

V(A). Planned Program (Summary)

Program # 4

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
402	Engineering Systems and Equipment	0%		100%	
	Total	0%		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	2.0	0.0
Actual Paid	0.0	0.0	2.1	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	77605	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	106342	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

- 1) Assess the application of a solar system to access groundwater for food production uses, including irrigation, aquaponics, and hydroponic systems at the Muirkirk Agriculture Research Farm, the University of the District of Columbia.
- 2) Install an Integrated Distributive Utilities Network (IDUN) at the Research Farm. T
- 3) Combine renewable energy sources (solar) to produce power (electricity), extract groundwater and store into a cistern reservoir at above ground for further uses.
- 4) Data collection for feasibility study of the IDUN that will support the design and installation of similar Solar Well Systems (SWS) as alternative source of Water Supply for irrigation and other purposes, including drinking water during emergency in the event of a catastrophic contamination of the current sources of surface water for potable supply.

2. Brief description of the target audience

DC Department of the Environment
 Researchers
 DC Public School students and teachers (Grades 9 and above)
 UDC faculty and students
 Community Stakeholders

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	0	0	0	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	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Design of a fuzzy-logic based controller system to optimize the operation of the anaerobic digestion System in terms of operational cost, the produce energy, and the quality of the residual organic matter.
Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Creation of a set of fuzzy rules to control the input flow rate and to control the concentration of VFA, the concentration of chemical oxygen demand (COD), and digester operating temperatures.
Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Design and build of a solar power system required for research project.

Year	Actual
2014	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Development of better designs for digestion reactor and its data acquisition sensors
2	Control of the concentration of VFA in the digester system through the manipulation of the input flow rate.

Outcome #1

1. Outcome Measures

Development of better designs for digestion reactor and its data acquisition sensors

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Control of the concentration of VFA in the digester system through the manipulation of the input flow rate.

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
- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

At the farm, the solar power system was successfully built and has given an innovative solution to the problems of water conservation and crop productivity. Therefore, the system will help the farm to expand itself, so more crops can be grown in different fields. The project can be considered as a model water delivery system which could be duplicated in various parts of the world where water scarcity is acute.

Key Items of Evaluation