M O N T A N A B O A R D O F R E G E N T S

LEVEL I REQUEST FORM

Item No.:	**135-1012+R0507**	**Date of Meeting:**	**May 30 - June 1, 2007**
Institution:	**The University of Montana - Missoula COT**		
Program Title:	**Temporary A.A.S in Energy Technology**		

Level I proposals are those that may be approved by the Commissioner of Higher Education or the Commissioner's designee. The approval of such proposals will be conveyed to the Board of Regents at the next regular meeting of the board. The institution must file the request with the Office of the Commissioner of Higher Education by means of a memo to the Deputy Commissioner.

☐ **A.** **Level I action requested (check all that apply):** Level I proposals include campus initiatives typically characterized by (a) minimal costs; (b) clear adherence to approved campus mission; and (c) the absence of significant programmatic impact on other institutions within the Montana University System and Community Colleges.

- ☐ 1. Re-titling existing majors, minors, options and certificates; (e.g. from B.S. in Mechanized Agriculture to B.S. in Agricultural Operations Technology);
- ☐ 2. Eliminating existing majors, minors, options and certificates via a Program Termination Checklist;
- ☐ 3. Adding new minors or certificates where there is a major;
- ☐ 4. Adding new minors or certificates where there is an option in a major;
- ☐ 5. Departmental mergers and name changes;
- ☐ 6. Program revisions; and
- ☐ 7. Distance delivery of previously authorized degree programs.

☐ **B.** **Level I with Level II documentation:** With Level II documentation circulated to all campus chief academic officers in advance, the Commissioner or designee may propose additional items for inclusion in the Level I process. For these items to move forward, the Commissioner or designee must reach consensus with the chief academic officers. When consensus is not achieved, the Commissioner or designee will move the item to the Level II review process.

- ☐ 1. Options within an existing major or degree;
- ☐ 2. Eliminating organizational units within larger institutions such as departments, divisions and colleges or schools *with the exception of the five Colleges of Technology where changes require Board action;*
- ☐ 3. Consolidating existing programs and/or degrees.

☒ **C.** **Temporary Certificate or A.A.S. degree programs:** Certificate or Associate of Applied Science Degree Programs may be submitted as Level I proposals, with memo and backup documentation, when they are offered in cooperation with and/or at the request of private or public sector partners and the decision point to offer the program is not consistent with the regular Board of Regents program approval process. Level I approval for programs under this provision will be limited to two years. Continuation of a program beyond the two years will require the normal program approval process as Level II Proposals.

All other Certificate or Associate Degree programs may be placed on submission at any Board of Regents meeting. They will be placed on action agendas at subsequent meetings. All campuses agree to insure that all other campuses receive program information well in advance of submission.

Item No.: 135-1012+R0507	Institution: The University of Montana - Missoula COT

Specify Request:

The Department of Applied Computing and Electronics requests approval for a temporary A.A.S. degree program in Energy Technology.

M O N T A N A B O A R D O F R E G E N T S

NEW ACADEMIC PROGRAM PROPOSAL SUMMARY

Item No.: 135-1012+R0507	Institution: The University of Montana - Missoula COT

1. How does this program advance the campus' academic mission and fit priorities?

The proposed temporary Associate of Applied Science program in Energy Technology supports the mission of the University of Montana, College of Technology to develop the Montana workforce and provide students with access to well-paying jobs

2. How does this program fit the Board of Regents' goals and objectives?

The proposed temporary Associate of Applied Science program in Energy Technology responds to Goal II Assist in the expansion and improvement of the economy by increasing responsiveness to workforce development needs by expanding and developing programs in high demand fields in the state.

3. How does this program support or advance Montana's needs and interests?

The program increases the number of trained employees in an area of rapid job growth. Providing a career opportunity for Montanans with the potential for an above average salary with benefits advances Montana's needs and interests.

4. How will this program contribute to economic development in Montana? (Note projected annual economic impact both regionally and statewide.)

The expansion of conventional and alternative energy development and production in Montana as well as the Governor's policy to grow an "energy economy" has created a need for trained technicians in fields associated with traditional, emerging and alternative energies. A well-trained workforce is necessary component in supporting these industries.

5. What is the program's planned capacity?

• Break-even point?	0 FTE students
• Enrollments / year?	25
• Graduates / year?	20
• MT jobs / year?	15

6. Resource Allocation:

• Total program budget?	$ 572,734
• Faculty FTE?	3 first year/3.5 second year
• Staff FTE?	3.5 first year/4.25 second year

7. Does this program require new resources? ☒ Yes ☐ No

If yes, what is the amount? $ $572,734

8. How will the campus fund the program?

The experimental program will initially be funded through a WIRED grant fund allocated through the Department of Commerce and the UM Online Department

9. If internal reallocation is necessary, name the sources.

No internal reallocation is necessary.

Associate of Applied Science Degree in Energy Technology
Department of Applied Computing and Electronics
College of Technology
The University of Montana, Missoula
March 2007

I. Objectives and Needs

1. Description of Program:

The expansion of conventional and alternative energy development and production in Montana as well as the Governor's policy to grow an "energy economy" has created a need for trained technicians in fields associated with traditional, emerging and alternative energies. The University of Montana, College of Technology (UM COT) has been awarded funding for two years through a Workforce Innovation in Regional Economic Development (WIRED) grant to train Energy Technicians. In response, the Department of Applied Computing and Electronics (ACE) is requesting approval for an experimental Associate of Applied Science degree program in Energy Technology to begin Autumn Semester 2007.

Goals of the program are to provide the fundamental underpinnings of science and mathematics; familiarize students to the full slate of energy technologies and their application, installation, operation and maintenance; and introduce the diverse career possibilities available in the industry. Graduates of the Energy Technology program are best described as general practitioners who may be involved in energy systems design, operation, maintenance, integration, and installation; component procurement; economic assessment; troubleshooting; sales; regulatory compliance; site selection; research and development; project management; and, a variety of other activities in the energy industry. The program will provide students with a broad familiarity of energy systems and technologies; develop critical and analytical thinking skills; refine adaptive problem-solving skills; and establish research skills, resources and pathways to additional learning.

The learner objectives for the program are:

- Identify Safe Workplace Habits and Practices
- Develop and Practice Professional Standards of Communication
- Identify Concepts Affecting Energy Efficiency and Conservation
- Understand Energy Production, Delivery, Consumption, and Disposal
- Comprehend Traditional, Alternative, and Sustainable Energy Production Technologies
- Evaluate Energy Production Sites
- Design, Install, and Manage Energy Systems
- Assess Societal, Economic, Environmental, Ethical, and Legal Implications and Constraints in Energy Systems.

The degree program will be available online and include initial partnerships with Dawson Community College, Miles Community College, and Montana Tech's College of Technology. All students will complete a summer practicum at the University of Montana using the energy learning sites located at Montana Technology Enterprise Center (MonTEC), the College of Technology's West Campus, and other approved sites. Students will also complete local and regional internships.

Curriculum and graduation requirements for the 64-credit experimental associate of applied science degree program, along with course descriptions, can be found in the attached appendix.

2. Documented Need:
A paramount issue at both the state and national levels is our country's attempt to move toward energy self-reliance. Montana's natural resources are at the forefront of producing a new energy economy for the state. These resources include renewable resources, like biomass, seed oils, wind, and solar systems. They also include traditional fossil fuels. Although these natural resources exist throughout Montana, the greatest opportunities may exist in remote locations found in the northern and eastern areas of the state. These areas have not seen the economic prosperity found in the "boot shaped areas" of western and central Montana. The economic disparity in rural Montana and Native American Reservations is compounded by the dispersed nature of the educational resources of those areas. The program will partner with local institutions in these areas to provide a workforce for Montana's energy economy.

Support from local and regional employers has been obtained with nearly twenty letters of support endorsing the program and its curriculum. Initial funding for the program was recently received through a state WIRED grant program. The program is a product of two years of research at the University of Montana resulting in the curriculum and a learning and demonstration site.

The U.S. Department of Labor (DOL) predicts a continued demand for engineering technicians over the next ten years in its Occupational Outlook Handbook. The educational expectation for an engineering technician is completion of a two-year associate degree. The median annual income in the engineering technician field varies from $38,480 to $52, 500. The DOL predicts job opportunities for environmental engineers to grow at a rate "much faster than average" for all occupations. Technicians to support environmental engineers will be needed.

3. Additional Courses:
All general education and professional courses have been offered. The majority of courses involving the specific skills required for energy technicians are partially or fully developed. Several have been successfully offered as experimental special topics.

No new courses will be requested at this time. Standard UM curricular approval processes will be followed for future new courses. This experimental degree program includes traditional courses already offered by departments on campus and experimental specialty topics.

II. Adequacy, Accreditation, Assessment, and Facilities

1. Adequacy of Present Faculty, Facilities, Equipment, and Library Holdings
A majority of the special topics courses are fully developed and several have been successfully offered in past semesters. Traditional courses are offered on an annual basis by full-time and adjunct faculty. Grant funding is available for additional faculty where needed. Courses offered online will have a minimal impact on facilities. Partnership will allow students to complete traditional courses online or regionally at local institutions. A learning site has been developed at MonTEC and on the COT West Campus. A 10 kilowatt wind turbine and 2 kilowatt photovoltaic hybrid system has been deployed. Both are operational providing student training and public demonstrations. A 1 kilowatt wind turbine, 50 kilowatt wind turbine, fuel cell, and state-of-the-art biomass gasifier/power generator have been procured. Further learning sites will be created as each of these technologies is deployed. Current library holdings in the MUS are sufficient.

2. Accreditation
The proposed certificate program meets the minimum standards for regional accreditation through the Northwest Association of Schools and Colleges and all requirements for the Associate of Applied Science Degree from The University of Montana, College of Technology.

3. Assessment Plan

A local advisory committee will be formed to provide assessment of the program, its curriculum, and its appropriateness in meeting the regional demands of the workforce. Periodic review, faculty assessment, student perception course surveys, employer surveys, and student exit interviews will all be used in providing assessment data.

III. Impact on Faculty, Costs, Enrollment, Other Campus Programs

1. Impact on Faculty
WIRED grant funding and UMOnline will provide the additional faculty needed to support experimental courses in energy-related topics and additional sections of traditional courses. Funding for a full-time program coordinator and for coordination at partnership sites are covered by WIRED grant funding for the next two years.

2. Cost Analysis
To be included in appendix

3. Enrollment Impact
Initial enrollment goals will be 20-25 students annually. Prospective students will only be accepted during Autumn Term.

4. Relationship to Other Campus Programs
Partnerships have been established on campus with the Department of Applied Arts and Sciences, Department of Business Technology, Department of Industrial Technology, Department of Environmental Studies, UMOnline, and COT Outreach. All departments will be working together with the Department of Applied Computing and Electronics to support the experimental degree program.

5. Relationship to Other Institutions
Initial partnerships with Dawson Community College, Miles Community College, MSU-Billings College of Technology, and the Montana Tech College of Technology are being pursued to offer the program to audiences throughout the state of Montana. Financial support through the WIRED grant will be provided to assist these institutions in advising and directing students accessing the program from remote sites. Plans for additional partnerships with Montana Tribal Colleges are slated for the program's second year.

IV. Proposal Development Process

The proposal has been developed through the research work of a number of entities at the University of Montana. Experimental courses have been successfully offered. A learning and demonstration site has been created. An experimental curriculum has been adopted and supported by local industry leaders.

Course Descriptions

AASC195T Special Topics: Issues in Sustainability 2 cr. This literature-intensive course is intended to expose the student to a variety of essays addressing the balance of economic development with the principles of sustainability and social equity. The student is offered an introduction to sustainability concepts, natural systems/cycles and environmental economics. Natural capitalism and triple bottom line maximization is explored, along with the role of corporations and small businesses in sustainable development. A survey of issues surrounding corporate social responsibility and sustainability-driven innovation will be conducted.

BUS 103S Principles of Business 3 cr. Introduction to the world of business. Examines capitalism, the economic environment, the types of business organizations, management, marketing, production, labor, financing, and business/governmental relations. Credit not allowed for both BUS 103S and BADM 100S.

BUS 135T Business Law 3 cr. Offered spring. An overview of law as it applies to business transactions. Topics include the nature and source of law; courts and procedure; contracts, sales, and employment; commercial paper; bailments; property; business organizations; insurance; wills and estate planning; consumer and creditor protection; torts; criminal law; and agency law. Credit not allowed for both BUS 135T and BADM 257.

COM 150S Interpersonal Communication 3 cr. Offered every term. Focus on communicating and listening more clearly to improve personal and professional relationships. Topics include forms of communication, communication and identity, emotion, conflict, climates, gender, and cultural diversity. Credit not allowed for both COM 150S and COMM 110S.

CRT 172 Introduction to Computer Modeling 3 cr**.** Offered autumn and spring. Prereg., CRT 111 or demonstrated computing experience. Problem solving and data modeling using computer productivity software. Emphasis using spreadsheets and databases for data analysis. Formal presentation of results. Credit not allowed for both CRT 172 & CS 172.

CRT 209T Project Management 3 cr. Offered intermittently. Prereq., CRT 172. Investigation of topics in project management including scope, definition, risk, procurement and the RFP. Management of time, cost, quality, and human resources. Concepts are reinforced with PM software.

EET195T Special Topics: Basic Electricity 4 cr.
Introduction to the concepts of electricity, current flow, direct current (DC) and alternating current (AC) electrical circuits. The course covers passive components; scientific notation and metric conversions; voltage, current, and resistance units of electrical measurement; Ohm's Law; analysis of series, parallel, and series-parallel circuits; the use of electrical circuit theorems; electromagnetism; capacitance; inductance; transformers; and motors.

EET195T Special Topics: Energy Systems 3 cr. A comprehensive and technical examination of traditional and alternative energy systems and the energy industry, energy production, and patterns of consumption. Introduces the concept of life cycle assessment and applies it to various forms of energy as a means to evaluate social, economic, political and environmental impacts.

EET295T Special Topics: Solar and Wind Systems 3 cr. An overview of the basic concepts and procedures used in designing and installing small solar and wind projects. The focus is on photovoltaic power systems, but systems that produce electricity from wind, and systems that produce hot water from the sun will also be considered.

EET195T Special Topics: Power Systems Technology 3 cr. An introduction to the basic devices and techniques used to generate, transmit, and use electrical power. Investigates generators, motors, and the electrical supply system known as "the grid."

EET195T Special Topics: Energy Technology Practicum 2 cr. Offered Summers Provides opportunity for practical application of classroom experience and skill development. To be completed at a regional energy learning site.

EET295T Special Topics: Energy Conservation and Efficiency 2 cr. Explores how advancements in equipment, structural design and materials, and changes in operations can result in improved energy efficiency and conservation in residential and commercial buildings. Examines the analysis techniques used for reduction of energy consumption and addresses energy management in terms of energy accounting and energy auditing.

EET295T Special Topics: Alternative Fuels 3 cr. An introduction to alternative fuels. Defines and identifies alternative fuels; explores fuel characteristics; the infrastructure required to produce, store, distribute, and use them; discusses emissions and conversion details; assesses social, environmental and economic impacts.

EET295T Special Topics: Bioenergy and Other Renewable Energy Sources 2 cr. Investigates the issues surrounding production and use of bioenergy. Also introduces other alternative sources of energy such as geothermal, micro-hydro, ocean energy, clean coal, hydrocarbon reforming, nuclear fusion, superconducting magnets, and magnetohydrodynamics.

EET295T Special Topics: Fuel Cells 3 cr. An introduction to the different types of fuel cells (hydrogen, biological, metal/air, proton exchange membrane, etc.), accompanied by a critical examination of their applications, operation, efficiencies, advantages and disadvantages.

EET295T Special Topics: Storage and Distribution Systems 2 cr. Examines the methods of storage, transportation, and transfer for different types of energy. Explores emergent technologies and mechanisms designed to enhance efficiency.

EET295T Special Topics: Fossil Fuels 3 cr. An introduction to fossil fuels and technologies. Examines exploration, production, transportation, and distribution systems, and assesses social, environmental, economic, and political issues associated with the production and use of fossil fuels.

EET 295T Special Topics: Government and Energy 2 cr. Tax laws, policies, regulations, financial incentives or disincentives, criminal penalties, and other government programs influence the development, commercialization, and deployment of traditional and alternative energy systems. This course investigates the role of government in energy systems.

EET 295T Special Topics: Energy Economics 3 cr. Energy Economics is the use of mathematical methods in cost-benefit analyses (CBA) of alternative energy solutions. The information gained from CBA can then be used to evaluate the desirability, feasibility, and value of a proposed engineering project. Energy Economics is a subset of Engineering Economics devoted specifically to calculating the costs and benefits associated with alternatives in energy projects in the supply, utilization, and conservation of energy.

EET 295T Special Topics: Energy Sources for the Future 3 cr. Political and social instability in oil-producing countries, depletion of petroleum reserves, increasing demand for fossil-fuel based products and services, and increasing concern over environmental impacts is driving efforts to develop alternative energy paradigms to power the world's economies. This course explores, within a cultural context, the issues of energy supply, sustainability, security, economic development, transition, and environmental protection, as they relate to traditional, alternative, and emerging energy technologies.

EET 295T Special Topics: Introduction to Coalbed Methane 3 cr. Introduction to overview of the geology and mechanics of coal seam gas reservoirs. This course includes exploring for, assessing, developing, or investing in coalbed methane. Topics included in this course are sedimentary geology of coal, coal primary characteristics, coalbed gas storage, coalbed permeability, hydrologic regime, phased prospect assessment, cbm wells, water and environmental issues, ECBM and CO2 sequestration.

EET 295T Special Topics: Hydrology and Hydroelectric Systems 3 cr. An introduction to hydrology, and the application of knowledge and principles toward recognition of and responding to water-related problems in society including quantity, quality, and availability. Exploration of hydroelectric generation systems will be included.

EET 295T Special Topics: Petroleum Technology 3 cr. An overview and history of the petroleum industry. Purposes and proper procedures in a variety of different petroleum technologies: exploration, drilling,

production, transportation, marketing, and refining are topics included. Other topics included are health, safety, and environmental issues related to 'job' activities, regulatory requirements, and regulating compliance issues.

EET295T Special Topics: Internship 2 cr. On-the-job training in positions related to each student's career goal. This experience prepares students for initial employment and increases occupational awareness.

EVST 101N Environmental Science 3 cr. Offered autumn. An introduction to the scientific principles that underpin environmental science and discussion of how these shape national and local environmental laws and policies. Features local approaches to solving environmental problems.

MAT 100 Intermediate Algebra 3 cr. Prereq., MAT 005 or appropriate placement score. Topics include linear equations and systems of linear equations, inequalities, applications and graphing; polynomials; rational expressions and equations; radicals, rational exponents and complex numbers; quadratic equations; introduction to exponential and logarithmic functions. Credit not allowed for both MAT 100 and MATH 100.

MAT 120 Elementary Functions 4 cr. Offered autumn and spring. Prereq., MAT 100 or appropriate score on the ASSET placement test. Algebraic, trigonometric, exponential/ logarithmic functions of one real variable and their graphs. Inverse functions, complex numbers and polar coordinates. Conic sections. Credit not allowed for both MAT 120 and MATH 121.

PSY 110S Organizational Psychology 3 cr. Offered autumn and spring. Foundation in the psychological processes that influence behavior of people in work settings.

SCN 175T Integrated Sciences 3 cr. Offered every term. Prereq. or coreq., MAT 005. An introduction to the basic principles of physics, chemistry, environmental and earth sciences, biology, and astronomy, emphasizing the scientific method and real-world applications.

WTS 101 English Composition 3 cr. Prereq., COM 090T or passing score on placement test. Instruction and practice in both the expository writing and research process. Emphasis on the use of specific techniques of writing to develop style, unity, clarity, and force of ideas, and structure. Students are expected to write without major errors in sentence structure or mechanics. Credit not allowed for both COM 101 and ENEX 101. Grading A-F, or NC.

Regional Letters of Support

The following regional private employers, state agencies, and industry leaders have provided letters of support for the program and its curriculum:

- Sage Mountain Center
- CTA Architects Engineers
- Montana Dept of Environmental Quality
- Thirsty Lake Solar
- Gross Electric
- Interstate Renewable Energy Council
- WindCatcher and Windraulics
- Montana Community Development Corporation
- Montana Associated Technology Roundtables
- Sundance Solar Systems
- United Hydrogen Sources
- Solar Plexus, LLC
- Montana Renewable Energy Association
- Oasis Montana, Inc
- National Center for Appropriate Energy
- Sunelco, Inc
- Windpark Solutions America
- Community Power Corporation
- Independent Power Systems, Inc
- North American Board of Certified Energy Practitioners

BUDGET ANALYSIS

ITEM:

Campus: The University of Montana College of Technology

Proposed Program: Energy Technology

	Year 1		Year 2		Year 3		Year 4		Year 5	
Estimated **ENROLLMENT**										
FTE Enrollment	25		20							
Estimated Incremental **REVENUE**										
Use of Current General Operating Funds	0		0							
State Funding for Enrollment Growth	106985		75520							
Tuition Revenue										
A. Gross Incremental Tuition Revenue	109773		76752							
B. Reductions to Incremental Tuition										
C. Net Tuition Revenue (A-B)	109773		76752		0		0		0	
Program/Course Fees	0		0							
External Funds	253800		318934							
Other Funds (please specify)										
TOTAL Estimated Incremental Revenue	470558		471206		0		0		0	
Estimated Incremental **EXPENDITURES**										
Personal Services	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**
Faculty	3	65000	3.5	81000						
Other Staff	3.5	119800	4.25	149434						
Operating Expenses	59000		88500							
Equipment										
Start-up Expenditures	20000		10000							
TOTAL Estimated Incremental Expenditures	263800		328934		0		0		0	
Estimated Revenues Over/(Under) Expenditures	206758		142272		0		0		0	

CTA
ARCHITECTS
ENGINEERS

October 26, 2005

Brian Kerns
UM College of Technology
909 South Avenue West
Missoula, MT 59801

Dear Mr. Kerns:

We at CTA are pleased to hear about your progress in developing an Alternative Energy Technician Degree Program. This is an important and timely move on your part and we offer our support and assistance. We have several engineers in this field and could make them available for class presentations.

If you have any questions, please do not hesitate to call.

Best regards,

CTA ARCHITECTS ENGINEERS

Kent C. Bray, AIA, CSI
Principal

c: CTA File -

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www.ctagroup.com • msla.info@ctagroup.com

SAGE MOUNTAIN CENTER
79 Sage Mountain Trail • Whitehall, MT 59759 • 406.494.9875

October 10, 2005

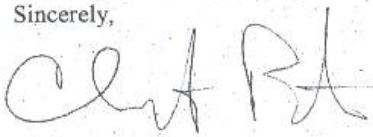
Greetings,

My name is Christopher Borton and I am director of Sage Mountain Center, LLC. We are a small business in Montana with 3 employees. We have been in operation for about 10 years promoting sustainable living skills through workshops, lectures, and tours. Of particular interest to us within the renewable energy field are solar electricity, solar thermal, and small wind generation. Our staff has been trained purely by the trial and error of hands-on applications. This learning process could be greatly enhanced by a structured knowledge base presented in a coherent and systematic way. We strongly believe that some type of curriculum in alternative energy is greatly needed in our state, especially as interest in this field continues to dramatically expand worldwide.

Sage Mountain Center is also a hub for environmentally conscious consumers, architects, and alternative builders. These fields, by there very nature, overlap into alternative energy. Regularly we are asked for contact information for skilled and knowledgeable workers in these areas, but can only offer a few suggestions as to who to contact. We would love to be able to draw from a larger skilled workforce.

Thanks for your concern and we hope very soon to see alternative energy education become a part of UM's curriculum.

Sincerely,



Christopher Borton
Director
Sage Mountain Center

Montana Department of
ENVIRONMENTAL QUALITY
Brian Schweitzer, Governor
P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.state.mt.us

September 23, 2005

Brian Kerns
University of Montana College of Technology
909 South Avenue West
Missoula, MT 59801

Brian,

I am the Deputy Director of the Montana Department of Environmental Quality (DEQ). I am pleased to take this opportunity to support the new Alternative Energy Technician curriculum for the College of Technology. Our agency supports the development of renewable and alternative energy in Montana. Because Montana is so rich in alternative energy resources, these developments will provide environmental, economic, and reliability benefits to Montana and our nation.

Among our staff, we currently employ more than 12 individuals that are required to possess some of the skills that you are proposing to develop with your program. The agency also contracts with dozens of professional consulting firms that are required to have qualified energy technicians. I project the number of employees and contracted personnel may increase due to new duties that our agency is being required to fulfill. For instance our Permitting Department is reviewing, for the first time, plans to expand a transmission line for a proposed wind plant. The U.S. Department of Environmental Quality and Department of Energy are encouraging states to develop plans to utilize alternative energy to reduce air pollution, and DEQ may need to staff up in the future to implement these plans.

I also envision the increased need in the private sector for skilled professionals in the emerging field of alternative energy. The increasing energy costs in the state has required that consumers look at alternatives. Recent national events have reminded us of the need for reliable, diverse, and domestic energy resources development. Our agency has tracked the increased utilization of alternative energy. Wind energy may provide close to 10% of our electrical energy use by the end of this year with the commercial wind plant at Judith Gap coming into production. Alternative energy is showing significant gains in the heating and transportation fuel sectors also. The

Montana Legislature passed the Renewable Portfolio Standard in 2005, which provid alternative energy an established role in our state's energy planning process.

I appreciate this opportunity to support the efforts of your alternative energy program.

Sincerely,

Tom Lives

Brian Kerns
U of Montana College of Technology
909 South Avenue West
Missoula, MT 59801

Jeff Wongstrom
Thirsty Lake Solar
POB 538
Eureka, MT 59917

September 27, 2005

Thirsty Lake Solar is a small renewable energy system design, install, and maintenance company mainly servicing residential off grid clients within a 2 hour driving radius of Eureka Montana. Our home and business operate off grid.

We endorse a renewable energy program offered at the College of Technology. My background includes a BS Materials Science and Engineering degree from the University of Michigan and I started the company by traveling from Montana to Colorado to receive solar design and install training. Our part time apprentice is currently in New Mexico pursuing a renewable energy degree and may continue on afterwards at a school in Oregon.

This is only our third year in business and we have done twice as many installs this year compared with the first two years. We expect continued growth as our reputation becomes known. We are finding that many of the people out there doing installs are not properly trained and are doing substandard work, hurting the industry and sending work our way. We hope to employ an apprentice full time next year to meet the increase in demand for our work.

We support a program which puts skilled and properly trained people into the industry.

Jeff Wongstrom
NABCEP Certified Solar Installer
Thirsty Lake Solar

BRIAN KERNS
C/O UNIVERITY of montana
College of Technology

909 South AVE WEST
missoula mT 59801

In Regards to our phone Conversation
I do support The need for RENEWABLE ENERGY
being Taught to the general population and
to improve Knowledge Sharing of Installers w/ a
good Electrical background

I support Your Efforts

Sincerely William Edward Gross 9/27/05

Gross Electric

Alternative Energy Design & Installation

892-4940

892-4914 FAX

Since 1978

IREC INTERSTATE RENEWABLE ENERGY COUNCIL

September 16, 2005

Brian Kerns
UM College of Technology
909 South Avenue West
Missoula, MT 59801

Dear Dr. Kerns:

The Interstate Renewable Energy Council, a national, non profit organization, applauds your Alternative Energy Technician Degree Program. It is an important educational offering and will bring the renewable energy industry into step with other recognized craft labor trades.

Both national and international forecasts and government and private reports show major growth patterns for renewable energy technologies and products. The Worldwatch Institute says that renewable energy is entering a boom period, with global wind energy use tripling since 1988 and annual solar cell production increasing 150 percent in the past thee years. A study from Navigant Consulting, Inc. states that the wind and solar electric markets have seen 15-25 percent annual growth over the past five years. The report predicts that renewable energy use will more than double over the next decade in the United States and Canada.

Other economic signals include that 18 states now have laws that require a percentage of generating capacity be derived from renewable sources and 15 states have Public Benefit Funds which assure continued support for renewable and energy efficiency initiatives. And, Renewable Energy Certificates, which generate resources to support renewable energy, are estimated to reach $600 million by 2010.

A University of Berkley report finds that an investment in solar, wind, and biomass energy produces more jobs than a comparable investment in fossil fuel sources. A 2001 report by the Renewable Energy Policy Project found that wind and solar electricity production offer 40 percent more jobs than coal.

The evidence is overwhelming that the renewable energy sector of the economy will continue to grow and create industry demand for skilled renewable energy technicians.

The UMCOT Alternative Energy Technician Degree Program provides educational, training and experiences that lead to defined workplace knowledge, skills, and abilities. And, the Program appropriately addresses issues of safety and codes.

IREC encourages the University and the State to approve the Alternative Energy Technician curriculum.

Sincerely,

Jane M. Weissman, Executive Director
Interstate Renewable Energy Council
(781)461-8167
jane@irecusa.org

Missoula, September 23, 2005.

Mr. Brian Kerns
Project Manager
Alternative Energy Program
College of Technology
University of Montana
909 South Avenue West
Missoula, MT 59801

Dear Mr. Kerns,

We represent the Research and Development Corporations WindCatcher, Windraulics and H2GO which are, at this time, being relocated to Missoula, Montana.
WindCatcher Windmills LLC is developing a new design for wind machines based on higher efficiency and lower costs.
Windraulics LLC has a new technology for power storage, variable ratio transmission and the integration of multiple systems for wind machines, solar systems and other backup power sources.
H2GO LLC has a novel design for hydrogen powered hydraulic assisted electric motor for the transportation industry.
We are and we intend to continue to be exclusively Research and Development companies, in order to create new and innovative Intellectual Properties to be licensed and manufactured for the clean efficient renewable realm of the power industry.
It is our primary intention to develop an Apprentice Program to integrate young innovative minds with high technology specialists to create a working environment that will not only build up stockholder value but will make real contributions to the changes that will be required in the next generation of the power industry.
These programs will include our first sources of personnel to be hired full time in the coming year to include at least 15 people. Due to the progress in our research work we expect to be hiring students within 90 days to assure their participation in the process of building, testing and certifying the first units of our technologies.
In reference to your Letter of Support Request, we strongly uphold your views and intentions and we are very pleased and honored to have the opportunity to be included in the Alternative Energy Program of the College of Technology.
Sincerely,

James Lee Bailey
Director of Engineering

Maria Tereza Couto Buck
CEO

September 20, 2005

Brian Kerns
University of Montana College of Technology
909 South Avenue West
Missoula, MT 59801

Brian,

I represent Montana Community Development Corporation (MCDC) which is a private non profit business specializing business consulting, technical assistance, and financing.

MCDC strongly endorses the new Alternative Energy Technician curriculum that the College of Technology has developed. This program helps fill a growing need for skilled professionals in the emerging field of alternative energy. High energy prices are expected to drive economic growth in this industry which would further add to workforce demands in the immediate future.

I appreciate this opportunity to support the efforts of your alternative energy program.

Sincerely,
Montana Community Development Corporation

C. Craig Rawlings
Business Development Specialist

Montana Associated Technology Roundtables
339 S. 5th St. E.
Missoula, MT 59801

Brian Kerns
UM College of Technology
909 South Avenue West
Missoula, MT 59801

9/20/05

To whom it may concern:

On behalf of the Montana Associated Technology Roundtables, I would like to voice my strong support for the development of a 2 year University of Montana College of Technology Alternative Energy Technician Degree Program.

Montana is uniquely situated with an abundance of the elements necessary for alternative energy solutions including the hydrogen, wind, bio-fuels and other opportunities. What we need are the skilled personnel to realize these opportunities.

The COT is well situated to educate the best and the brightest in these technologies and help them develop the solutions of tomorrow.

I have no idea on how many will be employed or how many companies will be started from the innovation and collaboration among the students but, if we don't have this type of education, we won't benefit from the exploding alternative energy industry. Montana cannot afford to ignore this promising sector of the economy and it will never develop it if we don't have the trained work force.

I encourage full and ever-expanding support for this program by the University System and the State of Montana.

Sincerely,

Russ Fletcher

SUNDANCE SOLAR SYSTEMS

HC 50, Box 4404
Red Lodge, MT 59068
406/425-1153

September 20, 2005

Brian Kerns
UM College of Technology
909 South Avenue West
Missoula, MT 59801

Dear Brian:

I am writing in support of your proposed Alternative Energy Technician Degree Program. Sundance Solar Systems has been providing on and off-grid photovoltaic and wind energy systems in Montana for 11 years. We have seen not only tremendous local growth in this industry but also changes in its application. Montana has vast areas of land that have no utility service. Remote home PV and wind systems are a viable source of electricity for these areas. This application of PV and wind systems accounted for almost all of our early business. Since the 1997 Utility Deregulation Act and the accompanying Net Meter law, a large sector of grid-connected people have incorporated PV into their homes. This has established Montana as a leader in promoting renewable energy technologies and has opened a much wider customer base.

It is imperative for those of us in this industry to stay informed and current to provide state of the art, code compliant installations and support. Our employees must have the expertise and technical knowledge of photovoltaics and wind energy to be effective. An alternative energy technical degree program would provide this training locally and contribute to meeting the growing demand for this progressive technology. I fully support the development of such a program and would be willing to help with its creation. Thank you very much for your efforts to bring this necessary training to Montana.

Sincerely,

Henry Dykema
Sundance Solar Systems (owner)

4317 Nicole Ct
Missoula, MT 59803

Brian Kerns
UM College of Technology
909 South Avenue West
Missoula, MT 59801

Dear Brian,

I have recently started a company called United Hydrogen Sources, which is located in Missoula, Montana. The business consists of producing hydrogen gas as an clean fuel by utilizing renewable energy sources. Our goal is to begin the transition process from fossil fuel energy to a hydrogen-based energy paradigm. We believe that hydrogen and a distributed network of renewable power systems will help make Montana and the United States more energy self-sufficient.

In order for my business to succeed, I will need assistance in a variety of fields, which will be covered in the alternative energies program. I plan to hire personnel from the qualified individuals that will complete this program. In the immediate future, I will need at least two workers to convert a vehicle to bi-fuel, which will be offered in the program. I will also need a project manager, who can help with the business modeling. In the extended future, I will need many employees to carry out my goals. From skilled factory workers, to expert analyzers and problem-solvers, we will unquestionably need a quality team to overcome obstacles in the alternative energies field. It is crucial for the success of my business to have capable employees.

I feel that this program will help the University of Montana, College of Technology to become a leading school in the nation for alternative energies. It will help the struggling econmony of this state by creating jobs and will appeal to other businesses looking for skilled workers. I hope the academic review personnel will approve this curriculum and make it a part of the already phenomenal courses that are currently offered.

Regards,

Christopher Schafer
CEO
United Hydrogen Sources

United Hydrogen Sources
Christopher Schafer, CEO
4317 Nicole Ct, Missoula, MT 59803
406.370.6846

Brian Kerns
UM College of Technology
909 South Avenue West
Missoula, MT 59801

Hi Brian.

We are following the development of the College of Technology's renewable energy program with interest and are excited that you are developing such a program. Currently sound educational options in renewable energy are scattered, and comprehensive long-term programs (longer than two weeks) are rare.

At present we have a staff of 5 people engaged in the renewable energy business, and 3 of those spend the majority of their time installing solar, wind, and hydroelectric systems.

We had already anticipated substantial growth in our solar installation business, and with the new Energy bill solar tax credits we anticipate even more growth. With that growth we will have a need for additional trained employees, for installation and for design. I anticipate that in the next few years we will likely need to double the size of our staff.

Being able to call on a ready source of well-trained people to fill our staff needs would be a great help four our business. We look forward to helping you develop your program and we look forward to hiring from your eventual pool of trained graduates.

Thank you.

Lee Tavenner
Solar Plexus

MREA
Montana Renewable Energy Association

Brian Kerns
University of Montana College of Technology
909 South Avenue West
Missoula, MT 59801

Brian,

I represent The Montana Renewable Energy Association which is a 501 c3 non profit incorporated in Montana. The MREA membership includes utilities, government agencies, and renewable energy businesses located both inside and outside Montana.

The Montana Renewable Energy Association strongly endorses the new Alternative Energy Technician curriculum that the College of Technology has developed. We are seeing an expansion in the use of renewable energy worldwide. As the use of renewable energy expands, the need for qualified professionals and technicians will grow. The Alternative Energy Technician curriculum will help fill this growing need. High energy prices and a growing concern for the environment are driving growth in this industry which will add to workforce demands of the renewable energy industry in the future.

I commend the College of Technology for taking on the task of developing this curriculum. Having reviewed the course outlines, I believe that the curriculum will well serve students interested in a career in renewable energy.

I appreciate this opportunity to support the efforts of your alternative energy program.

Sincerely,

David Ryan PE
President, Montana Renewable Energy Association
2910 Floral Blvd, Butte, MT. 59701
(406) 494-0930

PO Box 263 • Butte, MT 59701 • (406) 494-0930

436 Red Fox Lane
Stevensville, MT 59870
Fax: 406 777-0830 Local Line: 406 777-4321 or 4309
Toll Free: (877) OASISMT (877-627-4768 or 4778)
Web Page: www.oasismontana.com
E-Mail: info@oasismontana.com

20th September, 2005

To Whom It May Concern:

Our business name is Oasis Montana Inc. and we are located in Stevensville, MT. We design systems for and sell renewable energy power equipment (photovoltaic solar modules, wind generators, inverters, batteries, other balance of system components) for remote homes, utility-tied systems, water pumping, UPS and back up power needs, telemetry and related sensor devices, and RV/marine use. We provide detailed wiring diagrams, installation as needed, and tech support for all the systems and equipment we sell.

While we are a small woman-owned business (our staff consists of three persons including myself), we hope that with increasing sales, we will be able to add another sales technician down the line, perhaps in several years.

We live in an exciting time for the field of renewable energy, and it is heartening that the UMCOT is considering adding this sort of training for those entering the future workforce. Worldwide, solar and wind power are among the fastest growing industries of the energy sector, and specialists in those fields will, I suspect, prove very invaluable.

Regards,

Christine Daum
President, Oasis Montana Inc.

National Center for Appropriate Technology

3040 Continental Drive • P.O. Box 3838 Butte, MT 59702
406/494-4572 FAX: 406/494-2905 E-MAIL: info@ncat.org

September 12, 2005

Brian Kerns
UM College of Technology
909 South Avenue West
Missoula, MT 59801

Re: Alternative Energy Technician Program Curriculum Approval

Dear Brian:

The Alternative Energy Technician Program proposed for the University of Montana College of Technology ("UMCOT") is the right program at the right time. As an architect and energy specialist I have an excellent view of trends in the energy marketplace. Issues such as rising traditional energy costs, the future carbon constrained economy, and emerging alternative technologies make the proposed program timely and appropriate.

The National Center for Appropriate Technology (NCAT) has played a significant role in advancing the use of wind and solar technologies in Montana and elsewhere in the country. In the last six years we have witnessed a growing interest in alternative energy. When combined with energy efficiency, renewable energy, and distributed generation technologies represent the greatest potential for meeting out nation's energy needs in the long term.

NCAT currently employees five staff members who daily work with the implementation of renewable energy systems. We hope to build our workforce as we offer technical assistance and oversight to utilities and local nonprofit organizations outside the state. In the next five years we would like to double our workforce.

The knowledge and skills that will result from the Alternative Energy Technician Program are applicable both to alternative technologies and energy conservation. Each complements the other and provides employers with hiring options that are not currently available in the marketplace.

I strongly urge the appropriate university and state authorities to approve the Alternative Energy Technician Program.

Sincerely,

Dale Horton

Dale Horton, Architect
NCAT Sustainable Energy Program Manager

SUNELCO
THE SUN ELECTRIC COMPANY

9/16/05

Brian Kerns
UM College of Technology
909 South Avenue West
Missoula, MT 59801

Dear Mr. Kerns,

Concerning the proposed Alternative Energy Technician Degree Program, I would like to offer my wholehearted support. My company, Sunelco, Inc., located in Victor, MT currently employs 6 people. As a growing company we are always looking for qualified personnel to fill vacancies and increase our capacity to meet the growing demand for renewable energy systems across the U.S. We are a bricks and mortar business with one of the best renewables catalogs on the market and a web site which was designed primarily as an educational tool for those interested in learning more about alternative energy. It can be accessed at www.sunelco.com.

We currently have three technologists who design, sell, install and troubleshoot renewable energy systems. Their backgrounds are in education, journalism and diesel mechanics. While the individual talents work well together, the cross training to facilitate their current responsibilities requires months of extensive work and is expensive. It would be economically advantageous for us to locate and employ people who have had previous training in the renewable energy field.

I would be happy to host visits from students who wish to see what the day to day employment routine consists of and would not rule out summer internships and apprenticeships after completion of the program with an eye to permanent employment.

The technicians (we refer to them as technologists) must have a broad base of knowledge from mathematics to aesthetics and specific knowledge about the products they are working with. A sound basis in the fundamentals of electricity is also essential for the starting technologist if they are to be effective at the start of their career. I feel that the College of Technology is ideally suited to provide this training and sincerely hope that this program is approved and implemented.

The field of alternative energy is rapidly expanding as can be seen by the deployment of huge wind farms around the world, the current European (specifically German and Spanish) programs to install grid connected solar systems and the increased fuel cost for operating fossil fueled generators domestically. The role that hydrogen fuel cells will play in the future should not be overlooked as a renewable resource and the technicians needed to advance their usage should be in training now.

Please feel free to contact me should you wish further information concerning the job market in renewable energy or for additional information about Sunelco, Inc.

Respectfully,
Tom Bishop
President, Sunelco, Inc
2086 Highway 93 North, Suite 130
Victor, MT 59875
1-800-338-6844

WINDPARK SOLUTIONS AMERICA

154 Johannes Avenue
PO Box 70
Big Sandy, MT 59520
Phone (406) 378-2179
Fax (406) 378-2657

WPS

September 16, 2005

Brian Kerns
University of Montana College of Technology
909 South Avenue West
Missoula, MT 59801

Brian,

I represent WindPark Solutions America. Our offices are located in Big Sandy, MT, and we are the company that developed the Judith Gap Wind Farm in Wheatland County, MT.

According to the American Wind Energy Association, the next few years will show record breaking growth for the wind industry in the United States and as the industry grows, skilled professionals will be needed. We at WindPark Solutions America strongly endorse the new Alternative Energy Technician curriculum that the College of Technology has developed. This program will not only benefit the wind industry, as well as the entire alternative energy industry, but provide a skilled workforce in a state that has a tremendous future in renewable energy.

I appreciate the opportunity to support this program.

Sincerely,

Wendy Kleinsasser

Wendy Kleinsasser
Project Coordinator

Community Power Corporation

Energy Systems for Sustainable Power

September 29, 2005

Brian Kerns
University of Montana College of Technology
909 South Avenue West
Missoula, MT 59801

Brian,

Community Power Corporation (CPC) is a small business specializing in the design, installation, operation and maintenance of small modular biopower systems. Our Product Development Facility is located in Littleton, CO.

CPC strongly endorses the new Alternative Energy Technician curriculum that the College of Technology has developed. This program helps fill a growing need for skilled workers in the emerging field of alternative energy. In our business high energy prices are expected to increase the demands for our products.

Our staffing level currently consists of seventeen people involved in the development, demonstration and deployment of modular biopower systems. The breakdown is as follows: three management, eight professional, and six non-exempt. The professionals are engineers and scientists in the mechanical engineering (three), chemical engineering (three) and electrical engineering (two) disciplines. The non-exempts are mechanical (five) and electrical (one) technicians. As our backlog increases we will be looking to increase staff in both the professional (two) and non-exempt (two) ranks in the near future. Over the next five years we hope to make the transition to commercial status. If we accomplish that goal we will either add to staff or align with a strategic partner. In either case, the commercialization of our product will create at least twenty new positions in all of disciplines previously cited.

I have been impressed with the leadership of the University of Montana College of Technology in helping to educate users in the field of bioenergy; therefore I strongly support this innovative new initiative within your alternative energy program.

Sincerely,

Art Lilley
Chairman

Brian Kerns
U of Montana College of Technology
909 South Avenue West
Missoula, MT 59801

Jeff Wongstrom
Thirsty Lake Solar
POB 538
Eureka, MT 59917

September 27, 2005

Thirsty Lake Solar is a small renewable energy system design, install, and maintenance company mainly servicing residential off grid clients within a 2 hour driving radius of Eureka Montana. Our home and business operate off grid.

We endorse a renewable energy program offered at the College of Technology. My background includes a BS Materials Science and Engineering degree from the University of Michigan and I started the company by traveling from Montana to Colorado to receive solar design and install training. Our part time apprentice is currently in New Mexico pursuing a renewable energy degree and may continue on afterwards at a school in Oregon.

This is only our third year in business and we have done twice as many installs this year compared with the first two years. We expect continued growth as our reputation becomes known. We are finding that many of the people out there doing installs are not properly trained and are doing substandard work, hurting the industry and sending work our way. We hope to employ an apprentice full time next year to meet the increase in demand for our work.

We support a program which puts skilled and properly trained people into the industry.

Jeff Wongstrom
NABCEP Certified Solar Installer
Thirsty Lake Solar

Independent Power Systems, Inc.
1404 Gold Ave. Unit #4
Bozeman, MT 59715
Tel: 406-587-5295 Fax: 406-587-5332

Brian Kerns
College of Technology

September 30, 2005

Subject: Letter of support for 2 year alternative energy program

My name is Tony Boniface president of Independent Power Systems, Inc based in Bozeman, Montana. My business designs, sells, and installs solar, wind, and generator based power systems for both the off-grid and grid-connected market.

I have been actively involved in alternative energy for 12 years as I see it being a necessary component of energy production for a sustainable world. I have had to learn much of what I know by diligent self learning most of the time. Certainly my BSEE and various tech seminars have assisted me but I have always believed that there needs to be a university based curriculum that educates in the realm of alternative energy if this industry is to flourish. I have spoken with Brian Kerns about his plans for such a curriculum and would like to see it happen.

I currently have three active employees all of whom I have had to train in these technologies. While there are many tasks to running the business that are not specific to technology, the critical jobs do. As my business grows, I will be seeking individuals with either experience or education in this field. I am expanding into the state of Colorado as there is now great incentive for individuals to adopt solar and wind energy and I will be requiring hiring knowledgeable individuals. I hope to be able to look to UM for candidates.

Respectfully,

Tony Boniface
President

North American Board of
NABCEP

Saratoga Technology + Energy Park
10 Hermes Road, Suite 400
Malta, NY 12020

Phone: (518) 889-8126
Fax: (518) 899-1622

September 29, 2005

Mr. Brian Kerns
University of Montana College of Technology
909 South Avenue West
Missoula, MT 59801

Dear Brian,

I represent the North American Board of Certified Energy Practitioners (NABCEP) which is the nationally-recognized certification program for installers of photovoltaic systems. We have developed our rigorous qualification standards and examination after a wide ranging consensus building process with many PV stakeholders.

We strongly endorse the new Alternative Energy Technician curriculum that the College of Technology has developed. This program helps fill a growing need for skilled professionals in the emerging field of alternative energy. Indeed, NABCEP is very concerned and supports efforts to increase the number of qualified installers of renewable energy technology. It is imperative that such systems are installed in accordance with the applicable codes such as the National Electric Code and, meet the expectations of consumers. Having a well-trained workforce is critical in making this happen.

Nationally, we currently have 177 NABCEP® Certified Solar PV Installers, including five within the state of Montana. With energy prices skyrocketing, and with growth estimates of solar panel production at approximately 30% per year, we believe there will a critical need for a qualified work force in the state of Montana, particularly with its excellent solar resource.

Thank you for the opportunity to support the Alternative Energy Technician curriculum at the University. If I can be of any assistance, please let me know.

Sincerely,

Peter Sheehan
Executive Director