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ISU SUSTAINABILITY ANNUAL REPORT

Iowa State University is pleased to report on sustainability accomplishments over the past year. With more than 34,000 students, faculty and staff on campus, the university is finding new ways of reducing resource consumption and new challenges for achieving greater levels of environmental stewardship. Through coursework, research and community involvement, ISU is a leader in sustainability. This report covers the highlights of this last year.

Planning and Development

Vision: Each institution will demonstrate a commitment to sustainability in its campus master plan, incorporating environmental stewardship.

Goals:

1. **LEED Certification:** All major projects (new buildings and major capital renovations) initiated after April 1, 2009 shall meet or exceed the U.S. Green Building Council's guidelines for silver level LEED certification.
 - Since 2008, ISU has adopted the goal for all new buildings and major remodeling to be certified LEED Gold or better. At this time, two buildings on the ISU campus have received LEED certification, and all new construction is registered with the USGBC for future certification. Minimum LEED (Iowa State specific) standards have been incorporated into the Campus Design Manual and Standards for all capital projects. All project bids at Iowa State are expected to incorporate these standards, even if they are unable to file in a traditional LEED category.

PROJECTS COMPLETED

| | LEED LEVEL | STATUS |
|--|-------------------|---------------|
| Morrill Hall Renovation (2008) | Silver | Complete |
| College of Design- Foundations Pavilion (2010) | Platinum | Complete |

PROJECTS IN PROGRESS

| | | |
|--|------|--------------|
| Chemistry Facilities (Hach Hall) | Gold | Construction |
| Biorenewables Complex – Biorenewables Lab | Gold | Construction |
| Recreation Facilities Expansion & Renovation | Gold | Construction |
| College of Veterinary Medicine Phase 2 – Small Animal Hospital Renovation & Addition | Gold | Design |
| Biorenewables Complex – Agriculture & Biosystems Engineering | Gold | Design |

Planned: In the process of incorporating sustainable design standards into all small projects designed by staff. This is anticipated to be completed by the end of the fiscal year.

2. **Design Professional Services Selection:** For all major capital projects initiated after April 1, 2009, preference shall be given to design professionals with LEED certification experience.
 - LEED certification is a criterion for selection of design professionals on all major

- projects. All design professional contracts initiated after April 1, 2009, for major capital projects have a minimum of one LEED accredited professional on the design team. An on-staff LEED accredited professional is also a requirement for contractors on new buildings and major remodeling.
3. **ASHRAE Energy Standards:** All new building and major capital renovation projects that alter mechanical and electrical systems shall exceed the current American Society of Heating, Refrigerating & Air Conditioning Engineers (ASHRAE) 90.1 requirements, which provides minimum requirements for energy efficient design of buildings.
 - All projects executed at Iowa State are expected to exceed ASHRAE requirements of energy efficiency by 34% for new buildings, and 30% for existing building renovations. This relates to the LEED requirements of ISU on new buildings and major remodeling.
 4. **Energy Efficient Lighting and Lighting Systems:** The design of new lighting and lighting control systems shall comply with the latest version of the American Society of Heating, Refrigerating & Air Conditioning Engineers/Illumination Engineering Society of North America (ASHRAE/IESNA) 90.1, Energy-Efficient Design of New Buildings Except Low-Rise Residential. The Lighting quality and light uniformity shall comply with Illuminating Engineering Society of North America (IESNA) Standard, Current Edition.
 - All projects executed at Iowa State are expected to comply, if not exceed, the energy efficient design of the lighting systems as part of the LEED requirement of overall building efficiency. All buildings comply with illumination standards.
 5. **Electronic Business Solutions:** All campuses shall encourage electronic business solutions to reduce the demand for paper and travel, such as electronic systems and teleconferencing.
 - There are a number of ISU functional areas and departments that have incorporated electronic business solutions into their policies and planning. Highlighted examples include:
 - Centric Project, a web-based project management program is used on all capital projects, reducing the demand for paper and traditional mailing of project related communications; weekly teleconferences are used to coordinate discussion, in lieu of travel, to address items that come up between the standard monthly onsite meetings.
 - Accounting Services provides all accounting statements electronically and offering electronic submission for reimbursements and vouchers.
 - Information Technology Services Network and Communications (NetCom) group offers conferencing technologies including multi-party conference calls and conference call meetings. These capabilities are used extensively across campus for both on and off campus participants.
 - An increasing number of webinars are utilized to provide onsite training to multiple professional staff rather than only being able to send just one or two individuals to off-site training. In addition, webinars are also being used by ISU faculty and staff to facilitate and originate training sessions, as well as get training. Webinars are being utilized across campus in many functional areas including: ISU Dining, Facilities Planning and Management,

Department of Residence, Information Technology Services, University Transportation Services, Memorial Union, and Iowa State University Extension – as well as numerous colleges and departments.

Purchasing

Vision: Each institution shall adopt a campus-wide environmentally preferable purchasing plan that is consistent with best practices in higher education. These policies will increase the purchase of products with a reduced environmental impact, while balancing the purchase decision with fiscal responsibilities.

Goals:

1. **Energy Efficiency:** Institutions shall specify U.S. EPA Energy Star* equivalent or better ratings on applicable energy consuming products when available and practicable. When Energy Star labels are not available, all purchasing units shall choose products that are energy efficient.
 - ISU has incorporated reference to U.S. EPA Energy Star* equivalent or better ratings on applicable energy consuming products in specifications and bid evaluation criteria. In cases where all or no products bid are Energy Star* rated and the equipment is planned to be used continuously for a period of years, the agent will conduct a 5-10 year total cost of ownership calculation based upon energy consumption to determine the best value for the university. A recent example is the purchase of ice machines for the Athletic Practice Facility. Power plant equipment is also evaluated in this manner to factor in cost of operation over 10-20 years.
2. **Source Reduction**
 - Institutions shall purchase products with a minimum of 30% Post Consumer Waste (PCW) recycled content for paper products, or, at the minimum, EPA standard for other products, or bio-based materials, when available and practicable.
 - There are a number of purchasing examples that incorporate PCW considerations. Highlighted examples include:
 - ✓ Central Stores purchases recycled content paper from joint regent contracts for the university. Iowa State University is using a SFI certified paper that meets the EPA and state requirement of 30% post consumer waste. The purchase of all fine paper is running at about 98% recycled. The only exception would be one or two colored papers that cannot be sourced with recycled content. Rough paper purchases, tissue, towels, etc.; also meet the requirement of recycled content. Additionally, with respect to PCW in products other than paper, trash liners used at ISU have a recycled content of 30%.
 - ✓ Purchasing encourages the purchase of bio-based products when available. Recent examples include bamboo (scientific) casework installed in the newly constructed Biorenewables Research Lab, and Marmoleum flooring (made of 100% natural, bio-based products) installed in the Friley (residence) Hall renovation project replacing asbestos floor tiles or other old linoleum products.
 - ✓ Some functional areas have adopted individual policies regarding PCW.

For example, ISU Dining requires PCW napkins as a standard operating product.

- ✓ Purchasing has developed a manual process for tracking PCW content products when products are bid, which should yield information in FY11. There is no feasible means of identifying PCW on all products purchased since purchases can take place through procurement cards, as well centralized purchasing.
- **Planned:** Purchasing is exploring the possibility of requiring the suppliers to report on PCW content of items purchased.
- Institutions shall encourage vendor packaging that is reusable, contains a minimum of hazardous and non-recyclable materials, and meets or exceeds the recycled material content levels in the U.S. EPA Comprehensive Procurement Guidelines for Paperboard and Packaging.
 - Iowa State University's contract with Office Max has provisions to reduce packaging and ship in bulk to Central Stores for internal distribution on campus. Purchasing includes clauses in bid solicitations encouraging vendors to reduce packaging, use recyclable packaging materials or recycled content packaging. As there is currently no central receiving function on campus, it is not possible to monitor and track all packaging materials. Reusable and recyclable packaging that is received at the university's main warehouse is in turn utilized for daily campus functions or recycled through local recycling outlets. Purchasing also encourages utilization of pallets instead of boxes and blanket wrapping of many furniture items, including chairs – thus eliminating the need for any packaging.
- Reduce the use of disposable products. Specify and purchase products that are reusable or refillable wherever feasible and practical.
 - Purchasing has issued guidelines for catering encouraging the use of refillable and reusable products.
 - ISU Dining retail operations have had a Reusable Coffee Mug Program since Spring of 2007, and have sold 1,781 (in two different styles), plus given a .35 cent discount for any reusable mug beverage purchase. Dining will be specifically tracking disposable coffee cup diversion (of the ½ million disposable coffee cups used in 2008-2009) in 2009-2010.
 - ISU Dining residential operations have given out 11,500 free reusable mugs to students, from 2008-2010, to encourage the reduction of disposable use and purchase.
 - Catering services utilizes reusable plastic cups as a standard operating product for Jack Trice Stadium suite seating and at other large catering events, where feasible.
 - Water bottle filler faucets have been purchased and installed throughout various campus locations to encourage the reduction of disposable bottled water use and purchase.
- By July 1, 2012, the Regent institutions' combined purchases with recycled

content will increase by 10% over the base year of FY 2010.

- Purchasing is collecting data on new products (other than the paper products) with PCW content toward meeting the goal of increasing PCW content purchases by 10%.
3. **Buy Local:** Institutions shall encourage purchase of locally grown and produced products, defined as within Iowa or a 500 mile radius of the institution, to minimize the environmental costs associated with shipping.
- Implementation of ISU Dining's Farm to ISU Program (<http://www.dining.iastate.edu/farm/>), in place since Spring 2007. Last year \$500,000 (10% of annual purchases) in local products were purchased in the areas of produce, meat, honey, and dairy. Dining has a goal of 35% local product purchases in the next three years. Presently, 23 different farmers' products are featured monthly in residence halls, during Family Weekend, at the Burrito Works retailing outlet in the Memorial Union Food Court, and at multiple catering events. A recent example is the purchase of 1,000 cases of local apples from a local vendor and the Horticulture Farm on campus, resulting in the utilization of 120,106 Iowa-grown apples.
 - ISU Dining is facilitating a visioning project among all Regent Institutions toward creating a successful and collaborative Farm to School program.
4. **Green Goods and Services:** Institutions shall encourage the use of green-certified products and services such as, but not limited to, Green Seal, Egologo, EPEAT (Electronic Product Environmental Assessment Tool), FSC, etc.
- There are a number of purchasing examples that incorporate green goods and services considerations. Highlighted examples include:
 - Purchasing includes reference to green-certified products in applicable bid solicitations. Most of the cleaning supplies are purchased through Central Stores.
 - A number of campus functional areas have adopted green cleaning programs including Facilities Planning and Management, Department of Residence, and the Memorial Union. These programs take a multi-faceted approach to green cleaning and services. For example, cleaning chemicals are green certified and cleaning equipment, such as wet mops and dust mops, are made from recycled plastic pop bottles. Mop handles and mop heads are made from bamboo and recycled car battery cases. (Annual purchase estimates for mops will eliminate over 4,000 tons of greenhouse gases.) Electric equipment, such as vacuums, are low decibel and HEPA filtered providing a better environment for the worker and the space occupant, meeting LEED-EB standards, CRI certified and emitting 70dB or less. Currently, chemical-free carpet and floor care products are being analyzed to also be included in standard operating procedures.

5. E-procurement:

- Institutions shall strive to achieve paperless processes by reducing the use of paper, toner, storage files and space.
 - There are a number of purchasing examples that incorporate paperless process considerations. Highlighted examples include:
 - ✓ Web-based requisitioning system
 - ✓ Electronic "Requisition to Quote" process
 - ✓ Electronic procurement card reconciliation process
 - ✓ On-line catalog hosting, order, and payment process for major contracts (CyBuy)
 - ✓ Web-based and electronic vendor application process
 - ✓ Computer faxing of purchase orders to vendors instead of printing and mailing a paper copy (resulting in a 67.5% reduction in postage costs over the past two years)
 - ✓ Purchase order imaging for paperless access by departments
- By January 1, 2010, institutions shall require all bidders for goods and services (excluding construction) to:
 - submit bids/proposals electronically or, at a minimum, on recycled paper, double-sided and without extra materials not requested
 - reduce packaging or minimize the negative impact of packaging
 - consider the environmental and social impact costs over the lifetime of a product or services in evaluation criteria.
 - There are a number of purchasing examples that incorporate bidding process considerations. Highlighted examples include:
 - ✓ Web-based bid opportunities with email notification to vendors. Bidders log on to bid opportunity site and download bid documents.
 - ✓ Bidder requirement to submit bids and proposals via email for paperless distribution to evaluation committees. For bidders not able to submit bids electronically, requirement to submit a maximum of one duplex paper copy.
 - ✓ Purchasing includes clauses in bid solicitations encouraging vendors to reduce packaging, use recyclable packaging materials, or recycled content packaging.

Energy and Climate

Vision: Institutions shall commit to pursuing climate neutral operations through energy efficiency, conservation, on-site generation and strategic procurement of clean and renewable energy.

Goals:

1. **Metering:** By July 1, 2013, 90 percent of the utilities (steam, condensate, electricity, potable water and chilled water) systems shall be metered at the point of consumption to measure effectively use and waste in the system.
 - Iowa State University's metering of campus utilities is currently at the following percentages:
 - 100% of electricity is metered
 - 90% of steam is metered
 - 90% of chilled water is metered
 - 50% of potable water is metered

2. **Energy Portfolio:**

- By July 1, 2013, the combined energy portfolio of the Regent institutions shall include at least 10% from renewable sources.
 - Iowa State University has signed a contract to purchase 10 percent of its electrical energy from a wind farm located in northern Story County. This is a joint contract with the City of Ames, who will purchase 15 percent of its electrical energy.
 - **Planned:** Iowa State University continues to search for viable biomass products that can be used to displace a portion of the coal burned at the main power plant. At this time, a suitable biomass product has not been located. All products found will either increase production costs and/or require significant capital expenditures to add fuel handling systems.
- By 2025, the Regent institutions shall meet the Culver/Judge Energy Legislation Initiative for a renewable standard of 25%.
(http://www.governor.iowa.gov/news/2008/01/15_1.php)
 - **Planned:** Monitoring of the current wind power contract will take place for one year. At that time, additional planning will take place toward achieving this goal.
- The Regent institutions shall establish individual goals to enable the collective success toward the use of renewable energy. As part of this, the institutions will also develop and act on individual plans for energy reduction, energy efficiency and energy conservation goals.
 - There are a number of energy and climate examples that incorporate individual goal-setting considerations. Highlighted examples include:
 - ✓ Campus billing for building energy consumption has been modified to a “pay-as-you-use” system in which all campus buildings are billed for the actual energy they consume, rather than a billing system based upon total campus consumption and the gsf of each individual building. Included in this system is the opportunity for units that reduce their energy consumption and save money to retain those savings and apply them toward supporting their specific operations and initiatives. A Live Green Revolving Loan Fund (<http://www.livegreen.iastate.edu/loan>) has been established to assist in providing initial start-up funds for energy saving renovations and modifications (with the loan being paid back through the achieved savings). This revised system and assistance fund has heightened interest in energy conservation and has built awareness of how the building occupants can affect their energy consumption and utility bills.
 - ✓ Twenty-eight Green Teams (<http://www.livegreen.iastate.edu/involved/teams/>) have been formed on campus and are exploring how to save energy in their individual colleges, major administrative units, or buildings, and to develop strategic plans and goals that support energy savings and sustainability.
 - ✓ Facilities Planning and Management offers energy savings ideas and resource assistance to departments through energy assessments and technical information related to potential energy savings projects that the departments may want to explore. FP&M also maintains an energy consumption tracking website that allows individual campus building energy

consumption (as well as total university consumption) to be available for information and awareness 24/7.

http://www.fpm.iastate.edu/utilities/billing/benchmarks_building.asp

- ✓ Information Technology Services has implemented a campus-wide policy that focuses on reducing energy usage for university computer systems. Through this initiative, desktop computers and monitors are forced into quicker and deeper sleep mode, resulting in a significant energy footprint reduction. Currently, 2,000 systems are included in this initiative.
 - ✓ The College of Liberal Arts and Sciences Green Team completed a four-month behavioral research project targeting 24 campus buildings housing LAS faculty and staff. The project included a series of information strategies to inform building occupants about building energy consumption (signage, email updates, and building competitions), and resulted in an average energy consumption reduction of 8% (total net savings \$37,817).
 - ✓ The Department of Residence offers a free light-bulb exchange program for students (in Frederiksen Court apartments) to exchange their incandescent bulbs for compact fluorescent bulbs, and depleted CFLs for new ones (saving energy and ensuring continued energy efficiency).
 - ✓ Through a collaborative project between the Council on Sustainability, ISU Dining, Vending Services, and Facilities Planning and Management 168 vending machine misers were installed throughout various campus locations, resulting in an estimated annual savings of \$14,000.
 - ✓ During the 2009 winter break, Facilities Planning and Management spearheaded an initiative to encourage campus buildings to consider closing during the 11-day winter break. Fifty-five buildings took part, with 22 of those buildings opting to try additional energy savings operational modifications. This resulted in energy savings of (at least) \$120,000, with the Parks Library individually saving over \$1,000/day (lowering their energy bill by 60% during this period).
- The Regent institutions shall achieve reductions in Greenhouse Gas (GHG) emissions consistent with the strategies developed by the Iowa Climate Change Advisory Council created under Iowa Code § 455B.851 in 2007.
 - There are a number of energy and climate examples that incorporate Greenhouse Gas emissions considerations. Highlighted examples include:
 - ✓ ISU Dining has evaluated transportation needs and usage to and from various campus retail outlets, and revised their policy. Included in this revision is a reduction of transportation vehicles, as well as reducing the delivery routes.
 - ✓ Facilities Planning and Management has installed a solar trash compactor on central campus to replace a conventional trash can. The compactor eliminates four out of five of the trash pick-ups required by the conventional trash can. Reduction in use of vehicles, as well as staff time, has been so impressive, FP&M will be purchasing and installing 11 additional units this summer.
 - ✓ Facilities Planning and Management and University Transportation Services (in collaboration with Environmental Health and Safety) have purchased four electric vehicles to replace one F-150 ½ ton pick-up truck, one mini-van, and two compact cars. FP&M has also replaced a gas-fueled utility cart with an electric cart.

- ✓ University Transportation Services has doubled the number of hybrid vehicles in the university fleet over the past two years. As policy, UTS bids all vehicles with flex fuel engines, when available.
- ✓ University Transportation Services offers trailer rental to accommodate luggage transportation and allow larger groups to limit number of passenger vehicles.
- ✓ Parking Division, in partnership with the College of Design and Facilities Planning and Management, implemented a two-year pilot program for low emission vehicle designated parking as part of the new King Pavilion.
- ✓ Parking Division is reducing their law enforcement vehicles by 25% and replacing them with a combination of increasing their bicycle enforcement program, renting vehicles on an “as-needed” basis, and instituting of a vehicle “buddy up” program.
- ✓ ISU Athletics purchased renewable energy credits to off-set emissions created at the November 7th home football game (approximately 24 megawatts).

Materials and Recycling

Vision: Regent institutions shall reduce the volume of materials and resources consumed, and reuse or recycle resources and materials whenever possible, with the long-term objective of contributing to the development of a waste-free society.

Goals:

1. **Recycling:** Encourage and promote programs that reuse, repurpose or recycle surplus items such as lamps/light bulbs, toxic waste, batteries, paper, bottles, and other products where feasible and practicable.
 - There are a number of materials and recycling examples that incorporate reuse, repurpose, and recycling considerations. Highlighted examples include:
 - The following items have established recycling and/or reuse programs at Iowa State University that can be utilized by all campus buildings and operations:
 - White paper
 - Newspaper
 - Cardboard
 - Phone Books
 - Confidential Paper
 - Light Bulbs
 - Rechargeable Batteries
 - Used Oil and Oil Filters
 - Electronics
 - Printer and Toner Cartridges
 - Tires
 - Scrap Metal
 - Glass
 - Surplus Chemicals
 - Shrink Wrap
 - Pallets
 - Packaging

- Iowa State University's Surplus Program returned over \$250,000 of reusable assets into university operations in 2009.
- The University Compost Facility processes ~15,000 tons of materials annually, including animal farm manure and bedding, campus yard waste, biomass research waste, and food waste from campus dining facilities. All finished compost is utilized for campus projects.
- Iowa State University's TreeCYcle Program has salvaged ~2-3,000 board feet of reusable lumber from downed campus trees.
- The Department of Residence and the student GreenHouse Group organization established a multi-commodity recycling program (mixed paper, redeemable cans and bottles, plastics, and wet board) for all residence halls and student apartment buildings in Fall 2009 – recycling 18.5 tons during the first six months. Recycling for compact fluorescent light bulbs, rechargeable batteries, and household hazardous waste is also available to students in university residences.
- The Department of Residence established the SAVE (Simple Act Vital Effect) Move Out recycling/reuse program offering an alternative outlet for items that would otherwise be put into dumpsters (food, clothing, furniture, electronics, and various recyclables). In 2009, 290 grocery bags of food were provided to local food pantries and three truckloads of other household items (including ~2,000 pounds of clothing) were donated to local charities.
- The Memorial Union offers a departmental office supply swap event to repurpose various office supplies, accepts campus and community donations of various art materials for their Workspace classes, holds an annual used magazine sale that utilizes community donations, and is working in partnership with the Green Umbrella student group to offer redeemable beverage recycling for all Union patrons and a fundraising opportunity for campus student organizations.
- Through Iowa State University's green building standards, construction waste recycling is a standard operating practice for all new buildings and major remodeling.
- Information Technology Services has implemented initiatives which focus on reducing the need for physical assets (as well as increasing power savings) including:
 - Server consolidation - using virtual servers and centralized storage to reduce the power needed, number of physical servers, heat output, and physical space requirements. Currently, consolidation is occurring at a ratio of approximately 20 virtual servers per physical server (total of 160 servers). In moving forward, the goal is approximately 50 virtual servers per physical server.
 - Virtual desktop environment - replacing desktops with thin clients as they near the end of their lifecycle. In addition to reducing the amount of physical assets, thin clients use far less power than a standard desktop computer. Additional benefits include a longer product lifespan, less noise pollution, and less heat output.

- In combination with the City of Ames Resource Recovery Plant (that utilizes a refuse-derived fuel system to provide electrical power to residents), and all the above mentioned programs and initiatives, Iowa State University diverts nearly 75% of university waste from being landfilled.
- 2. **Conserving:** Select the duplex setting as the default for printers and copiers, and use recycled toner whenever possible.
 - Information Technology Services has, where feasible, set “equipped” printers to duplex print jobs. Additionally, a new campus-wide printing system has been implemented (for ITS managed student printers) that offers tracking of total paper usage within designated printing “environments”. This has resulted in a 33% reduction in paper use in one semester.
 - **Planned:** Implementation of a similar paper-usage tracking system, ITS managed faculty and staff printers is being considered.
- 3. **Materials:**
 - Recycle electronic waste in a responsible manner.
 - Iowa State University has an established electronics recycling program that can be utilized by all campus buildings and operations. The University’s recycling vendor has been thoroughly audited to ensure responsible handling and management of all electronic waste and by-products.
 - **Planned:** Targeted recycling collection events for student electronics have been piloted in 2009-2010 and are currently under discussion to become ongoing.
 - Encourage institutions to continue to identify strategies and programs to mitigate waste.
 - There are a number of materials and recycling examples that incorporate waste mitigation considerations. Highlighted examples include:
 - ✓ ISU Dining has implemented a number of initiatives focused on the mitigation of waste, including:
 - Implementation of a trayless dining program for one of three residential dining facilities in Fall 2009. In comparison to a trayed residential dining program, serving a comparable number of daily meals, food waste was 50% less for the trayless program (reduced water usage, as well as reduction in cleaning supplies, also impacts waste reduction). As a result, and by student request, all residential dining facilities will be trayless beginning Fall 2010.
 - Composting of all food waste produced by the residential dining facilities is currently sent to the University Compost Facility (~500 tons/year), with the resulting compost utilized for campus projects.
 - Donation of “day-old” items from dining café locations to a community free-meal program, Food at First.
 - Researching of compostable “take-away” packaging for retail locations.
 - ✓ ISU Athletics has incorporated beverage container recycling as a part of event operations.
 - ✓ The Inter-Residence Hall Association’s GreenHouse Group, in conjunction with the VEISHEA Planning Committee, has incorporated beverage container recycling as part of this annual university event.

- **Planned:** Participation in Recyclemania (benchmarking status) is currently under discussion.

Transportation

Vision: Regent institutions shall develop transportation strategies that increase fuel efficiency and reduce fuel use, air pollution and carbon dioxide emissions while providing opportunities for alternative transportation including bicycle and pedestrian infrastructure.

Goals:

1. **Emissions:** Regent institutions shall reduce the emissions related to the campus fleet through:
 - Increasing E85 and biodiesel alternate fuels while increasing the percentage of Flex Fuel, hybrid and electric vehicles in each fleet.
 - University Transportation Services has implemented a number of initiatives focused on alternate fuels and alternate fuel vehicles including:
 - ✓ Doubling the number of hybrid fleet vehicles in the past two years.
 - ✓ Adding four electric vehicles to the university fleet (in collaboration with Facilities Planning and Management and Environmental Health and Safety) two trucks and two cars), replacing one F-150 ½ ton pick-up truck, one mini-van, and two compact cars.
 - ✓ Consistent and concerted efforts to specifically increase the use of flex fuel in its flexible fuel fleet.
 - ✓ Installation of a 5,000 gallon above ground E85 tank, which has led to a significant increase in the number of gallons of E85 consumed.
 - ✓ Increase of biodiesel blend ratios from 2% to 5%.
 - ✓ Focused and diverse customer education about flex fuel such as:
 - Dispatch desk fliers noting the benefits of choosing flex fuel and locations of where flex fuel can be purchased.
 - Glove box information packet providing assistance in locating flex fuel retail locations and providing fueling instructions.
 - Information on UTS website regarding flex fuel use and benefits.
 - **Planned:** ISU Parking is exploring replacement of one Ford Ranger pick-up truck with an electric vehicle for law enforcement.
 - Increasing the number of passenger miles traveled (number of passengers times the miles traveled) in university fleet vehicles, relative to total fleet mileage.
 - University Transportation Services has implemented a number of initiatives focused on increasing number of passenger miles in university fleet vehicles including:
 - ✓ Encouraging the use of appropriately sized vehicles for university travel. This is exemplified through the Student Organization Travel Commitment. Through this commitment, UTS allows student organizations to rent large passenger vans (after completing classroom training and a driving session with UTS staff). This offers the opportunity for groups to utilize one large vehicle rather than two or three smaller vehicles.
 - ✓ A flexible reservation policy to accommodate changes in group size and appropriate vehicle size and number.
 - ✓ Actively identifying opportunities for fleet vehicle pooling opportunities.

- Reducing the number of vehicles used for transportation of employees and guests to/from airports.
 - University Transportation Services has implemented a number of initiatives focused on reducing vehicles used for airport transportation including:
 - ✓ Departmental vehicle rental for airport shuttling.
 - ✓ One-way, by request, airport shuttle service for the university community through a private rental agency.
 - ✓ Referral assistance to an Ames area shuttle service that offers scheduled trips to and from the Des Moines International Airport.
 - ✓ Consultation services to all university faculty, staff, and students with respect to identifying appropriate alternative shuttling solutions.
- Initiating discussions with Risk Management personnel to resolve Worker's Compensation issues to allow Regents' fleet vehicles to transport other state, county, municipal, and governmental staff and officials on coordinated travel.
 - Partnerships between Iowa State University and other state agencies are in place to offer rental of agency fleet vehicles between agencies (to accommodate occasional periods of increased use and demand) in lieu of purchasing additional vehicles.
 - **Planned:** Ongoing discussions between University Transportation Services and Risk Management regarding implementation of coordinated travel options for other state, county, municipal, and governmental staff and officials are taking place. Incorporating other state agencies in these discussions to assure need and participation is a next step.
- Increasing efforts to reduce vehicle idling.
 - There are a number of transportation examples that incorporate vehicle idling. Highlighted examples include:
 - ✓ Parking Division has adopted a policy of turning off vehicles when enforcing or stopping to issue citations.
 - ✓ ISU Dining has adopted a policy of turning off vehicles during deliveries.
 - **Planned:** University Transportation Services has written a draft Idling Policy for fleet vehicles that is pending approval for implementation.
- 2. **Alternative Transportation:** Regent institutions shall strive to reduce the number of single occupant vehicles coming to campus through:
 - Creating new or expanding programs or partnerships with municipalities and local bus, van pool and ride share systems to provide alternatives to commuting alone.
 - There are a number of transportation examples that incorporate commuting alternative considerations. Highlighted examples include:
 - ✓ University Transportation Services offers van pooling vehicles and facilitation for university employees. Currently, van pools are established in four local communities (Des Moines, Boone, Roland, and Story City) and provide alternative commuting to 40 employees.
 - ✓ Government of the Student Body has established an online carpooling and ride share website for use by all students, faculty, and staff (<http://wd22.its.iastate.edu/>).

- **Planned:** Ongoing collaboration discussions with the city/university bus system, Cy-Ride and the Ames DOT to identify and facilitate additional van pool options.
- Increasing parking system controls or incentives to encourage alternatives and achieve reductions in the number of single passenger commuter vehicles.
 - There are a number of transportation examples that incorporate single passenger commuter vehicle considerations. Highlighted examples include:
 - ✓ Parking Division has implemented a number of initiatives focused on reducing single passenger commuter vehicles including:
 - Implementation of a policy offering reserved parking wait list priority to spouses (based upon combined years of service at Iowa State University) when they agree to only purchase one parking permit.
 - Implementation of a single day parking permit to allow options to those who normally use alternative means of transportation.
 - ✓ Free city/university bus service (CyRide) to students (through student-initiated fees) and university subsidized service for faculty and staff.
 - **Planned:** Parking Division is planning a number of initiatives which focus on single passenger commuter vehicles including:
 - ✓ Development of a reserved parking wait list that gives priority to groups (that are van pooling or car pooling) over individual permit holders.
 - ✓ Implementation of a single day scratch permit (limit 10 per purchase) to allow options to those who normally use alternative means of transportation.
- Expanding the use of teleconferences, video conferencing, and interactive webinars with geographically distant individuals
 - Information Technology Services has implemented a number of initiatives focused on expanding the use of teleconferences, video conferencing, and interactive webinars including:
 - ✓ Integration and expansion of desktop videoconferencing availability and opportunity. Technologies such as Skype and Windows Live Messenger are some of the desktop based videoconferencing tools being utilized to reduce needs for traveling.
 - ✓ Connection of multiple off-site desktop systems to enable a large, point-to-point communication videoconference. Two Polycom-equipped videoconferencing rooms are currently available at Iowa State University.
 - ✓ Availability of an Access Grid location offering state-of-the-art videoconferencing amenities (cameras, projectors, and data sharing capabilities).
 - ✓ Online opportunities for any desktop system to provide live presentations and training sessions through Adobe Connect.
 - ✓ An on-campus node within the Iowa Communications Network providing point-to-point and multi-point conferencing with other network nodes throughout Iowa. The ICN node hosts an average of 8-10 events per month.

- Coordinating travel of employees attending the same event.
 - University Transportation Services has implemented a number of initiatives focused on increasing number of passenger miles in university fleet vehicles including:
 - ✓ A flexible reservation policy to accommodate changes in group size and appropriate vehicle size and number.
 - ✓ Availability of trailer rental to accommodate luggage transportation and allow larger groups to limit number of passenger vehicles.
 - ✓ Actively identifying opportunities for fleet vehicle pooling opportunities.
- Encouraging walking and biking by enhancing safe walking paths, bike lanes, and other bicycle programs such as bike storage.
 - Parking Division has implemented a number of initiatives which focus on encouraging biking including:
 - ✓ Development of a diversified education and awareness program (in conjunction with the Government of the Student Body and the Transportation Advisory Council) for the ISU community focusing on the benefits of biking, important biking rules and regulations, and general biking etiquette in order to promote increased biking in a safe and enjoyable manner to all members of the ISU community.
 - ✓ Free registration to all ISU and Ames community bicyclists at several Ames locations. Through this system, if a bike becomes lost or stolen, owner contact information is readily available if the bike is found.
 - ✓ Implementation of a single day parking permit to allow options to those who normally bike or walk to work.
 - ✓ Free city/university bus service (CyRide) to students (through student-initiated fees) and university subsidized service for faculty and staff.
 - **Planned:** Parking Division is planning a number of initiatives which focus on encouraging biking and walking including:
 - ✓ Proposed change to the Iowa Administrative Code that would allow electric bicycles under 750 watts to be treated as a traditional bicycle. (Currently they are treated as a motorcycle and require purchasing a permit and not being allowed on community bike trails.)
 - ✓ Implementation of a single day scratch permit (limit 10 per purchase) to allow options to those who normally bike or walk to work.
- Exploring work alternatives and alternative scheduling that meets the needs of the institution.
 - The Memorial Union is exploring opportunities for alternative work hours to allow staff to take part in van pools and car pools.

Water and Landscape

Vision: Regent institutions shall pursue water saving and efficiency measures, including collection technologies and re-use mechanisms.

Goals:

1. **Irrigation Water Consumption:** Regents institutions will adopt best management practices for minimizing irrigation and for the use of graywater for this purpose.

- There are a number of water and landscape examples that incorporate irrigation water consumption considerations. Highlighted examples include:
 - Non-irrigated turf areas as a common practice for campus lawns, residential areas, and recreational areas.
 - For high-use event spaces that allow irrigation to maintain turf longevity (including Veenker Memorial Golf Course, Athletic Fields, Reiman Gardens, and Central Campus), management units use water savings devices, monitor water use according to seasonal demands, and focus irrigation to complement rainfall patterns whenever possible.
 - Compost (through the University Compost Facility) and mulch (through Facilities Planning and Management), derived from campus operation by-products (animal production, yard waste, food waste, biomass research, etc.), are standard operating products utilized to reduce irrigation consumption and needs.
 - Veenker Memorial Golf Course is pursuing Audubon Cooperative Sanctuary Certification.
 - **Planned:** New construction projects have not redirected graywater for irrigation of turf since current campus policy restricts irrigation of campus lawn areas. Graywater is currently collected for purposes considered of higher use than irrigation. If the need would arise, consideration for graywater for irrigation, as a best management practice, would be given consideration.
2. **Organic Campus:** Regents institutions will use Organic Materials Review Institute (OMRI) listed pesticides and fertilizers on campus.
- Iowa State University has an Integrated Management Program for turf, shrub, and tree care. These collective programs provide direction for decision making on cultural practices for grounds maintenance.
 - **Planned:** Ongoing consideration of organic product use as is beneficial and appropriate within Iowa State University's Integrated Management Program.
3. **Stormwater Management:** Regents institutions will adopt best management practices for stormwater on campus.
- Iowa State University has implemented over 45 best management practices for stormwater on campus. Implemented project strategies include green roofs, bio-retention cells, bio-swales, rain gardens, permeable paving (pavers, concrete, and asphalt), stream bank stabilization, native plantings, detention, retention, and finally gray water reuse. Construction phase best management practices are also observed.
 - **Planned:** Iowa State University is pursuing Tree Campus USA designation.

Sustainability in the Curriculum

Public Universities

Vision: Regent institutions will pursue a sustainable future through the curriculum by:

- Providing educational opportunities for students to facilitate their acquisition of the knowledge, skills, and collaborative work ethic necessary to engage effectively in public discourse and policy debate and in other hands-on problem-solving in matters relating to environmental, social, and economic sustainability;

- Providing educational programs that prepare students for sustainability-related careers (e.g. in wind power and other green industries, biobased energy and other biobased products, governmental organizations, international economic or policy organizations, non-governmental organizations, farmers, researchers, engineers, writers, or teachers);
- Providing opportunities for students to participate in sustainability-related research, the “greening” of campus infrastructure, civic engagement, and internships;
- Exposing students to ideas and issues related to a sustainable, balanced, and ethical future for the planet and its inhabitants, including (1) the dynamics of biological population growth and decline in the natural world, predator-prey models, overexploitation of natural resources, and energy balances; (2) how human behavior affects the natural world and the ability of earth to sustain life; and (3) the stochastic interplay of human and natural factors in determining the long-run population growth path for human and non-human species; and
- Helping students understand how to make informed rational decisions as consumers, workers, resource owners, and citizens electing government officials by taking into account the effects of human actions on human welfare in this and future generations.
- Helping students think in terms of economic, social, political, and environmental sustainability, as well as environmental health.

Goals:

1. Increase efforts to recruit high school students, as well as professional and graduate students, who are seeking an education in sustainability at an institution that practices sustainability.
 - Increased emphasis for building awareness and marketing the Live Green! initiative and its many facets (including curriculum) is taking place via the Live Green! website (which includes a listing of all sustainability related courses offered at Iowa State University, http://www.stuorg.iastate.edu/esw/ESW_Sustainable_Courses/Departments.html and through various promotional materials promotional materials (ISU Facts Book, press releases, etc).
2. Increase the sustainability experiences for freshmen through first-year seminars, core general education requirements, or living/learning communities.
 - Core education learning outcomes
 - ⇒ Agriculture and Life Sciences - environmental awareness; and international and multi-cultural awareness
 - ⇒ Business - recognizing ethical, legal and global implications in business decision making
 - ⇒ Design - Ethics Awareness of the artist’s, designer’s and planner’s potential impact on the individual, society and environment. Engage with communities in collaborative efforts to understand, envision and promote a fundamental enhancement of their physical environment.
 - ⇒ Engineering - ability to solve the technical problems of society while considering the ethical, social, and economic implications of their work. Understand the impact of engineering solutions in a global and national context.

- ⇒ Liberal Arts and Sciences - Strengthen abilities to interact with people, cultures, and the environment in an ethical and sensitive manner. Stimulate students to think globally, and to acknowledge and celebrate human diversity
 - ⇒ Human Sciences - articulate and demonstrate a clear concept of a just society in which individuals and groups equitably share in societal benefits within a global community.
 - First Year Sequence: Community engagement frequently occurs through first year student learning communities. More than half of entering first-year students participate in Learning Communities at Iowa State, several of which incorporate service-learning into their programs.
 - ⇒ Biology Education Success Team - Students are encouraged to participate in the service-learning component, The Skunk River Navy (SRN). The SRN does community service in the form of environmental improvement and education.
 - ⇒ Project Glean is a service learning initiative that combines the efforts of interdisciplinary teams within the Horticulture and Food Science and Human Nutrition learning communities. Students learn about the procedures involved in harvesting, grading, packing, storing and distributing apples, while researching local food banks and charities in need of fresh produce. The students then deliver the produce to the organizations they find are in greatest need.
 - ⇒ The Student Role Model program was established by Iowa State University's Program for Women in Science and Engineering to encourage students, grades K-12, to pursue education and careers in science, technology, engineering, and mathematics. The student role models are undergraduate students who visit schools and community organizations across the state of Iowa, engaging K-12 students in fun, interactive science and math activities. The program, which was created in 1990, reaches nearly 70 schools and 4,000 students each year.
 - ⇒ Hundreds of students in ISU College of Human Sciences learning communities volunteered to beautify the Iowa State campus on Friday, Sept. 11, as part of the United Way "Day of Caring." Approximately 300 first-year students registered to help – so they comprised the lion's share of the 600 volunteers in Story County, according to Frankee Oleson, executive director of United Way of Story County.
 - ⇒ ACES – last year students helped re-build a flood damaged farmstead in Minnesota.
 - ⇒ Ag Business – students participated in a trash dig at the Iowa State Center.
 - ⇒ ANTS – students stocking the food pantry at Sloss House.
 - ⇒ Globe – students work with Latino/a population in Marshalltown.
 - ⇒ Kinesiology – many service activities including working on health awareness with the Beloit facility.
 - ⇒ Preparing Tomorrows Teachers – assisting others from diverse cultures and disadvantaged youth.
3. Make sustainability a part of all orientation programs on campus.
- Director of Sustainability meets with 128 Community Assistants and 78 Resident Managers for the Department of Residence, at Student Staff Orientation. In turn,

- residence leaders discuss sustainability with the residents of the respective “houses” and apartment communities, thus providing all on-campus students with an orientation to sustainability. This is a new addition to Student Staff Orientation for the 2009-2010 academic year and is planned to be a standard part of orientation hereafter.
- All new incoming students are invited to take part in the Destination Iowa State new student event held each year. The ISU Council on Sustainability is one of the groups that takes part in this event and provides information on sustainability, ideas of ways students can support the Live Green! Initiative and various “green” resources.
4. Form curriculum workshops to engage and assist faculty and teaching assistants in integrating sustainability into general education and, as appropriate, undergraduate and graduate programs.
 - Completion of the 2nd Annual ISU Symposium on Sustainability on February 23-24, 2010. The symposium offered students, staff, and faculty the opportunity to learn about Iowa State's sustainability accomplishments, initiatives, and activities of the past year, hear from those who have taken an active role in ISU's Live Green! initiative, and gain awareness from national and international sustainability keynote speakers.
 5. Continue to participate in national efforts to understand and promote sustainability education, such as the National Teach-in Day for Climate Change and Sustainability, the workshop on sustainability education sponsored by the Association for Advancement of Sustainability in Higher Education, and the Consortium on the place of sustainability in Global Learning Leadership sponsored by the Association of American Colleges and Universities.
 - Iowa State University will be represented at the AASHE Sustainability Across the Curriculum Leadership Workshop taking place June 2010 (through partnering sponsorship by the Council on Sustainability).
 6. Increase the curricular offerings in sustainability to undergraduates through majors, minors, certificates, internships, service learning, and living/learning communities.
 - Global Resource Systems is an interdisciplinary major that emphasizes global and cross cultural engagement while equipping students with strong technical competency in a resource area of their choosing. This major prepares students to work on complex global resource issues through leadership positions in international non-governmental organizations, global businesses, and government agencies engaged in international trade and development, and globally engaged foundations, educational institutions and volunteer organizations. The major allows students to develop a core set of technical competencies in a resource area selected from among the 21 minors offered by the College of Agriculture and Life Sciences.
 - Undergraduate Certificate Program in Community Leadership and Public Service. This interdisciplinary certificate program utilizes courses offered in a variety of academic disciplines to provide a strong foundation and appropriate experiences for Iowa State University undergraduate students who plan to become community leaders and engage in public service-regardless of their profession-in the public, nonprofit or private sectors.

- ISU is beginning a Healthy Lifestyles Service Learning Initiative. This proposal funds initial development of a longer term project to provide students in the Department of Kinesiology and the Department of Food Science and Human Nutrition with practical, real-world learning opportunities while serving the Iowa State University community and residents in surrounding communities. The proposal seeks to create a coordinated service learning structure that will expand the use of service learning in the college of Human Sciences and create a sustainable and economically viable program to serve the campus and the community.
 - A sustainability minor proposal is under review and discussion.
7. Continue to support incorporating sustainability in the curriculum and in faculty research.
- The PLaCE (Partnering Landscape and Community Enhancement) program aims to enhance and promote the quality and character of Iowa's landscapes and communities. The College of Design will engage with communities in collaborative efforts to understand, envision and promote a fundamental enhancement of their physical environment.
 - Iowa State University, the College of Human Science and Main Street Iowa offered a select group of students the opportunity to participate in a field study project during the spring 2009 semester. The Main Street Makeover Marathon is an experiential learning opportunity with business design enhancement, marketing and promotions assistance, and merchandising/hospitality analysis and assistance. Students created and implemented design for interior makeovers in four downtown businesses in Elkader, Iowa.
 - Study abroad experiences that address sustainability include:
 - ⇒ Creating A School Garden: Service Learning in Uganda
 - ⇒ Applied Methods in Sustainable Engineering and International Development
 - ⇒ Integrated Agriculture and Food Systems: Improving Rural Livelihoods
 - ⇒ Multidisciplinary Experiential Study of International Nutrition in Peru
 - Masters of Business Administration program has placed emphasis on incorporating sustainability into its core classes.
8. Encourage departments to offer interdisciplinary courses related to sustainability.
- A E 411. Bioprocessing and Bioproducts. (Dual listed with 511). (Cross-listed with BioE, BSE, C E).
 - A E 610. Foundations of Sustainable Agriculture. (Cross-listed with Anthr, Soc, SusAg, Agron).
 - Arch 558. Sustainability and Green Architecture. (Cross-listed with Dsn S).
 - Biol 173. Environmental Biology. (Cross-listed with Env S).
 - C R P 484. Sustainable Communities. (Dual-listed with 584). (Cross-listed with Dsn S, Env S).
 - TSC 220X Global Sustainability

9. Offer courses that address specific issues related to sustainability, including encouraging students to be knowledgeable and responsible citizens and preparing students to pursue sustainable practices in their professions. Topics that can be addressed are environmental restoration and preservation, LEED construction practices, efficient operation and control of mechanical and power systems, alternative power sources, and sustainability incorporated in the design of human environments.
 - www.stuorg.iastate.edu/esw/ESW_Sustainable_Courses/Departments.html
 - Agron 497. Agroecology Field Course.
 - Arch 529. Spatial Dialectics in the American Midwest.
 - Arch 596. Seminar on the Built Environment II: Landscape and Society.
 - Diet 565. Malnutrition in Low-Income Countries.
 - I E 403. Introduction to Sustainable Production Systems.
 - Agron 497. Agroecology Field Course.
 - CE 594L Advanced Construction Topics: LEED® for New Construction
 - AE 388 Sustainable Engineering and International Development
 - BRT 501 Fundamentals of Biorenewable Resources
 - Design Studies 446 Bridge Studio
10. Sponsor Town Hall meetings on campus to discuss curricular efforts related to sustainability.
 - The Council on Sustainability hosted a Sustainability Forum that offered information and discussion of sustainability at Iowa State University inclusive of curriculum and operational efforts and initiatives.
11. Create sustainability enhancements for graduate and professional degree students through certificates, internships, or research partnered with green industry, government agencies, or non-government organizations.
 - Graduate program offered in Sustainable Agriculture.
 - Masters of Business Administration program has placed emphasis on incorporating sustainability into its core classes.
12. Increase opportunities for sustainability education through stand-alone certificates for returning students, certificates through distance education, or cooperative agreements with community colleges.
 - No action at this time.

Sustainability in Economic Development/Research/Outreach:

Vision: To pursue a sustainable future through economic research development and outreach by:

- Becoming a world leader in research related to the strengths of the three public universities.
- Helping Iowa businesses understand challenges and opportunities of a carbon-limited world.
- Developing and improving alternative energy sources.
- Serving as models and consultants to local, state, regional, national, and international industries, governments, and communities in issues related to sustainability.

- Developing public policy and practices for sustainable agriculture, community education for a sustainable lifestyle, sustainable tourism, solutions to problems of solid waste, reduction of pollution in metal casting, bioremediation of hydrocarbon contaminated soils, understanding ground water and surface water contamination, use of embedded sensors and software for systems control, use of geographic information systems to assess water quality and ecological damage, environmental threats to public health, and multimedia to communicate findings of sustainability research to the public.

Goals:

1. Expand external funding of sustainability research.
 - Iowa State University researchers have so far won 30 grants worth a total \$16.38 million from federal agencies awarding money from the American Recovery and Reinvestment Act (ARRA). The grants range from \$4.37 million to study how algae can be used for advanced biofuel production, to \$351,513 to establish a 10-week summer program that gives undergraduates research experience in environmental sciences, and to \$52,007 to develop new procedures to generate high-quality models of proteins.
 - The Bioeconomy Institute organizes faculty to work on interdisciplinary teams with the goal of advancing sustainable energy technologies based on biomass. Typical projects integrate agronomy, chemistry, engineering, and economics for this purpose.
 - The Center for Biorenewable Chemicals, CBiRC's, pioneering research programs are focused on developing technologies that enable the production of biorenewable chemicals. CBiRC will achieve this by harnessing the combined power of biotechnology and catalysis to deliver a broad platform of innovations that cost-effectively convert renewable materials into chemical feedstocks.
2. Continue to work with other educational leaders at all levels and leaders in the private sector to develop a statewide science and technology plan to reposition Iowa for workforce development and to capitalize on the unique strengths of each of the three public universities.
 - No action at this time.
3. Sponsor seminars for industries in wind energy, biofuels, solar and other renewable energies, biobased energy, and other biobased products.
 - In April 2010, ISU hosted the Iowa Alliance for Wind Innovation and Novel Development (IA WIND) Conference and the 2010 Iowa Wind Energy Association's (IWEA) Annual Meeting and Conference.
4. Work with students and businesses to exploit opportunities made available by the promotion of sustainability.
 - The College of Design, through its Bridge Studio creates an innovative studio that "builds bridges" between sustainability and affordability; design and community; and practice by bringing together upper-level students, architects, contractors, government agencies, community organizations and residents of low-income neighborhoods to develop prototypes for affordable, energy-efficient, single-family housing.

5. Conduct an ongoing series of high profile workshops on sustainability, available to the public, including major international conferences on renewable energy and water resources.
 - The Annual Symposia on Sustainability and the Wind Energy Conferences hosted by ISU both meet this goal.
6. Exploit the creative resources of the Internet to share the vision, knowledge, and practices and to invite engagement in these challenging issues of the 21st century.
 - Development of a Live Green! website that highlights sustainability initiatives and efforts of Iowa State University including research.
 - New free online tool developed at ISU helps farmers earn more, waste less. A new, free, online tool called [L-FARM](#) has been developed at Iowa State University to help farmers make better-informed operational decisions. The software draws on information collected from various state, regional and national sources.
7. Assist in the implementation of sustainable practices by firms and government agencies, including the identification of cost-effective environmentally-friendly processes that are economically sustainable to generate a normal rate of profit.
 - The Center for Sustainable Environmental Technologies seeks to promote, develop and demonstrate thermochemical technologies for the production of fuels, chemicals and power from biomass and fossil fuels.
 - The Bioeconomy Initiative focuses on the development of advanced biofuels and other biobased fuels as a way to reduce reliance on imported petroleum and reducing net greenhouse gas emissions.
8. Develop new methods of analysis for evaluating the sustainability of alternative natural and built environments within different economic systems.
 - ISU students participated in the international Solar Decathlon event held in Washington, D.C. in fall 2009. The U.S. Department of Energy Solar Decathlon challenges 20 collegiate teams to design, build, and operate solar-powered houses that are cost-effective, energy-efficient, and attractive. The ISU team placed 12th overall, and scored in the top 10 in four of 10 competition areas.
 - The College of Design, through its Bridge Studio creates an innovative studio that "builds bridges" between sustainability and affordability; design and community; and practice by bringing together upper-level students, architects, contractors, government agencies, community organizations and residents of low-income neighborhoods to develop prototypes for affordable, energy-efficient, single-family housing.
9. Develop and transfer new technologies that conserve energy, matter, and, in particular, water, air, minerals, and other natural resources.
 - The BioCentury Research Farm furthers research that brings together scientific expertise to address biomass cropping systems, biofuel and bioproduct processing, logistics of biomass supply and positive environmental effects such as nutrient recycling back to the land.
 - The Iowa Energy Center advances Iowa's energy efficiency and renewable energy use through research, education and demonstration.

- The Department of Agricultural and Biosystems Engineering's Water and Environmental Stewardship Engineering focus area works to develop engineering solutions and best management practices that protect and conserve the soil and water resources of Iowa, as well as provide extension services on topics such as water quality.
10. Sustain and create industries that drive the world's economic engines to improve the quality of life.
- There are some new businesses dealing with solar and wind energy to which Iowa State University has offered assistance and guidance.
11. Continue to develop and grow programs that are directed at sustainability for the nation and the developing world.
- There is a variety of research and curricular initiatives underway on the ISU campus that focus on furthering sustainability, as described throughout this report.
12. Provide public education to increase energy and resource conservation and the recycling and reuse of material.
- An Iowa State University architecture class is working with the community of Corning, Iowa to create a prototype house that is both affordable and sustainable.
13. Develop public education to reduce soil erosion and overuse of chemicals and fertilizers in agriculture, and to increase energy efficiency on farms.
- The Leopold Center does educational programs on soil erosion and lower use of chemicals.

Other Sustainability Efforts:

In addition to the above noted functional areas, Iowa State University has been very involved in identifying, planning, and facilitating opportunities for faculty, staff, and students to engage in sustainability events, initiatives, and awareness building. These opportunities have not only included the campus community; they have also included collaborative opportunities with the Ames community. The highlights of this campus and community engagement have included the following:

Campus Engagement:

- A number of campus engagement initiatives and opportunities have taken place, including:
 - ✓ For students:
 - Establishment of the Green Umbrella – a student organization focused on coordinating efforts and leveraging resources among all campus student organizations focused on sustainability-minded initiatives.
 - National Campus Sustainability Day – campus event.
 - Campus Electronics Recycling Events – for all students.
 - Sustainability internships offered to students through the Live Green! initiative, ISU Dining, and Parks Library.
 - Establishment of a ride share and carpooling website by the Government of the Student Body.

- Sustainability lectures and presentations provided by the Director of Sustainability and other campus staff from functional areas including: Facilities Planning and Management, Environmental Health and Safety, and ISU Dining.
- Awareness opportunities, including: Iowa State University Sustainability Lecture Series and various Sustainability Forums, lectures, exhibits, and educational opportunities provided through collaborative efforts of the campus community including: Lectures Program, Live Green! initiative, Council on Sustainability, National Affairs, College of Design, College of Agriculture and Life Sciences, College of Business, College of Engineering, College of Liberal Arts and Sciences, Parks Library, and ISU Dining.
- Establishment of a Live Green! website www.livegreen.iastate.edu.
- Appointment of a Director of Sustainability to the Government of the Student Body Cabinet.
- Establishment of a Sustainability Chair for all student residence halls.
- Establishment of an Undergraduate Sustainability Coordinator for ISU Dining.
- Education and awareness of sustainability initiatives and opportunities through Department of Residence community bulletin boards, residence hall meetings, and student apartment newsletters.
- Establishment of a Student Engagement Working Group focused on creating diverse opportunities for students to become engaged in sustainability at Iowa State University.
- Establishment of the Inter-Residence Hall Association GreenHouse Group focused on increasing education, awareness, and involvement of campus housing residents in sustainability and recycling.
- Providing outreach and awareness (through ISU Dining) to offer the opportunity to experience foods that have been produced through alternative forms of processing, including: Fair Trade, pasture-raised, and grass-fed.
- Creation of a student Building Energy Audit Team to offer limited consulting and brainstorming assistance to campus building occupants.
- Establishment of student positions on university committees and councils focusing on sustainability, including: President's Advisory Council on Energy Conservation and Global Climate Change, Council on Sustainability, Live Green Loan Fund Advisory Committee, Recycling Committee, and University Green Teams.
- Participation in the US Department of Energy's Solar Decathlon event – involving 15 faculty, numerous staff, and over 200 students across multiple colleges and functional areas.
- Completion of individual, class, and organizational projects focused on the following sustainability topics:
 - ❖ Emerald Ash Wood Waste Beneficial Use
 - ❖ Library Electronic Sustainability Guide
 - ❖ Expansion of Campus Recycling (including a campus waste sort)
 - ❖ Bicycle Usage Patterns and Amenities Inventory for Ames and Iowa State University
 - ❖ Sustainability campus promotions and products (including press releases, website design, social marketing, event publicity, how-to guides, living green tips, and interpretive signage for campus sustainability products and processes)
 - ❖ Energy Efficient Landscaping

- ❖ Campus Forest Carbon Sequestration
- ❖ Energy Efficient Renovation Projects for Ames and Iowa State University
- ✓ For faculty and staff:
 - Electric Bicycle Trial Event in conjunction with X-Treme Scooters.
 - LASFF Green Team Energy Consumption Research Project.
 - Opportunity for faculty and staff involvement on university committees and councils focusing on sustainability including: President's Advisory Council on Energy Conservation and Global Climate Change, Council on Sustainability, Live Green Loan Fund Advisory Committee, and University Green Teams.
 - Establishment of a Live Green! website www.livegreen.iastate.edu.
 - Establishment of a ride share and carpooling website by the Government of the Student Body.
 - Participation in the US Department of Energy's Solar Decathlon event – involving 15 faculty, numerous staff, and over 200 students across multiple colleges and functional areas.
 - Sponsorship opportunities (through the Council on Sustainability) for attendance at various national and regional sustainability meetings and conferences.
 - Providing outreach and awareness (through ISU Dining) to offer the opportunity to experience foods that have been produced through alternative forms of processing including: Fair Trade, pasture-raised, and grass-fed.
 - Awareness opportunities, including: Iowa State University Sustainability Lecture Series and various Sustainability Forums and lectures provided through collaborative efforts of the campus community including: Lectures Program, Live Green! initiative, Council on Sustainability, National Affairs, College of Design, College of Agriculture and Life Sciences, College of Business, College of Engineering, College of Liberal Arts and Sciences, Parks Library, and ISU Dining.

Community Engagement:

- A number of community engagement initiatives and opportunities have taken place in the past year that have engaged and connected the Ames and Iowa State University communities, including:
 - ✓ Annual Iowa State University Symposium on Sustainability.
 - ✓ Public awareness opportunities, including: Iowa State University Sustainability Lecture Series and various Sustainability Forums and lectures provided through collaborative efforts of the campus community including: Lectures Program, Live Green! initiative, Council on Sustainability, National Affairs, College of Design, College of Agriculture and Life Sciences, College of Business, College of Engineering, College of Liberal Arts and Sciences, Parks Library, and ISU Dining.
 - ✓ College Creek Cleanup Event.
 - ✓ Earth Week – various campus and community events.
 - ✓ Ames and Iowa State University Clothing Swap Event.
 - ✓ Ames and Iowa State University Book Swap Event.
 - ✓ Creation of a Green Business Checklist (in conjunction with the City of Ames, Iowa State University, and the Ames Chamber of Commerce).

- ✓ Creation of “Greening Together” – quarterly campus and community “green” events and resources featured newspaper insert (in conjunction with the Ames Tribune, City of Ames, Iowa State University, and Ames Chamber of Commerce).
- ✓ Various (by request) sustainability lectures provided by the Director of Sustainability and other campus staff from functional areas including: Facilities Planning and Management and ISU Dining.
- ✓ Participation in VEISHEA and 4th of July Events – as a collaboration between the Council on Sustainability, the Live Green! initiative, and Keep Iowa State Beautiful.