

Contact: Sheila Doyle

REGISTER OF IOWA STATE UNIVERSITY
CAPITAL IMPROVEMENT BUSINESS TRANSACTIONS

Actions Requested: Consider recommending to the Board approval of the following actions for the **New Century Farm** project, a major capital project as defined by Board policy.

1. Acknowledge receipt of the University's initial submission of information to address the Board's capital project evaluation criteria (see Attachment);
2. Accept the Board Office recommendation that the project meets the necessary criteria for Board consideration; and
3. Authorize permission to proceed with project planning, including the architectural selection process.

Executive Summary: The **New Century Farm** project would establish the first integrated and sustainable biofuel feedstock demonstration farm in the United States. The Farm would serve as a model for American biorenewable energy and bioproducts production, and would demonstrate the transformation of agriculture to become feedstock ready. The Farm would be located at the site of the Agricultural and Biosystems Engineering and Agronomy Research Farm located west of Ames on Highway 30.

The New Century Farm would benefit from the following: the University's location at the geographical, research and educational center of the expanding bioeconomy; the University's research accomplishments and expertise in biorenewables, which date back to the 1970s; the University's internationally recognized biorenewables programs, which offer the only biorenewables graduate degree in the nation; the University's close collaboration with major agricultural and chemical industries, most of which have major facilities in central Iowa; and the University's excellent statewide extension and outreach programs serving agriculture and business and industry. The University believes the New Century Farm will provide a significant addition to ISU's nearly 150 years of demonstrated innovation and excellence in its mission of research, teaching and extension.

The estimated project cost of \$14 million is anticipated to be funded by a combination of private giving and federal funds (totaling \$7.0 million), the Federal Small Business Administration (authorization of \$3.5 million), and the Iowa Department of Economic Development (authorization of \$3.5 million).

Details of Project:

New Century Farm

Project Summary

	<u>Amount</u>	<u>Date</u>	<u>Board Action</u>
Permission to Proceed		March 2007	Requested

New Century Farm

Evaluation Criteria

Since the project meets the Board's definition of a major capital project, the University has provided the following information in response to the Board's evaluation criteria.

Institutional Mission/Strategic Plan: The emerging bioeconomy and the emphasis on bio-renewable fuels produced from biomass (crop residues and dedicated cellulosic crops) means for our nation, especially rural areas, an opportunity to develop new industries and to diversify its agriculture. Key to the success in attracting the development of biorefineries will be the ability of producers to grow the kind and quantities of feedstocks needed by the industry. It is widely recognized that the renewable fuels economy cannot be supported by corn grain alone – that a variety of annual and perennial cellulosic crops must be grown to complement corn and soybean production. If carefully designed and implemented, a transformed agriculture will 1) serve the bioeconomy, as well as provide food and feed; 2) conserve soil, water and other natural resources; and 3) strengthen rural communities and improve the quality of life for those who produce and supply biomass materials.

Achieving this vision of sustainable bioenergy and bioproducts production will require new crops and new cropping systems. It will require the integration of disciplines in the agronomic and biological sciences, social sciences and engineering into teams focused on biofuels and bioproducts. It will require, at all stages of the research and development process, input from producers, industry representatives and policy-makers.

The New Century Farm's vision will encompass:

- Research that brings together scientific expertise to address biomass cropping systems, biofuel processing, logistics of biomass supply and positive environmental effects such as recycling nutrients back to the land.
- Teaching that serves as a laboratory and resource for training future scientists, producers and extension experts.
- Extension that demonstrates economic, social and environmental viability of biorenewable energy and bioproducts production to producers, policy-makers and the public.

Other Alternatives Explored: Research conducted on the New Century Farm will address some of the most critical questions facing biorenewables, including:

- Crop production: What are the optimal biomass production systems (species, crop rotations, nutrients and energy inputs, management practices)?
- Germplasm development: How can selection and breeding improve conventional and alternative biomass crops (both herbaceous and woody)?
- Environmental impact: How can biomass production improve environmental quality? What practices help ensure that producing and harvesting biomass will not compromise natural resources?
- Harvest, transport and storage: Because biorefineries will require large amounts of bulky materials that need to be collected, stored and transported, what new equipment and associated technologies will enable this to be accomplished most efficiently and with acceptable environmental trade-offs?

- Biomass processing: In a test facility conducting comprehensive pilot-scale evaluations, how will biochemical, thermochemical and hybrid technologies that convert biorenewables to fuels and biobased products perform? To what extent can processing byproducts be recycled through the feedstock production system to minimize inputs to the agro ecosystem and improve soil?

The New Century Farm will be highly visible on its own site adjacent to Highway 30, a major entrance corridor to Ames/ISU and near the recently announced permanent Farm Progress Show site. The site has excellent access for many kinds of arrivals and departures, including biomass, wastes, equipment, scientists, cooperators, students, and visitors.

The location has ample land area for storage, pre-processing, handling, processing, and delivery of biomass materials at one site. This is a key attribute that significantly minimizes costs, simplifies logistics, and enhances research and demonstration possibilities. Biomass from research plots, ISU bulk fields, and from neighboring private farmer-owned fields can be readily aggregated at the site for later use. All biomass activities can occur at one location rather than at several.

The location on the ISU Ag Engineering/Agronomy Research Farm has the advantages of a rural setting to accommodate the noise, odor, dust, etc., generated by the biomass plant's activities. In addition, by being on the research farm, there is the potential for shared equipment, staff, dryers, coolers, shops, and storage. Also, the potential synergies of scientists across many disciplines of agroecology, crops, soils, agricultural engineering, mechanical engineering, chemical engineering, plant breeding, and social science are greatly enhanced by locating all segments of the process adjacent to one another.

By siting the pilot plant near the research plots and farmlands, the potential for the entire biorenewable system, from soils to crops to harvest to processing and returning wastes back to the soil, can be documented in a holistic systems approach. Waste products from the bioenergy production can be captured, quantified, and recycled. This information will be critical in building a new bioenergy industry in Iowa.

Impact on Other Facilities and Square Footage: The center piece of the New Century Farm will be a state-of-the-art bioprocessing facility that contains research space for three "research trains": biochemical; thermochemical and bioprocessing. There will be additional laboratory, meeting and office space in the facility. Nearby there will be several buildings to serve equipment, pre-processing, biomass storage and harvesting/transportation needs. This new activity will not be relocated from existing facilities.

Financial Resources for Construction Project: Estimated project cost is \$14,000,000, with \$3.5 Million from IDED appropriations, \$3.5 Million from Federal Small Business Administration appropriations, and \$7.0 Million from private funds/federal funds.

Financial Resources for Operations and Maintenance: Estimated operations and maintenance costs of the new facility are:

Custodial and routine maintenance	\$ 400,000
Utilities	\$ 300,000
Other (Grounds/Mail/EHS/DPS)	\$ 150,000
Annual Capital Renewal	\$ 150,000

The proposed sources of funds for operations and maintenance are: 1) College of Agriculture, 2) sponsored research awards, and 3) fees for research at the processing facility.

External Forces: The emerging bioeconomy and the emphasis on renewable fuels produced from living biomass plants and crop residues present our nation — and especially rural areas — with a unique opportunity to develop new industries, diversify its agriculture and sustain its communities and environment.

The university is a leader in biorenewable energy and bioproducts production. The New Century Farm will help to ensure this national leadership. There are very important state and national policy issues and the university is expected to play a role in answering these difficult questions.

Global events are revolutionizing the agricultural and energy industries. The New Century Farm will be an important contributor to the expertise needed for the transformation of agriculture to become feedstock-ready.