V(A). Planned Program (Summary)

Program # 11

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
101	Appraisal of Soil Resources	0%	0%	20%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	30%	0%
402	Engineering Systems and Equipment	0%	0%	40%	0%
511	New and Improved Non-Food Products and Processes	0%	0%	10%	0%
	Total	0%	0%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	2.1	0.0
Actual Paid Professional	0.0	0.0	2.5	0.0
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**
0	0	194206	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	520727	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

One of the current challenges in producing biofuels from the poplar tree is lignin degradation. Research is underway to explore ways to break down lignin more efficiently. Scientists will characterize cinnamyl alcohol dehydrongease genes from tulip-poplar and their promoters to test a novel approach to facilitate lignin digestibility.

A marine algal biomass production process is being examined for its potential to produce ethanol and biodiesel. This process could eliminate the need for large areas of high quality farm, forest and/or pasture land; intensive inputs of fertilizers, pesticides and energy; and subsequent harvest related costs, as well as the need to produce large quantities of low-value solid fuels. The process also would eliminate a number of negative environmental impacts from nutrient loss and greenhouse gas that can result from the production and degradation of synthetic fertilizers.

In addition, the following activities were implemented:
1. Introduced sorghum feedstock as a source of material for the SC biofuel industry.
2. Identified ways to optimize switchgrass growth in the Southeastern coastal plain.
3. Identified ways to enhance the conversion of swichgrass to biofulels using cellulose systems in microbes.
4. Developed and conducted workshops to teach sustainable forestry principles.
5. Produced media programs on forest management.
6. Informed landowners of the economic and environmental benefits of using BMPs in all forest management operations.
7. Worked with established groups within the forestry community to support and promote appropriate training and outreach programs related to sustainable forest management.
8. Utilized the TOP Logger and other logger education programs to train loggers on sustainable forestry and alternative silvicultural systems.

2. Brief description of the target audience

All consumers in the state benefited from research and education programs related to lower cost energy options.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

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

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

Patent Applications Submitted

Year: 2012

Actual: 1

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	7	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Actual
2012	2

Output #2

Output Measure

- License agreements

Year	Actual
2012	0

Output #3

Output Measure

- Number of people completing educational workshops.

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people participating gaining knowledge as a result of participating in educational workshops

Outcome #1

1. **Outcome Measures**

Number of people participating gaining knowledge as a result of participating in educational workshops

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Researchers are analyzing more than 400 varieties of sorghum grown in South Carolina, seeking the ones most easily converted into fuel. They also are using genetics and bioinformatics to find sorghum genes that maximize sugar release from the whole plant (not just grain and juice), enabling sorghum plant breeders to naturally engineer next-generation bioenergy feedstock to improve the crop-to-fuel conversion process. In addition, discoveries of genetic controls in sorghum--such as drought tolerance, pest resistance and improved yields--will aid producers of related crops, including corn, rice and turfgrass.

Key Items of Evaluation