

## Greenhouse Energy Extravaganza September 4, 2014 Executive Summary of Participant Evaluations

This event was held to introduce growers from the region to the soap bubble system and energy curtains for greenhouse insulation. It was also to inform growers about simple ways they can implement energy conservation measures. Forty five people attended the Vermont Greenhouse Energy Extravaganza held at Claussen's Greenhouses and Florist in Colchester, VT on September 4, 2014. Most were growers, though several energy efficiency advisors and Extension personnel also attended. Attendees came from New York (New York City and Buffalo), Vermont, Massachusetts (Boston), New Hampshire, Connecticut and Maine in the US, and from Israel.

### General Summary and Quotable Quotes

- We **reached 45 people**, including presenters; 63% of the attendees who completed the evaluation were greenhouse growers, and 21% were energy efficiency advisors.
- **100% of the attendees learned new techniques** they intend to use in the future, including bench heating, knee wall insulation, ECM pumps, thermal heat loss issues, IR poly inner layer, foil insulation, vent cover motors, ventilation, insulating gaps around doors and shutters, energy audits, thermostat calibration, gaskets on vents.
- **94% of the attendees indicated they made new contacts**; including John Bartok, Bob Kort (NRCS), UVM Extension personnel, Don Tobi, installers, other growers, engineers involved in the project, John Wells (Rimol); NRCS, UVM, HarlemGrows.
- Averaged over all of the individual sessions, attendees gave the workshop program a **ranking of 4.4 out of 5.0**.
- Growers listed many topics relating to energy conservation that they want to learn about: heat recovery ventilators, thermal batteries, presentations about results of detailed studies about energy efficiency improvements; solar energy; greenhouse design and use; multi source heat systems; foundation information on energy conservation; greenhouse winterization; biomass and biothermal heating systems; cold season greenhouse management; energy savings by type of conservation measure; info on coolers and walk-ins for greenhouses; solar hot water; utility efficiency program; financing options for energy conservation, how to work with your utility or Efficiency VT; alternative heating solutions, e.g., geothermal, compost; heat pumps; ag plastic recycling; Efficiency Vermont; Step by step process for implementation of the systems.

### Some general quotable quotes from the session:

“I intend to share information with farmers who are planning to install greenhouses”

“Great to know UVM colleagues in this field.”

“There are emerging technologies (soap bubble system) that we'll definitely keep an eye on for future program offerings.”

“Will be more thoughtful about heat loss and do better research on fans”

“Extension needs to bring more to the table in Maine!”

“Would have liked more focus on small-scale greenhouse operations.”

“The bubble system was a super interesting idea, but we need the financial information to see if it is worth the cost.”

“The information about the bubble system was super cool and very useful.”

“The grower sessions were an excellent opportunity to see what others are doing.”

“Need more basic information to make full use of energy efficiency opportunities and these lectures.”

“From an efficiency program standpoint, this information is critical for finding the energy savings opportunities.”

*Thank you to all who contributed to making this series of workshops a success!*

## Summary of Evaluations

1. Number of Registrants and Presenters: CT: 1 MA: 1, ME: 3, NH: 4 NY: 6 VT: 28, Israel: 2

2. Number of evaluations: 19 (54% response rate)

3. Primary Profession of Participants who Completed Evaluations

Grower/Gardener	Educator	Energy Efficiency Advisor	Ext./State/Gov
12	1	4	1

**Question 1.** How useful was this workshop to you increase energy conservation in your greenhouses? 1= not effective; 5 = very effective.

**3.9 out of 5.0**

**Notable Comments/Suggestions:** (numbers in parentheses indicate number of people who made a similar comment)

“Would have liked more focus on small-scale greenhouses (2)”; Not enough foundation/context material provided, i.e., R values, greenhouse design, etc.”, “Too much assumed knowledge”; “It reinforced key concepts in greenhouse energy efficiency”; It provided critical information for finding energy savings opportunities.”

**Question 2.** Did you learn new techniques you plan to use this year? YES/NO % YES

**16/0: 100.0%**

**Notable comments/Suggestions:** (numbers in parentheses indicate number of people making similar comment)

Bench heating (2), knee wall insulation (3) ecm pumps, thermal heat loss issues (2), IR poly inner layer, foil insulation (2), vent cover motors (1), ventilation, insulating gaps around doors and shutters (4), energy audits, thermostat calibration, gaskets on vents; soap bubble insulation system (2); Shade/heat curtain

**Question 3:** Did attending this workshop provide you with new contacts? YES/NO % YES

**20/10 66.7%**

**Notable comments/Suggestions:** (numbers in parentheses indicate number of people who made that comment)

John Bartok, Bob Kort (NRCS), UVM Extension personnel, Don Tobi, installers, other growers, engineers involved in the project, John Wells (Rimol); NRCS, UVM, HarlemGrows

**Question 4.** Please rate following aspects of this workshop (1 = poor; 5 = excellent)

Workshop site	4.4
Workshop length	4.5
Food	4.1
Workshop size	4.7
# of presenters/assist.	4.4
Workshop price	4.2
Overall Average	4.4

**Question 5.** Please rate the educational value of each workshop section (1 = poor, 5 = excellent)

Retrofitting for Energy Conservation	4.4
Light the Way and Open the Window	4.1
Bubble greenhouse Technology	4.1
Draw the Curtain on Energy Costs	3.3
Grower-to-Grower	4.6
USDA NRCS What can they do for you	4.8
Handouts	4.4
Total overall average	<u>4.2</u>

**Notable Comments/Suggestions:** (numbers in parentheses indicate number of people who made that comment)

**Greenhouse Energy Conservation: Retrofitting:**

“Would have preferred a focus on poly-tunnels because that is what most growers have”; Very thorough; Helpful in terms of practical applications; Conant was excellent.

**Light the Way and Open the Windows:**

Very informative but assumed a knowledge ability of the audience greater than they have.

**Bubble Greenhouse Technology**

Super interesting idea, but without financial info, it isn't as useful as it could be (4); fascinating technology (2); too much extraneous chatting; Wish I could have seen it fill all the way

**Draw the Curtain on Energy Costs:**

Super interesting idea, but without financial info, it isn't as useful; the presenter couldn't give good facts or numbers (3); not much educational info provided

**Grower-to-Grower Session:**

Good input for what works; excellent opportunity to see what others are doing; great job

**USDA: What can they do for YOU?:**

Good to have for later to review (2); very informative; great presenters; specific examples of area farmers who have benefited; I had low expectations, but it was a good session.

**Information Packet:**

Fantastic! Love the checklists to break it all down and I'll be visiting all the recommended websites; very informative

**Other General Comments:**

Love Margaret's facilitation, Yay for enthusiastic people!

**Question 6.** What other topics would you like included in future Energy Conservation workshops?

More on heat recovery ventilators, thermal batteries, presentations about results of detailed studies about energy efficiency improvements; solar energy; greenhouse design and use; multi source heat systems; foundation information on energy conservation; greenhouse winterization; biomass and biothermal heating systems; cold season greenhouse management; energy savings by conservation measure type; info on coolers and walk-ins for greenhouses; solar hot water; utility efficiency programs; financing options for greenhouse energy conservation, how to work with your utility or Efficiency VT; alternative heating solutions, e.g., geothermal, compost; heat pumps; ag plastic recycling; Efficiency Vermont; Get Brian Krug from UNH and Skinner again; Step by step process for implementation of the systems.

**Question 7.** How can we improve this type of workshop in the future?

Outlines of presentations so we don't have to take notes; Give some examples of financials for various systems; emphasize the science involved, not just the solutions; start with less assumed knowledge; slide show of other energy efficiency improvements; more about costs and savings of different energy conservation measures; better grouping of attendees so people can hear the speaker better; closer to Maine!

**Question 8.** What other educational tools/advice would help you implement IPM?

Printed case studies of energy conservation success stories or case studies (2); webinars; list of equipment suppliers, web links to these products; emails/links to new tec/improvements/innovations