

Alternative Energy Systems and Bioproducts

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V(A). Planned Program (Summary)

1. Name of the Planned Program

Alternative Energy Systems and Bioproducts

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
511	New and Improved Non-Food Products and Processes			100%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.1	0.0
Actual	0.0	0.0	2.3	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	22113	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	340205	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	266262	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The program goals are biological engineering for the production of alternative energy and bioproducts. Investigators in this program have worked to develop a microbial fuel cell that can use wastewater and sewage to generate electricity; conduct research to allow the production of hydrogen for fuel cells by microorganisms that use solar energy to split water; and find an efficient method of producing bioenergy from mass-produced algae. Results have been disseminated through journal publications, presentations, interviews and articles.

2. Brief description of the target audience

The target audiences for this research are potential producers and industrial manufacturers of hydrogen and bio-diesel.

V(E). Planned Program (Outputs)**1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	600	6000	60	60
2007	200	6000	0	0

2. Number of Patent Applications Submitted (Standard Research Output)**Patent Applications Submitted****Year Target****Plan:** 0

2007: 3

Patents listed

1.(Provisional) Nanoenhanced Microbial Fuel Cells for Power Generation and Microscale Device and Nanoelectronic Applications (2007) Chaplen, F, Liu, H, Jiao, J. Fern, A. (Inventors).

2.(Provisional) Enhanced Coulombic Efficiency and Power Density of Air-Cathode Microbial Fuel Cells (MFCs) with Cloth Electrode Assemblies (2007) Liu, H; Fan, Y. (Inventors)

3(Provisional) Microbial Fuel Cells Using bicarbonate as buffer. (2008) Liu, H; Fan, Y. (Inventors)

3. Publications (Standard General Output Measure)**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	0	0	0

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2007	9	9

Output #2**Output Measure**

DEVELOP IMPROVED BIOPRODUCT PRODUCTION SYSTEMS – boost solar energy capture for hydrogen production through development of a variety of feedstocks – improved microbial feedstocks for biodiesel production

Year	Target	Actual
2007	0	3

V(G). State Defined Outcomes

O No.	Outcome Name
1	Improved knowledge about feedstocks for biofuels and bioenergy: - Researchers learn new methods of metabolic engineering for photobiological H ₂ production on a 24-hour basis - Energy sector will learn that the electrical energy required with the photobiological approach could be much lower than the typical energy requirement of hydrogen produced by water electrolysis. - Growers learn to produce algae as a biofuel feedstock
2	Applications will advance production systems for bioenergy: - Peers develop biomimetic models to create biobased generators to produce molecular H ₂ and O ₂ from water and light, and these generators are incorporated into integrated H ₂ energy systems, providing generation, storage, and utilization of H ₂ in one unit. - Energy producers optimize the photobiological process to yield higher energy efficiencies. - Construction and operation of bioenergy facilities close to potential feedstocks will generate additional economic activity in rural areas. - If waste biomass, such as animal wastes and organic component of urban wastewater is used as feedstocks, not only biohydrogen can be harvested, but also the wastes can be treated. - Algae can produce 30 times more oil per unit area of land than terrestrial oilseed crops

Outcome #1

1. Outcome Measures

Not reporting on this Outcome for this Annual Report

2. Associated Institution Types

3a. Outcome Type:

3b. Quantitative Outcome

Year	Quantitative Target	Actual
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}