

**V(A). Planned Program (Summary)**

**Program # 4**

**1. Name of the Planned Program**

Sustainable Energy

**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%
<b>Total</b>		100%	100%	100%	100%

**V(C). Planned Program (Inputs)**

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	4.0	1.0	4.0	1.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
164601	65804	138260	72111
<b>1862 Matching</b>	<b>1890 Matching</b>	<b>1862 Matching</b>	<b>1890 Matching</b>
164601	65804	138260	72111
<b>1862 All Other</b>	<b>1890 All Other</b>	<b>1862 All Other</b>	<b>1890 All Other</b>
329202	131608	270192	144222

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

**Energy Efficiency & Composting (Green Industry & Poultry Growers):** Short course and training seminars for industry personnel and growers; Conduct field research in alternative fuel sources, energy

saving techniques and recycling of green waste products; Trade and peer reviewed journal publications. Also, conducted research in efficient digestion techniques for cellulosic material for conversion to biofuel.

**Biofuels & Alternative Energy Sources-Youth:** Conducted state wide 4-H science experiment day focused on biofuels and alternative energy sources. Twenty three counties and Baltimore City held the events involving 750 4-H members.

**Biofuels & Alternative Energy Sources-Research:** UMES research is focused on biofuels, sustainability, and geospatial information technologies to enhance experiential learning for precision agriculture projects and diverse grass species as potential sources of biofuel and the impact on soil organic matter dynamics. MAES research focused on:

- introducing switchgrass as a potential biofuel crop to the local agricultural and conservation communities in the Chester River Watershed.
- Investigating the early evolution of land plants and employing high-throughput DNA sequencing and computational analysis to understand evolutionary history that can help predict how changes in biodiversity impact the productivity of ecosystems.
- Discovery of an unusual bacterium that has the potential to produce 75 billion gallons a year of carbon-neutral ethanol. The bacterium *Saccharophagus degradans*, found in the Chesapeake Bay, is capable of breaking down biomass into sugars, which are then converted into ethanol and other biofuels.
- Integrating cation transport and pH across endomembranes with the secretory system.
- Controlling the pH and cation homeostasis of secretory compartments modulated membrane trafficking is critical for growth, tolerance to environmental stress, and synthesis of cell wall components.
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The regulation of rapid development in *Marsilea*.

## 2. Brief description of the target audience

**Energy Efficiency & Composting (Green Industry & Poultry Growers):** Nursery, greenhouse, poultry growers and managers. For Research, the target audience was industry and the scientific community.

**Biofuels & Alternative Energy Sources-Youth:** Youth 4-H members participating in Science, Engineering and Technology focused projects. Graduate students & undergraduate students.

**Biofuels & Alternative Energy Sources-Research:** Industry and the scientific community.

## V(E). Planned Program (Outputs)

### 1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	{NO DATA}	{NO DATA}	{NO DATA}	{NO DATA}
<b>Actual</b>	882	0	750	0

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

Year: 2010  
 Plan:  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
Actual	0	21	21

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Factsheets & publications, curricula, partnerships, in-services, train-the-trainer sessions, workshops, grants, web sites, social media networks

Year	Target	Actual
2010	{No Data Entered}	85

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

## **Outcome #1**

### **1. Outcome Measures**

{No Data Entered}

### **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
- Populations changes (immigration, new cultural groupings, etc.)

#### **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 and Data Collection)**

#### **1. Evaluation Studies Planned**

#### **Evaluation Results**

{No Data Entered}

#### **Key Items of Evaluation**

{No Data Entered}