

## Executive Summary

The purpose of *SUNRISE BioProducts, A Center of Excellence for Chemicals, Polymers, and Composites From Crop Oils* is to invent, develop, and commercialize green industrial chemicals, polymers, and fiber composites utilizing crop oils (soybean and canola oil) as the primary raw material feedstock. Technologies developed by SUNRISE will be licensed for commercialization by SUNRISE Renewables, a new private sector corporation, established in March 2008. SUNRISE Renewables, will further develop the technologies through pilot-scale facilities located at the Center of Excellence for Life Sciences and Advanced Technologies and a demonstration facility at Northwood and then license the intellectual property worldwide. This COE will create 15 new technology-related private sector jobs ramping up to over 50 jobs within 4 years. Additional private sector jobs are anticipated when commercial facilities are placed to take advantage of North Dakota's extensive crop oil agricultural economy.

The technology from the SUNRISE BioProducts COE will be used by other North Dakota-based companies at the end of the value chain to increase the renewable "green" content of their products, thus strengthening their businesses through increased customer acceptance. One example is Integrity Windows of Fargo, a division of Marvin Windows, which manufactures fiberglass composite window and door frames.

The Sustainable Energy Research Initiative and Supporting Education (SUNRISE) group is a faculty-led research group centered at UND but with participants from 14 academic departments at UND, NDSU, MaSU and, NDSCS and is one of two research initiatives sponsored by the ND EPSCoR National Science Foundation (NSF) research infrastructure improvement program. Faculty and students at UND, NDSU, and MaSU will participate in the SUNRISE BioProducts COE.

SUNRISE has the facilities, expertise, and resources to work at all scales in the RD&C process. A majority of the work proposed by the center is focused on developing SUNRISE chemical and polymer inventions into commercial facilities following the successful commercialization model of our biojet fuel technology. But, additional research will invent new sustainable products by exploring feedstock modifications and new product lines, including fiber/biopolymer composites thus insuring that this COE continues to be sustainable beyond the period of funding support included in the proposal.

**UNIVERSITY OF NORTH DAKOTA**  
**BUDGET SUMMARY**  
**The SUNRISE BioProducts Center of Excellence**

Start date: 1/1/2009  
 End date: 12/31/2011

DESCRIPTION	Year 1	Year 2	Year 3	TOTAL
SALARIES - REGULAR	152,000.00	159,600.00	167,580.00	\$479,180
SALARIES - OTHER				\$0
SALARIES - FACULTY	121,666.67	127,750.00	134,137.50	\$383,554
FRINGE BENEFITS	76,626.67	80,458.00	84,480.90	\$241,566
TOTAL PERSONNEL	350,293.33	367,808.00	386,198.40	\$1,104,300
				\$0
TRAVEL	16,500.00	16,500.00	16,500.00	\$49,500
COMMUNICATIONS-PHONE				\$0
COMMUNICATIONS-POSTAGE				\$0
RENTS/LEASES-EQUIPMENT & OTHER				\$0
RENTS/LEASES-BUILDING/LAND				\$0
OFFICE SUPPLIES				\$0
PRINTING-COPIES, DUPLICATING				\$0
SUPPLIES-IT SOFTWARE				\$0
SUPPLY/MATERIALS	0.00	4,025.00	0.00	\$4,025
				\$0
IT EQUIPMENT <\$5,000		0.00	0.00	\$0
FEES-OUTREACH ACTIVITIES	55,000.00	55,000.00	55,000.00	\$165,000
FEES-PROFESSIONAL FEES & SERVICES				\$0
FEES-SUBCONTRACTS	165,000.00	165,000.00	165,000.00	\$495,000
PROFESSIONAL DEVELOPMENT	0.00	0.00	0.00	\$0
WAIVERS/SCHOLARSHPS/FELLOWSHPS	0.00	0.00	0.00	\$0
TOTAL OPERATING	236,500.00	240,525.00	236,500.00	\$713,525
				\$0
EPC CONTRACTS	375,000.00	375,000.00	300,000.00	\$1,050,000
EQUIPMENT >\$5,000	21,539.67	0.00	60,635.60	\$82,175
IT EQUIPMENT >\$5,000	0.00	0.00	0.00	\$0
TOTAL EQUIPMENT	21,539.67	0.00	60,635.60	\$82,175
				\$0
TOTAL DIRECT COST	983,333.00	983,333.00	983,334.00	\$2,950,000
F&A (INDIRECT COST)	165,127.67	155,166.55	160,194.44	\$480,489
UNRECOVERED INDIRECT COSTS	-165,127.67	-155,166.55	-160,194.44	-\$480,489
TOTAL COST	983,333.00	983,333.00	983,334.00	\$2,950,000
				\$0
<b>Matching Funds</b>				
USDA NRI Grant	116,666.67	116,666.67	116,666.67	350,000.00
Federal Appropriation	2,100,000.00	2,200,000.00	2,300,000.00	6,600,000.00
Private Partners Cash	83,333.33	83,333.33	83,333.33	250,000.00
Private Partners In-lieu of Cash	407,500.00	427,875.00	449,268.75	1,284,643.75
North Dakota Soybean Council	100,000.00	100,000.00	100,000.00	300,000.00
University of North Dakota In-kind	165,127.67	155,166.55	160,194.44	480,488.66
TOTAL MATCHING FUNDS	2,972,627.67	3,083,041.55	3,209,463.19	9,265,132.41

Due to the limitations within the Universities accounting system, the system does not provide for accumulating and reporting of expenses at the detail level outlined above. The costs will be accounted for and reported at the category level. The detail above is presented for proposal evaluation purposes only.

Private partners and the allocation of matching funds may change prior to award - see attachment 3 for explanation.

## BUDGET NOTES<sup>1</sup>

This budget is based on a project starting date of January 1, 2009 and a completion date of December 31, 2011.

### **Administrative Systems:**

The University of North Dakota has established systems for the effective administration of programs sponsored by external agencies. As with all sponsored programs, the Principal Investigator will be responsible for the overall administration and progress of the project.

The GCA office is responsible for submitting all required financial reports to all sponsoring agencies. Support for all expenditures including original invoices, payment vouchers, etc. will be maintained by the University. In addition, the GCA office will supply the Principal Investigator with monthly reports comparing the project's original budget with expenditures to date.

The University of North Dakota is included in the statewide single audit in accordance with OMB Circular A-133, Audits of States, Local Governments, and Non-Profit Organizations. A report is issued every other year.

- A. Senior Personnel: Centers for Excellence funds will be used to provide full-time (12 months per year) salary for the Center Director, Dr. Wayne Seames for three years. Dr. Seames may still retain a reduced set of additional duties in his role as a faculty member in the Department of Chemical Engineering. Therefore, some of the work performed in the conduct of this project may be above and beyond that expected for this job position. The funds requested may include salaries in compensation for overload, not to exceed 20% of the full time load for Dr. Seames' position. Year 1 salary is based on Dr. Seames' estimated 2008/09 academic year salary with a salary escalation of 5% per year is incorporated into this budget.

Salary is included for UND SUNRISE faculty working on research associated with this Center of Excellence. An average salary of \$7,778/month for Chemistry and \$8,889 for Chemical Engineering for the 2008/09 academic year was included for budgetary purposes; although faculty from other disciplines may be compensated from this salary pool. 0.5 months of chemistry salary and 0.5 months of chemical engineering salary are included for each year. The funds requested may include summer salaries and/or salaries in compensation for overload, not to exceed 20% of the full time load for faculty working on center sponsored research. Funding is included for one full-time visiting Chemical Engineering research professor for all three years. A salary escalation of 5% per year is incorporated into this budget.

Other Personnel: Centers for Excellence funds will be used to provide full-time (12 months per year for three years) salary for an instrument technician, hired by UND, to construct and maintain SUNRISE research equipment. This technician will work on both faculty-directed equipment and equipment located in the pilot plant center. Salary is based on compensation

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<sup>1</sup> See Subcontractor budget notes for details on allocation of costs directly assigned to other NDUS participants

for similar positions at UND. Also included is ½ time salary support for an administrative assistant to help manage the program. A salary escalation of 5% per year is incorporated into this budget.

B. Fringe Benefits: are estimated at a composite average of 25% of salary for UND faculty and staff positions. Amounts shown for fringe benefits are estimates determined by historical data and are provided for proposal evaluation purposes only. Actual fringe benefit costs will be charged to the grant according to each employee's actual benefits.

C. Travel: is estimated on the basis of UND travel policies which can be found at:

<http://www.und.edu/dept/accounts/employeetravel.html>.

Estimates include General Services Administration (GSA) daily meal rates.

Center of Excellence travel funds are provided to support commercialization and development activities plus faculty/student travel to conferences and meetings to discuss and disseminate results. These costs may include vendor participant fees, booth rentals, etc. Travel is expected to be a significant part of the commercialization efforts of the project. This budget includes \$16,500 per year for travel.

D. Materials and supplies: are included to support SUNRISE research and pilot plant area R&D activities plus those required to support commercialization activities. These include laboratory supply items and minor equipment items. Costs in this category include but are not limited to chemicals, consumable lab supplies, labware, consumable gases, minor equipment, and other supplies necessary to perform the experimental activities as well as for nuts, bolts, piping, tools, and other similar material and resources necessary to fabricate and operate lab-scale experiments. These materials may also include marketing-related items such as logo'd office supplies, information brochures and pamphlets, vendor booth equipment such as backdrops, projectors, bunting and banners. Costs may also include food, nonalcoholic drinks, and other miscellaneous costs associated with business meetings held for the purposes of discussing the commercialization of technologies developed by this center of excellence.

E. Outreach Programs: \$20,000 per year is provided to the UND Student Organization Power ON! which may be used for materials, equipment, participant stipend, volunteer travel and living cost reimbursement, laboratory supplies, and other expenses associated with developing and implementing a program for 5<sup>th</sup>-8<sup>th</sup> students in North Dakota schools that uses experiments and curriculum associated with sustainable energy technologies to motivate students to consider math, science, and engineering fields for study and careers.

\$35,000 per year is provided to the North Dakota EPSCoR NATURE program to support programs that encourage and assist Tribal students living within the geographical area of the state of North Dakota to enroll in math, science, or engineering programs. Funds may be used, but are not limited to participant stipends, housing, food, travel costs, and child care costs for single parent participants. Participants may be tribal students (high school or tribal college) or faculty (high school or tribal college). Funds may also be used for administrative

costs associated with NATURE programs including travel, publication material, duplicating costs, and program-related fees and expenses.

- F. Subcontracts: amounts included are estimates for budgetary purposes only; actual subcontract expenditures will depend upon the specific scope of work and the agreed compensation with the selected contractor.
1. \$375,000 is budgeted for year 1 to partially fund an Engineering, Procurement, and Construction contract(s) to provide a pilot plant system and equipment for a process to generate aromatic products from crop oils. The remaining funds are provided in year 2, supplemented with commercial partner funding.
  2. \$375,000 is budgeted for both year 2 to fund an Engineering, Procurement, and Construction contract(s) to provide a plant system and equipment for a process to generate aromatics from crop oils.
  3. \$300,000 is budgeted in year 3 to fund an Engineering, Procurement, and Construction contract(s) to provide a pilot plant system and equipment to product carbon products from tars generated from crop oils.
  4. \$45,000 per year is budgeted for the Mayville State portion of the project as a subcontract. See MSU budget notes for details.
  5. \$120,000 per year is budgeted for the North Dakota State University portion of the project as a subcontract. See NDSU budget notes for details.
- G. Tuition waivers/cost of education allowances: No funds were included under the Centers of Excellence funding.
- H. Capital Equipment: A pool of funding is included each year to partially fund capital equipment purchases. Specific equipment will be identified during the course of the program. Year 1: \$21,534. Year 2: \$0. Year 3: \$60,636.
- I. Indirect Costs: Per the guidelines included in the Centers of Excellence application, no indirect costs are charged for Centers of Excellence funded budget items. These disallowed indirect costs, charged at the rate of 35.0%, which is the rate approved by the Department of Health and Human Services (effective July 1, 2005) are included as in-kind match. Please see cost share, below. 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 subcontracts/subgrants in excess of the first \$25,000 for each award and tuition waivers.
- J. Cost Share: the total estimated value of matching funds to this Centers of Excellence grant is 3.1 to 1.

SUNRISE Renewables will provide at least \$1,284,644 in cash equivalent cost share as described in Attachment 2.

Bayer Crop Science will provide \$250,000 in cash.

North Dakota Soybean Council is projected to provide at least \$300,000 in cash to fund graduate student RAs and materials/supplies as matching funds to this Center of Excellence. NDSC funding must be requested annually through their proposal process. Funding has been received from NDSC for the past five years (2008-09 funding is \$110,000) and a letter of support, expressing NDSC's likelihood for future funding is provided in attachment 9.

The USDA/NRI will provide \$350,000 in cash through an approved research grant: "Bio-based Polymeric Materials from Cracked Crop Oils" which runs 9/08 through 8/11.

A Federal Appropriation (request submitted and pending), expected to be included in the USDA budget for FY 2009-2011 will provide: Year 1 - \$2,100,000; Year 2 - \$2,200,000; and Year 3 - \$2,300,000.

The University of North Dakota will cover the disallowed indirect costs from the Centers of Excellence funding source for all three years of this project.