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CAMPUS SUSTAINABILITY

Action Requested: Receive the report and encourage the Regent institutions to continue to pursue sustainability and green practices across campuses.

Executive Summary: Sustainability has been defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs. Our federal and state governments have passed energy sustainability initiatives that promote conservation and efficiency, expand the use of renewable energy, and invest in energy infrastructure.

Congress recently passed the “Energy Bill” to transform the way energy is produced and used, resulting in greater energy security, economic growth, and a healthier environment for future generations. The “Energy Bill” in part sets out to:

- encourage energy conservation and efficiency.
- expand the use of alternative and renewable energy.
- encourage investment in modernization and reliability of energy infrastructure.
- reduce the global demand for energy.

The state of Iowa is also committed to leadership in environmental protection and renewable energy use and development. Governor Culver plans to submit legislation to make Iowa energy independent by 2025. Energy independence includes the use of renewable energy for 25% of our total energy needs. The Governor also plans to establish new energy efficiency standards for utilities and improve energy efficiency of buildings.

In 2007, Governor Culver and the Iowa State Legislature created the Office of Energy Independence (OEI) and the Iowa Power Fund to accelerate Iowa’s leadership in energy production and conservation.

OEI’s mission is to achieve a clean and sustainable energy future by providing leadership through education, research, planning, and investment and by developing policies and resources to produce market transformation.

The goal of the Iowa Power Fund is to invest in cutting edge research and development that is required in the new energy economy. The Power Fund was created to be a tool for OEI and, the Power Fund Board to use to promote the goals of Iowa energy independence. The Governor’s FY 2009 budget includes a second year appropriation of \$25 million to the Power Fund. The money will provide financial assistance to entities conducting business, research, or programs in Iowa that will reduce energy consumption, lower greenhouse gas emissions, and reduce dependence on fossil fuels and foreign energy. The Iowa Power Fund can be used to:

- accelerate research and development, knowledge transfer, technology innovation, and improve the economic competitiveness of efforts.
- increase the demand for and educate the public about technologies and approaches.

The Regent institutions have implemented many programs to promote and demonstrate sustainability that are in alignment with the energy initiatives of the federal and state governments. They continue to identify new ways to create and conserve energy and promote energy independence through research and development. Each of the three Regent universities has established a council/committee to enhance energy efficiencies and promote environmental awareness. Energy management strategies include building system and utilities infrastructure improvements, energy purchasing/use strategies, expansion of energy awareness, and recycling initiatives.

Attachments A, B, and C include specific initiatives and projects for each university pertaining to energy efficiencies and renewable energy sources, recycling, construction and renovation, transportation, and green product utilization. Attachment D provides an update on sustainability and green initiatives at the special schools.

UNIVERSITY OF IOWA

The Energy Conservation Advisory Council (ECAC) was created in 2004 and is comprised of students, faculty, and staff who offer feedback and guidance to Facilities Management on energy conservation measures. The council was formed to advise the Associate Vice President for Facilities Management on issues related to the creation, communication, and implementation of energy conservation efforts at the University of Iowa.

The University of Iowa adopted its Energy Conservation and Management Plan in February 2007. This ambitious plan launched a campus-wide commitment to reduce the University's carbon footprint by using more renewable energy, increasing energy efficiencies, encouraging energy conservation, attaining energy security, and ensuring system reliability. Student participation, interdisciplinary ties, and innovative technology are the distinguishing characteristics of the plan. The plan includes a commitment of a 10 percent per square foot reduction in the University's reliance on non-renewable energy sources and sustainability in relying on renewable resources for 15 percent of its energy by 2013.

Renewable and Efficient Energy

Preliminary work has been undertaken to study the feasibility of constructing an Oakdale Renewable Energy Plant. The purpose of the project is to demonstrate multiple technologies using locally available resources to meet the expanding energy needs at the Oakdale Campus. The Board granted permission to proceed in December 2007 for the Upgrade Electrical Distribution and the Electrical Generation Upgrade projects on the Oakdale Campus. Permission to proceed with planning of the Central Chilled Water Production and the Mechanical Distribution projects is requested in Agenda Item 20 of this docket.

The College of Engineering and Facilities Management formed a Green Power Task Force to position the University as a national leader in the use of alternative and sustainable energy, and to develop a long-range plan to position the University to compete for federal funding for renewable energy research and for bringing new clean-burning power facilities to the University. Energy efficiency measures have been implemented in 17 General Fund buildings resulting in \$500,000 of avoided costs in Fiscal Year 2007.

The UIHC and the General Education Fund buildings continued their implementation of chilled water optimization projects resulting in \$2.6 million of avoided costs in FY 2007 due to these improvements.

Facilities Management is participating in College of Engineering research sponsored by the Iowa Energy Center for advanced boiler combustion control and optimization using data mining, and, is sponsoring research to develop a computational fluid dynamics model of the stoker boiler to study the existing combustion process and model changes that result from co-firing biomass fuel.

The University's main power plant burns oat hulls (biomass) delivered from nearby Quaker Oats, reducing the power plant's carbon emissions. Forty thousand tons of biomass are utilized per year which is 30 percent of all fuel purchased. SUI currently operates on approximately 11 percent renewable energy.

The University joined the Chicago Climate Exchange in May 2004. The Exchange requires a 6% reduction in the 1998-2001 baseline greenhouse gas emissions by 2010. SUI is currently more than two-thirds of the way toward this goal.

Two student projects in the College of Engineering are producing positive results. The Data Mining Combustion Optimizer maximizes boiler performance by producing recommended control setting changes that are posted in real time on a web page used by the boiler operators in the plant. Another graduate student project is evaluating additional biomass fuel opportunities for future operations.

The ECAC is now recommending that it investigate the actions necessary to achieve the same reduction standards in greenhouse gas emissions which the state's Climate Change Advisory Council is undertaking to develop.

Recycling Programs

The paper and cardboard recycling program nets approximately 22% of SUI's conventional waste stream. The University's recycling program is currently recycling over 75% of its total waste stream by weight. The recycled materials include food composting, paper, cardboard, plastics, universal waste (batteries, pesticides, mercury-containing equipment, fluorescent lamps), and coal and biomass ash byproducts. A group of students, faculty, and staff is analyzing the composition of the SUI waste stream to target additional recyclable products.

SUI's Design & Construction Services recycles carpet and includes central and deskside recycling in all new buildings. Roof replacement on the Carver-Hawkeye Arena resulted in approximately 150,000 square feet of recycled PVC membrane.

In early 2007, a student-proposed food-composting project with SUI Dining Services and the City of Iowa City has already turned 35 tons of campus food waste into landscaping compost. Dining Services is selling its waste cooking oil for reuse.

The University is considering increasing the recycling and reuse of construction and demolition waste. This is correlated with pursuing LEED (Leadership in Energy and Environmental Design) certification on future projects. (LEED is a voluntary, consensus-based national rating system for developing high-performance, sustainable buildings.)

Construction/Renovation Projects

SUI has crafted and adopted minimum energy standards for new construction and major renovation. These standards are included in the recent, major revision of SUI's Design Standards and Procedures. In addition, Facilities Management initiated an in-house commissioning team to ensure the systems have been designed and installed to operate as they were intended. The University became an institutional member of the U.S. Green Building Council (USGBC) in FY 2005.

The University of Iowa has three new buildings for which it will be seeking LEED Certification (College of Public Health, Hygienic Laboratory and Rowing Team Boathouse). The Institute for Biomedical Discovery is also being considered for LEED certification.

Transportation

The SUI diesel fleet includes 31 Cambuses and 85 trucks which operate on up 10% biodiesel. In its fleet of 544 vehicles (not including Cambus), the University has 214 light duty Flex Fuel vehicles which have used over 100,000 gallons of E-85 in calendar 2007. The University also operates 8 hybrid vehicles.

SUI Parking and Transportation supports alternative transportation methods for UI commuters through access to Cambus, discount bus passes on the two local systems; and the operation of 75 vans for an employee van pool program.

Some departments are currently evaluating electric vehicles for the service fleet, including the Utilities & Energy Management and the Operations & Maintenance departments of Facilities Management.

Green Product Utilization

The purchasing department maintains an Energy Star web page for listing information on the Energy Star program as well as contracts with vendors who provide green-certified products.

The University's purchase terms and conditions have been updated to include a clear statement regarding Energy Star-rated products to ensure that Energy Star-rated equipment is purchased when possible.

Green-certified product reviews for soap, janitorial supplies, and facial tissue are underway. Numerous vendors have been contacted to provide a list of green products which will be made available for purchase by the University.

The purchasing department has converted all systems to a paperless process to save dollars on paper and toner costs.

IOWA STATE UNIVERSITY

ISU's Council on Sustainability (COS) was established in 2005 to promote sustainability as a core value of the University. The Council serves as a learning community to coordinate information, activities, and to facilitate collaboration. ISU initiatives include the Office of Bio-renewable Programs, the Leopold Center for Sustainable Agriculture, the College of Agriculture and Life Science's Graduate Program in Sustainable Agriculture, Henry A. Wallace Chair for Sustainable Agriculture, Department of Industrial and Manufacturing Systems Engineering Sustainability Research Initiative, Ag MRC, and student groups such as Engineers for a Sustainable World, Emerging Green Builders, and the Skunk River Navy.

ISU embraces a vision that it will be recognized as a national leader in developing and embodying sustainable practices which integrate education and the environment. In commitment to this vision, the University incorporates core environmental concepts throughout the curriculum, promotes environmental literacy among students, faculty, and staff, and ensures that campus facilities, policies, planning, and management are efficient and environmentally appropriate.

Renewable and Efficient Energy

ISU has had an energy task force since 2001. The goal has been to save \$1.5 million annually. The current task force has made recommendations to the administration for additional energy saving initiatives. Since 2001, the University has saved over \$6 million when compared to the average of the three years prior to the initiation of the program.

The University operates a cogeneration power plant which generates heating or cooling, and electricity. Because of the efficiencies of this process, a cogeneration plant is much more efficient than a typical power plant. The ISU plant averages about 55% efficiency, as compared to efficiencies of 35-40% for a typical utility-type power plant. This increased efficiency results in reduced fuel consumption and fewer pollutants emitted into the environment. For FY 2007, cogeneration saved approximately \$1.4 million by eliminating the burning over 15,000 tons of coal and the subsequent emissions of 37,000 tons of carbon dioxide into the air.

Iowa State is actively talking with a two different companies that may be able to provide alternative fuels for the power plant. Both companies are converting demolition wood waste and processing it into a fuel that could be mixed with coal and burned in the spreader stoker boilers. It is not yet known if these fuels will be economical or if the fuels will work in the boilers. Approval from Iowa DNR has been received to perform a test burn on one of the fuels, and ISU has requested approval from the DNR for the other fuel. If the test burn results are positive and the fuel can be delivered at an economical price, up to 25% of the coal burned in two of the boilers could be replaced with alternative fuels.

Iowa State is participating in a study by the Iowa Association of Municipal Utilities to locate a wind farm in central Iowa. The study will evaluate the economics and feasibility of the wind farm. Preliminary information shows that it may be advantageous for Iowa State to participate in the project. The feasibility study should be complete in the near future.

Recycling Programs

Storm damaged trees represent a unique lumber resource. ISU has implemented a program to evaluate and saw the downed trees for lumber, which is used on campus in woodworking, furniture design and fabrication classes in the College of Design. Discussions are underway with the College of Agriculture for the Department of Natural Resource Ecology and Management to process the trees into lumber by sawing and drying lumber for the furniture design classes.

ISU recycles waste product streams whenever a viable market is available and is constantly seeking new opportunities to recycle. The estimated annual amounts of recycled material include 32,000 tons of power plant ash and approximately 580 tons of cardboard, paper, wood, and scrap metal.

ISU Central Stores operates a resource recovery operation that makes unwanted materials and assets available to other University departments. Remaining resources are offered for sale to the general public. The operation significantly reduces the flow of unwanted materials to the local landfill.

Environmental Health and Safety Department staff operates a program that identifies and re-packages unwanted chemicals from laboratories. These chemicals are made available to other laboratories and researchers, thus avoiding new purchases and the costly disposal of the chemicals.

ISU is in the planning stages of developing a compost site to take animal waste from the Animal Science Teaching farms and food waste from Dining Services to process into compost for reuse on campus property as an amendment to soils.

Construction/Renovation Projects

ISU has emphasized the utilization of sustainable practices in the design and construction of capital projects to reduce the negative impact the projects have on the environment. These practices include sustainable site planning, transportation, safeguarding water, energy efficiency, conservation of materials and resources, and indoor environmental quality. ISU is establishing LEED certification goals for most major capital projects.

ISU is putting processes in place on all major capital projects to formally commission building systems to assure that they are designed, installed, and calibrated to operate as they were intended.

ISU has initiated a comprehensive process to evaluate the operating strategies of existing buildings. Approximately 10 buildings per year will be evaluated with the intention of continuing this program over multiple years. The review has identified unintended equipment operation and energy consumption, along with reduced occupant comfort. Efforts to date have resulted in approximately a 10% energy reduction beyond the existing energy conservation program.

Transportation

ISU partners with the City of Ames the highly effective public transportation system, CyRide, which uses bio-diesel fuels to transport students, faculty and staff throughout the campus and the Ames community. Eight bus routes provide an efficient and effective service reducing the demand for personal vehicles and parking facilities. The University plans for bicycle parking adjacent to campus buildings and bike paths that link to city paths which extend throughout the community.

ISU is using soy blend ultra low sulfur diesel fuel for lawn equipment, tractors, trucks, and excavation equipment. Transportation Services is incorporating E85 vehicles into their vehicle fleet and has installed an E85 fueling system. In FY 2008, the University will investigate the use of electric and propane powered service vehicles and lawn care equipment.

Green Product Utilization

ISU Custodial Services utilizes green products for the majority of daily cleaning needs. They are in the process of testing green hard surface floor products, cleaners, strippers, and floor finishes. They also use micro fiber dust mops, wet mops, and finish mops that reduce the amount of chemical products needed to perform daily tasks.

ISU Dining has instituted a program that provides local foods in dining areas in a "Farms to ISU" program. Their goal is to have 35% of raw food purchases from organic, sustainable, and local producers. The program also includes an educational component to increase awareness of sustainable food options in central Iowa.

ISU Campus Services developed an integrated management plan for turf care, tree management, and shrub care. The plan outlines processes to be followed for application of herbicide and fertilizer, insect control, aeration, watering, trimming, removal, and over seeding. There has been a positive impact on storm water from a reduction in the use of herbicides, fertilizers, and insecticides. Reiman Gardens is developing a number of programs to promote and demonstrate sustainability; the rose garden has been maintained without the use of chemical treatments.

The University uses low temperature bio-based soy grease as a lubricant for lawn equipment, service vehicles, and excavation equipment.

UNIVERSITY OF NORTHERN IOWA

The University Energy Conservation Committee was established in 2006 and consists of University faculty, staff, and students with city and community representation. The Committee works to enhance both energy efficiency and environmental awareness; it has three subgroups that focus on the tasks of engaging the campus community, auditing campus practices, and compiling best practices.

UNI is a member of the Association for the Advancement of Sustainability in Higher Education (AASHE). The membership enables the University to collaborate with other members and to gather information on sustainability accomplishments at other universities.

Renewable and Efficient Energy

Petroleum coke, a waste product of the petroleum industry, has been burned in the circulating fluidized bed boiler since 1993 to reduce the use of coal and the resultant pollutant emissions. Petroleum coke is approximately one-half the cost of coal; cumulative savings using this alternate fuel totals approximately \$3.0 million. UNI continues to work with the City of Cedar Falls on other alternative fuel sources including biofuels and wind generation.

UNI has conducted an energy audit walk through of the Wellness Recreation Center, the Biology Research Center, and the Curris Business Center. The purpose of the audits was to educate the occupants on energy consumption in the campus buildings and to identify ways the building occupants can reduce energy usage.

The University initiated a retro-commissioning study for the Maucker Union and the Wellness Recreation Center. Consultants were hired to complete an energy analysis for the facilities, including identifying operational and maintenance improvements to optimize the building systems. The consultants will work with the University to implement acceptable recommendations.

UNI partnered with Stockton Infrared Thermographic Services to perform an infrared survey on campus. Areas where thermal anomalies exist on campus can be determined with the information obtained from the infrared survey. Fifty-nine buildings were included in the survey. Results of the survey identify wet areas on roofs and improve maintenance planning activities.

A cogeneration review with Innovative Business Engineering (IBE) will examine the existing UNI cogeneration model. IBE has extensive experience with the use of biomass/renewable energy which can be utilized to displace the use of coal and reduce harmful emissions. An analysis of the electrical interconnection agreement for the purchase of electricity from Cedar Falls Utilities will also be included in the review. UNI has also had discussions with RENEW Energy-Briqs on the possible use of a wood waste biomass material. They recently received product samples to conduct a fuel analysis and plan to obtain the necessary test burn permits from the Iowa Department of Natural Resources.

A plan has been initiated to test the use of biodiesel fuels in place of number two fuel oil at the power plant. Approximately 13,000 gallons of fuel are used each year in the operation of the Boiler 3 for startup and soot blowing operations. UNI plans to purchase a small oil storage tank to test burn 5% biodiesel fuel. Results will dictate whether increased usage of biodiesel can be achieved.

Steam condensate meters were purchased for approximately 20 general fund buildings. Installation has begun and will be completed this fiscal year. The meters provide information on steam energy usage which will assist in tracking conservation measures for future implementation.

Recycling Programs

Campus Services along with Green Project UNI and the Recycling and Reuse Technology Transfer Center (RRTTC) received the Best New Campus Recycling Program of the year from the Iowa Recycling Association at its annual meeting in October 2007.

Campus Services is integrally involved in recycling and UNI recently completed its 17th year of recycling mixed paper in academic and administrative campus facilities. The University recycled 135 tons of paper saving over \$100/ton. The University also captured 47 tons of cardboard at its entry point (warehouse, central receiving, dining centers) which was also recycled.

Facilities Services has the following active programs to support sustainability:

- Yard waste composting and reuse.
- Conversion of low use turf areas into prairie and woodland.
- Integrated Pest Management techniques.
- Program to plant carbon fixing trees.
- Recycled plastic lumber used for site amenities and pedestrian control fencing.
- Litter control program.
- Installation of water quality Best Management Practices.

In 2006, the City of Cedar Falls and the University of Northern Iowa entered into a collaborative venture to establish a recycling drop off center on the University's campus. The center collected 176 tons of cardboard, plastics, tin, glass, and newsprint during FY 2007.

Construction/Renovation Projects

Two recent construction projects incorporated "green" building design and sustainability features. The renovation of the East Gym into the Integrated Teaching and Technology Center and the new Business and Community Services Building allowed for several sustainable and energy savings features including efficient lighting strategies and water conservation measures.

The University has implemented or is in the process of implementing several sustainability improvements that have targeted Best Management Practices elements. The implemented projects shown below have been a collaborative effort by Facilities Services, the UNI Parking Division, and the Black Hawk County Soil and Water Conservation District.

- Installation of bio-retention cells.
- Stream bank rehabilitation of Dry Run Creek.
- Installation of pervious paving in parking lots.
- Inclusion of a request for information related to "green" building design experience in request for proposals to provide architectural and engineering services.

Transportation

The University has been moving in the direction of adding alternate fuel vehicles to its Motor Pool fleet whenever feasible.

- 44 of the 71 vehicles in the rental fleet are E85 flex fuel vehicles.
- A large percentage of the Physical Plant truck fleet and the Price Lab School buses are diesel powered and use bio-diesel.
- Eight additional flex fuel vehicles are owned by other University departments

Green Product Utilization

UNI's Facilities Services is currently testing green products from five companies. Green products are being used for general cleaning (100%) in Begemann Hall, McLeod Arena, Business and Community Services Building, Innovative Teaching and Technology Center and Latham Hall.

An Environmental Stewardship Task Force authored a review of environmental practices in 1997 and the University immediately began to implement the recommendations suggested in the report. By 2000, treated turf was reduced by 50% and the use of herbicides and pesticides was reduced by 70%. The University continues to implement environmentally sustainable practices including the use of bio swales, pervious pavement, and naturalization.

The Department of Residence (DOR) installed new Energy Star compliant washing machines in 2007. The anticipated reduction in water use is one million gallons per year. The DOR also utilizes local food purchasing programs and purchases paper products made from recycled materials.

SPECIAL SCHOOLS

The Special Schools are also aggressively pursuing methods to reduce energy consumption and energy costs and to use renewable energy sources.

Iowa School for the Deaf

Several years ago, the Iowa School for the Deaf replaced the boilers in the School's Power Plant with more energy efficient and appropriately sized new units for the campus heating/cooling load. The School has reduced its natural gas consumption to approximately 65% of the FY 2000 level.

More recent initiatives to maintain and further reduce energy consumption include major window and exterior door replacements, roofing replacement projects, thermal pipe insulation repair and replacement, more efficient lighting bulbs and ballasts, installation of stand-alone kitchen equipment, alleviating the need to run the central boiler plant during temperate conditions, reduction of classroom and administration building temperatures during the winter, and installation of occupancy sensors in restrooms. The School has also established a rain garden to reutilize fallen precipitation and revitalized the campus wide recycling program to include all tenant operations.

ISD also entered into a cooperative energy efficiency awareness program with MidAmerican Energy to foster a heightened level of awareness among School stakeholders.

Iowa Braille and Sight Saving School

The Iowa Braille and Sight Saving School recently installed a geothermal heating and cooling system in Old Main; a similar system had previously been installed in Rice Hall. The two buildings are no longer dependent upon natural gas for heating. Use of a second campus natural gas boiler has been discontinued with the installation of these systems. The geothermal systems also cool the buildings more efficiently than the window air conditioners which they replaced.

A feasibility study is also underway to determine the cost of installing a geothermal system in Palmer Hall.

IBSSS also reports that the building automation system is being used to schedule systems to provide heating and cooling only when the areas are occupied.