

**V(A). Planned Program (Summary)**

**Program # 9**

**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
401	Structures, Facilities, and General Purpose Farm Supplies	15%			
402	Engineering Systems and Equipment	10%			
403	Waste Disposal, Recycling, and Reuse	65%			
405	Drainage and Irrigation Systems and Facilities	10%			
	<b>Total</b>	100%			

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	0.0	0.0
Actual Paid Professional	5.8	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
220315	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
110158	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**

- Included in our workshops and meetings aspects of sustainable energy with emphasis on structures, waste management and irrigation equipment, and energy conservation.

- Established collaborations with government agencies (Puerto Rico Electric Power Authority; Environmental Quality Board; Departments of Agriculture, Environmental and Natural Resources, and Education; Puerto Rico Aqueducts and Sewage Authority; USEPA; USDA; NRCS; and others) and with our partners in the University of Puerto Rico and other educational institutions.

- Designed and made plans that include and promote energy sustainability and efficiency in structures, waste management systems and irrigation systems (new facilities or improvement to existing facilities).

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

Extension professionals, government personnel (professional), professionals from the private sector, and farmers.

**3. How was eXtension used?**

We recommended eXtension to clients as an excellent source of information.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	11423	1202	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**

<b>2012</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Actual</b>	0	0	0

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

**Output Target**

**Output #1**

**Output Measure**

- Number of workshops and meetings offered which include aspects of energy sustainability and efficiency.

<b>Year</b>	<b>Actual</b>
2012	46

**Output #2**

**Output Measure**

- Number of collaborators from government agencies, partners in the University of Puerto Rico, and other educational institutions.

<b>Year</b>	<b>Actual</b>
2012	40

**Output #3**

**Output Measure**

- Number of designs and plans that include and promote energy sustainability and efficiency in structures, waste management systems, and irrigation systems (new facilities or improvement to existing facilities).

<b>Year</b>	<b>Actual</b>
2012	45

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

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

O. No.	OUTCOME NAME
1	Number of clients that participated in workshops and meetings offered, which include aspects of energy sustainability and efficiency.
2	Number of government agencies and partners in the University of Puerto Rico and other educational institutions that collaborate in projects that promote energy sustainability and efficiency.
3	Number of clients that adopted designs and plans that include and promote energy sustainability and efficiency in structures, waste management systems, and irrigation systems (new facilities or improvement to existing facilities).

**Outcome #1**

**1. Outcome Measures**

Number of clients that participated in workshops and meetings offered, which include aspects of energy sustainability and efficiency.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	1611

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities

**Outcome #2**

**1. Outcome Measures**

Number of government agencies and partners in the University of Puerto Rico and other educational institutions that collaborate in projects that promote energy sustainability and efficiency.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	34

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

**Issue (Who cares and Why)**

The high costs in the production of electricity in Puerto Rico during the past year, caused a decrease in the profits of the agricultural business, a decrease in labor, and the closure of several industries. As a result, the Government of Puerto Rico created public policy so that public agencies and educational institutions work together to find a way to lower energy costs or become more efficient in the use its use to help keep these businesses in operation and keep jobs.

**What has been done**

Settled agreements between various government agencies like the Puerto Rico Department of Agriculture, the Natural Resources and Conservation Service, municipalities, private industry, and the University of Puerto Rico to promote the use of energy-efficient equipment in cowsheds and coffee processing facilities.

**Results**

Results: (10 To 12 Lines Max)

Thirty-four (34) collaborations were established between government agencies and the University of Puerto Rico across the island to promote the use of energy-efficient equipment.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities

### **Outcome #3**

#### **1. Outcome Measures**

Number of clients that adopted designs and plans that include and promote energy sustainability and efficiency in structures, waste management systems, and irrigation systems (new facilities or improvement to existing facilities).

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

- 1862 Extension

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	45

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

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

The dairy industry is the most important agricultural industry in Puerto Rico. In recent years, it has been affected mainly by the continued increase in feed costs(affected by production energy costs and the change in purpose from sowing grains for food to planting energy crops).

The milk collection process in cowsheds depends on high energy consumption equipment or is inefficient (ie. cooling and heating, vacuum pumps and transfer systems and lighting among others). During 2012, the average Kwh in Puerto Rico was around \$0.28, which is 2.5 times higher than the USA average (except Hawaii) \$0.11 / kwh. This has forced several farmers to reduce labor, others to operate without profit and in the worst cases close operations.

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

A training program for agricultural agents and home economists was established to disseminate the educational message about efficient use of electricity to the owners of agricultural enterprises and households. The program included training on energy efficiency, solar and wind energy, and the use of waste from animals in confinement for the production of biogas and electricity using methane.

##### **Results**

As a result, several dairy farm owners in Puerto Rico established variable speed drives in the vacuum line and heat recovery systems in milk cooling tanks to achieve a reduction of approximately 12.5% in the use of energy. This translates into savings of \$270,000 annually in the electrical bill.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities

#### **V(H). Planned Program (External Factors)**

##### **External factors which affected outcomes**

- Economy
- Public Policy changes
- Competing Programmatic Challenges
- Other (Availability economic incentives)

##### **Brief Explanation**

Due to high production costs, compared to other States in the nation, energy is one of the priorities of stakeholders in Puerto Rico. We were impacted adversely by the global economic downturn. The effects were observed during the past years, when we are in a declining economy with a low creation rate of well-paid jobs and a high unemployment rate. Consequently the public in general does not feel economically secure. It was not until 2012, that we saw the economy gradually begin to recover.

However, in part due to the recession, and on the other hand, to competition and the availability of financial incentives, stakeholders were shy or did not dare to invest their money in sustainable technology. Also, high transportation costs, which are added to the costs of equipment, from the US to Puerto Rico make the installation of green technology poorly viable. We understand that, until the Government makes changes in public policy to facilitate the use of this technology and offers greater incentives for their purchase and installation, we will not see a very strong growth in this sector. However, we have managed that our clientele save in energy costs by making small changes like changing light fixtures, using energy-efficient equipment or changing their behavior and using less energy while operating them.

#### **V(I). Planned Program (Evaluation Studies)**

##### **Evaluation Results**

As sustainable energy is a new initiative, during 2012 an intensive training program was established aimed at PRAES staff and personnel from other government agencies. In 2013 we will be conducting surveys to assess the results of this training program.

##### **Key Items of Evaluation**