Outreach Scholars Academy 2009

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Project : Vegetable and ornamental plant production greenhouse energy audits and renewable energy system analyses for New Hampshire.

Project Description

The value of ornamental plants and vegetables produced by New Hampshire farmers is reported to be $78.2 million by the USDA-NASS for 2007. These two sectors of New Hampshire agriculture account for 44% of all agriculture products in the state. A large portion of the ornamental plants in New Hampshire are produced exclusively or temporarily in heated greenhouses, and many vegetable crops are grown in heated high tunnels for season extension or young transplants are started in heated greenhouses before being planted in the field. The cost of heating a greenhouse or high tunnel in a climate such as New Hampshire's to adequate temperatures for plant growth can be 10 – 30% of a producer's operating costs. New Hampshire producers are eager to identify ways to be more energy efficient while still producing high quality crops but lack the knowledge to conduct their own energy audits and/or the ability to pay for a professional energy audit.

This project will allow the University of New Hampshire Cooperative Extension, in collaboration with The Sustainable Development and Energy Systems Group to perform energy audits, at a low cost, to New Hampshire vegetable and/or ornamental plant producers. The energy audits will begin with visits to the selected growers to become familiar with each individual operation and to survey past energy use. During the process of conducting the energy audits, video will be taken to document the different techniques used. A report for each facility will be written and presented to the operator to outline the results of the audit and the recommendations to increase energy efficiencies. After sufficient time has past to allow the participants to implement recommendations (12 mo.) a follow up visit will be made to each to survey changes and improvements made and cost savings.

A website will be launched to disseminate the information produced by the project (videos of energy audits being conducted, generic recommendations for energy conservation and expected payback of changes in practices and capital investments). This website will benefit New Hampshire growers not directly involved in the project as well as growers throughout New England and the United States. In addition to the launched website the presentation materials will be developed to educate extension specialists and educators as well as other growers.

Methods:

During the first year the producers who will participate in the proposed project will be selected. Site visits will allow our team to become familiar with each producer's facilities as it pertains to energy production and use. Undergraduate students (plant biology and engineering) will be hired to assist with audits and recommendations. Conducting energy audits will begin and videos will being taken during the process to be later posted on a greenhouse energy audit website. The design of a website to disseminate the information produced by the project will be conceptualized as well as hiring a web page programmer.

During the later half of the first year the results of the audits will be compiled and distributed to the participants. Accompanying the results will be individualized recommendations (developed by the entire team) to improve energy efficiency.

During the second year one visit will be made to participants to survey implementation of energy efficiency improvements and to quantify energy savings. The website will be launched including videos, recommendations, and case studies of the energy audits conducted during this project.

Audience:

The direct audience of this project are small independent owner/operators of greenhouses that produce vegetables and/or ornamentals in the state of New Hampshire who would benefit from an energy audit to identify how they can become more energy efficient. Producers will be selected for the energy audits based primarily on the size of their operations (priority given to those with 0.5 acres of greenhouse space to keep the cost of the audits less than $1,0000).

A broader audience of the project will be served via the proposed web site. The audience includes those individuals who would like to learn more about energy audits and how they can become more energy efficient from the investment of an energy audit and improvements made to greenhouse structures and cultural practices.

Goals

- Promote energy efficiency in greenhouse ornamental and vegetable production in the state of New Hampshire.
- Offer low cost energy audits to producers.
- Identify infrastructure improvements to conserve energy and reduce costs associated with heating and cooling greenhouses.
- Identify changes in behaviors and practices to conserve energy and costs associated with heating and cooling greenhouses.
- Track energy and cost savings due to implemented recommendations.
- Develop a website to educate producers in New Hampshire, New England, and the northern tier of the United States on the methodology and benefits of energy audits.

External Partnership

Sustainable Development and Energy Systems Group is certified under BPI and HERS and will provide support as needed to this project. SDES Group has agreed to commit the time necessary to complete 10 energy audits/renewable energy system analyses. Audits will be performed with proprietary programs, eQuest, and RETscreen for the development of options pertaining to renewable energy system.

Impact and Evaluation

This project will have a three-fold impact on: growers of New Hampshire, SDES, and University of New Hampshire Cooperative Extension. The growers of New Hampshire will be given access to professional energy auditors to help assist them in becoming more sustainable in their energy consumption. Currently there are few professional firms with expertise in conducing energy audits for the greenhouse industry. This project will allow SDES to gain experience conducing energy audits for this industry and reduce the financial risk involved in fine tuning techniques used in energy audits for greenhouses. Due to this collaboration with SDES, Extension Specialist at the University of New Hampshire will gain technical experience with energy audits which will enable them to better assist growers interpret results and implement changes to their operations.

The initial evaluation will be based on follow-up visits to the operations where energy audits were conducted to determine what recommendations were implemented and the resulting cost/energy savings. Long term evaluations will focus on the expanded skill sets of SDES and extension specialist ability to assist greenhouse operations with energy audits in the future.

Scholarly Connection

In addition to energy conservation, a second product of this project is the dissemination of energy audit information and education through a website, professional meetings and training sessions, and published articles on the subject.