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STATE ENERGY OFFICE

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
DEPARTMENT OF AGRONOMY AND HORTICULTURE

Date: September 30, 2005

To: Jerry Loos, Nebraska Energy Office

Fr: Kenneth G. Cassman, Professor, Department of Agronomy and Horticulture



RE: Submission of final report

Please find enclosed the final report for our Nebraska Biomass Roadmap Project—Phase II, which terminates today, Sept 30 2005. Please let me know if the documentation in this report suffices.

It was a pleasure to work with you on this project, and I think the Workshop was a success.

Final Report: Nebraska Biomass Roadmap Project—Phase II

(Financial Assistance Award #04/05-013 from the Nebraska Energy Office)

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Scope of Work

1. Establish a Steering Committee to plan and implement a statewide Biomass Energy Workshop;
2. Hold a statewide Biomass Energy Workshop to:
 - Identify and prioritize needs and objectives for biomass utilization in Nebraska;
 - Identify potential funding sources and opportunities to implement, research, education and development of biomass energy systems in Nebraska;
3. Prepare a summary of the Workshop results and provide the Workshop summary to the Energy Office, and distribute to the Workshop participants, the Biopower Steering Committee, and other relevant groups;
4. Create and post a Biofuel Energy website that includes the output from the Workshop.

Project Accomplishments

1. Steering Committee

A Steering Committee was established in January 2005 to include representatives of the major biomass energy stakeholder groups in Nebraska. Committee members were selected from the bioenergy industry, state government agencies, agricultural commodity groups, environmental groups, and the University of Nebraska. A membership roster is provided in [Appendix 1](#). The Steering Committee met on three occasions to set the agenda and format for the Workshop, identify speakers of state and national prominence, and to identify key constituencies to reach for advertising the Workshop. Email communications were also used to follow through on issues and actions decided at the face-to-face meetings. By end of March 2005, the SC completed its assignment so that efforts could move forward on implementing the Workshop, which was to be held July 20, 2005. It was decided to focus the Workshop on opportunities and challenges to enhancing the “biofuel renewable energy industry” in Nebraska.

2. Implementing the Nebraska Biofuel Renewable Energy Roadmap Workshop

Speakers were identified and contacted to ascertain their availability and willingness to participate. A good balance was achieved in getting speakers of national and state prominence to address the topics identified by the SC ([Appendix 2](#)—Workshop program). We were very fortunate to have Governor Dave Heineman give the opening address, followed by presentations from Roger Conway—Director of the USDA Office of Energy Policy, Robert Brown—Director of Sustainable Environmental Technologies at Iowa State University, and several presentations from University of Nebraska faculty, and Nebraska bioenergy industry leaders. After lunch, the Honorable Mike Johanns, US Secretary of Agriculture, gave a video greeting, which was followed by four breakout sessions to address the following issues:

- Identifying Nebraska’s comparative advantages for investment in the biofuel/biorefinery industry;
- Public and private sector research priorities and opportunities;
- Educational/information needs;
- Policy/government programs, market development, infrastructure/capital investment needs.

Each breakout session was moderated by a facilitator and recorder so that the outputs could be reported back to the final plenary session, which concluded the Workshop.

Travel logistics, lodging arrangements, and reimbursement of travel and lodging costs were arranged for the speakers. A large conference room and breakout session rooms to accommodate up to 225 people were rented from the Marriott Cornhusker Hotel in downtown Lincoln.

A stakeholders database was established that included industry professionals and business leaders, officials and professionals in state government agencies, state legislators and their staff, Nebraska’s congressional delegation and their staff, members of agricultural commodity groups, university faculty and extension educators. This database was used for distributing Workshop announcements and included more than 400 entries. Workshop announcements were sent out to all entries in this, and a news release was prepared and sent out through several media channels. Registrations were made at the NEO website.

Arrangements were made with the University of Nebraska WebVideo facility to film and broadcast the program live through the state satellite video network.

Approximately 200 people attended the Workshop with strong participation in the afternoon breakout and final plenary sessions.

3. Summary and Dissemination of Workshop Results

After the Workshop, videos of the speaker presentations were posted on the UNL WebVideo website (<http://webvideo.unl.edu/biofuel.html>). In addition, each speakers powerpoint presentation is also available at this site. Outputs from the breakout sessions are also available at (<http://webvideo.unl.edu/downloads/9BreakoutSessionSummaries.pdf>), and they are included in [Appendix 3](#). The breakout session summary recommendations were also sent out to the participant registration list.

The summaries from the breakout sessions were comprehensive and complementary. As such, they will provide excellent input to development of a complete Biofuel Renewable Energy Roadmap for Nebraska.

4. Nebraska Biofuel Renewable Energy Websites

As previously described, the speaker presentations and recommendations from the breakout sessions are posted on the UNL WebVideo website (<http://webvideo.unl.edu/biofuel.html>, and <http://webvideo.unl.edu/downloads/9BreakoutSessionSummaries.pdf>). In addition, a summary website without the video presentations has been completed and will soon be posted. This site will contain additional background information and more detail about Nebraska's comparative advantages for investment in the biofuel renewable energy industry, current biofuel facilities and capacities, links to seminal scientific articles on life-cycle energy efficiency analyses of biofuel production and byproduct utilization, and state and national organizations and agencies that support the bioenergy industry.

5. Final Recommendation

The discussions at the breakout sessions were well attended. In general, there was a shared belief that Nebraska has a unique set of comparative advantages, compared with neighboring states that should help attract a lion's share of new investments in bioenergy facilities as a result of the Renewable Fuel Standard in the 2005 federal Energy Bill. Likewise, there was strong support for establishing a more cohesive and coordinated research effort within the state on biofuel production efficiency and contributions to decreasing dependence on imported oil, expanding the types of value-added byproducts and exploring more profitable byproduct utilization—especially in biorefineries linked to livestock feeding operations, and the sustainability of crop-to-biofuel production systems as related to impacts on soil and water quality. There was also interest in the enhancement of educational and outreach programs that can better support the needs of a rapidly expanding biomass energy industry. A number of policy, marketing, and infrastructure issues and needs were also identified. Taken together, these recommendations provide a solid foundation for developing a comprehensive Biomass Energy Roadmap for Nebraska. There is clearly excitement about the potential of this industry as a positive economic development force within the state—especially in rural areas.

Appendix 1. Biomass Energy Roadmap Steering Committee Roster

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Appendix 2. Workshop Program

| | | |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8:30-9:00 | Registration | Location: Foyer - Cornhusker Hotel Ballroom |
| 9:00-9:30 | Opening address | Nebraska Governor Dave Heineman Location: Ballroom |
| 9:30-9:45 | Nebraska's bioenergy future: A roadmap based on comparative advantages and opportunities. | Kenneth Cassman , Professor of Agronomy, University of Nebraska, Department of Agronomy and Horticulture, Lincoln, NE |
| 9:45-10:15 | Biofuels production: Implications for grain industry and consumers. | Roger Conway , Director, USDA Office of Energy Policy & New Uses, Washington, D.C. |
| 10:15-10:45 | Iowa's vision and roadmap for a bioeconomy: The journey so far. | Robert C. Brown , Bergles Professor and Director, Center for Sustainable Environmental Technologies, Iowa State University, Ames, IA |
| 10:45-11:00 | Efficiency and energy yield of Nebraska corn ethanol systems. | Daniel Walters , Professor of Soil Science, University of Nebraska, Department of Agronomy and Horticulture, Lincoln, NE |
| 11:00-11:20 | A Bio-refinery for Mead, NE | David Hallberg , CEO, E3 Biofuels, Omaha, NE |
| 11:20-11:40 | Opportunities and challenges for biodiesel. | Loren Isom , Industrial Agricultural Products Center, University of Nebraska |
| 11:40-12:00 | A starch and biomass conversion pilot plant in York, NE | Asif Malik , Plant Manager, Abengoa Bioenergy Corporation, York, NE |
| 12:00-1:00 | Lunch | |
| 1:00-1:05 | Comments | Honorable Mike Johanns , U.S. Secretary of Agriculture |
| 1:05-1:25 | Imperial, NE biomass energy project: Meeting bio-refinery feedstock needs—a regional approach. | Bob McGrath , Executive Director, Chase County USDA—Farm Service Agency, Imperial, NE |
| 1:25-3:00 | Breakout sessions to identify: | |
| | <ul style="list-style-type: none"> I. Nebraska's comparative advantages for investment in the Biofuel/biorefinery industry; | Frank Thompson , NPPD and Member Biomass Steering Committee, Facilitator Patty Hain , University of Nebraska, Recorder Location: Ballroom |
| | <ul style="list-style-type: none"> II. Public sector research priorities and opportunities; | Mark Brohman , Nebraska Game & Parks and Biomass Steering Committee, Facilitator Vikki Miller , University of Nebraska-Lincoln, Recorder Location: Arbor I |
| | <ul style="list-style-type: none"> III. Educational/information needs. | Mike Holton , Center for Rural Affairs, Facilitator Don Lee , University of Nebraska-Lincoln, Recorder Location: Arbor II |
| | <ul style="list-style-type: none"> IV. Policy/government programs, market development, infrastructure/capital investment needs. | Corrine Pedersen , Nebraska Municipal Power Pool, Facilitator Richard Clark , University of Nebraska-Lincoln, Recorder Location: Hawthorne |
| 3:00-3:15 | Break | |
| 3:15-4:00 | Final Plenary Session: Reports of Breakout Groups | Facilitators reporting. Location: Ballroom |

Appendix 3. Output and recommendations from the Workshop breakout sessions.

1. Nebraska's comparative advantages for investment in the biofuel renewable energy industry:

- **Infrastructure**
 - Transportation; Low cost public power; Irrigation systems for reliable production of grain and biomass feedstock; Cluster industry support; Natural gas pipelines
- **Natural Resources**
 - Water resources for irrigation; Abundant and good quality land and soil; Grasslands for livestock; Favorable climate; Wind; Fallow acres in western NE; Geographic advantage for shipping products west
- **Production Systems**–Abundance of productive crops; Complete livestock package-- including cattle feedlots for use of distillers grains; Availability of stover/biomass; Already 3rd nationally in ethanol production; Innovative pilot plants at York and Mead with new technologies
- **Human Factors**–Research/education at UNL; USDA-ARS commitment within the state; Regional partnerships possible with other states; Agri-innovation and quality of producers; Citizen support; Work ethic; Strong political support; Familiarity of service providers; Existing supportive industries
- **Recommended Action Steps**
 - Establish national/state *Renewable Fuel Standard*
 - Biofuel producer incentives
 - Create statewide entity for biofuel energy systems research and education/information
 - Improve communication & provide focus
 - Organize & coordinate research efforts
 - Improve visibility of UNL work in biofuels; deliver/publicize UNL research, education, outreach
 - Ensure that investments in current biofuel projects within the state are successful
 - Deal with phosphate mgt from by-products –research & implementation
 - Hold annual statewide Biofuel Energy meetings like today's Workshop

2. Public sector research priorities

- **Sustainability**
 - Of livestock industry in a biofuel economy
 - Reducing environmental impacts through biorefinery synergies (i.e. efficient and environmentally sound crop production, byproduct utilization, reducing manure and odor associated with feedlots, biogas production)
 - Long-term energy budget issues: How much more energy can be produced than is required in production of crop and biofuels? How much imported oil can be replaced?
 - Of cropping systems: impact of stover removal on soil quality, water use efficiency in crop and biofuel production and by-product utilization)
 - Socio-economic issues (e.g. impact on rural development; grain prices, etc).
- **Byproducts/co-products**
 - New value-added uses, expanded uses, new markets

- Minimizing some byproducts-Dried distillers grains
- How best to use in feed rations
- Develop standardized methods for assessing quality for diverse byproduct uses and incoming raw materials
- **Establish partnerships**
 - Public/industry partnerships to support research
 - Develop research facility to do plant-scale research that addresses industry problems
 - Push for a major public policy research initiative on biofuels
 - Identify players, funding sources –who has the money to support biofuel development?
 - Seek venture capital

3. Education and Information Needs

- **Who is the audience?**
 - General Public and Media
 - Technical, professional, and formal “students”
 - Active communities interested in the biofuel industry to help drive economic development
- **How to best reach these groups**
 - “Office” or entity to coordinate resources and efforts
 - Take advantage of NPPD, UNL, other educational institutions and industry groups

4. Policy Priorities

- Competitive, targeted incentives to make Nebraska effective in attracting investment in biofuel production plants and biorefineries
- Streamline permit process
- Establish a “Center for Bio-fuels Development”
- Establish a Midwest biofuel cartel
- Encourage ethanol development from multiple feedstocks
- Policies to encourage investment in technology development, innovation, and use in biofuel production
- Policies that promote use of bio-based products to replace products made from fossil fuels

5. Market Development, Infrastructure and Capital Investment

- Establish greater interaction and communication between biofuel producers and petroleum marketers
- Consumer education (see public awareness needs, breakout session 3)
- Standardization for quality of distillers grains used for livestock feed
- Encourage public agencies to support use of biofuels
- Streamline permitting process
- Incentives to compete
- Coordinate power production with power suppliers
- Identify co-generation opportunities