# APPLICATION CHECKLIST

*Use this checklist as a tool to ensure that you have all of the components of the application package. Please note, this checklist is for your use only and does not need to be included in the package.*

| | |
|---|---|
| ☐ | Application |
| ☐ | Transmittal Letter |
| ☐ | $100 Application Fee |
| ☐ | Tax Liability Statement |
| ☐ | Letters of Support (If Applicable) |
| ☐ | Other Appendices (If Applicable) |

When the package is completed, send an electronic version to Ms. Karlene Fine at kfine@nd.gov, and 2 hard copies by mail to:

Karlene Fine, Executive Director
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840

For more information on the application process please visit:
http://www.nd.gov/ndic/renew/info/submit-grant-app.pdf

Questions can be addressed to Ms. Fine at 328-3722, or Andrea Holl Pfennig at 328-2687.

# Renewable Energy Program

## North Dakota Industrial Commission

## Application

Project Title: Renewable Energy Commodity Trading Educational Program

Applicant: North Dakota State University

Principal Investigators:

Dr. William W Wilson

Date of Application: Apr. 27, 2012

Amount of Request: $234,346

Total Amount of Proposed Project: $468,692

Duration of Project: 2 years

Point of Contact (POC):

William W. Wilson

POC Telephone: (701-231-7472

POC Email:

william.wilson@ndsu.edu

POC Address: Dept. of Agbus and Ap. Econ

North Dakota State University

Fargo, ND 58108

**TABLE OF CONTENTS**

*Please use this table to fill in the correct corresponding page number.*

## Renewable Energy Commodity Trading Educational Program

**ABSTRACT:** The renewable energy industry has become very important to North Dakota's economy and the surrounding region. A major challenge to the sector is the amount of risk that firms are exposed to in terms of investments, as well as on-going business operations. Indeed, margins in the sector are extremely volatile, more so than other agricultural processing sectors. Margin volatility impacts not only firm risk, which stifles investment, but is also transmitted to feedstock suppliers, rural communities, and consumers. This project proposes to develop a world class commodity trading room that will be used for education programs on risk and risk management in the renewable energy sector.

**Objective:** Develop a world class renewable energy commodity trading educational program targeted to students, feedstock suppliers, and industry personnel.

**Expected Results:** Improved and innovative risk management strategies and better trained employees in this sector. The impact of these would be reduced risk, and as a result, less volatile returns and more investment in the sector.

**Duration:** 2 years start-up.

**Total Project Cost:** $468,692 ($234,346 from the NDIC)

**Participants:** North Dakota State University, ADM, and Gavilon

## PROJECT DESCRIPTION

**Objective:** Develop a world class renewable energy commodity trading educational program targeted to students, feedstock suppliers, and industry personnel. The scope of this project includes biofuels, cellulosic feedstocks, wind and electrical energy.

**Methodology:** Focus of the work in this project is on risk analysis and management in the evolving and developing renewable energy industry in North America. Creation of a nationally recognized Renewable Energy Commodity Trading Room (CTR) involves several key steps. These include:

1. ***Assessment of trade practices and curriculum demands:*** First, a study of current renewable energy trading practices will be undertaken to understand risk management; trading and logistics strategies used by the sector, the level of sophistication and methods. Information sources will be acquired to develop specific learning objectives, educational materials, mode of dissemination, and examples appropriate to the sector. Feedstock acquisition, product and co-product marketing, and renewable energy credits will be emphasized.
2. ***Develop Relevant Data Sets***. Bloomberg and DTN will be the primary source of data for the Commodity Trading Room. However, data available in this system is not sufficiently comprehensive for the renewable energy sector. Thus, we will assemble relevant primary data. These include costs and prices related to inputs, outputs, logistics costs, as well as data on ancillary functions including Renewable Identification Numbers (RINs), and prices for futures, options and other derivatives.

3. ***Develop draft curriculum:*** A draft curriculum will be developed and reviewed by educational professionals and industry peers to ascertain relevance and accomplishment of learning objectives. In addition to Step 1, this step will review programs taught at Tulane, and others (e.g., Informa) on energy trading and look for areas of common applicability. Availability of the educational program will be announced at key industry forums and conferences (Growth Energy, Renewable Fuels Association, and BBI International) to build awareness.

4. ***Develop models to measure risk and analyze risk management strategies:*** Models will be developed that can be used to measure risk and to analyze the efficacy of risk management strategies in the sector. Risk measurement techniques (e.g., VAR, mean-variance, and simple measurement techniques, Tulane risk index) will be reviewed for applicability.[1][2] Those most viable and useful will be developed further and integrated into the curriculum.

5. ***Develop logistics models of the renewable energy sector***: Logistics is integral to renewable energy risk and management. Logistics models[3] will be reviewed and those most viable will be integrated into the teaching program. In addition, a number of new logistics programs (EKA, Triple Point) are now being created to assist in managing logistics and risks in commodities, including renewable fuels. These are planned to be part of the Commodity Trading Room.

---

[1]The PIs have numerous publications along these lines including: Wilson, Nganje, and Hawes. 2007 "Value-at-Risk in Bakery Procurement." *Review of Agricultural Economics,* 2007; Bullock, Wilson, and Dahl. 2007. "Strategic Use of Futures and Options by Commodity Processors." *International Review of Economics and Finance*, 16(4)**.** Wilson, Nganje, and Wagner. "Hedging Strategies for Grain Processors." *Canadian Journal of Agricultural Economics*, 54(2006): 311-326.

[2] Recent references in this field include: Schofield, N. *Commodity Derivatives: Markets and Applications*, Wiley (2007); and T. James, *Energy Markets: Price Risk Management and Trading*, Wiley (2008).

[3]Important recent references in this field include: Geman, H. ed. *Risk Management in Commodity Markets (From Shipping to Agriculutruals and Energy)*, Wiley, 2008 (see specifically, Chapt 3, Integrating Physical and Financial Risk Management in Supply Management);

6. ***Create simulation models and programs for teaching risk, strategy, and logistics management***: The models and data above will be developed as simulation modules that can be used for teaching in the Commodity Trading Room. It is anticipated these will encompass 1) simulation models for individual participants, 2) trading games that can be played amongst participants designated as various agents in the industry (e.g., feedstock suppliers, renewable energy processors, speculators, market-makers, and other intermediaries), and 3) be used for competitions (not dissimilar from at Tulane) among course participants.
7. ***Integrate the data, models and simulations into the Commodity Trading Room***: The next step will be to operationalize the trading room for the purpose of this project. Specifically, computer hardware, software and data will be installed in trading room. The data, models and simulation modules will be integrated into the Commodity Trading Room for teaching purposes.
8. ***Deliver educational programs (initial)***: The educational program will be delivered to on-campus NDSU students, online students (through Ag*Idea,[4] ND Interactive Video Network), and targeted industry workshops. Curriculum for the renewable energy program will be developed in modules to permit greatest flexibility in delivery and tailoring to specific niche audiences. Degree students will be exposed to all modules. Program modules will delineate risks of renewable energy policy, feedstock supply, feedstock price, processing conversion, product/co-product prices, logistics and supply chain strategies, and renewable energy credits.

[4] Ag*IDEA is a national consortium of 20 land grant universities, including North Dakota State University, that offers online programs and courses in agriculture including a program in Bioenergy and Sustainable Technologies (see appendix ??). A renewable energy trading class would complement this curriculum.

Funding from this grant will support program development and operations for two years. After two years, revenues from on-going operations will sustain the program, including updating of curriculum and computer hardware.

**Anticipated Results:** A semester long upperclass/graduate graduate dedicated to renewable energy trading will be developed and delivered to North Dakota students both on-campus at NDSU as well as online to other NDUS campuses (BSC, etc.) interested in receiving the course. The NDSU class (es) will have approximately 20 students per year; and the on-line courses about 10 students per year. The class will also be required (proposed) in the Ag*Idea Bioenergy curriculum.

Curriculum modules will also be delivered to targeted renewable industry professionals with responsibility for management and risk on a fee basis. Seminars delivering an overview of the program as well as examples of key learning outcomes will be presented at industry conferences to build program awareness as well as provide general education. It is anticipated this will evolve toward an annual industry workshop/training program on commodity trading, contracting, logistics and risk in renewable energy. Fees will likely be in the $1000-1500/person range for a 3 day+ program. Initially, there would be about 15-20 individuals per year, but, over time it is expected to grow to the capacity of the room (32) and be available to firms throughout the United States.

**Facilities:**[5] The renewable energy commodity trading program will be delivered in Room 124 of North Dakota State University's Barry Hall. In May, 2012 this room will be

[5] The appendix provides a more detailed description of the proposed Commodity Trading Room. The room's technology specifications were identified and validated on the basis of requirements (that were derived from the demands and needs of

converted into a state-of-the-art commodity trading room patterned after a similar energy trading program at Tulane University.[6] The facility will be a high-technology room with live information feeds regarding financial (including equities, credit, forrex etc.) and commodity markets (including agriculture, energy and biofuels) and includes the ability to analyze portfolios, trading strategies and risks. Technically, the room will have: 32 work stations, 16 of which will be live initially with the capabilities of expanding these over time; access to Bloomberg and DTN information systems for agriculture, commodities and financials; simulation software from Trading Technologies;[6] and the capabilities of conducting live and re-play simulations in any of these markets. Industry specific renewable energy information sources such as U.S. Biofuels Exchange and RIN trading exchanges will be added.

**Resources:** NDSU's Commodity Trading Room has secured $1.5 million of sponsorship to date from nationally recognized agribusinesses (Gavilon, ADM, CHS, each of whom dominate the grain origination industry and in some cases are processors in this sector) and commodity organizations (ND Soybean council, ND Corn Growers, ND Wheat Commission), among other individual contributors. Given success to date, the NDSU Development Foundation has established a goal to fund a $5 million endowment to support future programming.

---

industry) and cost. We recognize that technology is changing and that many students own laptops and other mobile technology. The trading room software licenses are tied to hardware. User-based licenses were found to be cost prohibitive. Bloomberg terminals are unique from personal computers. The room's technology specifications were identified and validated on the basis of requirements (that were derived from the demands and needs of industry) and cost. We recognize that technology is changing and that many students own laptops and other mobile technology. The trading room software licenses are tied to hardware. User-based licenses were found to be cost prohibitive.

[6] http://www.tradingtechnologies.com

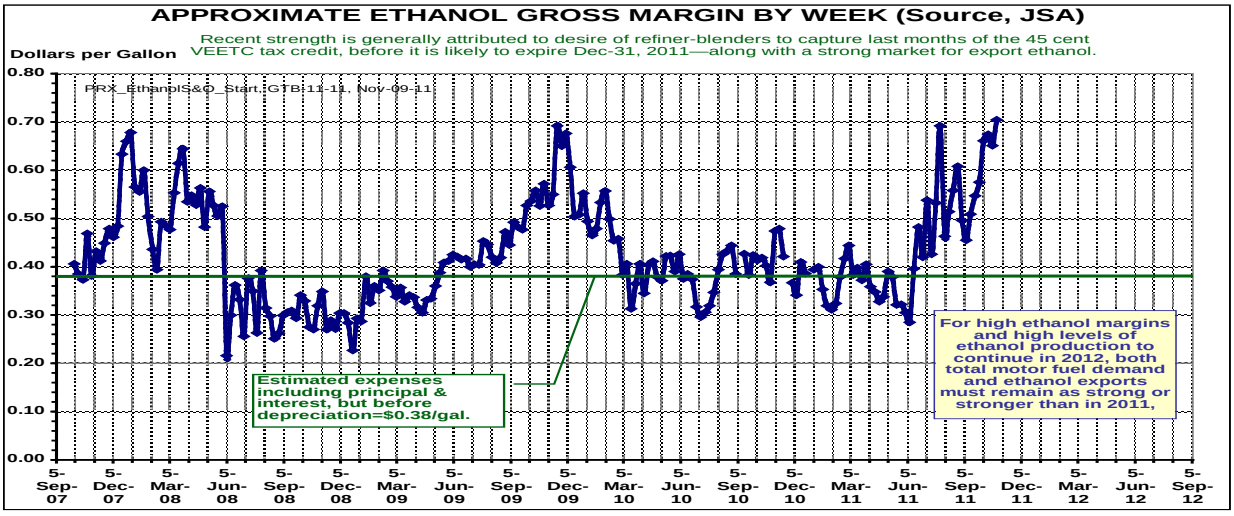
**Techniques to Be Used, Their Availability and Capability:** This project involves assembly of data, creation of relevant models (risk and logistics), development of curriculum, and delivery of educational programs. Bloomberg and DTN information systems were recommended to be adopted by the Biofuels sector, and trade execution (Trading Technology) are widely used in industry and are state of the art. In addition, our training programs and trading systems will be modeled after that at Tulane University which has proven to be a highly successful model for teaching about trading and risk management in the energy sector. This project is expected to have the same capability and impact.

**Environmental and Economic Impacts while Project is Underway:** No negative environmental impacts are expected as a result of project activity. Likewise, institution approved review protocols will be followed when developing all educational materials.

**Ultimate Technological and Economic Impacts:** The program will have a significant positive economic impact on the renewable energy industry in North Dakota and beyond. Beginning with the launch of the university course and industry workshop in early 2014, at least 20-30 university students (25 located on the campus of NDSU and 5 participating remotely via Ag*IDEA) and 20 workshop participants will be trained each year. Individuals who complete the course or workshop will have the skills and understanding necessary to implement or improve existing risk management and logistics strategies and practices. This will result in economic stability for existing renewable energy firms, owners, employees, suppliers, and communities, as well as the attraction of new renewable energy companies and investment to the state.

**Why the Project is needed:** Renewable energy production in the United States has escalated since passage of the 2007 Energy Independence and Security Act. Biofuel production of 36 billion gallons per year is mandated by 2022. While a similar national mandate for wind energy production was not established, production now exceeds 43,461mw nationally. Since 2007, biofuel and wind energy industries have experienced considerable risk originating from protracted periods of marginal profitability, uncertain federal policy, and volatile feedstock/energy prices[7]. A consequence of this risk has been the bankruptcy of several renewable energy firms.

Confronting all these firms and organizations is that this industry is vulnerable to risk in a number of dimensions. To illustrate, the figure below shows the volatility in ethanol margins, the primary indicator of profitability and result in extreme volatility of firm-level profits. The goal of risk management is to reduce the variability in this volatility using numerous risk management alternatives.




**ETHANOL MILLING MARGIN STRONG SINCE JUNE**

**Recent strength is generally attributed to desire of refiner-blenders to capture last months of the 45 cent VEETC tax credit, before it is likely to expire Dec-31, 2011—along with a strong market for export ethanol.**

[7] The inclusion of electricity within the scope renewable energy trading is natural given the role of wind, biomass, and other renewables in power generation. Consideration will be given to electricity trading; however, the program's initial emphasis will be on biofuel.

Leaders in North Dakota's renewable energy industry have encouraged development of a renewable energy trading curriculum with the purposes of: 1) Increasing enrollment amongst students wanting to pursue careers in renewable energy commodity trading (broadly defined); 2) Enhancing educational opportunities by providing a state-of-the-art teaching platform; and 3) Escalating the sophistication of training for current students and existing professionals in the industry. Indeed these firms have already made varying forms of commitment to support the operations of the room. In addition, there are substantial opportunities for research and outreach in numerous forms with the use of this technology.

Finally, a number of companies have already indicated their interest and encouragement that the topics addressed in the project is an important void that we can fill. ADM anecdotally provided that encouragement, and Gavilon provided a template program that they thought we could replicate.

## STANDARDS OF SUCCESS

The measurable deliverables include work plans and project reports for each of the 8 steps as defined in the Management Section. The value of the project to North Dakota is discussed in the Economic Impact Section above. Participants in the project include public entities (universities, educational programs, etc) and private firms operating renewable energy facilities in North Dakota and throughout the United States. Development of the CTR will be unique to the United States and important to North Dakota. The CTR is expected to provide substantial educational and research

opportunities, both for existing students as well as industry outreach (as defined above). Indeed the comprehensive nature of the data, models on risk and logistics and trading strategies will be of value to this sector. Throughout the process, firms will be able to enhance their expertise in risk and logistics management, which should allow them to reduce risk, increase profits and as a result preserve existing jobs and create new ones.

## BACKGROUND/QUALIFICIATIONS

Dr. William Wilson is NDSU Distinguished Professor in Agribusiness and Applied Economics. His focus is risk and strategy as applied to agriculture and agribusiness with a particular focus on marketing, procurement, transportation and logistics, international marketing and competition. He teaches classes in commodity trading, risk and agriBusiness strategy and has taught his risk class at Purdue University.
He served as a Board member of the Minneapolis Grain Exchange for 12 years, on the FGIS Advisory Board, and currently serves as a board member of several regional firms. He regularly consults with major agribusiness firms on topics related to above and has worked extensively in the following industries: procurement strategy, railroads, barges, ocean shipping, and elevators (shuttle development) malting and beer, durum and pasta, wheat and bread, and agbiotechnology.

## MANAGEMENT

The project will be managed by Dr. Wilson. In addition, an advisory council will be formed to guide implementation of the project. The advisory council will be comprised of representatives from the renewable energy industry, commodity traders, education experts, and IT professionals.

The project will be managed in accordance with the steps above and a reporting mechanism will be used as the output. Each of the project's 8 steps will have a specific reporting plan and deliverable element. The reporting plan will consist of 1) an initial detailed work plan outlining key performance benchmarks and timeline, 2) an interim report prepared halfway through each objective documenting activity and initial accomplishments, and 3) a final report summarizing study conclusions. However, intermediate performance benchmarks will be established to assure progress and overall project success. At the completion of each benchmark identified in the reporting plan, the entire group will be convened and updated to coordinate remaining project activities. A final report will contain all study results and program adjustments made.

## TIMETABLE

Below is the proposed time table, by activity (Steps as defined above) including duration and start and end dates.

| Activity | Start | End | Duration | 2012 | | 2013 | | | | 2014 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |
| **Step 1. State of Practice** | 7/12 | 3/13 | 9 months | | | | | | | | |
| **Step 2. Dataset Development** | 1/13 | 12/13 | 12 months | | | | | | | | |
| **Step 3. Curriculum Alternatives** | 1/13 | 12/13 | 12 months | | | | | | | | |
| **Steps 4/5. Teaching models** | 7/13 | 12/13 | 6 months | | | | | | | | |
| **Step 6. Simulation Modeling** | 7/13 | 12/13 | 6 months | | | | | | | | |
| **Step 7. Infrastructure/ Technology Installation** | 7/13 | 12/13 | 6 months | | | | | | | | |
| **Step 8. Program delivery** | 1/14 | 6/14 | 6 months | | | | | | | | |

## BUDGET

Total salary and benefits for the project covered under the REC grant are budgeted for $149,357. This includes 24 month's salary for research scientists/lecturers: including 12 months of effort at an annual rate of $54,500 in year 1 and 12 months of effort in year 2 with a 3% increase in rate. Fringe benefits accruing at a rate of 35% total $38,722.

The cost of printing course materials and software manuals is budgeted at $1,610. Research supplies (renewable energy data/information services) to develop the course are budgeted at $2,000.

Indirect Costs calculated at the institutional rate of 53.2% total $81,379. Program income generated by industry course fees will be used to support ongoing costs of the Commodity Trading Room.

Matching funds of $234,346 are provided in the form of private industry match.

ADM and Gavilon have each given $250,000 in support of the Commodity Trading Room, see the distribution of expenses below and letters of support are also attached.

The costs documented below are prorated at 50% of total costs to correspond with the Renewable Energy Trading Program's use of Commodity Trading Room.

These funds will be used to cover operating costs (ADM funds): technical support ($42,900), network and classroom maintenance ($1,224; $881), software licensing fees ($87,954); and capital costs (Gavilon funds): IT set-up (server-$15,222, network engineering-$8,840, setup - $13,345), and room renovations (carpentry and electrical - $64,000).

- There is a substantial up-front cost for both infrastructure as well as educational curriculum development.

- It is anticipated that during the first two years of the project, these courses will be presented as part of this project. Thereafter, the program will be self-supporting.

The project budget is shown below.

| **Project Associated Expense** | **NDIC's Share** | **Applicant's Share (Cash)** | **Other Project Sponsor's Share Gavilon** | **Other Project Sponsor's Share ADM** |
|---|---|---|---|---|
| **Salary & Fringe Benefits** | 149,357 | | | |
| **Information Technology Operating** | | | | |
| Technical support | | | | 42,900 |
| Network maintenance | | | | 1,224 |
| Classroom maintenance | | | | 881 |
| licensing fees[1] | | | | 87,954 |
| **Set-up** | | | | |

| | | | | |
|---|---|---|---|---|
| Server<br>Network Engineering[2]<br>Technology[3]<br>**Total** | | | 15,222<br>8,840<br>13,345 | |
| **Printing and Research Supplies** | 3,610 | | | |
| **Indirect Costs** | 81,379 | | | |
| | | | | |
| **Renovation Costs**<br>Remodel space into<br>Commodity Trading Room[4] | | | 64,000 | |
| **Total Project Cost** | 234,346 | | 101,407 | 132,959 |

[1] Subscription fees for agricultural, commodities, and financial services.

[2] Includes repeater, 24 port cisco, 48 port cisco 3750, support infrastructure and NEO installation.

[3] servers; T1; set up costs; replay servers; hubs; advanced distribution hubs; etc.

[4] Includes engineering, carpentry, electrical, podium, chairs, and workstations. See itemized estimate from NDSU Physical Plant.

## CONFIDENTIAL INFORMATION

It is not anticipated that confidential information will be generated.

## PATENTS/RIGHTS TO TECHNICAL DATA

This does not apply.

## Appendix: Commodity Trading Room *Project Summary*

**Purpose**: A Commodity Trading Room (CTR) is being planned for Barry Hall. The CTR will be a high-technology room with live information feeds regarding financial (including equities, credit, forrex etc.) and commodity markets (including agriculture, energy and biofuels) and includes the ability to analyze portfolios, trading strategies and risks. All of these are important in North Dakota and the region. The room is currently being designed and will be located in Barry Hall. Most competing Business Schools have financial and trading rooms. Developing a trading room in Barry Hall will provide similar training and research opportunities for NDSU students and faculty. Finally, for agribusiness, NDSU will be the first school having such capabilities with a focus on agriculture and the biofuels sector.

AgBusiness employers have encouraged development of Trading Room with purpose of: 1) Increasing enrollment amongst students wanting to pursue careers in commodity trading (broadly defined); 2) enhanced educational opportunities by providing state-of-the-art teaching platform; and 3) Escalating the sophistication of training for current students. Indeed these firms have already made varying forms of commitment to support the operations of the room. In addition, there are substantial opportunities for research and outreach in numerous forms with the use of this technology.

**Scope of Project**: The project will entail a high-technology room with live feeds to markets and financial information and will be modeled after that at Tulane University.[8] Technically, the room will have: 32 work stations, 16 of which will be live initially with the capabilities of expanding these over time; access to Bloomberg and DTN information systems for agriculture, commodities and financials; simulation software from Trading Technologies;[9] and the capabilities of conducting live and re-play simulations in any of these markets.

The CTR will be used for teaching of current courses in Agribusiness and the CBA (College of Business). There is a vision that courses would be refined, and jointly offered courses would be developed. The CTR can also be used for the *Bison Fund*, a student run portfolio. Finally, opportunities exist for outreach programs of numerous forms including: commodity organizations, NCI (Northern Crops Institute), Biofuels sector, and for individual companies, and advanced programs (to be developed).

**Room**: The room will be located in the first floor Barry Hall in Room 124.

---

[8] Tulane University is unique among university trading rooms because of its focus on commodities and energy. http://www.freeman.tulane.edu/energy/trading1.php http://www.freeman.tulane.edu/energy/trading2.php www.freeman.tulane.edu/energy/trading5.php http://www.freeman.tulane.edu/trading/default.php This includes a video of their competition they host among universities

[9] The classroom is configured to meet the needs of current NDSU upperclass and Northern Crops Institute course .

And http://www.tradingtechnologies.com

**Timing and Schedule**: To begin installation in May 2012, operating in August 2012, and ready for classes Fall 2012.

Specifically, following would be the approximate schedule

1. December
    - Submit proposal to SBHE
    - Complete agreements (TR, TT, ITS)
2. January
    - SBHE agenda for approval to proceed with spending
    - Dev Foundation
3. March
    - Plans for installation
4. April:
    - Wilson to Barry Foundation Business School Consortium (MSUM). Promote Tri-college type affiliation
5. May
    - Begin install
6. July 2012: Begin operations
7. August: Fall semester begins
8. October: Demonstration to Business School Consortium

ADM – Benson Quinn
701 4th Avenue South – Suite 800
Minneapolis, MN 55415
Ph. 612-340-5900
Fax: 612-335-2948

January 11, 2012

William Wilson, PhD
University Distinguished Professor
Agribusiness and Applied Economics
NDSU Department 7610
Richard H. Barry Hall
811 – 2nd Avenue North
Fargo, North Dakota 58108-6050

Dear Dr. Wilson:

This letter is to indicate that ADM-Benson Quinn would allow its cash contribution to the NDSU Commodity Trading Room to be used as part of the industry match for the projected titled:

*Renewable Energy Commodity Trading Educational Program*

If you need further clarification, please let me know.

Very truly yours,

**ADM-BENSON QUINN, A DIVISION OF ARCHER DANIELS MIDLAND COMPANY**

Scott D. Nagel, President

SDN:sm

January 23, 2012

Dear Dr. Bill Wilson,

This letter is to indicate the GAVILON would allow its cash contribution to the NDSU Commodity Trading Room to be used as the industry match for the project titled: Renewable Energy Commodity Trading Educational Program.

Please feel to call me for further clarification.

Sincerely,

Gregory Konsor

Vice President
Gavilon Grain

Eleven ConAgra Drive
Omaha, Nebraska 68102

1-402-889-4423
Greg.konsor@gavilon.com