


// ENERGY EFFICIENCY SUCCESS STORIES

CUT FLOWER GREENHOUSES IN CONNECTICUT



Cutting costs and minimizing energy use in greenhouse production is a goal for most producers. Making it happen, however, can be a task both challenging and complicated.

Action by USDA's Natural Resources Conservation Service (NRCS) in Connecticut (CT) is making this goal a reality. NRCS planners encourage practices to improve efficiency while supporting high production levels for greenhouse producers around the state. Greenhouse production represents over one third of the state's \$4 billion agricultural economy according to a 2024 report by Farm Credit East. Businesses range in size; some have small hoop houses on $\frac{1}{20}$ of an acre and others have extensive operations with greenhouse complexes covering a 10-acre site. Flowers are a big market across all four seasons; poinsettias in winter, Easter lilies and pansies in spring, annuals in summer, and mums in fall. Greenhouse growers contribute substantial revenues to the economy, but they also incur high costs due to energy input requirements. Diane Blais, the District Conservationist in the state's Hamden NRCS field office shared her experience supporting large greenhouse operations.

How NRCS-CT Helps Producers

Blais shared that Connecticut's first step to working with greenhouse growers on energy upgrades, is to have the producer complete a survey. This survey is a basic inventory of the greenhouse's equipment, dimensions, and square footage which helps identify the needed energy upgrades for each grower.

Horizontal Airflow Fans and Roof Vents used in greenhouse for mums production, improving airflow while reducing energy needed for proper ventilation. USDA NRCS photo by Diane Blais.

The greenhouse efficiency upgrades NRCS offers assistance with include hot water heaters, hanging heaters, horizontal airflow fans, motors, motor upgrades, end-wall fans, roof vents, sidewall curtains, overhead curtains, flood benches, and flood floors. Blais shared that the most frequently requested practices in the state are heater upgrades and thermal curtains. Insulation and roof vents are also of interest to producers, though less commonly pursued. "A producer might want to use a roof vent or maybe install insulation. Both offer significant energy savings. But many growers aren't interested because they think it's a lot of work," Blais said. While this is a common concern from producers, NRCS-CT has found that the initial planning time and money invested can be recouped in only one or two years depending on the type and extent of greenhouse use, and over-all greenhouse efficiency. NRCS has already replaced roof vents in many greenhouses, so those upgrades are currently less in-demand in the state.

Heater Upgrades

Most producers want to upgrade their heaters from old oil-fired to newer high efficiency heaters. Doing so can offer big cost savings, energy savings in terms of actual fuel use, and emissions reductions on a farm, but there are other practices that are important for conserving energy.

“Growers will come to us and say, ‘I’m interested in upgrading my heaters’. But when we go out to visit their greenhouses, we see that the horizontal airflow fans are either missing, not placed correctly, or ineffective,” Blais said. Heating upgrades are not nearly as beneficial until greenhouse airflow has been properly set-up. NRCS staff will address airflow with producers first or in combination with a heater upgrade in order to have the benefits of the heater upgrade realized. Once a plan for improved airflow has been decided upon, NRCS can work with engineers to provide producers with guidance on the most effective and efficient heater size for their greenhouse system.

Thermal Curtain Payback

Different types of thermal curtains offer different services to the greenhouse. “If the producers are growing poinsettias or Easter lilies, it will be a totally different system than if they are growing bedding plants,” Blais explained. Curtains offer various levels of light diffusion. Some reflect light with full foil strips to combat shadows, while others let in limited light. Thermal curtain selection depends on what a producer is growing and when. Blackout curtains can be used in the dead of winter when heat retention is more important than sunlight. In the summer, they can be used for shading or forcing flowering. Heating upgrades are great options, but the greatest return on investment (ROI) are thermal curtains.

Heaters can have a payback time of about five years, but the ROI window for thermal curtains is only 1.5 to 2 years. Additionally, thermal curtain fabric usually lasts at least 8 to 10 years, matching the NRCS practice lifespan, which means that the curtains will last until the producer is eligible to apply for assistance replacing those curtains. NRCS is working with producers on 2nd generation curtain replacement which requires a new motor to be installed with the curtains. The stainless-steel runners for the curtains can be reused but the wires and motors need to be replaced at the 10-year mark.



Thermal Curtains (above orchids) in use to control light infiltration on a flower farm in Connecticut. USDA NRCS photo by Diane Blais.

Generally, if producers are interested in a thermal curtain, the first place to start is having a conversation with installers, Blais shared. Once the producer and installer are connected, they work closely with NRCS to figure out what practice and payment reimbursement options are possible. Blais showed appreciation for installers and their thorough knowledge of greenhouse systems and upgrades. NRCS and installers work together to identify the best technical specifications for a production system including fabric type and light diffusion requirements in order to meet producer’s goals.

Producers benefit from conversations with innovative NRCS planners who can help them consider the many ways that greenhouse energy efficiency can be improved. Together they can work to find the best solution. In Connecticut, planners have been able to help producers and offer baseline efficiency improvements, install more efficient heaters, and improve passive heating and cooling through ridge vents, insulation, and thermal curtains. As NRCS staff continue to share success stories from the Northeast states, planners throughout the region will be better able to support producers as they work to implement new practices and overcome hurdles.

References:

- Personal communications with Diane Blais, NRCS-CT on May 1, 2025.
- Rifenburgh, David, ed. “The Economic Contribution of the Connecticut Greenhouse Industry to the State Economy 2017-2020” A Report by Farm Credit East Business Consulting Group, Connecticut Greenhouse Growers Association, September 2021.

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