EERC
Energy & Environmental Research Center

UNIVERSITY OF NORTH DAKOTA
15 North 23rd Street — Stop 9018 / Grand Forks, ND 58202-9018 / Phone: (701) 777-5000 Fax: 777-5181
Web Site: www.undeerc.org

October 31, 2008

Ms. Karlene Fine
Executive Director
North Dakota Industrial Commission
ATTN: Renewable Energy Development Program
600 East Boulevard Avenue
State Capitol – Fourteenth Floor
Bismarck, ND 58505

Dear Ms. Fine:

Subject: EERC Proposal No. 2009-0085

Enclosed please find an original and one copy of the proposal entitled "North Dakota Biomass Feasibility Studies." Also enclosed is the $100 application fee.

The Energy & Environmental Research Center (EERC) of the University of North Dakota is pleased to submit the subject proposal. The EERC is committed to completing the project as described in this proposal if the Commission makes the requested grant.

If you have any questions regarding this proposal, please contact me by phone at (701) 777-5013, or by e-mail at kleroux@undeec.org.

Sincerely,

Kerryanne M.B. Leroux
Research Engineer

Approved by:

Dr. Barry I. Milavetz, Associate VP for Research
Research Development and Compliance

KMBL/sah
Enclosures

c/enc: Jeff Burgess, NDIC

NORTH DAKOTA BIOMASS FEASIBILITY STUDIES

EERC Proposal 2009-0085

Submitted to:

Karlene Fine

North Dakota Industrial Commission
ATTN: Renewable Energy Development Program
600 East Boulevard Avenue
State Capitol – Fourteenth Floor
Bismarck, ND 58505

Amount Request: $100,518

Submitted by:

Kerryanne M.B. Leroux
Kirk D. Williams
Sheila K. Hanson

Energy & Environmental Research Center
University of North Dakota
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

Kerryanne M.B. Leroux, Project Manager

Dr. Barry I. Milavetz, Associate VP for Research
Research Development and Compliance

October 2008

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ABSTRACT

The Energy & Environmental Research Center (EERC) is proposing to provide technical support to the North Dakota Renewable Energy Council (NDREC). The goals of this project are to identify the North Dakota public facilities with the greatest potential for economic benefit from implementation of a biomass fuel and to educate the respective communities on biomass utilization. Substantial savings are possible for public facilities across the state of North Dakota using biomass for energy. The proposed project will stimulate interest in renewable energy systems for the public, private, and commercial sectors by communicating the potential savings to local communities. Evaluation and monitoring of the tasks conducted will maintain quality of work and completion as scheduled.

Despite the many investigations within the state of North Dakota for biomass utilization opportunities, especially by the North Dakota Forest Service, efforts have resulted in the installation of few biomass energy systems to date. An in-depth, comprehensive study of all North Dakota communities is thus recommended to identify the public facilities with the greatest economic opportunity for implementation of biomass as fuel.

The EERC is one of the world's major energy and environmental research organizations, providing access to an array of multidisciplined engineers and scientists. Many exciting renewable energy research, development, demonstration, and commercialization projects have been conducted using a variety of biomass types for residential, industrial, and utility power generation. The project team has significant experience in renewable energy and economic development.

The total budget for the study is estimated at $201,036. The NDREC is asked to commit $100,518. The proposed work is further supported by the EERC's Center for Biomass Utilization® (CBU®). The CBU program will supply the required 50% match of $100,518. Data previously collected by the EERC will also be utilized in support of the project. Completion is expected within 12 months of project start.

INTRODUCTION

The Energy & Environmental Research Center (EERC) is proposing to provide technical support to the North Dakota Renewable Energy Council (NDREC) to assist in achieving the goals set forth under the Renewable Energy Program (REP) and the Biomass Incentive and Research Program (BIR). The missions of REP and BIR are to promote the growth of North Dakota's renewable energy industries and biomass industry efforts, respectively, through research, development, marketing, and education. The proposed work is further supported by the EERC's Center for Biomass Utilization® (CBU®).

Despite the many investigations within the state of North Dakota for biomass utilization opportunities, especially by the North Dakota Forest Service (NDFS), efforts have resulted in the installation of few biomass energy systems to date. A preliminary, state-wide study (Schmidt et al., 2003) was conducted to explore the utilization of subsequent waste biomass produced from fire mitigation efforts. Several projects have followed, such as feasibility studies for Minot State University – Bottineau, institutions within the Bismarck–Mandan area (Schmidt and Leroux, 2006), and regions surrounding Minot and Dickinson (Leroux, 2008); a fire mitigation project with the city of Bismarck; and a biomass energy demonstration project by the Bismarck Landfill. Studies outside NDFS efforts include investigation of alternative energy for Mayville State University (Leroux and Williams, 2007; Leroux and Williams, 2008). With about 700 public energy systems statewide, a need still exists to educate North Dakota communities of the specific local economic benefits of biomass utilization.

An in-depth, comprehensive study of all North Dakota communities is thus recommended to identify the public facilities with the greatest economic opportunity for implementation of biomass as fuel. This approach differs from past attempts at identifying biomass energy opportunities which determined the economic viability for a few chosen facilities or institutions. Instead, a model will be created that compiles the location of all major biomass resources and the size of each energy load and type across the state and compares the potential savings of utilizing a biomass fuel from current fossil fuel

consumption. The proposed approach will therefore generate a list of all public facilities for which implementation of a biomass energy system is economically feasible.

GOALS AND OBJECTIVES

The goals of this project are to identify the North Dakota public facilities with the greatest potential for economic benefit from implementation of a biomass fuel and to educate the respective communities on biomass utilization. The EERC will meet these goals by performing a feasibility study with the following objectives:

- Determine the availability of biomass resources for specific communities.
- Locate all public facilities within the state, as well as current energy systems and fuels.
- Identify applicable technology options for biomass utilization.
- Determine economic viability for installation of biomass energy systems in public facilities.
- Publish and disseminate results.

SCOPE OF WORK

The North Dakota biomass feasibility studies will be accomplished through the following five tasks.

Task 1 – Resource Assessment

This task will focus on available fuels that could be provided long term or under contract. Potential sources include municipal, industrial, or agricultural by-products or waste and forest-related activities. Potential resource facilities will be contacted to determine quantity and quality of major fuel resources. Existing information from previous studies will be utilized; resources in urban and rural areas will be equally considered.

Task 2 – Fuel and System Profile

Public facilities located in North Dakota will be identified, including schools, universities, municipal buildings, etc. Fuels and systems currently used for energy and heating requirements will be determined. Current annual energy costs will be estimated. Modifications required for transition to a biomass system, such as additional labor or buildings, will be reviewed.

Task 3 – Equipment and Technology Options

Biomass technologies, such as combustion or gasification, will be identified, and the equipment required, as well as biomass preparation (e.g., grinders) and transportation, will be determined. Existing systems and equipment, modification of systems and equipment, and new purchase requirements will be considered.

Task 4 – Project Economics

The economic feasibility for utilization of the biomass fuel resources identified and implementation of the technologies determined will be calculated for the North Dakota public facilities cited. Estimated capital costs will include system and fuel preparation equipment and any additional building requirements. Operating expenses will include estimated utility and labor requirements and fuel transportation costs. Potential savings from current energy costs will be used to estimate a simple payback and, therefore, economic viability. A payback of 10 years or less is considered economical.

Task 5 – Meetings and Reports

A final report summarizing results will be made available for distribution. Meetings will be held in Fargo–West Fargo, Bismarck–Mandan, Grand Forks, Minot, Dickinson, Jamestown, and Williston with regional leaders, businesses, and public facilities personnel. Final results will be presented to garner interest and encourage implementation.

STANDARDS AND EVALUATION

Substantial savings are possible for public facilities across the state of North Dakota using biomass for energy. The proposed project will stimulate interest in renewable energy systems for the public, private, and commercial sectors by communicating the potential savings to local communities. Evaluation and monitoring of the tasks conducted will maintain quality of work and completion as scheduled.

It is possible to create $10–$20 million annually in energy savings to North Dakota public facilities from the utilization of biomass, creating savings to city, state, and federal budgets; new jobs; and greater interest in renewable resources and technologies. A range of $2–$5 million annually in energy savings

were estimated to be possible for public facilities in the one-quarter of North Dakota surveyed (Leroux, 2008). Transferring existing energy systems to biomass solid fuel systems not only preserves the existing jobs of operating personnel but may create new jobs as solid fuel systems do require more oversight than liquid (e.g., propane) or gas (e.g., natural gas) systems. It is a goal of this project to educate the public on the extent of North Dakota's biomass resources and the specific applicability to local communities.

Detailing the savings possible to local public facilities will stimulate interest in biomass energy systems not only in the public sector, but in the private and commercial sectors as well. It is anticipated that several public facilities in each region of North Dakota will make use of project results, especially as heating costs are expected to continue rising this winter season. This may take several years, as funding is often needed for implementation and system design, and installation can take up to 2 years. Upon demonstration of the successful implementation of biomass energy, the private sector will likely follow. There is also a potential for commercial businesses to emerge in or segue into the renewable energy industry, including but not limited to biomass and related equipment distribution, biomass energy system design, equipment training and maintenance, etc.

Progress will be monitored to ensure quality of work is maintained and tasks are completed on schedule. Milestones, such as scheduled completion and progress reporting will be used to evaluate the progress of the project as anticipated. Expected deliverables will also be reviewed following completion of each task to ensure project success:

- The biomass resources available throughout the state of North Dakota
- A list of North Dakota public facilities and current respective energy systems
- The applicable renewable energy technologies for the facilities identified
- The North Dakota public facilities for which biomass energy systems have economic potential and the respective estimated savings
- Presentations across the state of project results and a final report available for public review detailing findings

PERSONNEL AND PROJECT MANAGEMENT

The project team has significant experience in renewable energy and economic development. Ms. Leroux will manage EERC project efforts, assisted by Mr. Williams and Dr. Hanson.

Project Manager

Ms. Kerryanne M.B. Leroux, Research Engineer. Ms. Leroux is a Research Engineer at the EERC with M.S. and B.S. degrees in Chemical Engineering. Ms. Leroux has extensive experience researching renewable, alternative, and fossil energy markets and production. Ms. Leroux has performed data, statistical, market, and economic analyses, as well as feasibility studies, for numerous renewable energies such as wind hybrid systems, gasification, fuel cells, energy storage, cogeneration facilities, biorefineries, biodiesel, ethanol, biomass, and hydrogen. Current efforts include process designs for biomass products such as ammonia, bio-oil, and heat.

Technical Support

Mr. Kirk D. Williams, Research Engineer. Mr. Williams, a Research Engineer at the EERC, has a M.S. in Geological Sciences and a B.S. in Geophysics. His principal areas of interest and expertise include mechanical and materials engineering, combustion engineering, and thermal imaging applications. Mr. Williams is presently involved in several projects related to researching renewable, alternative, and fossil energy markets; carbon capture and sequestration; hydrogen end-use demonstration, education, and outreach; municipal wastewater and landfill biogas treatment; energy conversion systems design and development; and combustion gas treatment technologies. Mr. Williams is presently working with commercial partners to lower the overall cost of current biogas treatment technology while maintaining the efficiency for smaller applications. He is also guiding the development of economical and durable stationary power generation equipment that is capable of utilizing low-Btu fuel sources derived from renewable sources.

Dr. Sheila K. Hanson, Marketing Research Manager. Dr. Hanson, Marketing Research Manager at the EERC, holds a Ph.D. and a M.S. in Research Methodologies, a B.A. in Psychology and German, and a B.B.A. in Marketing, all from the University of North Dakota. Her principal areas of interest and

expertise include business development of energy conversion systems and renewable energy, commercialization and marketing of high-tech products, economic and technical feasibility studies, university–industry relations, technology transfer, and marketing of higher education. Prior to her position at the EERC, she served as the Marketing Director at the University of North Dakota Center for Innovation, a technology incubator, and as Marketing Research Director for Simmons Advertising.

EERC QUALIFICATIONS

The EERC is one of the world's major energy and environmental research organizations, providing access to an array of multidisciplined engineers and scientists. Many exciting renewable energy research, development, demonstration, and commercialization projects have been conducted using a variety of biomass types for residential, industrial, and utility power generation. This section details the EERC's qualifications for the proposed project.

Capabilities

The EERC has established working relationships with over 1000 clients in 51 countries and all 50 states, including federal and state agencies, universities, coal companies, utilities, research and development firms, equipment vendors, architecture and engineering firms, chemical companies, and agricultural products companies. The EERC emphasizes true working partnerships among private industry, government agencies, academic institutions, and the research community. The EERC also fosters cooperation among industry, government, and the local communities. These relationships involve contracts with individual entities, as well as contracts involving groups of entities participating in cooperative multiclient projects. Thus the EERC is committed to a partnership team approach for energy and environmental technologies.

The Centers for Renewable Energy and Biomass Utilization are a designated Center of Excellence located at the EERC. The Centers conduct critical research, development, demonstration, and commercial deployment of technologies utilizing biomass, wind, solar, geothermal, and hydroelectric energy sources.

Under the CBU, the EERC offers the most comprehensive approach to biomass conversion research. Capabilities specific to the proposed project include:

- Characterization and analysis of any type of biomass, including wood residue, rice straw, switchgrass, wheat straw, forest and wood residues, agricultural residues, energy crops, and municipal solid waste.
- Assessment of biomass resources and determination of annual biomass tonnage available.
- Identification of feedstocks and long-term supply.
- Cost and benefit assessment: tax credits, emission credits, green power incentives, and fuel cost savings.
- Providing economic and technical assessment of efficiency of power and electricity, emissions, biomass handling, and ash behavior.

Personnel, Facilities, and Equipment

Since its founding in 1949, the EERC has conducted research, testing, and evaluation of fuels, combustion and gasification technologies, emission control technologies, ash use and disposal, analytical methods, groundwater, waste-to-energy systems, and advanced environmental control systems.

The EERC has specific experience in the design, procurement, fabrication, installation, and testing of conventional and advanced process development systems. Over 320 scientists, engineers, technicians, and support staff are available at the EERC to address current problems and assess future needs. The research staff is equipped with state-of-the-art analytical and engineering facilities. The main EERC facilities, with 245,000 square feet of laboratory, technology demonstration facility, and office space, are located on the southeast corner of the University of North Dakota campus. Laboratory- and pilot-scale equipment is available for evaluating new fuels and assessing new emission control technologies. Analytical techniques and instrumentation are available for the characterization of solid, liquid, and gaseous materials. Thus the EERC can provide a total-system assessment of a wide variety of energy, environmental, and mineral resource research topics.

Expertise

All EERC projects have resulted in valuable information used by various federal, state, and municipal agencies and industrial clients to pursue financing, present projects for management or legislative review, negotiate rates with utilities, or provide public outreach. The EERC is a nonprofit organization that seeks the best solution for the client. The EERC is not affiliated with any specific corporation or required to promote technologies under development at the EERC. Examples of EERC reports are available upon request.

The following is a selected list of biomass feasibility studies performed by the EERC, followed by a bibliography of each project (Table 1) and the corresponding clients (a full publication list is provided in Appendix A):

- The Potential for Biomass District Energy Production in Chugachmiut Communities
- Cogeneration of Energy for Value-Added Agriculture in Jamestown, North Dakota
- North Dakota Forest Service Fuels for Schools Feasibility Studies
- Energy Opportunities for Mayville State University

Table 1. Selected EERC Biomass Feasibility Studies

Project:	*The Potential for Biomass District Energy Production in Chugachmiut Communities*
Client:	Chugachmiut, A Tribal Organization Serving the Chugach Native Peoples of Alaska
Contact:	Mr. Charles Sink, Director Enterprise and Trust Services (907) 562-4155, Charlie@Chugachmiut.org
Contract Period:	July 2006 – July 2007
Description:	This project was conducted to determine the economic and technical feasibility for implementing a biomass energy system to service the Chugachmiut community of Port Graham, Alaska; the EERC performed load evaluation, resource data analysis, energy and cogeneration technology evaluation, and economic analyses.
Project:	*Cogeneration of Energy for Value-Added Agriculture in Jamestown, North Dakota*
Client:	North Dakota Department of Commerce, Division of Community Services
Contact:	Mr. Darin Scherr, State Energy Engineer Ph (701) 328-1022, Fx (701) 328-5320
Contract Period:	March 2002 – January 2003
Description:	The EERC evaluated the technical and economic feasibility of installing an on-site cogeneration facility in an existing industrial park, considering potential synergies, efficiencies, and energy production from local coal, biomass, or wind energy technology.

Continued…

Table 1. Selected EERC Biomass Feasibility Studies (continued)

Project:	*North Dakota Forest Service Fuels for Schools Feasibility Studies; Fuels for Schools – Minot and Dickinson Biomass Feasibility Studies*
Client:	North Dakota Forest Service
Contact:	Mr. Tom Claeys, Sustinable Forestry Coordinator (701) 328-9945, thomas.claeys@ndsu.edu
Contract Period:	July 2005 – June 2006; June 2006 – June 2008
Description:	The EERC provided technical support to the North Dakota Forest Service for a feasibility study under the Fuels for Schools program considering utilization of biomass energy in public institutions. This program helps public schools retrofit their fuel or gas heating systems to biomass heating systems. A *Guide to Commercial Biomass Energy Conversion Systems* was also prepared under this contract.
Project:	*Energy Opportunities for Mayville State University*; *Energy Opportunities for Mayville State University – Phase II*
Client:	Energy Services Group
Contact:	Mr. Bob Huber, Energy Engineer (763) 383-8622, robert.huber@1esg.com
Contract Period:	February 2007 – March 2007; January 2008 – February 2008
Description:	The EERC identified economically feasible energy options for Mayville State University, considering alternative fuels (biomass, fossil fuels, wastes, etc.) and technologies (combustion, gasification, etc.); Phase II narrowed the focus of energy options by performing a secondary, in-depth resource and economic analysis for coal and wood energy.

COST AND SCHEDULE

The total budget for the study is estimated at $201,036. The NDREC is asked to commit $100,518. The EERC CBU program will supply the required 50% match of $100,518 (commitment letter enclosed in Appendix B). Data previously collected by the EERC will also be utilized in support of the project. Completion is expected within 12 months of project start.

Project Cost

A description of project expenses is given below, and a detailed breakdown of cost is provided in the attached budget (see Appendix C). The budget is estimated based on the scope as described; thus a reduced award would result in a modified scope.

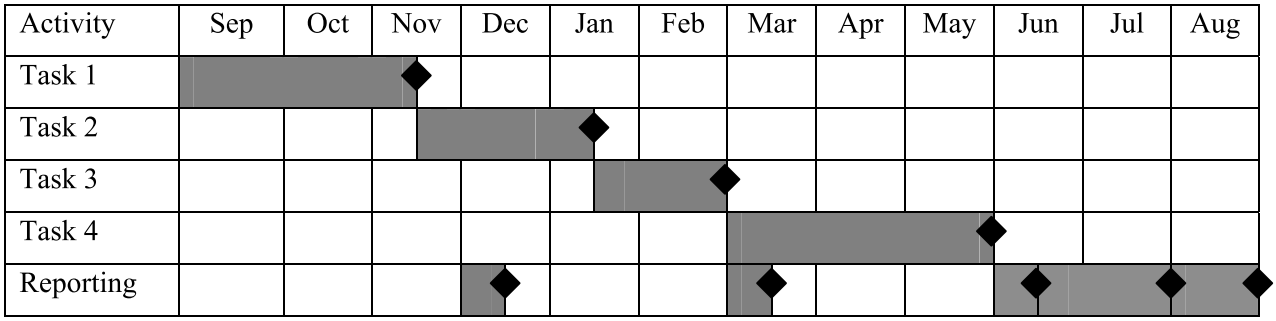
Because the EERC is a nonprofit organization, the estimated budget strictly covers the costs of labor hours, use of facilities, and any travel. About 2405 labor hours are estimated for due diligence on project tasks. EERC buildings, computer equipment, and administrative staff, as well as support technical

staff, will be available for utilization by the project team as needed. Travel expenses for EERC personnel to present final project results are also included in the budget estimate.

Project Schedule

The anticipated schedule is shown below. The following milestones are marked:

- Tasks
  - Task 1 completion – November 2009
  - Task 2 completion – January 2010
  - Task 3 completion – February 2010
  - Task 4 completion – May 2010
- Reporting
  - Progress reports – Quarterly (December 2009, March 2010, June 2010)
  - Final report – July 2010
  - Presentations – August 2010



TAX LIABILITY

The EERC is part of the University of North Dakota, a tax-exempt entity.

CONFIDENTIAL INFORMATION

There is no confidential information contained in this proposal.

REFERENCES

Leroux, K.M.B. *Fuels for Schools – Minot and Dickinson Biomass Feasibility Studies*; Final Report (June 1, 2006 – June 30, 2008) for North Dakota Forest Service and Bottineau Chamber of Commerce; EERC Publication 2008-EERC-05-01; Energy & Environmental Research Center: Grand Forks, ND, June 2008.

Leroux, K.M.B.; Williams, K.D. *Energy Opportunities for Mayville State University*; Final Report (Feb 15 – March 31, 2007) for Energy Services Group; EERC Publication 2007-EERC-03-07; Energy & Environmental Research Center: Grand Forks, ND, April 2007.

Leroux, K.M.B.; Williams, K.D. *Energy Opportunities for Mayville State University – Phase II*; Final Report (Jan 1 – Feb 29, 2008) for Energy Services Group; EERC Publication 2008-EERC-02-04; Energy & Environmental Research Center: Grand Forks, ND, Feb 2008.

Schmidt, D.D.; Hanson, S.K.; Martin, K.E. *Identifying Resources and Options to Mitigate the Risk of Wildland Fires in North Dakota*; Final Report for North Dakota Forest Service; EERC Publication 2003-EERC-06-04; Energy & Environmental Research Center: Grand Forks, ND, June 2003.

Schmidt, D.D.; Leroux, K.M.B. *North Dakota Forest Service Fuels for Schools Feasibility Studies;* Final Report (July 1, 2005 – June 30, 2006) for North Dakota Forest Service; EERC Publication 2006-EERC-06-07; Energy & Environmental Research Center: Grand Forks, ND, June 2006.

APPENDIX A

PUBLICATION LIST

PUBLICATION LIST OF SELECTED EERC BIOMASS PROJECTS

- Guide to Commercial Biomass Energy Conversion Systems
- Fuels for Schools – Minot and Dickinson Biomass Feasibility Studies
- Energy Opportunities for Mayville State University
- Energy Opportunities for Mayville State University – Phase II
- The Potential for Biomass District Energy Production in Chugachmiut Communities
- North Dakota Forest Service Fuels for Schools Feasibility Studies
- Cogeneration of Energy for Value-Added Agriculture in Jamestown, North Dakota

Hanson, S.K.; Buckley, T.D.; Schmidt, D.D.; Leroux, K.M.B. *Guide to Commercial Biomass Energy Conversion Systems*; Prepared for North Dakota Forest Service; Energy & Environmental Research Center: Grand Forks, ND, June 2006.

Leroux, K.M.B. *Fuels for Schools – Minot and Dickinson Biomass Feasibility Studies*; Final Report (June 1, 2006 – June 30, 2008) for North Dakota Forest Service and Bottineau Chamber of Commerce; EERC Publication 2008-EERC-05-01; Energy & Environmental Research Center: Grand Forks, ND, June 2008.

Leroux, K.M.B.; Williams, K.D. *Energy Opportunities for Mayville State University*; Final Report (Feb 15 – March 31, 2007) for Energy Services Group; EERC Publication 2007-EERC-03-07; Energy & Environmental Research Center: Grand Forks, ND, April 2007.

Leroux, K.M.B.; Williams, K.D. *Energy Opportunities for Mayville State University – Phase II*; Final Report (Jan 1 – Feb 29, 2008) for Energy Services Group; EERC Publication 2008-EERC-02-04; Energy & Environmental Research Center: Grand Forks, ND, Feb 2008.

Leroux, K.M.B.; Williams, K.D.; Hanson, S.K.; Zacher, E.J. *The Potential for Biomass District Energy Production in Chugachmiut Communities*; Final Report for Chugachmiut, A Tribal Organization Serving the Chugach Native Peoples of Alaska; EERC Publication 2007-EERC-07-07; Energy & Environmental Research Center: Grand Forks, ND, July 2007.

Schmidt, D.D.; Leroux, K.M.B. *North Dakota Forest Service Fuels for Schools Feasibility Studies;* Final Report (July 1, 2005 – June 30, 2006) for the North Dakota Forest Service; EERC Publication 2006-EERC-06-07; Energy & Environmental Research Center: Grand Forks, ND, June 2006.

Schmidt, D.D.; Leroux, K.M.; Stevens, B.G.; Aulich, T.R.; Zygarlicke, C.J.; Martin, K.E. *Cogeneration of Energy for Value-Added Agriculture in Jamestown, North Dakota*; Final Report for North Dakota Department of Commerce, Cavendish Farms, and Alchem, Inc., 2002-EERC-07-01, July 2002.

APPENDIX B

LETTER OF COMMITMENT

EERC
Energy & Environmental Research Center

UNIVERSITY OF NORTH DAKOTA
15 North 23rd Street — Stop 9018 / Grand Forks, ND 58202-9018 / Phone: (701) 777-5000 Fax: 777-5181
Web Site: www.undeerc.org

October 31, 2008

Ms. Karlene Fine
Executive Director
North Dakota Industrial Commission
600 East Boulevard Avenue
State Capitol – Fourteenth Floor
Bismarck, ND 58505

Dear Ms. Fine:

Subject: North Dakota Renewable Energy Council Application

This letter is in regard to the cost share provided by the Energy & Environmental Research Center (EERC) for "North Dakota Biomass Feasibility Studies", as proposed to the North Dakota Renewable Energy Council. The EERC will provide a 50% match of $100,518, contingent on award from the 2009 U.S. Department of Energy (DOE)-sponsored Center for Biomass Utilization® (CBU®). Availability of CBU funding is expected in early 2009 with awards sent Fall 2009; likelihood of funding is very strong, as the EERC has been receiving CBU program awards from DOE for 9 consecutive years.

If you have any further questions, please contact me by phone at (701) 777-5123 or by e-mail at czygarlicke@undeerc.org.

Sincerely,

Chris J. Zygarlicke
Deputy Associate Director for Research

CJZ/kal

APPENDIX C

BUDGET AND BUDGET NOTES

NORTH DAKOTA BIOMASS FEASIBILITY STUDIES
NORTH DAKOTA RENEWABLE ENERGY COUNCIL (NDREC)
PROPOSED PROJECT START DATE: 9/1/2009
EERC PROPOSAL #2009-0085

BUDGET

CATEGORY		TOTAL		NDREC SHARE		EERC-CBU SHARE	
TOTAL DIRECT HRS/SALARIES	2,405	$ 79,931	1,110	$ 37,095	1,295	$ 42,836	
TOTAL FRINGE BENEFITS		$ 42,603		$ 19,772		$ 22,831	
TOTAL LABOR		$ 122,534		$ 56,867		$ 65,667	
OTHER DIRECT COSTS							
TRAVEL		$ 2,207		$ 2,207		$ -	
SUPPLIES		$ 840		$ 440		$ 400	
COMMUNICATION - PHONES & POSTAGE		$ 700		$ 538		$ 162	
PRINTING & DUPLICATING		$ 1,600		$ 1,432		$ 168	
FOOD		$ 325		$ 325		$ -	
OPERATING FEES & SVCS							
Graphics Support		$ 1,230		$ 615		$ 615	
Research Information Systems		$ 399		$ 399		$ -	
TOTAL DIRECT COST		$ 129,835		$ 62,823		$ 67,012	
FACILITIES & ADMIN. RATE - % OF MTDC	VAR	$ 71,201	60%	$ 37,695	50%	$ 33,506	
TOTAL PROJECT COST		$ 201,036		$ 100,518		$ 100,518	

Due to limitations within the University's accounting system, bolded budget line items represent how the University proposes, reports and accounts for expenses. Supplementary budget information, if provided, is for proposal evaluation.

BUDGET NOTES

ENERGY & ENVIRONMENTAL RESEARCH CENTER (EERC)

BACKGROUND

The EERC is an independently organized multidisciplinary research center within the University of North Dakota (UND). The EERC receives no appropriated funding from the state of North Dakota and is funded through federal and nonfederal grants, contracts, and other agreements. Although the EERC is not affiliated with any one academic department, university faculty may participate in a project, depending on the scope of work and expertise required to perform the project.

INTELLECTUAL PROPERTY

If federal funding is proposed as part of this project, the applicable federal intellectual property (IP) regulations may govern any resulting research agreement. In addition, in the event that IP with the potential to generate revenue to which the EERC is entitled is developed under this agreement, such IP, including rights, title, interest, and obligations, may be transferred to the EERC Foundation, a separate legal entity.

BUDGET INFORMATION

The proposed work will be done on a cost-reimbursable basis. The distribution of costs between budget categories (labor, travel, supplies, equipment, etc.) is for planning purposes only. The project manager may, as dictated by the needs of the work, incur costs in accordance with Office of Management and Budget (OMB) Circular A-21 found at www.whitehouse.gov/omb/circulars. If the Scope of Work (by task, if applicable) encompasses research activities which may be funded by one or more sponsors, then allowable project costs may be allocated at the Scope of Work or task level, as appropriate, to any or all of the funding sources. Financial reporting will be at the total-agreement level.

Escalation of labor and EERC recharge center rates is incorporated into the budget when a project's duration extends beyond the current fiscal year. Escalation is calculated by prorating an average annual increase over the anticipated life of the project.

The cost of this project is based on a specific start date indicated at the top of the EERC budget. Any delay in the start of this project may result in a budget increase. Budget category descriptions presented below are for informational purposes; some categories may not appear in the budget.

Salaries: The EERC employs administrative staff to provide required services for various direct and indirect support functions. Salary estimates are based on the scope of work and prior experience on projects of similar scope. The labor rate used for specifically identified personnel is the current hourly rate for that individual. The labor category rate is the current average rate of a personnel group with a similar job description. Salary costs incurred are based on direct hourly effort on the project. Faculty who work on this project will be paid an amount over their normal base salary, creating an overload which is subject to limitation in accordance with university policy. Costs for general support services such as contracts and intellectual property, accounting, human resources, purchasing, shipping/receiving, and clerical support of these functions are included in the EERC facilities and administrative cost rate.

Fringe Benefits: Fringe benefits consist of two components which are budgeted as a percentage of direct labor. The first component is a fixed percentage approved annually by the UND cognizant audit agency, the Department of Health and Human Services, and covers vacation, holiday, and sick leave (VSL). This percentage is applied to direct labor for permanent staff eligible for VSL benefits. The second component is estimated on the basis of historical data and is charged as actual expenses for items such as health, life, and unemployment insurance; social security; worker's compensation; and UND retirement contributions.

Travel: Travel is estimated on the basis of UND travel policies which can be found at www.und.edu/dept/accounts/policiesandprocedures.html. Estimates include General Services Administration (GSA) daily meal rates. Travel may include site visits, field work, meetings, and conference participation as indicated by the scope of work and/or budget.

Equipment: If equipment is budgeted, it is discussed in the text of the proposal and/or identified more specifically in the accompanying budget detail.

Supplies – Professional, Information Technology, and Miscellaneous: Supply and material estimates are based on prior experience and may include chemicals, gases, glassware, nuts, bolts, and piping. Computer supplies may include data storage, paper, memory, software, and toner cartridges. Maps, sample containers, minor equipment, signage, and safety supplies may be necessary as well as other organizational materials such as subscriptions, books, and reference materials. General purpose office supplies (pencils, pens, paper clips, staples, Post-it notes, etc.) are included in the facilities and administrative cost.

Subcontracts/Subrecipients: Not applicable.

Professional Fees/Services (consultants): Not applicable.

Other Direct Costs

Communications and Postage: Telephone, cell phone, and fax line charges are generally included in the facilities and administrative cost. Direct project costs may include line charges at remote locations, long-distance telephone, postage, and other data or document transportation costs.

Printing and Duplicating: Photocopy estimates are based on prior experience with similar projects. Page rates for various photocopiers are established annually by the university's duplicating center.

Food: Food expenditures for project meetings, workshops, and conferences where the primary purpose is dissemination of technical information may include costs of food, some of which may exceed the institutional limit.

Professional Development: Fees are for memberships in technical areas directly related to work on this project. Technical journals and newsletters received as a result of a membership are used throughout development and execution of the project by the research team.

Fees and Services – EERC Recharge Centers, Outside Labs, Freight: EERC recharge center rates for laboratory, analytical, graphics, and shop/operation fees are anticipated to be approved for use beginning July 1, 2008. Only the actual approved rates will be charged to the project.

Laboratory and analytical fees are charged on a per sample, hourly, or daily rate, depending on the analytical services performed. Additionally, laboratory analyses may be performed outside the university when necessary.

Graphics fees are based on an established per hour rate for production of such items as report figures, posters, and/or PowerPoint images for presentations, maps, schematics, Web site design, professional brochures, and photographs.

Shop and operation fees are for expenses directly associated with the operation of the pilot plant facility. These fees cover such items as training, personal safety (protective eyeglasses, boots, gloves), and physicals for pilot plant and shop personnel.

Freight expenditures generally occur for outgoing items and field sample shipments.

Facilities and Administrative Cost: Facilities and administrative cost is calculated on modified total direct costs (MTDC). MTDC is defined as total direct costs less individual items of equipment in excess of $5000 and subawards in excess of the first $25,000 for each award. The EERC Facilities and Administrative rate for commercial entities as proposed in this budget is 60%. The components are as follows: the approved federal rate is 50%; added to the federal rate is an increment of 10%. This increment represents calculated costs that exceed the allowable 26% federal cap on Administrative costs as well as depreciation/use allowance on buildings and equipment purchased with federal dollars.