

V(A). Planned Program (Summary)

Program # 8

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
123	Management and Sustainability of Forest Resources	50%			
131	Alternative Uses of Land	15%			
605	Natural Resource and Environmental Economics	35%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.0	0.0
Actual Paid	12.0	0.0	0.0	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
370000	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
640681	0	0	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 Sustainable Energy planned program at West Virginia University Extension works toward energy independence to develop biomass use for biofuels by designing optimum forestry and crops for bioenergy production. It also works towards improving woodlot conditions and expanding forest and non-timber product production in general.

In 2014, there were 18 educational initiatives in this program area and 2,386 direct contacts.

Educational topics include: reclamation of Marcellus well sites, chestnut for reforestation, switchgrass potential for minesoils, chestnut growth on surface mines, bioenergy crops on surface mines, flow effects on acidity, survival of chestnut trees, biomass for bioenergy, switchgrass biomass stewardship, biomass issues for forest management plans, and workshops on byproduct utilization for bioproducts/bioenergy collaborative research on blueberry waste. One specialist is conducting research on reducing food waste and increasing agricultural byproduct utilization for producing other food products and/or producing bioproducts that will be useful for other applications such as enzymes/catalysts. Another specialist is conducting research on the reclamation of mined land with switchgrass, Miscanthus, and Arundo for biofuel production.

Other educational events included: Understanding Renegotiation and Renewal of Natural Gas Leases, Shale Mineral Management: Understanding Your Royalties, 3rd Annual Enhancing Public Understanding of Natural Gas Issues Conference, and WVUES NGET Tour of the Bakken Oil Region in North Dakota.

2. Brief description of the target audience

Foresters, government officials, consumers of wood products, commercial enterprises dealing with wood products, Extension staff and faculty.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1197	0	1189	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	2	4	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational materials created or updated about sustainable energy

Year	Actual
2014	7

Output #2

Output Measure

- Number of educational materials about sustainable energy distributed

Year	Actual
2014	2

Output #3

Output Measure

- Number of professional presentations on sustainable energy topics

Year	Actual
2014	14

Output #4

Output Measure

- Number of training activities related to sustainable energy

Year	Actual
2014	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of stakeholders participating in production/harvesting/storage systems that increase or improve their skills.
2	Number of youth who gain science process skills in biofuels.
3	Number of participants who adopt BMPs for production/harvesting/storage systems.
4	Number of participants who were trained in issues related to natural gas production.

Outcome #1

1. Outcome Measures

Number of stakeholders participating in production/harvesting/storage systems that increase or improve their skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	63

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

West Virginia is well-suited to supply biofeedstocks for renewable energy to produce fuels such as ethanol and other transportation fuels. Forest by-products and wastes can be used, and dedicated energy crops such as switchgrass and Miscanthus can be grown on marginally productive lands. The state also has tens of thousands of acres of reclaimed surface mine sites which are well-suited for production of woody and herbaceous biomass energy crops. West Virginia is the nation's second largest coal-producing and third most heavily forested state in the nation. Opportunities exist for the co-development of biomass and coal energy which combine the sustainable qualities of woody biomass with the high quality fuel of West Virginia coal.

What has been done

Presentations were made at the American Society of Mining and Reclamation national meeting and at the National Association of Abandoned Mine Land Meeting. Topics included biomass and coal development opportunities, bioenergy research and development, torrefied biomass and coal blends, energy policy and environmental impacts, and the technical and financial feasibility of coal and biomass as feedstocks for liquid transportation fuels. Other educational topics throughout the year included: reclamation of Marcellus well sites, switchgrass potential for mine soils, chestnut growth on surface mines, quality of bioenergy crops on surface mines for ethanol production and yield, switchgrass biomass stewardship and biomass issues for forest management plans.

Results

Participants gained knowledge of West Virginia surface mine post-mining land use development, biomass and coal development opportunities, bioenergy research and development, torrefied biomass and coal blends, energy policy and environmental impacts, and the technical and financial feasibility of coal and biomass as feedstocks for liquid transportation fuels. West Virginia

Department of Agriculture personnel and county commissioners gained on-the-ground experience with growth, development and harvesting technologies for warm-season grasses and forestry wastes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #2

1. Outcome Measures

Number of youth who gain science process skills in biofuels.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The purpose of RREA-supported programs in West Virginia is to put landowners in touch with natural resources professionals and to educate citizens about forests, wildlife, and water resources. Education programs developed for the 270,000 private landowners aim to demonstrate the importance of natural resources and how these resources can be managed to assure they are available for current and future use. Stakeholders include Master Gardeners, Master Naturalists, WV Woodland Stewards, and Woodland Owners Association members, and programs are carried out with funds from educational grants (e.g., USDA Redesign, WV Forest Stewardship Program).

What has been done

RREA supports Extension Specialists facilitation of the youth forestry contests and activities in West Virginia. The primary youth events include the WV Conservation Camp, the National 4H Forestry Invitational, and the Future Farmers of America state forestry contest. These youth activities had over 250 participants.

Results

250 youth in forestry activities in West Virginia gained knowledge and skill in the conservation of our natural environment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Number of participants who adopt BMPs for production/harvesting/storage systems.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of participants who were trained in issues related to natural gas production.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	820

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

With the discovery of the Marcellus shale and new drilling techniques to tap the natural gas it contains, West Virginia emerges as one of the central natural gas shale plays in the Appalachian Basin. The growth and economic development of the Marcellus shale in West Virginia provides opportunities for public and private landowners, local communities, and local and state governments to benefit from monies generated from land leases and royalties. However, with this

economic growth and development comes safety and environmental concerns. WVUES Natural Gas Education Program (WVUES NGE) was formed to address topics of interest and concern citizens have about the natural gas industry in WV.

What has been done

A WVUES Natural Gas Education Team (WVUES NGET) comprised of WVU professors, WVUES county Extension Agents, and representatives from the natural gas industry, WV state environmental agencies, and the environmental community collaborated to provide natural gas education throughout WV. WVU Extension held 11 educational programs including regional trainings, the third Annual Enhancing Public Awareness of Natural Gas Issues Conference, a session at the inaugural Women in Agriculture Conference, an educational program at Ritchie County High School to prepare youth for careers in the natural gas industry, and a tour of the Bakken Oil Region in North Dakota for 7 members of the WVUES Oil and Natural Gas Team.

Results

Participants (820) increased their knowledge of natural gas development in the areas of leasing; hydraulic fracturing law and regulation; fire safety, prevention, and control on natural gas well drilling sites; natural gas drilling impacts on water; researching private property-deeds and leases; disposal of drilling wastes; landowners and their mineral rights; the WV Shale Gas Network; hydraulic fracturing/oil exploration in North Dakota and its relationship to WV; collegiate natural gas education programs and careers in the natural gas industry; managing natural gas windfalls; and mineral management/understanding royalty payments.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

More than 820 people attended the 11 natural gas educational programs directly offered by or in association with the WVUES NGET. Attendees increased their knowledge of natural gas development in the areas of leasing; hydraulic fracturing law and regulation; fire safety, prevention, and control on natural gas well drilling sites; natural gas drilling impacts on water; researching private property-deeds and leases; disposal of drilling wastes; landowners and their mineral rights; the WV Shale Gas Network; hydraulic fracturing/oil exploration in North Dakota and its relationship to WV; collegiate natural gas education

programs and careers in the natural gas industry; managing natural gas windfalls; and mineral management/understanding royalty payments. As a result of the evaluation comments, the Team has identified new topics to be addressed during the 2015 series of regional education programs and at the statewide conference (May 2015).

Key Items of Evaluation