

Board Meeting Agenda Item Executive Summary

Supt.'s Office Use Only

Board Meeting _____

Agenda _____

Item No. _____

Board Meeting Date:	November 6, 2007
Submitted By:	Everett Caudle
Item Description:	Florida Renewable Energy Technologies Grant

Purpose and Explanation:

The 2006 Florida Legislature initiated the Renewable Energy Technologies Grant Program established in the Florida Department of Environmental Protection to provide renewable energy matching grants for demonstration, commercialization, research, and development projects relating to renewable energy technologies.

The Department of Career and Technical Education has submitted a request for funding for the *Fuel Alternative Demonstration Project*, to be implemented at the Professional Academies Magnet at Loften and operated in conjunction with the Automotive Tech and the Agricultural Tech programs. This project is intended to increase awareness of alternative fuels as an energy resource and to demonstrate the positive impact of biodiesel on the environment while introducing students to the resources and feasibility of current technology. Students will take part in the science and process of turning waste vegetable oil and other vegetable-based oils into usable fuel for various machines such as the school tractor and a car engine.

Technical assistance will be contracted through the University of Florida's Institute for Sustainable Energy. Grant funding is provided on a cost reimbursement basis.

The project will operate three years following the award. The School Board of Alachua County will incur costs beyond the project scope in terms of chemicals needed to turn waste oil into biofuel and continued disposal of by-products by the University.

BUDGETARY IMPACT

Funding Source (Description): FL Dept. of Environmental Protection **Amount:** \$113,151

Staff Attorney Review & Approval <i>(For Contracts Only)</i>	Date: _____ Initial: _____	ADDITIONAL INFORMATION Yes: _____ No: _____
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Florida Renewable Energy Technologies Grant Program Application

RENEWABLE ENERGY PROJECTS

PART I – COVER LETTER

PROPOSAL INFORMATION					
Proposal Title:		Alachua County Fuel Alternative Demonstration Project			
Proposal Area(s): (check all that apply)		<input type="checkbox"/> Hydrogen	<input type="checkbox"/> Geothermal	<input type="checkbox"/> Waste Heat	
		<input type="checkbox"/> Biomass	<input type="checkbox"/> Wind	<input type="checkbox"/> Hydroelectric	
		<input type="checkbox"/> Solar	<input type="checkbox"/> Ocean	<input checked="" type="checkbox"/> Other	
Project Type:		<input checked="" type="checkbox"/> Demonstration Project		<input type="checkbox"/> Commercialization Project	
		<input type="checkbox"/> Research Project		<input type="checkbox"/> Development Project	
Project Location:		Professional Academies Magnet at Lofton			
Proposer (Organization):		School Board of Alachua County			
Proposer FEID No:		59-6000500			
TECHNICAL CONTACT INFORMATION					
Technical Contact Name:		Dave Edwards			
Organization:		Career and Technical Education (School Board of Alachua County)			
Address Line 1:		620 East University Avenue			
Address Line 2:					
City:	Gainesville	State:	FL	Zip:	32601
Email:	edwardda@sbac.edu				
Phone:	352-955-7600	Fax:	352-955-7125		
BUSINESS CONTACT INFORMATION					
Business Contact (if any):					
Organization:					
Address Line 1:					
Address Line 2:					
City:		State:		Zip:	
Email:					
Phone:		Fax:			
FUNDING REQUEST AND COST SHARE					
1. Total Amount of Grant Funds Requested:				\$113,151	
2. Total Cost Share (Provided by applicant and project partners):				\$15,909	
3. Total Project Cost (Add amounts in 1 and 2):				\$129,060	
4. Cost Share Percentage (Divide amount in 2 by amount in 3):				14%	
CERTIFYING OFFICIAL					
Certifying Official's Signature					
Certifying Official's Name (printed):		W. Daniel Boyd, Jr.			
Title:		Superintendent			
Organization:		School Board of Alachua County			

PART II – PROJECT NARRATIVE

Section I: Project Summary/Abstract

The School Board of Alachua County operates forty-two schools and serves a population of approximately 28,000 students. This project, the Fuel Alternative Demonstration Project, is intended to increase awareness of alternative fuels as an energy resource and demonstrate the positive impact on biodiesel production on the environment while introducing students to the resources and feasibility of current technology. It is intended to fully integrate students in the science and process involved in turning waste oil and other vegetable-based oils into usable fuel as well as exploring the uses of biofuels in a number of purposes. In addition, information will be made available to the community in an attempt to demonstrate the viability of producing biodiesel on a local scale across various applications.

The project will be managed by a team consisting of the District Director of Technical Education, the principal of the district's Professional Academies Magnet, staff from the district Technical Education Department, the lead teacher from the Automotive Tech program, and participation by members of the district Facilities Departments. Technical assistance will be contracted through the University of Florida's Department of Agriculture, Soil, and Water Science Departments.

The district will provide a facility for assembly and housing of the equipment required to demonstrate biodiesel production, and resources needed to produce biodiesel from waste cooking oils are readily available. In addition, the proposed site of the Fuel Alternative Demonstration Project is a large campus facility with programs in place, such as Automotive and Ag Tech, that will lend themselves to the endeavor. It is anticipated that students in the Ag Tech programs, for instance, will participate through further development of raw material needed to produce finished fuel.

Project activities will occur over the course of three years. The first year will be devoted to acquisition of the needed equipment, set-up of the demonstration facility, testing of equipment, development of curricula needed to integrate biodiesel production activities with existing programs, introduction of a limited number of students to the process, and development of a dissemination program. Years two and three will include full integration of the facility resources into appropriate programs at the Professional Magnet Academies, expansion of demonstration operation and curriculum materials to include schools throughout the district, and summer demonstrations for members of the public and local business community. During years two and three, students will also research and experiment with different biodiesel applications, explore alternative production methods (through development of agricultural resources at the Ag Tech center), and further develop use of biodiesel in district motor vehicles.

Goals of the project focus less on large-scale production of a usable fuel resource and more on providing information and educational connections for students participating in the program. Long-term goals include greater acceptance of biodiesel technology and increased use of this fuel resource across state and local applications.

Section II: Project Background

Finding alternative fuels has driven U.S. policy since the 1970s when the United States experienced two energy crises. At that time, OPEC members refused to ship petroleum to the U.S., its Allies, and Japan, and started leveraging their corner of the production market to raise oil prices across the globe. As a result, the U.S. and the other affected countries responded with a wide variety of new, and mostly permanent, initiatives to contain their further dependency on foreign oil.

As reflected in legislation today, the drive to find alternative fuels to decrease dependency on foreign fuel sources can be seen in the proposed Biodiesel Promotion and Quality Assurance Act of 2007. The goal of this Act is to promote a stable domestic market for biodiesel. As U.S. Representative Baron Hill (D-IN) stated “Biodiesel and other bio-based diesel replacements offer a domestic fuel source that can be used right now to displace foreign oil. It is important for our country to move forward in an economically and environmentally responsible way, and this legislation does just that.”¹

Biodiesel is an alternative fuel of choice because it is more environmentally friendly, leaving less of a carbon footprint than other fuels, and because it provides a greater energy “balance” by providing 3.2 units of energy for every unit of fossil energy used to make it. Biodiesel also is made from domestic, renewable resources, created by chemically reacting vegetable oils or animal fats with alcohol.

At the state-level, *Florida is third in the nation for motor fuel consumption*. Governor Crist has already proposed more than \$68 million in grants, rebates, and tax incentives in Fiscal Year 2007-08 to encourage Floridians to conserve energy, to promote the development of alternative fuels and other energy resources, and encourage the development of the facilities and infrastructure needed to manufacture and deliver renewable energy resources to Floridians throughout the state.²

There is clear recognition across the nation and state for development of alternative fuel resources. With these initiatives in mind, The School Board of Alachua County would use the Florida Renewable Energy Technologies grant to increase biodiesel awareness among high school students, teachers, and local businesses by creating a biodiesel technology demonstration center. This center, the *Fuel Alternative Demonstration Project*, would be located at the district’s Professional Academies Magnet center, and would provide educational and informational resources throughout the north Florida area on biodiesel production.

¹ National Biodiesel Board, press release, October 9, 2007. <http://nbb.grassroots.com>

² Charlie Christ, “Policy and Budget Recommendation Fiscal year 2007-08,” <http://peoplesbudget.state.fl.us>

Section III: Project Objectives:

- 1. Develop and implement instructional modules on the production and use of biodiesel fuel. Research the use of biodiesel fuel and requirements for student production of this and other alternative fuels.**
 - Research possible uses for the by-products and/or disposal of by-products.
 - Write instructional lesson plans relevant to the curriculum in auto technology classes and agriculture classes.
 - Write instructional lesson plans for science classes relating to the basic chemistry of alternative fuel production and use as well as to the global ramification of alternative fuels.
 - Create hands-on activities for students.
 - Develop written assessments as well as demonstration evaluations to determine student levels of success.

- 2. Increase the awareness of the use of alternative fuels and the importance of utilizing reusable resources effectively and efficiently throughout the community.**
 - Develop a demonstration site for the conversion of biodiesel fuel from used oil.
 - Produce and test biodiesel fuel using oil from a variety of local sources.
 - Develop a public relations campaign involving both students and teachers.
 - Promote the use of alternative fuel as a means of improving the Florida environment.

- 3. Provide information to high school students on careers involving alternative fuels.**
 - Consult with professors at the University of Florida and Santa Fe Community College about career fields related to alternative fuel production and use.
 - Consult with local business representatives about predicted future needs related to alternative fuels.

- 4. Investigate uses of alternative fuel within the school district and expand the use of alternative fuel at the demonstration site.**
 - Demonstrate the cost-effectiveness of using alternative fuels.
 - Consult with district maintenance staff regarding current diesel-powered equipment and develop a plan for converting some to biodiesel.

Section IV: Project Description:

Task 1: Development of lesson plans, hands-on activities, and student evaluation methods.

- Teachers at the Professional Academies Magnet at Loften High School will develop curricula, including hands-on activities and student evaluations, to be incorporated into the existing auto technology, agriculture and science classes.
- Teachers in the auto technology, agriculture, and science classes will begin instruction.

Task 2: Production of biodiesel fuel.

- Faculty, with the assistance of district staff, will prepare the facility as a demonstration site and install and begin operation of a biodiesel production unit.
- Students will participate in the production of biodiesel fuel.
- Students will experiment with the use of biodiesel fuel on an existing school tractor. They will repair and/or replace gaskets and seals as needed.

Task 3: Create a dissemination plan.

- Schedule and implement training sessions for teachers in other schools within the district as well as in surrounding counties.
- Schedule opportunities for business leaders, local officials, etc. to visit the demonstration site.
- Disseminate information about the project through local media.
- Schedule field trips for students from other schools to visit the demonstration site to observe and participate in the production of biodiesel fuel.
- Present information about the successes of the program at the statewide Career and Technical Education conference.
- Post lesson plans on a state or local web site for use by other teachers.

Task 4: Develop an awareness of future career opportunities and applications for biodiesel.

- Teachers at the Professional Academies Magnet at Loften High School will schedule visits by professionals employed in alternative fuel related fields to discuss their careers and provide information to students about future career possibilities.
- Continue demonstrations at the site for area business and community leaders in order to build support for biodiesel applications.

Task 5: Explore expanded uses of biodiesel fuel produced at the demonstration site.

- Students will meet with current school district staff to discuss possible uses for their fuel within the site at Loften High School and other district schools.
- Students will meet with local community representatives to discuss the possible use for alternative fuel in the community surrounding their school.

- Students will experiment with the production of crops or commercially available grains as alternative sources of oil necessary for production of biodiesel fuel.

Task 6: Ongoing Evaluation of the program.

- Submit progress monitoring reports as specified
- Submit final report as specified

No.	Task/Activity Description	Start	Complete	Deliverables/ Outputs	Deliverable/ Output Due Dates
1	Development of lesson plans, hands-on activities and student evaluation methods.	Month 1	Month 4	Lesson plans for use in auto technology, agriculture and chemistry classes	Month 4
	Acquire needed equipment.	Month 1	Month 6	Purchased distiller and related supplies.	Month 6
	Begin instruction on the production and uses of biodiesel fuel	Month 1	Month 12	On-going instruction & evaluation of students	Month 36
2	Installation and initial operation of biodiesel production unit	Month 4	Month 12	Biodiesel fuel for use by students - existing school tractor	Month 12
3	Dissemination of information	Month 6	Month 18	Training materials for teachers Schedule of events (visits, field trips, etc.)	Month 18
4	Exploration of career field awareness opportunities	Month 12	Month 36	Schedule of visits/meetings with professionals	Month 36
5	Exploration of expanded uses of alternative fuels	Month 12	Month 36	Student logs of meetings and research	Month 36
6	On-going Evaluations	Month 6	Month 36	mid-year and end of year reports	Month 36

Section V: Review Criteria Discussion

Economic Development: It is difficult to find a business model that is not affected by energy costs. As a result, the primary economic development component of Alachua County Public School's *Fuel Alternative Demonstration Project* is in creating knowledge throughout the community of bio-diesel technology and its credibility as a viable means of lower operating costs for both small and large business. Providing familiarity to the public of the processes involved in turning waste oil into a usable energy resource has the potential for creating greater demand for and acceptance of biomass produced fuels. Bringing this knowledge to our students, who will soon be entering the workforce, increases the economic impact. These young people will be provided with training and a working knowledge of a resource that can potentially have great affect on their working careers and allow them to contribute to what promises to be a growing dialog regarding the use of biofuel on a local scale within a number of applications.

Technical Feasibility: There is a growing body of research and practice documenting the technical feasibility of producing diesel-equivalent fuels from waste oils and bio sources. Patents on the equipment and technology needed to convert vegetable oils to fuel were issued as early as the 1930s. Since that time, the process of converting vegetable oils, animal fats, and recycled cooking oil to a viable energy resource has been demonstrated on both a large- and small-scale basis utilizing commercially produced distillation units. Once produced, bio-diesel can be used in a variety of fuel applications, including use as a motor fuel, in the production of domestic heating for climate control, and to produce hot water. Perhaps the most promising aspect of bio-diesel production is that the products necessary to produce finished fuel oil is available mainly as a waste product. Each year, thousands of gallons of used cooking oil are thrown away by restaurants and other food-producing industries. Production of a usable energy source from this waste thus serves to reduce disposal of an otherwise unwanted product as well as providing an alternative to fossil fuel consumption.

Alachua County Public Schools has adequate infrastructure to support development of the *Fuel Alternative Demonstration Project*. The district owns a large campus that is used to house a number of technical education programs and a technical education staff with ample experience in setting up and operating projects that involve a high degree of mechanical and technological know-how. In addition, the county is home to the University of Florida. District staff regularly works closely with a number of colleges and departments at the university and has obtained commitments from a professor in the Soil and Water Science Department to consult with the school system on development and operation of this project. This professor (see biographical sketch) has extensive experience in working with biomass fuel production and has agreed to provide technical expertise, assist with troubleshooting of equipment, test raw materials and finished products, as well as work with the district on disposal of any byproducts.

Innovative Technology: The *Fuel Alternative Demonstration Project* utilizes existing technology, but applies it in an innovative way. Rather than focus on production of bio-diesel for a strictly economic purpose, this program attempts to develop in young people awareness and understanding of alternative fuels and their importance through providing a hands-on learning experience. In addition, there is a focus on integrating bio-diesel production into auto technology, agriculture, and science curricula at the Professional Academies Magnet (PAM) at

Loften High School, thereby assuring a broad exposure to a variety of students and providing a basis for a number of applications.

Production Potential: Experts estimate that bio-diesel can be produced at the rate of approximately nine gallons of finished fuel to each ten gallons of waste-fuel input. Chemicals needed in the production process are relatively common and inexpensive, making bio-diesel a very cost-efficient product. Production potential itself is mainly limited to two factors: the amount of waste oil or raw materials available and the production capacity of the distiller. Participants in the *Fuel Alternative Demonstration Project* will focus on production of fuel that can be used in a number of applications throughout the district, including a diesel-powered car built and retrofitted by students in the Automotive Tech program, a tractor used in the Ag Tech area, and other equipment used in the technology programs at Loften Center. The district also has a Culinary Arts program, and use of bio-diesel for heating water is another possible use.

Energy Efficiency: As noted above, the use of waste oil in the bio-diesel production process makes this technology both extremely cost-effective and efficient. Not only are products used in the production that would otherwise be cast aside, there is added efficiency in the savings associated with disposal costs. Bio-diesel produces energy at a rate comparable to modern fossil fuels, and it has wide application. It may be mixed with conventional diesel fuel oil to create a blend or used in its complete state. Production costs are estimated to range in the neighborhood of 55 to 75 cents per gallon of bio-diesel. Additionally, there is wide application for and use of diesel as a fuel oil. It is commonly used as a motor fuel in fleet transportation, commercial hauling, farm machinery, and as a heat-producing energy source in the production of hot water, steam, and electricity.

Fostering Awareness: This project is focused on increasing awareness and acceptance of bio-diesel as a viable energy resource and is to be operated primarily as a demonstration project.. Great emphasis will be placed on introducing young people to the technology involved in the process and providing connections between current curriculum offerings and the science of producing fuel from waste oils and other bio sources. Special emphasis will be directed at a segment of the district's students who have exhibited interest in careers that will be greatly impacted by this technology (i.e., automotive, agriculture, and landscaping). Project activities are designed to give these students not only a knowledge of the process and science behind making bio-fuel, but also to provide a hands-on experience in application of the technology. For this reason, the proposed site of the demonstration facility will be located at the Professional Academies Magnet campus at Loften High School.

Additional activities will be designed to introduce non-technical students to the process as well. The project includes activities that are designed to bring students into the facility from throughout the district's schools, and community outreach will be conducted in order to bring adults from the surrounding area into the facility over the summer months. The overall goal is to create a degree of familiarity with bio-diesel that extends to classrooms outside of the technical arena and creates knowledge and acceptance of bio-diesel as a viable energy resource for local use and across a number of applications.

Location Served: The project is designed to serve the students and community of Alachua County. However, as the project is developed and is brought on line, other counties may desire to send students and community members in for demonstrations and experience with the facility.

Public Integration: Information about the project and the proposed bio-diesel demonstration facility will be made available through the schools and students, through news releases, and through fliers and other community outreach projects. In addition, the district provides a website for its technical education programs, and this venue may be utilized to further promote the program and provide public access to information regarding activities.

Section VI: Measure of Success

The project will be evaluated based on the following measurable goals and objectives:

Goal # 1: Prepare facility for the demonstration of bio-fuel production.

By the end of month six, the following objectives will be completed:

- District staff will have prepared site for biodiesel production, acquired the necessary equipment for making biodiesel, and shall have tested equipment for proper operation.
- Teachers in the Professional Academies Magnet at Loften will have developed curricula, including hands-on activities, to involve the integration of biodiesel technology with automotive technology, agriculture, and science classes.
- District staff will have prepared a dissemination plan and will have provided information to the public and other schools in the district through district communication, the media, and on the internet.

Goal # 2: Provide instruction and demonstration activities to students involving the biodiesel production facility.

By the end of month twelve, the following objectives will be completed:

- Students in at least one technical education program at Loften will have been taught lessons based on developed curricula.
- Students in at least one technical education program will have participated in the production of biodiesel fuel at the facility.
- Students will have begun experimentation with the use of biodiesel fuel on existing vehicles in the automotive tech program and with the tractor used on the school grounds and landscaping program.
- Biodiesel production lessons will be posted on the district website for use by teachers in other schools and other districts.

Goal # 3: Expand the impact of the Fuel Alternative Demonstration Project to include additional programs at Loften, classes in other schools, and to the community.

The following objectives will be accomplished during the second and third year of the project:

- Schedule and implement training sessions for teachers in other schools within the district.
- Schedule and implement an informational session for interested members of the local business community.
- Schedule field trips from other schools to visit, observe, and participate in the production of biodiesel at the site.
- Provide demonstrations on biodiesel production to the public at the site.
- Develop a public education plan to provide information on the use of alternative fuel to decrease reliance on conventional energy and to improve the environment.

Section VII: Biographical Sketches

David A. Edwards, Director, Technical Education Department: Project Director

Education

Ph.D., The Ohio State University.

Additional graduate hours (42) in Educational Administration, Bowling Green State University and The Ohio State University.

Master of Education, Bowling Green State University.

Bachelor of Arts in Education, Wichita State University.

Professional Experience:

1990 – Present: School Board of Alachua County: Originator and developer of the career academies. Director of the Career & Technical Education and Adult Education programs.

Previous positions included:

1985 – 1990: Director of Career, Vocational, and Adult Education, Westerville City Schools, Westerville, Ohio: Managed Career, Vocational Education and Adult Education Programs.

1985: Consultant to United States Agency for International Development (USAID)

Sent to Indonesia to evaluate vocational-technical education in that country and to make recommendations for nationwide improvement.

1983-1985: Project Manager, International Training and Education Company, Boston, Massachusetts: Managed and directed ITECO's curriculum development project for the Jubail Human Resources Development Institute in Saudi Arabia. Managed the development of highly illustrated competency-based instructional materials produced in Boston and used in trade courses in the Jubail Human Resources Development Institute.

1980-1983: Education Specialist, Bureau of International Labor Affairs, United States Department of Labor, Washington, D.C.: Managed staff development programs for Saudi Arabian educators for the Vocational Training and Construction Project (VOTRAKON) conducted by the Department of Labor for the Saudi Arabian government.

Additional management and administrative experience:

Served as an assistant supervisor for trade/industrial and health occupations training programs for two area vocational-technical schools in Ohio; served as assistant principal of adult education for trade training programs in Toledo, Ohio.

Instructor of technical subjects: Taught vocational machine trades for three years, Toledo Public Schools; taught courses in metrology, manufacturing, and metallic production processes at Bowling Green State University in Ohio.

Machinist, Cessna Aircraft Company, Wichita, Kansas: Set up and operated machine tools for production in the machine shop. Qualified as journeyman machinist after three years of vocational training plus two years of industrial experience.

Ann C. Wilkie, Ph.D., Associate Professor, Soil and Water Science Department, University of Florida-IFAS, Project Consultant

(352) 392-8699 Fax: (352) 392-7008 E-mail: acwilkie@ufl.edu

Research Interests: Environmental Microbiology, Biomass, Bioenergy, Biogas, Biodiesel

Education:

Ph.D. (*Microbiology*), National University of Ireland, Galway, Ireland – 1984.

B.Sc. (*Microbiology*), National University of Ireland, Galway, Ireland – 1979.

Professional Experience:

7/2000 – Present: *Associate Professor*, Soil and Water Science Department, University of Florida, Gainesville, Florida 32611.

7/1991 - 6/2000: *Assistant Professor*, Soil and Water Science Department, University of Florida, Gainesville, Florida 32611.

9/1988 - 7/1991: *Senior Biological Scientist*, Department of Microbiology and Cell Science, University of Florida, Gainesville, Florida 32611.

2/1985 - 9/1988: *Postdoctoral Research Associate*, Department of Microbiology and Cell Science, University of Florida, Gainesville, Florida 32611.

Relevant Publications:

1. Wilkie, A.C. (2007). Anaerobic Digestion and Biofuel Synergies. *Southeast Bioenergy Conference 2007*, Tifton, Georgia, August 1, 2007.
[http://www.sebioenergy.org/ConferencePDF/Aug1/130-300/B/Ann Wilkie.pdf](http://www.sebioenergy.org/ConferencePDF/Aug1/130-300/B/Ann%20Wilkie.pdf)
2. Wilkie, A.C. (2007). Biogas and Biofuel Synergies. *2007 Farm to Fuel Summit*, Florida Department of Agriculture and Consumer Services, St. Petersburg, Florida, July 19, 2007.
<http://floridafarmtofuel.com/ppt/2007/Wilkie.ppt>
3. Wilkie, A.C. (2007). Biogas and Renewable Carbon. *Climate Change Conference*, Tampa, Florida, May 10, 2007. <http://www.ces.fau.edu/ccf/download.php?id=16>
4. Wilkie, A.C. (2007). Biogas Energy Potential in Florida. *Renewable Energy Workshop*, Florida Public Service Commission, Tallahassee, Florida, January 19, 2007.
<http://www.psc.state.fl.us/utilities/electricgas/RenewableEnergy/Wilkie-UF.ppt>
5. Wilkie, A.C. (2006). The other bioenergy solution: The case for converting organics to biogas. *Resource: Engineering & Technology for a Sustainable World* **13**(8):11-12. October 2006. American Society of Agricultural and Biological Engineers (ASABE), St. Joseph, Michigan.
6. Wilkie, A.C. (2005). Anaerobic digestion: biology and benefits. In: *Dairy Manure Management: Treatment, Handling, and Community Relations*. NRAES-176, 63-72. Natural Resource, Agriculture, and Engineering Service, Cornell University, Ithaca, NY, 2005.
7. Wilkie, A.C. (2005). Anaerobic digestion of dairy manure: design and process considerations. In: *Dairy Manure Management: Treatment, Handling, and Community Relations*. NRAES-176, 301-312. Natural Resource, Agriculture, and Engineering Service, Cornell University, Ithaca, NY, 2005.
8. Wilkie, A.C., Castro, H.F., Cubinski, K.R., Owens, J.M. and Yan, S.C. (2004). Fixed-film anaerobic digestion of flushed dairy manure after primary treatment: wastewater production and characterisation. *Biosystems Eng.* **89**(4):457-471.
9. Wilkie, A.C. Fixed-film anaerobic digestion of flushed manure. US Patent No. 6,811,701 (2004).
Wilkie, A.C., Smith, P.H. and Bordeaux, F.M. (2004). An economical bioreactor for evaluating biogas potential of particulate biomass. *Bioresour. Technol.* **92**(1):103-109.

Shannon S. Ritter, Teacher on Special Assignment, Technical Education Department

Email: ritterss@sbac.edu Phone: 352-337-1739

EDUCATION

Bachelor of Science, April 1988
University of Central Florida
Orlando, Florida
Major: Business Education

PROFESSIONAL EXPERIENCES

Current Position:

February 2005 – Present: Teacher on Special Assignment, Career & Technical Education Alachua County Public Schools: Provide support to Career & Technical Education teachers throughout the district. Represent the Director of Career & Technical Education as needed at community events, board meetings, etc.

Previous positions included:

January 2001 – May 2001: Recruiter and Human Resources Assistant at Kelly Services in Gainesville, Florida: Recruit qualified candidates and fill open positions in a timely manner and maintain appropriate documentation.

November 1998 – September 2000: Manager, Customer Service Moltech Power Systems in Gainesville, Florida: Managed and directed the Customer Service Department. Duties included directing personnel in the areas of policy, customer inquiries, order processing, freight, returns, inventory control, credits, and special programs.

January 1997 – October 1998: Buyer, Purchasing Department: Managed the procurement of division materials and services. Duties included monitoring raw material pricing as well as economic factors that may impact the cost or availability and working with suppliers through a team approach to improve total product cost.

October 1994 – December 1996: Senior Customer Service Representative, Customer Service Department: Duties included processing orders, involvement in new design and design changes, working with internal departments to maintain service to customers, extensive telephone interface and working with sales to design and execute service plans and custom programs for key accounts.

July 1990 – September 1994: International Services Specialist, International Services Department Duties included processing orders, management of premium freight, understanding of general international business (i.e. required documentation such as letters of credit, commercial invoices, etc.)

November 1998 – July 1990: Credit and Collections Analyst, Credit Department: Duties included managing account status, setting and monitoring credit limits, and maintaining credit holds when necessary. In addition to credit/collection duties, managed the Accounts Receivable function.

July 1988 – November 1989: Staff Assistant, Human Resources: Duties included maintaining the Personnel Computer System, conducting new hire and one year benefits orientations, assisting in administering training classes for employees, and administering educational assistance program.

Mark A. Moore, Science Teacher, Professional Academies Magnet at Loften: Teacher Specialist

EDUCATION:

University of Florida, Gainesville, FL January 2000–August, 2001, Doctoral work
Masters Degree in Special Education, August 1992
West Virginia University, Morgantown, WV
General Science Teacher Certification, May 1991
Fairmont State College, Fairmont, WV
Bachelor of Science Degree, August 1981
West Virginia University, Morgantown, WV GPA: 2.7/4.0

PROFESSIONAL EXPERIENCES

Current Position:

Aug. 2007 to Present: Science Teacher, Professional Academies Magnet at Loften High School
Gainesville, Florida: Teaching Integrated Science I and II

Previous Positions included:

September 1998 to June 1999: Teacher of Emotionally Disturbed Students, Resource Itinerant Stafford County Public Schools Stafford, Virginia: Reported to and received assignments from the Supervisors of Special Education.

September 1995 to June 1998: Teacher of Emotionally Disturbed Students, Self-Contained Classroom teacher and Evaluator of Emotionally Disturbed Behavior. T. Benton Gayle Middle School, Stafford County Public Schools Stafford, Virginia Subjects taught: 6th, 7th, & 8th grade Science, Math, Social Studies & Language Arts..

September 1992 to June 1995: Teacher of Emotionally Disturbed Students, Self-Contained Classroom teacher and Child Study Committee member. A.G. Wright Middle School, Stafford County Public Schools Stafford, Virginia Subjects taught: 6th, 7th, & 8th grade Science, Math, Social Studies & Language Arts.

Raymond J. Fayo II, Director, Academy of Automotive Technology at Loften: Teacher Specialist

Email: fayorj@sbac.edu

Work Experience

August 2007 – Present	Director, Academy of Automotive Technology Professional Academies Magnet @ Loften High School Alachua County Public Schools Gainesville, Florida
November 1994 – August 2007	Automotive Equipment Mechanic University of Florida Gainesville, Florida
May 1993 – November 1994	Automotive Technician Johnson Auto Center Keystone Heights, Florida
May 1992 – April 1993	Pressman Florida Times Union Jacksonville, Florida
July 1987 – April 1992	Automotive Technician Johnson Auto Center Keystone Heights, Florida
February 1986 – July 1987	Sales and Service Technician Small Engine Repair Bryan's Ace Home Center Keystone Heights, Florida

Certification

ASE Master Technician - National Institute for Automotive Service Excellence

PART III – PROJECT BUDGET

Section VIII: Budget Summary

Funding Category	Grant Funds Requested	Cost Share: Matching Funds and Other In-Kind Contributions	
		Funding	Source of Funds
Salaries:	\$22,650	\$12,909	5% of Principal's time/salary; 5% of Career & Technical Education Director's time/salary; 5% of Career & Ed Staff
Fringe Benefits:	\$4,338	0	
Equipment:	\$14,185	0	
Travel:	\$5,466	0	
Contractual:	\$22,500	0	
Supplies/Other Expenses:	\$41,490	\$3,000	Installation costs for water and electric to new workspace for demo site
Indirect:	\$2,522	0	
Totals:	\$113,151	\$15,909	
Total Project Cost:	\$129,060	= Grants Funds Requested + Cost Share	
Cost Share Percentage:	14%	= Cost Share / Total Project Cost	

Project Task*		Grant Funds Requested	Cost Share: Matching Funds and Other In-Kind Contributions	
			Matching Funds	Source
1	Development	\$49,753	\$12,909	School Board of Alachua County
2	Installation & Production	\$42,936	\$3,000	School Board of Alachua County
3	Dissemination	\$7,466		
4	Career Field Awareness	\$0		
5	Expanded Usage	\$10,474		
6	Evaluation	\$2,558		
Totals:		\$113,151	\$15,909	
Total Project Cost:		\$129,060	= Grant Funds Requested + Cost Share	

* Should match the list of tasks identified in **Section IV: Project Description**.

Section IX: Budget Detail

Personnel						
Salaries (Name/Title/Position)	Hourly Cost (\$)		Hours		Totals (\$)	
Teacher Stipends for Integrating Biodiesel Content into Curriculum	\$15.00	*	300	=	\$4,500	
Teacher Stipends for Planning the Activities for Field Trips to Site	\$15.00	*	100	=	\$1,500	
Teacher Stipends for Workshop in Alternative Fuels	\$15.00	*	720	=	\$10,800	
Lead Teacher	\$15.00	*	390	=	\$5,850	
Total Salaries					=	\$22,650
Fringe Benefits (Rate% * Total salaries applicable)	Rate (%)		Salaries		Total (\$)	
	19.15	*		=	\$4,338	
Total Personnel Expenses					=	\$26,988
Equipment						
Description	Unit Cost (\$)		Quantity		Totals (\$)	
Freedom Fueller Deluxe FLFF07	\$5,195 (w/shipping)	*	1	=	\$5,195	
250 Gal Algae BioReactor	\$2,695 (w/shipping)	*	1	=	\$2,695	
1 Ton Oil Screw Press	\$2,895 (w/shipping)	*	1	=	\$2,895	
Biodiesel Engine for Press	\$3,400 (w/shipping)	*	1	=	\$3,400	
Total Equipment					=	\$14,185
Travel						
Purpose/Destination	Days	Per Diem	Fare/Rate (\$)	Mileage	Totals (\$)	
Student Field Trips to Grant Site	(18	*	(\$74/trip for school bus)	*	\$1,332	
Travel to FACTE Conf. for 3 days, 3 people, over 3 years	(9 total	*	\$120 per year x 3 years = \$360	+ Registration \$300/person x 3 people x 3 years = \$2,700; airfare @	* Roundtrip to Orlando 246 miles @ 0.485 x 3 people x 3 years = \$1,074	= \$4,134
Total Travel					=	\$5,466
Contractual						
Name or Services	Fee/Rate (\$)		Hours		Totals (\$)	
Dr. Wilkie at the University of Florida – contracted services to include student support with setting up demonstration center, testing, and environmentally-friendly disposal of by-products.	\$7,500/year	*		=	\$22,500	
Total Contractual					=	\$22,500
Supplies and Other Expenses						
Description	Unit Cost (\$)		Quantity		Totals (\$)	
Methanol – 55 Gal Drum from Rollins Automotive	\$210	*	30	=	\$6,300	
Lye (64 lbs Biodiesel Grade Flakes)	\$110	*	3	=	\$330	
pH Indicator Strips (100 strips)	\$20	*	5	=	\$100	
Grain for year 2 oil press – soybeans \$50/40 lbs 245 lbs per 35 Gal container = \$350 x 4 different grains	\$350	*	4	=	\$1,400	

Storage Containers for Grain – 35 Gal with screw-on lid	\$21	*	4	=	\$84	
BioClean 350 Purification System	\$800	*	1	=	\$800	
Oil Collection Kit (drum)	\$295	*	2	=	\$590	
Industrial Drum Dolly	\$50	*	3	=	\$150	
Biodiesel Discovery Packets - safety kit and dry wash included (3 yrs)	\$1,239	*	24	=	\$29,736	
Teacher Materials for Workshop in Alternative Fuels	\$500	*	n/a	=	\$500	
Materials for Civic & Business Leader Presentation	\$500	*	n/a	=	\$500	
Materials for Florida Career & Technology Education Assoc. (FACTE) State Conference	\$1,000	*	n/a	=	\$1,000	
Total Supplies and Other Expenses				=	\$41,490	
Overhead/Indirect						
Base of Calculations	Rate (%)		Base (\$)		Total (\$)	
Negotiated Indirect rate for Alachua County	2.28	*	\$110,629	=	\$2,522	
Total Budget						
				Total Budget	=	\$113,151

SECTION X: Commitment Letters from Third Parties

Not Applicable