V(A). Planned Program (Summary)

Program # 14

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
132	Weather and Climate	15%		20%	
133	Pollution Prevention and Mitigation	20%		20%	
141	Air Resource Protection and Management	15%		0%	
605	Natural Resource and Environmental Economics	25%		0%	
608	Community Resource Planning and Development	10%		40%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	1.0	0.0
Actual Paid Professional	1.6	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.1	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**
79648	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
46269	0	10439	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

Energy benchmarking and greenhouse gas inventory in selected RI municipalities
Feasibility and implementation of energy efficiency and renewable energy technologies
Feasibility and implementation of air quality control technologies
Energy training for municipal officials and employees
Residential energy education:
- Education of available efficiency programs and incentives provided by the public utility
- Education of current state initiatives for renewable energy and energy efficiency
Energy training and professional development training for URI students
Public energy education through workshops, newspaper columns, presentations, canvassing
Outreach Activities:
- Sustainable energy page on local websites
- Community workshops
- Library lectures on renewable energy technologies
- Site visits of state renewable energy projects

2. Brief description of the target audience

Municipal officials:
- Building and utility managers
- Financial administrators
- Mayors and Town Managers
Municipal employees
Residential energy consumers
Small business owners
School systems
ESCos (Energy Service Companies)
Ocean State Clean Cities Coalition
Legislators
Academic professionals (students and research faculty)
Private sector industry personnel

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	2660	105000	200	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	3	1	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Fact sheets, Bulletins and newsletters

Year	Actual
2012	20

Output #2

Output Measure

- Short courses

Year	Actual
2012	0

Output #3

Output Measure

- Website development and refinement

Year	Actual
2012	5

Output #4

Output Measure

- Workshops and Conferences hosted

Year	Actual
2012	30

Output #5

Output Measure

- Public presentations

Year	Actual
2012	21

Output #6

Output Measure

- Student training

Year	Actual
2012	50

Output #7

Output Measure

- Certifications

Year	Actual
2012	36

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Build and leverage partnerships across multiple stakeholder groups
2	Increase stakeholder awareness of energy conservation benefits (municipalities, small business, consumers)
3	Build capacity within local municipalities to address energy management and GHG emission reduction
4	Link funded activities to broader climate management issues.
5	Increase energy conservation behaviors by municipal, residential and small business stakeholders
6	Develop replicable project and program models for sustainable energy education and management
7	Design and install demonstration renewable energy projects as part of overall energy management system
8	Provide URI undergraduate and graduate students with opportunities to gain invaluable experiential and interdisciplinary experience addressing real-world energy challenges through the URI Energy Fellows Program.
9	Complete energy benchmarking of public facilities in (4) select Rhode Island municipalities to prioritize locations for and implement projects that achieve cost-effective, persistent greenhouse gas reductions and serve as models for communities across the country.
10	Provide a broader array of programs and services for RI stakeholders concerned about energy issues in the transportation sector through NIFA-funded energy outreach programs at URI, coordinated with the DOE-funded Ocean State Clean Cities Coalition (OSCC), also at URI.
11	Develop tools and guidelines and analyze data for use by RI cities and towns to site and manage new renewable energy activity through a project led by the Renewable Energy Siting Partnership (RESP) composed of URI scientists and outreach experts.
12	Capitalize on the wealth of both experience and funding available at the state and federal levels to accelerate and facilitate reduction of diesel pollution from work performed on projects managed by the RI Department of Transportation (RIDOT).
13	Assist homeowners, renters, and small business owners in select RI municipalities in reducing their energy consumption and saving money on monthly utility bills by partnering with National Grid to provide current information on available incentive and rebate programs for energy efficiency measures.
14	Provide URI undergraduate students from under-represented cultural backgrounds with interdisciplinary, experiential learning opportunities addressing real-world challenges and prepare those students to enter the job market with the skills and training needed to succeed through the Science and Engineering Fellows Program (SE Fellow).

Outcome #1

1. **Outcome Measures**

Build and leverage partnerships across multiple stakeholder groups

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Increase stakeholder awareness of energy conservation benefits (municipalities, small business, consumers)

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Build capacity within local municipalities to address energy management and GHG emission reduction

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Link funded activities to broader climate management issues.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Increase energy conservation behaviors by municipal, residential and small business stakeholders

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Develop replicable project and program models for sustainable energy education and management

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Design and install demonstration renewable energy projects as part of overall energy management system

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Provide URI undergraduate and graduate students with opportunities to gain invaluable experiential and interdisciplinary experience addressing real-world energy challenges through the URI Energy Fellows Program.

2. **Associated Institution Types**

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rhode Island has a growing green economy, and the energy sector represents one of the most rapidly growing industries. Businesses in the private sector are seeking individuals with experience and training in the energy field; and URI students are showing a growing interest in energy studies and experiential learning opportunities. Recognizing the need for training per employers and experiential learning and networking opportunities per students, the URI Energy Fellow Program was created in 2008 and continues to provide links to experiential learning

networking opportunities for undergraduate and graduate students.

What has been done
The URI Energy Fellows Program accepted (12) undergraduate and graduate students in 2012 to work on a variety of energy research and outreach projects led by URI Outreach Center staff, URI research faculty, and external partner organizations and businesses in RI. In addition to project work, students received general energy education, participated in team-building exercises and professional development workshops to improve communication and networking skills, and have attended field trips to expand their knowledge of the energy field and the different sectors within it.

Results
Of 21 URI Energy Fellows from the 2011 program, (3) or 14% pursued graduate studies in related fields, and (11) or 52% received job offers for both public and private sector energy-related positions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #9

1. Outcome Measures

Complete energy benchmarking of public facilities in (4) select Rhode Island municipalities to prioritize locations for and implement projects that achieve cost-effective, persistent greenhouse gas reductions and serve as models for communities across the country.

2. Associated Institution Types

- 1862 Extension
- 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)
Buildings account for 45% of carbon emissions and 70% of electricity consumption in the United States. Benchmarking building energy performance against other buildings with similar building and operating characteristics allows municipalities to assess energy management goals over time and identify strategic opportunities for savings. Municipalities are in need of technical assistance and training in identifying and implementing sustainable energy projects and guidance in fostering sustainable behavior change among their officials, employees, residents, and businesses.

What has been done
The URI Outreach Center Energy Team presented reports to (4) select RI municipalities that included a) a baseline of energy consumption as well as two additional years of comparable consumption data to identify trends and reductions; b) assistance with the adoption of municipal energy policies, c) a draft energy management guide, d) assistance with the development of replicable energy efficiency showcase projects, and e) hosted numerous educational workshops for officials, employees, and residents.

Results
Through means of education and outreach deliverables and the implementation of both energy policies and energy efficiency showcase projects, the URI Outreach Center Energy Team is on track to helping all (4) select RI municipalities achieve a 10% reduction in energy consumption and greenhouse gas emissions in both their municipal and residential sectors.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #10

1. Outcome Measures

Provide a broader array of programs and services for RI stakeholders concerned about energy issues in the transportation sector through NIFA-funded energy outreach programs at URI, coordinated with the DOE-funded Ocean State Clean Cities Coalition (OSCC), also at URI.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Ocean State Clean Cities (OSCC) Program provides resources and programs to reduce U.S. dependence on fossil fuels in the transportation arena. The wealth of information and services available through OSCC provides a valuable addition to energy services and information available to RI citizens.

What has been done
The OSCC hosted (7) outreach events focused on various alternative fuel programs, incorporated its website into the URI Outreach Center website, and written and distributed a newsletter that reaches over (1,000) stakeholders quarterly. Active OSCC stakeholder committees worked on biodiesel and electric vehicle infrastructure and opportunities to expand use of CNG vehicles in RI as well.

Results
An active and strengthening coalition of stakeholders are working collaboratively to explore all opportunities to reduce reliance on petroleum for transportation. Metrics are being gathered to allow quantitative assessment of progress.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #11

1. Outcome Measures

Develop tools and guidelines and analyze data for use by RI cities and towns to site and manage new renewable energy activity through a project led by the Renewable Energy Siting Partnership (RESP) composed of URI scientists and outreach experts.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The State of Rhode Island and many of its communities are considering investing in renewable energy infrastructure. Many of those considering these technologies lack the necessary resources to site and implement cost-effective projects and/or ability to measure impacts after implementation.

What has been done
On request from the RI Office of Energy Resources, URI researchers formed the RESP to provide technical expertise related to the effects renewable energy may have on the people, wildlife, and natural resources of Rhode Island. In particular, the RESP a) completed resource assessments for available landfill solar and hydropower potential in the state, b) developed publicly accessible GIS interactive mapping tools to allow communities to assess the viability and possible impacts of siting renewable energy facilities, c) designed and developed a website to house the mapping products, d) designed and developed a comprehensive clearinghouse of Rhode Island-specific energy data, e) led a complementary and integrated program for stakeholder involvement to engage the public in our work (16 public meetings), and f) organized and hosted a RI RESP Renewable Energy Day to provide public education on the project and the tools it developed.

Results
Proposals for future research to address and incorporate the ideas of various stakeholders have been submitted as a result of information gathered during the RESP stakeholder involvement sessions, and the website is currently being launched for use by state and local officials.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #12

1. Outcome Measures

Capitalize on the wealth of both experience and funding available at the state and federal levels to accelerate and facilitate reduction of diesel pollution from work performed on projects managed by the RI Department of Transportation (RIDOT).

2. Associated Institution Types

- 1862 Extension
- 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)
Cleaning up diesel pollution to improve air quality is an important goal throughout New England states where respiratory disease has reached historic levels. Diesel engines produce significant air pollution including fine particular matter (PM), nitrogen oxides (NOx) and more than 40 different types of Hazardous Air Pollutants (HAPs). Diesel emissions have been linked to a myriad of health problems, ranging from shortness of breath to cancer and cardiac arrest. Construction equipment engines typically produce more diesel emissions than other diesel engines because their engines are larger and are not regulated as strictly.

What has been done
As part of the URI/RIDOT Diesel Emissions project, the following were completed: a) review and analysis of available technologies and best practices in use, b) immediate implementation of a carefully monitored pilot project to reduce diesel emissions from a RIDOT-funded construction project in a highly populated urban area, c) extrapolation of the costs and benefits of the pilot

project to the RIDOT program in RI, along with development of RI-specific contract specifications, and 4) preparation of a final report summarizing lessons learned and providing a road map for diesel emissions reduction from DOT construction projects in RI.

Results
The list of the (14) vehicles assigned to the RIDOT Waterfront Drive Project were provided by the RIDOT Contractor, Cardi Construction. All (14) vehicles: a) had their vehicle identification numbers and engine family numbers verified, b) were each pre-data logged for a four-week period to determine duty cycle, and c) was pre-opacity tested. Further, appropriate retrofit technology for each vehicle was identified and selected; and a retrofit plan was submitted to RIDOT outlining the retrofit allocations. A bid process was undertaken to purchase and install the appropriate technology that RIDOT deemed appropriate, with Cardi Corporation selecting the contractor to order and install the retrofits. Once installed, post-opacity testing was performed on each vehicle in order to gauge the level of pollution reduction achieved.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
605	Natural Resource and Environmental Economics
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #13

1. Outcome Measures

Assist homeowners, renters, and small business owners in select RI municipalities in reducing their energy consumption and saving money on monthly utility bills by partnering with National Grid to provide current information on available incentive and rebate programs for energy efficiency measures.

2. Associated Institution Types

- 1862 Extension
- 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)
Energy prices in Rhode Island are among the highest in the country. RI also faces major consequences from rising greenhouse gas emissions, including rising sea level and extreme weather events. National Grid offers numerous energy efficiency programs that provide incentives and rebates to residents, businesses, and municipalities to engage in energy efficiency projects that will reduce their energy consumption and money spent on monthly utility bills. Many, if not all, of the programs available to energy consumers are not well known and as a result lack investment.

What has been done
The URI Outreach Center Energy Team developed surveys for (2) select RI municipalities to determine the current knowlege and awareness of residents and small business owners of National Grid efficiency programs, including a refrigerator recycling program, energy assessments, and weatherization retrofits. Energy Fellows canvassed in each of the (2) select municipalities and provided multiple presentations and information sessions to encourage participation in National Grid programs.

Results
By providing information to RI residents and small business owners, over (250) residents and (9) small businesses received an energy assessment; (50) residents received weatherization retrofit services; and (661) refrigerators were recycled. National Grid estimated CO2 reductions of about 400 metric tons through the resulting participation in these programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #14

1. Outcome Measures

Provide URI undergraduate students from under-represented cultural backgrounds with interdisciplinary, experiential learning opportunities addressing real-world challenges and prepare those students to enter the job market with the skills and training needed to succeed through the Science and Engineering Fellows Program (SE Fellow).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
RI businesses seek individuals who have experience and training in the science and engineering fields, while URI seeks to increase the diversity of students trained in these fields. Also, graduating students are looking to enter the workforce with marketable skills and experience; but there are few current existing opportunities for these students to engage in experiential learning activities.

What has been done
The URI Outreach Center, in collaboration with the College of Environment and Life Sciences and the College of Engineering, organized the first year of the SE Fellows Program and engaged a number of students from the two colleges in URI faculty and staff-led projects. Students also participated in professional development workshops throughout the course of the fellowship to improve their communication and networking skills.

Results
The SE Fellow Program saw (9) students through in its first year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Public priorities

Brief Explanation

The URI Outreach Center's previously offered Master Energy Training was scheduled to be held again in March 2012, but low enrollment required cancellation of the program in 2012. The Outreach Center's Energy Team is currently working to redesign the program to

increase interest from municipal officials, business owners, the general public and students throughout RI.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

- Workshops and training programs use pre and post-assessment vehicles to evaluate changes in stakeholder knowledge
- Behavior change of target audiences is assessed through longitudinal tracking of participant behaviors compared to behaviors identified prior to participation in programs
- Success of GHG and energy reduction programs are tracked through means of energy benchmarking and data analyses
- Google analytics tracking software is used to generate detailed information about website use (information includes number of views and downloads per webpage and the number and types of visitors to each portion of the websites)
- The URI Outreach Center Energy Team partners with National Grid to track the number of residents and small business owners who participate in available efficiency programs specifically as a result of URI effort.
- Students and faculty mentors who participate in the Energy Fellows and Science and Engineering Fellows programs are provided an evaluation to complete at the end of the program year

Key Items of Evaluation