April 28, 2010

North Dakota Industrial Commission
Attn: Renewable Energy Development Program
State Capitol—Fourteenth Floor
600 East Boulevard Ave. Dept. 405
Bismarck, ND 58505-0840

Dear North Dakota Industrial Commision,

Great River Energy is pleased to submit this grant application to the North Dakota Industrial Commission Renewable Energy Council. Enclosed you will find two copies of the complete application including the $100 application fee, application, tax liability statement and appendices. The electronic version has also been emailed to your office.

Great River Energy has formed Dakota Spirit AgEnergy LLC to develop and build a cellulosic biorefinery near Spiritwood, North Dakota and is committing to the cash match and in-kind contributions expressed herein. The objective of this grant request is to expedite the development phase of this project including the Preliminary Front End Engineering & Design (Pre-FEED) study and Financial Model for the overall facility.

We look forward to the opportunity to further discuss the application before the Renewal Energy Council. Please contact me with any questions regarding the application at (763) 445-5304 or sbroekema@GREnergy.com.

Sincerely,

GREAT RIVER ENERGY

Sandra M. Broekema

Sandra Broekema, P.E.
Manager, Business Development

Renewable Energy Program

North Dakota Industrial Commission

TABLE OF CONTENTS

Application

Project Title: Dakota Spirit AgEnergy Cellulosic Biorefinery

Applicant: GREAT RIVER ENERGY

Principal Investigator: Sandra Broekema

Date of Application: April 30, 2010

Amount of Request: $500,000

Total Amount of Proposed Project: $1,250,000

Duration of Project: 12 months

Point of Contact (POC):

Sandra Broekema

(763) 445-5304

sbroekema@GREnergy.com

Great River Energy

12300 Elm Creek Blvd

Maple Grove, MN 55369

ABSTRACT

Dakota Spirit AgEnergy LLC was formed in March 2010 to develop and build a commercial scale cellulosic biorefinery near Spiritwood, North Dakota. The cooperative effort to develop the biorefinery is being led by Great River Energy in cooperation with Inbicon A/S, the cellulosic technology subsidiary of Danish utility DONG Energy. Additional partners will be recruited from key stakeholders along the way.

The Dakota Spirit AgEnergy biorefinery will be located adjacent to Great River Energy's Spiritwood Station, a combined heat and power (CHP) facility under construction near Spiritwood, North Dakota. Utilizing new proven Inbicon A/S technologies, the biorefinery will convert wheat straw and/or corn stover to higher value energy products such as cellulosic ethanol, C5 molasses and purified lignin pellets.

The objective of this grant request is to expedite the development phase of this project including the Preliminary Front End Engineering & Design (Pre-FEED) study and Financial Model for the overall facility. The scope of the study includes budgetary cost estimates, schedules, technology scale up and conversion to U.S. standards, process and equipment design packages, general layout drawings and site survey.

Results from this study will provide a critical foundation for determining the ultimate feasibility of a cooperative approach for a commercial scale cellulosic biorefinery in Spiritwood. The Pre-FEED and Financial Model are essential elements for DOE and USDA grants, which in turn will be necessary to complete the construction of a commercial scale cellulosic biorefinery.

We seek a NDIC Renewable Energy grant in the amount of $500,000. The total cost for this phase of the project is approximately $1,250,000. The schedule proposed for this work is 12 months.

Dakota Spirit AgEnergy's founding participants are Great River Energy, Inbicon A/S, Headwater's Blue Flint Ethanol, Jamestown/Stutsman Development Corporation and North Dakota Department of Commerce. Sandra Broekema, Great River Energy, will serve as Principal Investigator.

PROJECT DESCRIPTION

Project Objectives

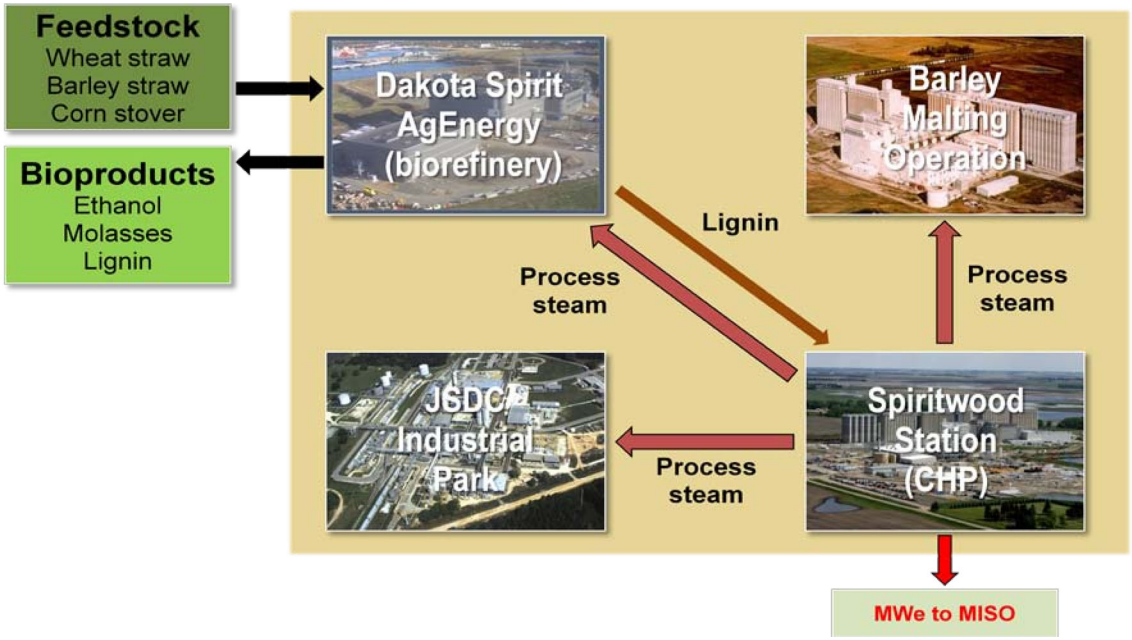
- **Renewable Energy Development:** A cellulosic biorefinery furthers our country's energy independence and domestic security by providing local sources of renewable energy to help reduce our dependence on foreign oil.
- **Energy Efficiency:** Great River Energy is building a 99MW combined heat and power (CHP) plant at the Spiritwood, North Dakota site. The CHP efficiency will go from approximately 43 to 66 percent when the biorefinery is online as a steam partner.
- **Jobs Creation:** The biorefinery will promote economic development through the creation of 175+ construction jobs, 57 full time jobs and 25+ seasonal jobs to harvest, collect, store and transport crop residues. It also creates a new revenue stream for agriculture producers to help sustain North Dakota's agriculture economy.

Great River Energy is proposing, in cooperation with Inbicon A/S, the construction of a commercial scale cellulosic biomass refinery adjacent to GRE's Spiritwood CHP plant near Spiritwood, North Dakota. With the successful implementation of advanced technologies that refine raw biomass into higher-value products, this facility will be one of the first of its kind in the United States representing a step-change in the understanding of sustainable biomass utilization and providing a replicable model for future biorefinery development.

Dakota Spirit AgEnergy was formed in March 2010 for the purpose of developing and building the proposed 20 mmgy biorefinery. Employing the technology developed by Inbicon (which is operating at a 1.4 mmgy demonstration plant in Denmark), this facility is expected to utilize **480,000 tons of local wheat straw** to produce: **20 mmgy of cellulosic ethanol** which will be marketed throughout the country; **188,000 tons of feed grade molasses** which will be marketed within the region and provide an alternative source of feed for nearby livestock; and **170,000 tons of lignin** which will be processed into a

high-density solid fuel, that contains combustion properties similar to those of coal, for use in boilers and power plants.

Great River Energy's Spiritwood Station will be partnered in a long-term arrangement to sell approximately 240,000 PPH of 150 psig steam and purchase solid fuel lignin as a renewable source of energy from Dakota Spirit AgEnergy.



The Spiritwood Expansion Model shows how the biorefinery fits into the Spiritwood industrial site as feedstock intake and bioproducts producer as well as a CHP steam partner and lignin (solid fuel) provider.

Given successful financing, construction is estimated to begin in Q2 2012 and provide for approximately 175 jobs during construction and 57 direct-hire jobs once operations commence. Overall local employment benefit is expected to be significantly greater, as the infrastructure to harvest, store, and transport the 480,000 tons of biomass feedstock is developed. The facility is expected to deliver significantly greater value to North Dakota agricultural products (specifically a new market for wheat straw), the infusion of new revenues into the surrounding communities and the State of North Dakota, and lead the way for the efficient and economic production of next generation transportation fuels, specialty chemicals, and renewable power.

This grant request is to expedite the early development phase including Preliminary Front End Engineering & Design (Pre-FEED) and Financial Model for the overall facility with specific deliverables to include:

1. Technology/Product Selection & Initial Design Package
    a. Process design basis
    b. Process flow diagrams
    c. Mass & energy balances
    d. Process description
2. High Level Estimates
    a. Total installed capital
    b. Annual operating & maintenance costs
3. Preliminary Schedule
    a. Development
    b. Financing
    c. Permitting
    d. Procurement
    e. Construction
    f. Commissioning
4. Drawings
    a. Overall plot plan
    b. General arrangement drawing
5. Major risk summary & mitigation plan
6. Site Survey
7. Financial Model

Methodology and Anticipated Results: The Pre-Feed will result in an engineering report that analyzes the technical and economic factors and conditions for the implementation of the Inbicon technology at the Spiritwood site. This will include general layout drawings, detailed process flow diagrams and budgetary estimates that are necessary to validate feasibility and provide the documentation for federal grant applications. This report will include a publishable summary and contain certain proprietary technical details from Inbicon's patented process. Since the biomass delivery infrastructure required to supply baled wheat straw doesn't exist today, we have included its development in the scope of the overall biorefinery project along with the "balance of plant" study.

Facilities and Resources: Inbicon has assigned a group of engineers from their Project Development Office to deliver this report under a Project Development Agreement. Great River Energy has assigned a

Business Development Manager, Project Engineer, Sr. Financial Analyst and Environmental Project Lead to work with Inbicon to provide site specific information and use the results to complete the financial model to establish feasibility. Each partner will provide their own facilities and travel expenses will be included in the cash and in-kind matches from the applicants.

Environmental Impacts: We do not anticipate environmental and economic impacts during the course of this engineering phase. The process flow diagram will provide the commercial scale plant inputs and outputs including water, wastewater and emissions. The proposed site includes jurisdictional wetlands which will require mitigation. A Feedstock Supply Study is being conducted locally to determine the sustainability and area impacts of wheat straw as the feedstock.

Ultimate Technological and Economic Impacts: The preliminary Regional Economic Models, Inc (REMI) prepared by North Dakota Department of Commerce on March 4, 2010 shows significant positive regional impacts to direct (69) and indirect employment (312), Personal Income ($23 million) and Gross Regional Product ($79 million per year) when operational (See Appendix 2).

Successful adaptation of European technology could certainly jumpstart the formation of a new generation ethanol industry in North Dakota. By utilizing proven technology and components, we minimize risk and avoid early problems that derail an emerging industry.

The ultimate objective of Dakota Spirit AgEnergy is to create a commercial scale biorefinery in Spiritwood, ND. The cellulosic “race is on” in the U.S. with various technologies in the pilot and demonstration phase. There are a few commercial scale plants currently in development. We have selected Inbicon’s technology because they are already operating at the demonstration scale in Denmark and have more than 14 years of experience handling wheat straw as a utility feedstock. Inbicon’s technology provides an excellent fit with local wheat straw availability and Great River Energy’s interest in selling steam and buying a value added biomass fuel.

The educational and marketing value of having one of the country's first commercial scale biorefineries up and running in North Dakota is truly immeasurable. First of a kind plants provide a unique opportunity for prospective clients and developers to see the technology in operation and it will undoubtedly attract visitors and create positive publicity for North Dakota and the region.

Why this project is needed: The ethanol industry is at a crossroads. Federal mandates predict strong future demand, but right now there is insufficient market demand even for first generation supplies with the E10 Blend Wall. Because standardized plant designs and economies of scale do not yet exist, new cellulosic technologies are very capital intensive. High capital costs must be mitigated by federal subsidies and low operating costs in order to cash flow to attract the necessary equity and debt to build a plant. This is why most of the early development in advanced biofuels is focused elsewhere and centered around "waste" feedstocks which carry negative feedstock costs providing additional revenue streams by displacing a major operating expense.

North Dakota has an abundance of crop residues and the land for future dedicated energy crops but lacks waste based feedstocks that would make it an obvious location for establishing this new industry. North Dakota wheat producers are struggling economically with increasing input costs and low crop prices. A new market for straw would provide an additional revenue stream plus the opportunity to get in on the ground floor of this emerging industry. A committed project champion and strong local support are absolutely essential for developing the industry here in North Dakota. Great River Energy is committed to securing additional steam partners for the Spiritwood CHP in order to regain operational efficiencies and economies. Developing a brand new agricultural + energy industry is a challenging path, but offers an excellent fit for area producers and as a steam customer and fuel supplier for Spiritwood Station.

New technology is vulnerable to many potentially fatal issues including: high capital cost, insufficient cash flow to attract required equity and to secure project debt, inadequate feedstock supply and/or

logistics, lack of transportation & utility infrastructure, and undeveloped markets. The Renewable Energy Council grant is absolutely essential to deflect these early attacks and conduct enough engineering to overcome these potentially fatal flaws.

STANDARDS OF SUCCESS

Ultimately, the standards of success for this phase of the project will include these parameters:

1) A working Financial Model based on a reasonable capital structure (Equity + Grant + Debt) with positive cash flows for the commercial scale biorefinery.

2) A Process Description Report with:
    a. Capital Budget that is financeable
    b. General Arrangement Drawings that fit the available land, transportation access and utilities
    c. Equipment & Material list – available in the U.S.
    d. Process Flow Diagrams that fit the available resources and permit requirements

This project is clearly aligned with the mission of the Renewable Energy Council, as Dakota Spirit AgEnergy in conjunction with Spiritwood Station, will continue to promote the growth of North Dakota's renewable energy industry, and lead the way for the efficient and economic conversion of biomass to higher-value products. The biorefinery will create new sustainable jobs, a new market for agriculture producer's crops and open the door that will lead to other biomass projects and processes in North Dakota.

Without the funding to prove-out initial feasibility, however, the project cannot go forward. The proposed facility is significantly larger than anything in commercial operation today and the volumes of wheat straw biomass and the scale-up of the engineering are unprecedented anywhere in the world. Comprehensive and thoroughly professional assessments of viability will be essential to engaging the support of the U.S. Federal Government and both future debt and equity holders for what is estimated to be a $300 million project.

BACKGROUND/QUALIFICATIONS

Great River Energy is a not-for-profit wholesale electric cooperative, serving 28 member distribution cooperatives in Minnesota and western Wisconsin. It is the second largest power supplier in Minnesota. Great River Energy owns and operates two power plants in North Dakota: Coal Creek Station near Underwood and Stanton Station near Stanton, and is currently constructing a new 99 MW CHP Plant near Spiritwood.

Great River Energy has made and continues to make important commitments to renewable energy development including a 37 MW RDF waste-to-energy plant in Elk River, MN, plus anaerobic digestion, wind and hydroelectric power purchases totaling over 318 MW.

Blue Flint Ethanol is a joint venture between Great River Energy and Headwaters Incorporated. Blue Flint Ethanol is a 58 million gallon per year dry mill ethanol plant that has been successfully operated continuously since February of 2007. Blue Flint Ethanol is co-located with Coal Creek Station in Underwood, North Dakota and benefits from shared infrastructure and process steam, creating a model for synergistic benefits for Great River Energy, Blue Flint Ethanol and the local producers and community.

Great River Energy along with Great Plains Institute, NDRECA, ND Dept. of Agriculture, ND Farmers Union and ND Natural Resources Trust banded together in 2008 and 2009 with co-funding by the Joyce Foundation and North Dakota Industrial Commission's Renewable Energy Council (Contract No. R001-003) to conduct a "Feasibility Study of a Biomass Supply for the Spiritwood Industrial Park" which was completed in June 2009 and published in summary report in September 2009. This study took a broad approach to determine the availability of biomass in the area of Spiritwood for the intended purpose of direct co-firing at Spiritwood Station. This study provided the foundation for looking at more specific biomass feedstocks and led Great River Energy toward exploring further processing of biomass

(i.e. purified lignin pellets) in order to overcome the operational challenges of handling and co-firing "raw" biomass.

Greg Ridderbusch is Vice President of Business Development and Strategy for Great River Energy and will serve as Executive Director for Dakota Spirit AgEnergy. He oversees Great River Energy's strategic planning process and diversification efforts that leverage the organization's core assets. Prior to joining Great River Energy, Greg spent 10 years as a utility management consultant serving utility leadership teams across the country on strategy and business planning assignments. In that role, he had supported Great River Energy on its strategic planning. He also assisted other utilities with their business development efforts. Ridderbusch previously was general manager of the industrial business unit of the Gas Technology Institute, Chicago. Early in his career, Greg was an engineer officer in the Army and reserves for 10 years. Ridderbusch earned a bachelor's degree from the U.S. Military Academy at West Point; a master's degree in mechanical engineering from the Georgia Institute of Technology, Atlanta; and an MBA from Northwestern Kellogg Graduate School of Business, Chicago.

Sandra Broekema is Manager of Business Development for Great River Energy and has been assigned the same role for Dakota Spirit AgEnergy. She brings more than 20 years of experience in the energy industry focusing on R & D and new product commercialization in solar, wind and industrial power generation. Sandra Broekema was the Principal Investigator on the "*Feasibility study of a Biomass Supply for the Spiritwood Industrial Park*" referenced above. Sandra has a Bachelor's degree in Mechanical Engineering from the University of Minnesota - Institute of Technology and a Master's in Business Administration from the University of St. Thomas. She holds a P. E. license in the State of Minnesota and has served on Boards for Energy Alley and Minnesota Environmental Initiative.

MANAGEMENT

Dakota Spirit AgEnergy will serve in a leading role managing this project including direction and oversight of any consultants brought in to assist in the analysis. Dakota Spirit AgEnergy's Principal Investigator will develop a comprehensive project plan to ensure that objectives are completed in a timely fashion. A project engineer, financial analyst and environment project lead have been assigned to the project.

TIMETABLE

MONTH	1	2	3	4	5	6	7	8	9	10	11	12
Contracting												
Project Management												
Pre-FEED Biorefinery												
Pre-FEED BOP												
Financial Model												
Interim Report												
Federal Grants												
Site & permitting												
Plant FEED												
Final Report												

BUDGET

Project Associated Expense	NDIC's Share	Applicant's Share (Cash)	Applicant's Share (In-Kind)	TOTAL
Project Management			$ 75,000	$75,000
Pre-FEED Biorefinery	$200,000	$25,000	$50,000	$275,000
Pre-FEED BOP	$50,000	$25,000	$25,000	$100,000
Financial Model			$25,000	$25,000
Federal Grant		$200,000	$50,000	$250,000
Site Permitting	$150,000		$25,000	$175,000
FEED	$100,000	$200,000		$300,000
Travel & Meetings		$ 50,000		$ 50,000
TOTAL	**$500,000**	**$500,000**	**$250,000**	**$ 1,250,000**

CONFIDENTIAL INFORMATION

There will be certain technical performance and financial data, including the Financial Model, which must remain confidential and cannot be released to the public due to non-disclosure requirements with technology providers.

PATENTS/RIGHTS TO TECHNICAL DATA

Great River Energy and Dakota Spirit AgEnergy wish to reserve the right to patent any Intellectual Property produced by this study.

TAX LIABILITY STATEMENT

Great River Energy and Dakota Spirit AgEnergy hereby attests that they are not delinquent in any tax liability to the State of North Dakota or any of its political subdivisions.

APPENDICES

The following appendices are attached:

1. Inbicon A/S PDA Overview
2. North Dakota Biorefinery Regional Economic Model

GREAT RIVER ENERGY: PROJECT DAKOTA SPIRIT AGENERGY

APPENDIX 3

The following information is provided as a supplement to Great River Energy's renewable energy grant application for the Dakota Spirit AgEnergy cellulosic biorefinery project upon the request of the technical review for the application.

PRELIMINARY FRONT END ENGINEERING & DESIGN PRE-FEED (See page 5)

Inbicon's biorefinery technology is currently operating at the Demonstration Scale (1.4 MGPY) in Denmark. In order to adapt the technology successfully, we will need to conduct the commercial scale-up (20 MGPY) and conversion of engineering specifications to U.S. standards. This work will be conducted by outside engineering firms.

1. Technology/Product Selection & Initial Design Package –evaluate trade-offs between technology options within the core Inbicon design, including the types and relative quantities of the various salable outputs from the biorefinery. The Initial Design provides a comprehensive overview of the process requirements. This information is needed for permit applications, equipment specifications, pipe sizing and facility layout.
    a. Process design basis – defines the needed flow rates, pressures, temperatures, and chemical compositions throughout the biorefinery processes. Material selection requirements are also defined.
    b. Process flow diagrams –a schematic depiction of the biorefinery processes, showing how the various components work together as well as needed instrumentation, controls and piping.
    c. Mass & energy balances –engineering calculations that support the sizing of unit operations and quantity of biorefinery inputs (feedstock and energy) and outputs (ethanol, lignin, molasses, waste streams, etc).
    d. Process description –narrative describing the functions of the various biorefinery components.
    e. High Level Estimates –to support the financial model
        i. Total installed capital – estimates for engineering services, permitting, financing costs, licensing agreements, land cost, interest during construction, taxes, equipment procurement, construction contractors, and commissioning services.
        ii. Annual operating & maintenance costs – estimates for feedstock cost, labor, consumables, routine and outage maintenance, insurance, debt payments, and utilities.
2. Preliminary Schedule – the preliminary project schedule indicates the needed timeline for major project activities. Critical path for the project is also determined.
3. Drawings
    a. Overall plot plan –provides the site layout of the entire biorefinery and biomass logistics facilities, showing locations of major equipment, roads, utilities, and buildings.

b. General arrangement drawing –provides more detail related to the equipment arrangement for coordination of locations and elevations, platforms, piping, ductwork, and space reservations for operations and maintenance.

4. Major risk summary & mitigation plan –outlines the financial, technical, environmental, legal and other risks to the project. The mitigation plan provides necessary steps to be taken by the project team to prevent these areas of risk from adversely affecting the project.
5. Site Survey – documents the topographic, legal boundary and geotechnical information needed to develop the site.
6. Financial Model –provides an analysis of the overall financial viability of the project. Inputs to the financial model include capital cost, feedstock cost, product prices, fixed and variable operations and maintenance costs, tax rates, interest and insurance payments, and expected cash infusion schedule and amounts. Outputs from the financial model includes overall cash flow, revenues, cost of goods sold, gross margins, net earnings and income, assets, liabilities and equity.

Environmental Characterization, Assessment and Permitting

Major Deliverables:

- Air emissions inventory including carbon dioxide (CO_2)
- Determination of applicable environmental requirements
- Concurrency from the North Dakota Department of Health on applicable requirements
- Preliminary ambient air impacts analyses
- Draft application for an Air Emissions Permit to Construct
- Wetlands impact analysis and mitigation plan
- Technical and analytical support for preparation of an Environmental Worksheet

The environmental impacts of biomass facilities are not well characterized due to the scarcity of commercial scale plants. A complete air emissions inventory will be developed based on the pre-FEED design specifications. The emissions inventory and a description of process equipment are the principle inputs for determining the applicable requirements. Based on current design information, we do not believe that project would be subject to New Source Review requirements for criteria pollutants or CO_2; however, a state Permit to Construct would be needed. Even though we do not expect that the facility will be subject to New Source Review's ambient air impact analyses requirements, we think that public questions will arise because of the concentration of air emission sources that can only be resolved with some level of computer-based air emissions modeling.

A draft application for a Permit to Construct will be prepared. The final application will be prepared after sufficient information from the FEED study is available to confirm the design analysis used in the regulatory applicability analysis and air impact analyses.

The proposed site contains numerous jurisdictional wetlands that could be impacted by construction of the plant and require on-site or off-site mitigation. A preliminary wetlands impact analysis will be completed and a mitigation plan will be drafted. The final impact analysis and mitigation plan will be

completed after sufficient information from the FEED study is available to confirm the preliminary assumptions.

Great River Energy anticipates federal funding of the project. The National Environmental Policy Act requires that an environmental assessment be completed for any project that is awarded federal financial aid. Establishing the complete scope of the environmental assessment isn't initiated until funding is proposed. Nevertheless, we can anticipate issues that may arise and we will conduct appropriate analyses to prepare for the preparation of an environmental assessment. Two issues that come to mind are a life cycle greenhouse gas analysis and an energy balance.

The majority of the costs to prepare the deliverables will be incurred by a third-party consultant. Great River Energy will incur costs in directing the consultants, reviewing their work products and meeting with regulatory agencies.

MANAGEMENT (See page 11)

The Principal Investigator will be assigned full time to this project for the duration of the development period. Other staffing including Project Manager, Senior Financial Analyst and Communications Specialist have been assigned on a part time, as needed basis. The comprehensive project management activities will include:

1. Establish specific Goals & Objectives for the project development phase
2. Prepare & manage the development budget & schedule
3. Monitor progress toward goals & develop action plans to address variances that arise
4. Administer external consultants (RFPs, evaluate, negotiate, award, review reports)
5. Prepare & present management reports
6. Communicating with the team members & external audiences

BUDGET (See page 11)

Terminology

The **Federal Grant** line item encompasses hiring external resources to prepare the specific federal grant applications to include research, writing, form preparation and reporting.

The **Site Permitting** line item entails hiring engineers to perform the calculations and analysis required to submit a permit application. See expanded description in Pre-FEED above.

Regional Economic Models, Inc.

North Dakota
Biorefinery Project

Prepared By

North Dakota Department of Commerce

Using

Regional Economic Models, Inc.

March 4, 2010

Summary Results

This report evaluates the economic impacts of a bio-refinery industry in North Dakota. The model is based on information provided by and the data generated using a customized REMI Policy Insight™ model for North Dakota. The analysis shows the change in economic activity caused by the industry expansion.

In order to show the total implications of the expansion, REMI developed a Policy Insight model with detailed employment, population, personal income, and other data specific to North Dakota. Using this model, REMI generated the regional baseline forecast and then used the information provided by the new project to develop an alternative forecast that would occur in the event of the expansion in this sector.

Assumptions

The analysis assumed the cost of the new bio-refinery for construction and equipment to be approximately $232 million spread between years 2012 and 2014. In addition to the refinery, a Feedstock Supply operation would have a capital investment of $20 million spread between 2013 and 2014. Upon completion the bio-refinery and feedstock operation would employ 69 full time workers.

Table 1

Additional Benefits

Year	2012	2013	2014	2015	2016	2017
Total Employment	360	709	1104	374	333	312
Direct Employment	n/a	n/a	69	69	69	69
Indirect Employment	360	709	1035	305	264	243
Total GRP (Million $)	24.2	47.7	128.3	79.5	77.5	79.3
Personal Income (Million $)	15	32	54	24	23	23
Output (Millions $)	39.8	79.6	233.1	146	145.5	146.9

Employment

Table 1 shows that construction of the refinery will add significant new jobs to the economy during years 2012 through 2014. In addition to the direct impact of 69 jobs upon completion of the facility, the refinery is estimated to generate additional jobs in both indirect and induced impacts. These multiplier effects bring total employment to over 300 as a result of the operations at the facility.

Gross Regional Product

Gross Regional Product (GRP) is the total market value of goods and services produced in a given period. It is equal to ouput, excluding the intermediate inputs, and represents compensation and profits. As shown in Table 1 the change in total GRP is estimated at $128 million in 2014 during the height of construction, and when the refinery is operational the increase in GRP nears $80 million per year.

Personal Income

Personal Income in the region is expected to increases by up to $54 million between 2012 and 2014 as indicated in Table 1. This is primarily due to the dollars invested in construction activities during those 3 years. In the years following construction the increase in personal income is estimated at $23 million.

Output

Output is considered as the amount of production including all intermediate goods purchased as well as the value added. It can be thought of as sales or supply.