V(A). Planned Program (Summary)

Program # 6

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
511	New and Improved Non-Food Products and Processes			40%	
605	Natural Resource and Environmental Economics			40%	
903	Communication, Education, and Information Delivery			20%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	6.6	0.0
Actual Paid Professional	0.0	0.0	4.1	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	70002	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	246597	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	90612	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conducted outreach activities related to biobased products
- Developed value-added, agriculturally based end-use products
- Enhanced partnerships among faculty across the Montana university system, producers, the agricultural industry, and other educational institutions across the region
- Explored sustainable fuels from crops grown in Montana

2. Brief description of the target audience

- Alternative energy groups and state agricultural advisory committees
- Crop and livestock producers in Montana
- Economic development groups
- Participants in extension and commodity group meetings, conventions, and conferences
- State of Montana, Montana Department of Agriculture, Bureau of Land Management, USFS, and other government entities

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	30	10000	0	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	5	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- New business partnerships created

Year	Actual
2012	1

Output #2

Output Measure

- Number of research citations

Year	Actual
2012	11

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of biofuels developed from existing crops in Montana
2	Number of new crop options introduced for biofuels in Montana

Outcome #1

1. Outcome Measures

Number of biofuels developed from existing crops in Montana

2. Associated Institution Types

- 1862 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)
Bioenergy alternatives will help reduce dependence on fossil fuels. Crops designated for biodiesel production include canola, camelina, and mustard. Scientists are studying new oilseed crops and cropping systems as viable options for biodiesel production. Research has shown camelina to be a promising dryland crop for use in biodiesel and other bioproducts.

What has been done
A researcher in the Central Agricultural Research Center is part of a multi-state project, "The Science and Engineering for a Biobased Industry and Economy." The Montana participants are interested in characterizing oilseed feedstocks for biodiesel production and utilizing co-products and/or by-products. Montana researchers studied camelina crops as a rotational crop with winter wheat and participated in a nitrogen input and harvest management study on CRP land investigating biomass yield and quality affected by N.

Results
Camelina has been identified as an oilseed energy crop for feedstock, but production systems need to be developed or optimized for economical and sustainable production of this crop. This study investigated the impact of camelina on winter wheat yield and system profitability while using camelina as a rotation crop for winter wheat. The study will answer the question if camelina can be grown as a rotation crop without an adverse effect on food crop production, which is the major concern for bioenergy feedstock production. Preliminary results have been presented at several conferences. CRP land has the potential to be used for biomass feedstock production. However, N management and harvest timing have not been studied. Results from this project will provide information of biomass productivity on CRP land in central Montana. Some results have been published in scientific journals and were presented at the Sun Grant Initiative National Conference.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes
605	Natural Resource and Environmental Economics
903	Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Number of new crop options introduced for biofuels in Montana

2. Associated Institution Types

- 1862 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)
MAES did not have any new crop options introduced this year for biofuels.

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes
605	Natural Resource and Environmental Economics
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Public Policy changes
- Government Regulations

Brief Explanation

Research in sustainable energy is now conducted through non-MAES entities. MAES energy research will be incorporated into Climate Change and Environment, and Global Food Security: Plant Improvements, Genomics, and Products. We will not maintain sustainable energy as a planned program.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

MAES and COA researchers will continue to grow oilseed crops, but their efforts will focus primarily on feedstock energy.

Key Items of Evaluation

Research in sustainable energy is now conducted through non-MAES entities. MAES energy research will be incorporated into Climate Change and Environment, and Global Food Security: Plant Improvements, Genomics, and Products. We will not maintain sustainable energy as a planned program.