V(A). Planned Program (Summary)

Program # 8

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
204	Plant Product Quality and Utility (Preharvest)	0%	0%	25%	100%
206	Basic Plant Biology	0%	0%	35%	0%
402	Engineering Systems and Equipment	17%	80%	0%	0%
511	New and Improved Non-Food Products and Processes	0%	0%	32%	0%
512	Quality Maintenance in Storing and Marketing Non-Food Products	0%	0%	8%	0%
723	Hazards to Human Health and Safety	83%	20%	0%	0%
	Total	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	5.0	0.1	6.1	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
79268	7393	323833	118661
1862 Matching	1890 Matching	1862 Matching	1890 Matching
91118	6841	1747651	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

The production of swithchgrass as a biomass energy source is in the fourth year of a pilot project. Understanding dormancy and increasing germination rates to improve adoption of gamma grass as a biofuel Feasibility of the 25x25 initiative, the goal of having 25% of our expected energy produced from renewable resources in 2025.

- The Poultry House Evaluation Service kept producers abreast of the rising cost of feed
- Specialists have provided training for industry representatives, contractors, builders, and individuals on energy efficient design, green building certification, and Energy Star products.
- Developing improved methods for estimating grain storage inventories and research investigating the impact of storage on the quality of bioprocessing co-products important to the renewable fuel and product industry
- Improving plants for renewable energy and carbon sequestration uses through research on cellulose biosynthesis pathways
- Creating new soybean lines with improved oil characteristics for biofuels and bio-based products

2. Brief description of the target audience

Swithchgrass producers
Landowners
Utility company personnel
Community leaders
General public

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA	{NO DATA	{NO DATA	{NO DATA
Actual	56415	44112	7453	6016

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	2	13	15

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Published research journal articles

Year	Target	Actual
2010	{No Data Entered}	10

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Feasibility of growing and utilizing switchgrass as a fuel in power generation plants.

Outcome #1

1. Outcome Measures

Feasibility of growing and utilizing switchgrass as a fuel in power generation plants.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The production and utilization of switchgrassas as a biomass energy source is being investigated. Switchgrass is tall-growing, warm-season, perennial bunchgrass native to portions of Kentucky. The question is whether it can be grown for its biomass to be used as fuel to generate electricity. The critical issues surround its production, the economics of production, and its utilization in existing power generation facilities.

What has been done
This past year was the fourth year of a five-year project in the production of switchgrass on farms in northeast Kentucky. In 2010, grass was harvested from 20 plots. The grass was then baled with conventional hay baling equipment and pelletized for mixing with coal for use in an East Kentucky Power generation plant.

Results
In cooperation with UK research specialists and farmers, the ANR agent in Rowan County has facilitated the establishment of approximately 12 acres of swithgrass. Educational efforts regarding growing and using switchgrass have included mass media, individual visits, and facilitating a field day on the project for young farmers. Over 15 tons of switchgrass have been harvested, delivered, and pelletized for use as a biofuel. Blends of switchgrass and coal (up to an 8-percent blend) has been tested with few problems. Production has been fairly stable even in drought years.

4. Associated Knowledge Areas

KA Code	Knowledge Area

402 Engineering Systems and Equipment

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

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

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

Key Items of Evaluation