V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Sustainable Energy

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
403	Waste Disposal, Recycling, and Reuse	40%	30%	50%	20%
601	Economics of Agricultural Production and Farm Management	60%	70%	50%	80%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	1.0	4.0	1.0
Actual Paid Professional	4.0	1.0	4.0	4.9
Actual Volunteer	0.0	0.0	0.0	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
164800	65687	242594	292531
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
164800	65687	242594	248448
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
164800	65687	242594	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Short course and training seminars for industry personnel and growers;
- Conduct basic and applied research in alternative fuel sources, energy saving techniques and recycling of green waste products;
- Contribute to trade and peer reviewed journal publications.

2. Brief description of the target audience

- Nursery, greenhouse, poultry growers and managers;
- In-state bioenergy industry;
- Research community at large.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	572	0	1822	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	17	22

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- 1. Alternative Energy Options and Energy Conservation & Efficiency (Agronomic, Poultry, Dairy & Green Industry): Number of workshops, seminars & twilight tours; Publications; Grants; Extension faculty engaged in programs.

Year	Actual
2012	335

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	1. Alternative Energy Options and Energy Conservation & Efficiency (Agronomic, Poultry, Dairy & Green Industry): Number of participants attending programs; Growers implementing new energy savings/conservation options; New energy systems installed; and Producers who participate in USDA's Rural Energy Audit Program.

Outcome #1

1. Outcome Measures

1. Alternative Energy Options and Energy Conservation & Efficiency (Agronomic, Poultry, Dairy & Green Industry): Number of participants attending programs; Growers implementing new energy savings/conservation options; New energy systems installed; and Producers who participate in USDA's Rural Energy Audit Program.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
UME is helping to move the industries toward sustainable practices and in adopting solar, wind, ground water heating and cooling, using more gas efficient cars and trucks, and switching to lower input light sources. These strategies will reduce input costs for producers/operators and reduce the consumption of non-renewable sources of energy.

What has been done
MAES research is developing technologies for efficient conversion of biomass and animal waste into bioenergy. A small-scale anaerobic digestion system capable of converting combined horseradish and animal waste into bioenergy was built and is in testing mode. Also, the use of algae as a nutrient scrubber and source of biofueld was tested and found to be an efficient strategy in a small-scale system.

Results
The Alternative Energy for Commercial Horticulture Industry in Maryland program works with commercial greenhouse operations and nursery owners in the state to adopt solar arrays, wind turbines, geothermal, biofuels, high efficiency wood stoves, energy saving methods and other alternative methods of energy. Some of the impacts as a result of this program include: The Ruppert Companies plans to install a 300 kilowatt solar array at their landscape and to conduct a one day educational tour of greenhouse operations in Northern Nursery, one of which is using miscanthus grass in pelletized form as an alternative energy source. Research on anaerobic

digestion of animal waste and conversion of algae to biofuel produced promising results in terms of refining the technology.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

UME has limited capacity to address this planned program. However, through the efforts of our Natural Resources Impact Team, it is planned to build capacity in this area and have an action team established within the next two years. The poultry, dairy, and green industry are very interested in alternative sources of energy and more energy savings techniques that make their operations more efficient and profitable. Research on the conversion of biomass to bioenergy was at its infancy, but it is envisioned that with more research funding Maryland scientists will move forward in developing economically and environmentally sound methods to convert biomass and waste into biofuels.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UME's work in this program area has not matured to the point that evaluation results can be reported.

Key Items of Evaluation