

**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 |
|---------|--------------------------|-----------------|-----------------|----------------|----------------|
| 125     | Agroforestry             | 40%             |                 | 19%            |                |
| 131     | Alternative Uses of Land | 20%             |                 | 62%            |                |
| 202     | Plant Genetic Resources  | 40%             |                 | 19%            |                |
|         | <b>Total</b>             | 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     | 14.3      | 0.0  | 4.6      | 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    |
| 611453              | 0              | 136538         | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 1701800             | 0              | 388269         | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 445261              | 0              | 543085         | 0              |

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

1. Brief description of the Activity

The development of Marcellus Shale natural gas reserves in Pennsylvania has resulted in a large opportunity to develop a domestic energy resource in the state. In response, we have initiated a comprehensive outreach program to understand the potential community, economic, and environmental

issues associated with the development of the Marcellus Shale resource in the state. This has included the development of webinars, meeting conferences, newsletters, tours, and factsheets on understanding the potential of the resource, gas leasing considerations, and other topics related to the development of the resource. Engagement with county commissioners, state government, and the industry is a critical part of the outreach effort. Renewable energy development that has minimal environmental impacts and limited effects on food and feed prices presents new opportunities and challenges for our clientele. The development of alternative energy strategies is also a function of federal, state, and local policies that either subsidize or restrict development. The AES strives to identify regionally adapted renewable energy solutions and develop the supporting research and outreach programs to help foster the appropriate development of these technologies. We have continued to develop an outreach program to address the potential of various alternative feedstocks for energy. One focus in our region is the development of biomass heating projects using woody biomass to displace heating oil and propane. Our clientele need an understanding of the feedstock production and availability, sustainable harvest strategies and cost, feedstock logistics, and the optimum methods of utilizing the resource most efficiently. Outreach education on these topics must be developed and shared with the public, communities, and potential project developers. Case studies of successful projects and on line monitoring systems of new projects are being developed. Research initiatives have included evaluations of cropping systems on dairy farms, development of novel bioenergy crops such as jatropha, canola and camelina, development of sustainability criteria for harvesting crop residues, and evaluations of cost and logistic issues associated with the harvest of woody biomass for energy. Faculty and extension staff are also helping clientele understand emerging markets for ecosystem service credits that are often generated in conjunction with renewable energy project developments and are key components of the business plan. These include renewable energy credits, carbon credits, and nutrient trading credits.

**2. Brief description of the target audience**

This audience is broad and encompasses much of the general public, but focuses on landowners, energy project developers, state and federal agency personnel, extension educators, and state and local community leaders.

**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> | 49943                  | 524684                   | 31                    | 333                     |

**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**

|               |                  |                 |              |
|---------------|------------------|-----------------|--------------|
| <b>2010</b>   | <b>Extension</b> | <b>Research</b> | <b>Total</b> |
| <b>Actual</b> | 0                | 0               | 118          |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of invention disclosures

| <b>Year</b> | <b>Target</b>     | <b>Actual</b> |
|-------------|-------------------|---------------|
| 2010        | {No Data Entered} | 0             |

**Output #2**

**Output Measure**

- Number of people enrolled and/or registered in programs

| <b>Year</b> | <b>Target</b>     | <b>Actual</b> |
|-------------|-------------------|---------------|
| 2010        | {No Data Entered} | 85886         |

**Output #3**

**Output Measure**

- Number of research projects completed

| <b>Year</b> | <b>Target</b>     | <b>Actual</b> |
|-------------|-------------------|---------------|
| 2010        | {No Data Entered} | 3             |

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

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

| O. No. | OUTCOME NAME   |
|--------|--|
| 1      | Number of participants who were evaluated and demonstrated increased knowledge and skills  |
| 2      | Number of participants who were evaluated in a follow up and who implement/adopt practices |
| 3      | Number of volunteers that helped with program leadership or program delivery               |

## **Outcome #1**

### **1. Outcome Measures**

Number of participants who were evaluated and demonstrated increased knowledge and skills

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | {No Data Entered}          | 1538          |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The development of Marcellus Shale natural gas reserves in Pennsylvania has resulted in a large opportunity to develop a domestic energy resource in the state. However, there are a multitude of potential community, economic, and environmental issues associated with the development of the Marcellus Shale that must be resolved. Renewable energy development that has minimal environmental impacts and limited effects on food and feed prices presents new opportunities and challenges for our clientele.

#### **What has been done**

Our extension teams have conducted webinars, meeting conferences, newsletters, tours, and factsheets on understanding the potential of the natural gas resource, gas leasing considerations, and other topics related to the development of the resource. They have conducted similar programs on renewable energy issues in the state. Engagement with county commissioners, state government agencies and officials, and the industry has been a critical part of the outreach effort.

#### **Results**

The Cooperative Extension Marcellus Shale Education Program has had widespread impacts on improving the skills of landowners in coping with this issue. For example, the program has improved participants confidence in the ability to make sound decisions pertaining to the leasing of oil and gas rights and understanding of the need to consult an oil and gas attorney before signing an oil and gas lease. Local government officials have also gained knowledge about the potential impact of the resource and how other communities have addressed gas related issues. Landowners have received personal advice on their own situations as a result of interactions with extension staff. In the renewable energy arena, project developers have interacted with Penn State researchers and extension staff at various programs to understand regulatory and technical

issues with feedstock procurement and processing.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area           |
|---------|--------------------------|
| 125     | Agroforestry             |
| 131     | Alternative Uses of Land |

#### Outcome #2

##### 1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices

##### 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}   | 37     |

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

The development of Marcellus Shale natural gas reserves in Pennsylvania has resulted in a large opportunity to develop a domestic energy resource in the state. However, there are a multitude of potential community, economic, and environmental issues associated with the development of the Marcellus Shale that must be resolved.

###### **What has been done**

Twelve webinars were developed, delivered, and evaluated via Adobe Connect software by a team made up of faculty and educators. These online seminars were held monthly from October 2009 through September 2010. Penn State speakers included: K. Brasier, T. Kelsey, T. Murphy, R. Pifer, G. Sheppard, B. Swistock, and D. Yoxtheimer. External speakers were from the following organizations: Carnegie Mellon U.; City of Fort Worth, TX; Bradford, Lycoming, Potter, and Somerset (PA) counties; PA Dept. of Cons. & Nat. Resources; Susquehanna River Basin Commission; and US Environmental Protection Agency.

###### **Results**

1220 individuals participated directly (live) in the webinars the day of the webinars. In addition,

nearly 20,000 individuals viewed the recorded webinars. 373 of 377 (98.9%) people who participated in a webinar in Fall 2009 or Spring 2010 answered once or multiple times that as a result of participating in today's webinar, within the next 6 months they intend to either: view recorded webinars, visit the Penn State Natural Gas site (<http://extension.psu.edu/naturalgas>), or become involved in their community around Marcellus Shale development.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area           |
|---------|--------------------------|
| 125     | Agroforestry             |
| 131     | Alternative Uses of Land |

#### Outcome #3

##### 1. Outcome Measures

Number of volunteers that helped with program leadership or program delivery

Not Reporting on this Outcome Measure

#### 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.)
- Other ()

##### Brief Explanation

Public interest in either Marcellus Shale natural gas or renewable energy strategies is tied closely to the economy and public policy. Increases in economic activity and energy prices could greatly increase the interest in the development of these resources and the potential for secondary issues to develop. Both of these industries are also closely tied to public policy and development is a function of tax, subsidy, and environmental policy. Changes in any policy often require subsequent interpretation and education and create additional opportunities for engagement through extension. These changes also create opportunities for public policy research on energy policy, which is also a strength of the AES.

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

## 1. Evaluation Studies Planned

- During (during program)

## Evaluation Results

Our evaluation results have demonstrated the quality and potential impact of our programs in these often complex and technical subject matter areas. For example, for the Fall 2009/Winter 2010 webinar series, 98.2% of those who responded to the on-line survey (N=165) rated the webinars as having met their expectations, including those who rated them as "good"(40%), "very good"(45.5%) or "excellent" (12.7%)." For the Spring/Summer 2010 series 95.6% of those who responded to the on-line survey (N=230) rated the webinars as having met their expectations, including those who rated the webinars as "acceptable" (17.8%), "good"(53%), or excellent" (24.8%). A broad measure of the webinars' quality and potential impact is participants' responses to the question of whether the webinar provided them with information that was useful to their needs. For the Fall 2009/Winter 2010 series, 97.6% of those who responded to the on-line survey (N=165) rated the webinars as having provided them with information that was useful to their needs. For the Spring/Summer 2010 series, 92.2% of those who responded to the on-line survey (N=230) rated the webinars as having provided them with information that was useful to their needs, including those who rated the webinars as "acceptable" (17.0%), "good"(50%), or "excellent" (25.2%).

## Key Items of Evaluation

Extension educators in the field in both the Marcellus and the Renewable Energy programs have the potential to engage the clientele in many new and innovative ways to facilitate energy development and address local development issues. Frequently these impacts are overlooked at the Federal level in terms of providing funding opportunities for county or regional field staff. A recently published paper on these new roles of faculty and field staff (<http://openjournals.libs.uga.edu/index.php/jheoe/article/view/273/252>) describes some of the potential methods of engagement that could be creatively included or encouraged in future NIFA project RFPs.