as possible within a few weeks.
- **With development of new programs (e.g., Ames Home Energy Yardstick website) include recognition** – provide publicity or benefits for customers who take part in programs – incentives could include recognition such as yard signs, newspaper articles, etc., or benefits such as invitation only parties or discounts at local retailers or restaurants
- **Creative education – develop a complete media campaign** (not limited to fliers or news columns) to inform, engage, and motivate. For promoting the Energy Smart Program, move beyond simple advertising to a professionally-researched, social marketing approach – social media such as Facebook, etc. – can we find a more effective means of communicating.
- **Identify groups such as realtors and target them** for education about the marketing value of efficiency investments.
- **Borrow ideas from other communities, such as Sustainable Dubuque** (<http://www.cityofdubuque.org/index.aspx?NID=606>) or Greenblocks in Missoula, MT (<http://www.ci.missoula.mt.us/index.aspx?NID=977>)
- **Identify partnering opportunities for progressive multi-family property owners and managers.**
- **Develop a competition opportunity between residential customers.**
 - Free advertising, public recognition, tax incentives, etc.
- **Develop a Green property Certification Program.**
 - Would require energy audit and implementation of certain recommendations
 - Possibly based on existing EnergyStar program

4. Make changes to utility rate structures

Presently, the Ames Electric Utility utilizes a block rate structure that provides no disincentive for higher consumption or time of day consumption. It is the recommendation of this committee that changes to rate structures be considered. These changes could include the following:

- Graduated rates: Increased costs for consumption above certain levels
- Time of day rates: Lower rates in evening hours where overall system demand is reduced
- Real-time or adjustable rates: Rates could be increased significantly for periods of high demand, or adjusted with regularity based on market costs

Challenges: The time of day or real-time rates would require an upgrade to metering capabilities for every residential customer on the system, which would have a significant cost. A graduated rate structure would be seen by some as unacceptable.

5. Establish base-line data on actual end use consumption

In order to achieve any effective savings we need to have the capacity to monitor efforts to realize those savings - personally and/or institutionally. Without a sound base-line dataset, this becomes impossible.

Lacking a baseline dataset also impedes the possibility of comparing efforts and results with other neighbors and communities and may impair options to win grants and other assistance

in realizing our goals of resource and cost savings. With this in mind, developing a sound baseline dataset for Ames, similar to that used by the Department of Energy for National Residential Electric Consumption by End Use would be very beneficial for monitoring and bench-marking efforts.

Challenges: Steps need to be taken to monitor savings achieved through implementation of Sustainability Task Force recommendations.

OPPORTUNITIES AND CHALLENGES

Opportunities: With the Residential Sector containing over 50,000 members, there is an incredible opportunity to achieve significant electrical reduction consumption results. In addition, with the ease in transferability of the Action Steps outlined in our plan to other sectors, there is additional opportunity to expand and diversify results throughout the collective Ames community.

Challenges: As is discussed throughout the Action Steps section of our plan, there are challenges in fully accomplishing our goals. Challenges primarily focus on costs of implementation, caution of residential customers, current City policies, and increasing marketing and awareness-building of resources and opportunities.

LOOKING AHEAD

The City of Ames annually consumes 564,835,000 kWh of electricity. Consequently, along with many other Midwestern communities that still rely heavily on coal burning for electricity, Ames faces a significant challenge in helping address regional and national resource and emissions conservation, not to mention uncertain energy pricing and regulation fluctuations.

If electricity demand rises throughout the Ames Electric Utility's customer base, measures such as additional generation or purchasing of power from third parties will become necessary. In either of these cases there would be economic and environmental impacts, including increased electric rates for utility customers. Therefore, it is in the best interest of all Ames residents and utility customers to embrace conservation measures that avoid or delay this scenario for as long as possible.

The Residential Sector sub-committee feels it is important to acknowledge that electrical energy savings represent only one facet of sustainability. Most residential properties in Ames also utilize natural gas for space heating, hot water heating, etc. There is significant potential for savings in energy consumption in this area as well. Sustainability also encompasses strategies such as water savings, use of renewable materials, promoting healthy indoor environments, etc. It should be noted that these strategies are not mutually exclusive, and savings in one area can lead to improvements in another area.

APPENDIX E7
SCHOOLS SECTOR PLAN

SCHOOLS SECTOR PLAN

BACKGROUND

The Ames Community School District has a long history of commitment to energy conservation. Public schools in Iowa are funded based on student enrollment. As enrollment declines, so do budgets. Energy represents approximately 3 percent of the total available operating budget for the District.

Description of Sector: The Ames Community School District (36.5 square miles) is located in central Iowa in Story County. The District encompasses substantially all of the City of Ames as well as a small portion of land immediately adjacent to the City of Ames. Ames currently is the ninth largest city in the State of Iowa. The Ames Community School District serves the Ames area with public education under the laws of the State of Iowa and the United States as administered by the respective Departments of Education. Enrollment in the district has been steadily declining, stabilizing in recent years to approximately 4,279 resident students enrolled in the current year.

The Ames Community School District currently operates 12 facilities, including a shared swimming pool facility at the high school site, occupying 937,555 square feet of space. Facilities are listed in the table below.

School Facility	Square Footage
Ames High School	338,805
Ames High Swimming	39,784
Ames Middle School	222,329
Crawford Administration Center	27,230
Edwards Elementary	34,793
Fellows Elementary	50,988
Meeker Elementary	47,490
Mitchell Elementary	38,639
Sawyer Elementary	46,680
Northwood Preschool	31,904
Willson-Beardshear School (technology & storage)	19,922
Facilities Maintenance Building	19,500

Baseline Data: In the late 1990's and early 2000's, state budget cuts and minimal funding growth, along with declining enrollment reduced funding to the extent the District needed to close facilities to maintain economic viability. At that time the District engage the services of Energy Education, Inc. to work with District personnel and facilities on reducing consumption. Efforts included education on turning off lights, turning off computers, copiers and other electronic equipment and unplugging where possible, and regular monitoring of buildings during non-use time to make certain electrical equipment was off and thermostats lowered.

In 2007, with budget constraints again becoming a concern, the contract with Energy Education, Inc. was discontinued, and the function assumed by the Director of Facilities, Planning and Management. Additional efforts were undertaken through staff education and the budget process to reinforce the efforts to conserve energy.

The table below represents total kWh usage from 2002 to 2005 by the District. Variances are not readily comparable because the District closed 2 facilities in 2005 and opened a new middle school. This resulted in a new overall increase in square footage to the District footprint of 54,784.

Electric Consumption in kWh

	2002	2003	% Inc.	2004	% Inc.	2005
Crawford Admin Center	96,591	115,189	19.3%	114,683	-0.4%	111,783
Edwards Elementary	157,520	177,280	12.5%	163,840	-7.6%	168,480
Fellows Elementary	293,240	326,770	11.4%	309,280	-5.4%	298,080
High School	2,336,552	2,692,079	15.2%	2,394,337	-11.1%	3,341,011
Maintenance Bldg	61,400	78,870	28.5%	77,120	-2.2%	77,360
Meeker Elementary	215,880	228,376	5.8%	213,360	-6.6%	321,040
New Middle School	0	0	N/A	89,700	N/A	2,126,400
Mitchell Elementary	297,440	331,360	11.4%	303,360	-8.5%	305,600
Northwood Elementary	286,640	337,200	17.6%	269,369	-20.1%	60,480
Old Middle School	685,600	827,200	20.7%	809,760	-2.1%	289,200
Pool	182,440	216,120	18.5%	293,132	35.6%	173,396
Roosevelt Elementary	123,547	146,632	18.7%	127,898	-12.8%	14,494
Sawyer Elementary	230,640	241,920	4.9%	233,360	-3.5%	219,760
Willson-Beardshear School	138,806	171,600	23.6%	141,280	-17.7%	141,760
	5,106,296	5,890,596		5,540,479		7,648,844
% Increase		784,300	15.4%	-350,117	-5.9%	49.8%
						2,108,365
						2,542,548

Even though the new middle school more than doubled from the size of the old middle school, care was taken to consider energy conservation. The new middle school was equipped with geothermal mechanical systems, lighting sensors in rooms where appropriate to automatically turn off lights when not in use, and automated building management through computer technology.

The high school was upgraded in 2005 to add a new kitchen and commons area. At the same time the District installed a Siemens building management system at the high school. Computerized security systems were installed in all District facilities. Elementary schools are being upgraded with energy efficient lighting fixtures and lighting sensors where possible to reduce the consumption of unneeded electricity. Light switches throughout the District have been equipped with “Turn off lights-for our children’s sake” stickers. Building usage hours and rules include turning off all lights and electrical devices. Students are educated on energy conservation measures at the appropriate times in their curriculum.

The results of our energy conservation measures are an overall reduction in electric consumption since 2005 detailed in the table below. As can be seen from the data, the District realized a 19% reduction in electric consumption from 2005 to 2009.

Electric Consumption in kWh

	<u>2005</u>	<u>% Inc.</u>	<u>2006</u>	<u>% Inc.</u>	<u>2007</u>	<u>% Inc.</u>	<u>2008</u>	<u>% Inc.</u>	<u>2009</u>	<u>% Inc.</u>
Crawford Admin Center	111,783	-2.5%	117,288	4.9%	124,154	5.9%	116,258	-6.4%	109,767	-5.6%
Edwards Elementary	168,480	2.8%	175,540	4.2%	168,400	-4.1%	162,320	-3.6%	153,600	-5.4%
Fellows Elementary	298,080	-3.6%	301,760	1.2%	310,320	2.8%	290,320	-6.4%	268,968	-7.4%
High School	3,341,011	39.5%	3,370,624	0.9%	3,194,156	-5.2%	2,843,998	-11.0%	2,803,913	-1.4%
Maintenance Bldg	77,360	0.3%	78,280	1.2%	83,360	6.5%	73,680	-11.6%	66,440	-9.8%
Meeker Elementary	321,040	50.5%	241,040	-24.9%	239,360	-0.7%	225,440	-5.8%	209,200	-7.2%
New Middle School	2,126,400	N/A	2,290,504	7.7%	2,180,841	-4.8%	1,683,785	-22.8%	1,543,126	-8.4%
Mitchell Elementary	305,600	0.7%	316,640	3.6%	311,200	-1.7%	284,640	-8.5%	260,000	-8.7%
Northwood Elementary	60,480	-77.5%	33,440	-44.7%	48,160	44.0%	46,353	-3.8%	282,720	509.9%
Old Middle School	289,200	-64.3%	127,280	-56.0%	63,760	-49.9%	38,000	-40.4%	25,440	-33.1%
Pool	173,396	-40.8%	208,836	20.4%	207,160	-0.8%	213,737	3.2%	218,910	2.4%
Roosevelt Elementary	14,494	-88.7%	10,782	-25.6%	8,020	-25.6%	7,896	-1.5%	6,821	-13.6%
Sawyer Elementary	219,760	-5.8%	217,440	-1.1%	229,840	5.7%	201,680	-12.3%	188,160	-6.7%
Willson-Beardshear School	141,760	0.3%	148,900	5.0%	156,640	5.2%	174,320	11.3%	51,520	-70.4%
	7,648,844		7,638,354		7,325,371		6,362,427		6,188,585	
% Increase		38.1%		-0.1%		-4.1%		-13.1%		-2.7%
			-10,490		-312,983		-962,944		-173,842	
Base Year 2005									-1,460,259	
									-19.1%	

VISION

Administration and Governance has long recognized the need to be energy efficient in order to sustain the long-term financial viability of the organization, as well as recognizing the need to conserve natural resources.

GOALS

As has been shown in the information above, energy efficiency (including electrical) is a long-standing goal for the Schools Sector. With that in mind, our short-term and long-term goals focus fully on maximizing efficiency. One specific goal that is part of our long-term plan is to achieve

“net zero” consumption increase. In other words, maintaining zero growth in electrical consumption, even as we increase gross square footage.

ACTION STEPS

To achieve these goals, we are implementing the following Action Steps.

The Ames Community School District Board has undertaken a long-range facilities plan to address the many infrastructure needs of all our facilities. A bond referendum is planned for September, 2011 to add a sixth elementary school to our facility inventory, as well as increase space on existing schools. If this plan is approved, elementary square footage may potentially increase as much as 91%. In 2009, the District-wide average annual electrical consumption was 6.74 kWh per square foot.

The Board has adopted guiding principles for the facilities plan which includes a commitment to school which are “smart in environmental design.” That principle states that “students will attend schools that will be built or renovated to lead to optimal energy efficiency and minimal environmental impact to the extent possible in each building”. Design of new construction or renovation of existing facilities will include consideration of geothermal technology, sensed lighting, maximized use of natural lighting, and “green” design principles including Leed certification standards. Alternative energy sources such as solar power, wind power, thermal storage, power factor correction, power and load shedding systems, demand response, and positioning facilities for future integration with smart grid technology are also being considered.

As the plan is developed, modified, and implemented, the District will continue our current energy efficiency initiatives. Most recently, the Board approved an Energy Monitoring and Control (EMC) pilot program through Siemens at the high school, middle school, Mitchell Elementary, and Northwood Preschool buildings to undertake more aggressive management of our energy consumption. It is the goal of Administration to eventually connect all District facilities through fiber connectivity so this technology may be utilized and shared throughout the District.

Facilities staff will continue to monitor new technologies like LED lighting, and to upgrade current lighting and systems to the extent possible in our existing facilities utilizing physical plant and equipment levy funds to improve overall energy efficiency.

OPPORTUNITIES AND CHALLENGES

Opportunities: With increasing technologies, there are many opportunities for the Ames Community School District to increase our electrical efficiency. In addition, with an extensive and engaged customer base, consisting of students and teachers, the opportunity for active involvement and impact within the Sector and throughout the Ames Community is significant and ongoing.

Challenges: In spite of the diverse and multiple opportunities for schools, the District must still consider how to fund facility operating costs within the current operating budget constraints. Budgeting for initial funds will be an ongoing challenge, regardless of rebate opportunities.

LOOKING AHEAD

Predicting what electrical consumption may be in the future is difficult at this time. However, we are dedicated to no proportional increase in electric consumption.

Until such time as a facilities plan is complete, predicting future energy use patterns would be only a guess. However, the District is committed to minimizing the impact of these changes on total electric consumption of the City of Ames.

RESOURCES

Not applicable.

APPENDIX F.

RESOURCES

RESOURCES

The resources included in this appendix are a compilation of research completed by all of the sectors. As well as offering goals and action steps for their sector, sector subcommittees compiled electrical efficiency educational resources they felt would be most beneficial and relevant to their sector members. The items listed below are not all-inclusive of all the resources that were identified by each sector. Rather, this appendix is included as a compilation of resources that are considered collectively beneficial to any business, organization, and resident in the Ames community. For specific sector-targeted resources, refer to individual sector plans in Appendix E.

Best Management Practices for Electrical Consumption Reduction

No or Low-Cost Opportunities:

Education and Awareness

- **Get a free energy audit from the City of Ames.** This audit is more comprehensive than other free audits and includes all of the opportunity areas listed below. The City of Ames has completed roughly 500 audits for residences leaving almost 21,000 still eligible. These audits are an excellent opportunity to identify most effective savings opportunities. Once you have completed your free audit, evaluate the recommendations and start implementing easy, low or no-cost items and prioritize the rest.
- **Publicize environmental policies and goals** in employee, customer, volunteer, organizational or even home updates and other communications. Then, through monthly utility bills, track and report the progress that has been made. Learning how to read your monthly utility bill and keeping track of usage from month to month can also help identify trends and changes in usage to help identify leaks and inefficient equipment, electronics, and appliances.
- **Post reminder signs** in visible areas so employees, customers, volunteers, and family members are aware of electrical efficiency initiatives and keep them in mind during daily activities.
- **Provide a feedback mechanism**, such as a suggestion box, for new ideas and improvements.
- **Appoint a coordinator** to help implement the suggested items in business, organization, or at home. Although it may take some time to set up the suggested items, the coordinator could start to track the changes in electrical usage and provide this information to the people involved.
- **Find opportunities** to include information about electrical efficiency efforts, goals, and accomplishments into any customer, employee, volunteer, or family awareness and education program or initiative that may be in place or taking place. Examples include newsletters, bulletins, announcement boards, displays, lessons, trainings, lectures, events, etc.

- **Offer collaborative community opportunities** related to electrical efficiency activities and awareness. Opportunities include events (hosting, planning, facilitation, or volunteerism), education materials in businesses conservation kits and resources, charitable contributions (in-kind or monetary), and community service.
- **Find a way to involve everyone** in your organization, business, and/or home in electrical efficiency efforts and initiatives.
- **Form a “green team”** or maintain a team or pool of persons committed to electrical efficiency. This group can help set goals, track progress, and inform about success.
- **Approach electrical efficiency as a team.** Ensure everyone in your organization or home has a role or assignment in reducing electrical consumption.
- **Create an opportunity for idea exchange.** Invite everyone in your organization or home to take part in a brainstorming session to find creative ways to reduce electrical consumption and keep everyone motivated. Be sure to keep everyone up-to-date on what happens after the brainstorming sessions so that momentum is not lost.
- **Appoint an energy steward** to oversee conservation efforts and be the organization or house contact. Assign the energy steward a limited appointment in this position so that others have the opportunity to get involved and too much is not expected from one person.

Lighting

- **Label light switches** around your home and office, especially when one switch plate has multiple switches. Turning on just the one light that is needed is much more efficient than turning on every light to ensure you find the right one.
- **Place reminder signs** “Turn off the lights if you are last to leave.” on switch plates and by doors.
- **Replace inefficient incandescent light bulbs** with more efficient compact fluorescent lights (CFLs). CFLs average a 75% increase in efficiency in comparison to incandescent light bulbs.*#
- **Use lower wattage light bulbs** in locations where lights are always on. For example, using a 25w bulb in a stairway will save roughly 67% over a 75w bulb in the same location.
- **Use timed, motion sensing or light sensing outdoor lights** so that they are automatically turned off when not needed.
- **Use timers or sensors** (daylight, motion) to turn off lighting when not needed in halls and restrooms. Some motion sensors, photo cells, and electronic dimmers are not designed to work with CFLs. Check instructions from the control manufacturer and CFL packing for compatibility.*
- **Don’t over light.** Use daylight when possible.

Heating and Cooling

- **Use space wisely,** determine the rooms that are not used regularly, and only heat and cool to accommodate occupancy when needed. If you have a choice of rooms to use for meetings or uses, choose the smallest room that will accommodate your needs.
- **Adjust your thermostat.** Each degree warmer you leave the thermostat in the summer, and each degree cooler you set it in the winter can save 6-8% in energy costs.

- **Install 7-day programmable thermostats.** Payback is about six months.*
- **Protect thermostats from unauthorized adjustment.** This can be accomplished by covering them with a locked plastic cover or installing seven day thermostats that have lockout features. Another method is for public rooms to have sensors which communicate with thermostats or a computer in a secure location.
- **Sign up for Prime Time Power** (if you have central air conditioning and meet eligibility requirements) to help the City manage peak demand and provide electric services as efficiently as possible.
- **Use fans and natural ventilation** when possible. The more air movement there is, the higher the cooling set-point (target) can be.
- **Pre-cool and pre-heat spaces** for guests and events rather than trying to “catch-up” once spaces are full.
- **Use dehumidifiers** during the summer to decrease humidity and reduce air conditioner use.
- **Consider minimizing direct heat** from summer sun coming through windows by using solar films, shades, and/or outside plantings.
- **Minimize and/or eliminate the use of electrical space heaters.**
- **Keep vents, radiators, and heaters clean and uncovered.**
- **Have regular HVAC professional maintenance.** Be sure condensers are clean and unobstructed and filters are clean.
- **Put a date on furnace filters** to know when to change them. This also decreases the need for electricity-driven air purifiers.
- **Identify “zones” in your home** or organization that are not used daily and consider reducing the heating and cooling supplied to the zones.
- **Caulk non-movable windows, cracks, around electrical openings, where the floor meets the wall, etc.** to reduce air leaks.
- **Weather strip drafty windows and doors.**
- **Inspect ducts and piping** for leakage or damaged insulation. Apply duct sealer, tape, and insulation as needed.
- **Repair old valves and steam traps.**

Electronics, Equipment, and Appliances

- **Adopt energy efficient electronics, equipment, and appliance practices and policies** around your home, office, and organization such as turning off or unplugging computers and all non-essential office equipment and unused electronics and appliances at the end of the day, on weekends, and while on vacation.
- **Think “Life Cycle” cost,** not just initial cost when purchasing and replacing electronics, equipment, and appliances.
- **Put timers on appliances** that cannot be easily unplugged or turned off.*
- **Program computers and non-essential office equipment** to auto power down and standby modes to take effect within 30 minutes of inactivity.
- **Check for power-saving features** that can be activated for all of your electronics, equipment, and appliances. Many times this feature is available but not automatically activated.

- **Turn off computers completely** when inactivity is expected to be at least an hour.
- **Reduce personal office equipment** in favor of communal equipment (printers, scanners, coffee pots, refrigerators, etc.).
- **Power work stations with multiple devices** by using a power strip that can be turned off at the end of the day and eliminate “standby” power usage. Power strips can be put into place with velcro and be in easily accessible locations.
- **Establish a printer/printing policy** for your organization and at home and the office. Reducing printer usage and opting for electronic documents saves electricity as well as paper.
- **Scan documents instead of faxing them** when sending information electronically at home or work email. Electrical use is higher for faxing.
- **Look for the Energy Star rating** when buying new electronics, equipment, and appliances.*
- **Do not oversize equipment.**
- **Clean refrigerator and freezer coils** about twice a year.
- **Replace refrigerator or freezer door gasket** if a dollar bill slips out easily when the door is closed.
- **Maintain efficient cooling temperatures** for refrigerators and freezers. To ensure food safety and optimize energy efficiency, refrigerator temperatures should be between 34 and 40 degrees F and freezer temperatures should be between -10 to 0 degrees F.
- **Eliminate extra (garage) refrigerators and/or freezers.**
- **Establish an acceptance policy and criteria for accepting “gifts”.** If you are a business or organization that is offered equipment and/or appliance “gifts”, many times these gifts are inefficient equipment and appliances that could be more costly than purchasing an efficient model. Payback for buying a new refrigerator or freezer to replace one that predates 1993 is about 5 years.

Water (on top of saving water, these tips also reduce electrical energy needed to supply and heat water)

- **Identify and stop leaks.**
- **Install aerators or restrictors** on faucets and showerheads. When replacing faucets, consider ones with occupant sensors.
- **Set water temperature only as hot as necessary** for business and organizational needs.
- **Install a blanket on older water heaters.** Insulate the first 3 feet of the heated water “out” pipe on both old and new units.
- **Fill dishwashers completely** before running loads.
- **Wash clothes in cold water.** There are many detergents available that clean clothes and remove stains effectively in cold water.

Higher Cost Opportunities

Lighting

- **Use LEDs for exterior building lights**, sidewalk lighting, and lighting in exit signs.* Exit sign replacements use a 2-watt LED. Payback is about 1 year.*
- **Convert T-12 fluorescent lighting** to T-8 or other more efficient lighting. (T-12 tubes are scheduled to be phased out in 2012.) To reduce costs, tubes and ballasts can be replaced without replacing fixtures. Rooms lit 15 hours/week or more will usually see a payback period of 3 years or less*#

Electronics, Equipment, and Appliances

- **Choose Energy Star products** (<http://www.energystar.gov/>) when replacing or upgrading electronics, equipment, and appliances.*
- **Replace old, inefficient appliances, equipment, and electronics** (refrigerators, freezers, furnaces, air-conditioners, printers, copiers, etc.) with more efficient ones.*
- **Replace aging desktop computers** with laptops. Laptops can use up to 70% less electricity and generate less heat.*
- **Replace old, inefficient clothes washers** with energy-efficient front load models (they spin the clothes much drier, resulting in less use of electric clothes dryers).*

Heating and Cooling

- **Install reflective film on windows** and block 40-60% of heat coming in and reduce cooling costs in the summer. The payback period averages 3 to 5 years.
- **Add insulation to attic spaces.***

Investment Opportunities

Heating and Cooling

- **Consider double-pane windows with shades** for increased heating and cooling efficiency.*
- **Consider radiant barriers and roof insulation** when installing a new roof.*
- **Consider installing solar panels.**
- **Look into the ways DDC (Direct Digital Control) can improve control**, including off-site monitoring and control.
- **Specify NEMA** (National Electrical Manufacturers Association) premium motors on HVAC equipment.
- **Consider installing Variable Speed Drives (VSDs)** on fans or pumps.
- **Consider installing Demand Controlled Ventilation (DCV).** Often outside air exceeds the amount really needed when occupancy of a space is low. A DCV has carbon dioxide sensors in the return air in order to determine how much outside air needs to be pulled in.
- **Consider installing economizers** that draw in outside air to assist in inside cooling needs.
- **Consider installing geothermal heating/cooling.** Payback for many applications is about 5 years.
- **Utilize low-e-insulated glass** and thermally improved frames to increase heating and cooling efficiency.

Lighting

- **Consider installing sun tubes** to increase and utilize daylighting.

Heating and Cooling

- **Add insulation to walls and attics.***
- **Replace inefficient windows** and doors with efficient, energy-rated ones. Payback, especially if just considering electrical efficiency, can be multiple years. *

Electronics, Equipment, and Appliances

- **Replace newer, less efficient appliances**, equipment, and electronics (refrigerators, freezers, furnaces, air-conditioners, printers, copiers, etc.) with more efficient ones.

Water

- **Replace water heater** with the most efficient model possible. For homes, businesses, or organizations with infrequent water use, consider “tankless” water heaters. Tankless systems can reduce “standby” storage costs and waste in heating “standby” water.
- **Consider a solar water heater.** Payback is 4 – 8 years.

Planning

- **Design and build to highest efficiency** (not just electric efficiency)

***Note:** Rebates are available for this electrical efficiency suggestion. Contact the City of Ames Electric Services Department at 515-239-5117 or visit www.cityofames.org and click on Go Green and Smart Energy.

Note: Both spent fluorescent tubes and CFLs are to be kept out of trash. Deliver them to the Resource Recovery Center. In case of breakage, clear the area and turn off the air handler for about 15 minutes. www.EPA.gov provides a description of how to clean up.

ELECTRICAL EFFICIENCY COST SAVINGS CHART

	Cost	Energy Use	Electricity	Reduction goals (kWh)		
Category	\$	% by class (cost)	kWh	Reductions (kWh)	Future kWh	Dollar Savings
Air conditioning & dehumidifiers	\$192	23.41%	1,744	35.00%	1134	\$ 67
Refrigerators and freezers	\$144	17.56%	1,308	50.00%	654	\$ 72
Lights	\$108	13.23%	986	75.00%	246	\$ 81
Cooking & dishwasher	\$108	13.23%	986	5.00%	936	\$ 5
TV's, computers, etc.	\$108	13.23%	986	7.00%	917	\$ 8
Laundry	\$79	9.67%	720	5.00%	684	\$ 4
Other	\$79	9.67%	720	5.00%	684	\$ 4
Total	\$820		7,450		6,372	\$ 241

Note: Estimated savings are calculated based on approximate energy savings that can be achieved by replacing technology from 2000 or before with new, EnergyStar or energy efficient technologies.

WEBSITES:

www.energystar.gov - This site, sponsored by the US Department of Energy and the Environmental Protection Agency, is a good resource for energy efficiency. This site provides resources and references for planning, funding, building, renovating and managing buildings as well as the Energy Star Portfolio Manager that allows the opportunity to compare energy efficiency performance with similar buildings, evaluate cost of improvements, and track progress.

www.cityofames.org – The City of Ames offers many Best Management Practices ideas and opportunities for businesses, organizations, and residents as well as information on rebates through its Smart Energy program.

www.greenseal.org – Green Seal is a non-profit, third-party certifier and standards development body in the United States. Since 1989, it has provided independent, objective, science-based guidance to the marketplace and to consumers. Green Seal is a non-profit, US-based ecolabeling organization and meets the criteria of the United States Environmental Protection Agency as a Third-Party Certifier, the requirements of ISO 14020 and 14024, and the standards of the Global Ecolabeling Network.

www.alliantenergy.com – Alliant Energy offers additional ideas for Best Management Practices, rebates, and other informational resources for electrical efficiency.