



Case Study: Dwyer Greens & Flowers

New Castle, Colorado By Suzie Romig/CLEER Correspondent



New Castle Greenhouse Pulls Curtains for Energy Savings

Employees at Dwyer Greens & Flowers near New Castle were busy in November 2010 hanging curtains, but don't think linen sheers or silk drapes.

These curtains are made of high-tech, reflective, climate control fabric manufactured in Sweden, and they are huge: 30 feet wide and 132 feet long. They are installed to save energy in greenhouses in both summer and winter.

Dwyer Greens manager Kristine Edge said the 11 sections of curtain cut electricity and propane bills in the company's large greenhouse by 30 percent. The automated system reflects heat on hot summer days and holds in heat during winter in the plastic-walled greenhouse.

"It has changed our greenhouse environment for the better," said Edge. "The more precisely you can control that environment, the

The Upgrades

- Specially designed energy curtain hung in main greenhouse
- Updated computer controls to monitor greenhouse environment and automatic curtain function

healthier your plants are going to be. Less stress on plants increases plant vigor, decreases water use and leads to less disease and insect problems on the plants."

Dwyer Greens & Flowers owner Lynn Dwyer decided to pursue the curtain project after enrolling in the Garfield Clean Energy Challenge for Business program being offered by CLEER (Clean Energy Economy for the Region) through Garfield Clean Energy. Dwyer, who founded her company in 1997, already uses solar hot water and solar electric systems to help heat and power the greenhouse operation.

Dwyer and Edge knew about the benefits of greenhouse energy curtains, and a walk-through energy audit conducted at the greenhouse by Craig Tate, commercial energy efficiency manager for Holy Cross Energy, confirmed the strategy. In a collaborative effort, Edge, Tate and CLEER Energy Coach Rob Morey researched the automated curtain systems of different manufacturers to see what would work best at the New Castle greenhouse.



Dwyer Greens' Christy Alderson, Pat Dwyer, and Kristine Edge. Photo by Rob Morey

By combining a WE CARE rebate (\$334) offered by Holy Cross Energy for the automated curtain controls with the \$5,000 rebate bonus from the Garfield Clean En-

Lessons Learned

- Unlikely technologies can boost energy savings
- Many technologies work both ways: trapping heat in winter and reflecting it in summer
- Curtains actually help reduce the required pumped water, a huge expense
- Stabilizing greenhouse environment with efficiency measures can increase crop yield

ergy Challenge for Business, Dwyer benefitted from a sizeable offset on the \$14,000 price tag for the curtains and associated design fees. The staff at Dwyer Greens installed the curtains—indeed, the installation kept two employees on during the winter of 2010–2011.

The curtains are fitted in between the roof trusses in the greenhouse. In winter, the automated controls can be set to open the curtains during the day for solar gain and to be closed at night to reduce the volume of space to be heated. The curtains reflect the stored heat back down to the plants instead of being trapped near the ceiling or lost through the thin roof. In summer, the operation can be reversed, helping keep the greenhouse from overheating.

"It's all about controlling your environment."

— Kristine Edge,
Dwyer Greens & Flowers

Edge said the company uses huge exhaust fans to keep the greenhouses cool in the summer, and she thinks the curtain system will save considerable amounts of electricity. And, despite 2011's colder-than-normal spring and a 50 percent increase in plant production, propane use is down 17 percent over the previous year.

Installation of the lightweight curtains should also conserve soil moisture in the greenhouse, cutting water demand and the energy needed to pump water up to the



Dwyer Greens & Flowers main greenhouse. The energy-saving curtains are visible along the walls and across the roof. Photo by Cam Burns

greenhouse site. The efficiency upgrade should increase worker comfort levels and reduce staff time for hand watering in the greenhouse. Edge also expects that healthier plants will also need less of the organic pesticides used in the operation.

"It's all about controlling your environment, and that curtain is definitely going to play a huge role in that," Edge said.

Edge knows from experience. She previously worked in greenhouses in Rifle, where the installation of energy curtains led to healthier plants during the western Colorado summertime when the sun's intensity is stressful for plants.

Installation consultant Roger Weakland, owner of Greenhouse Environmental Services in Denver, said energy curtains have been around for years, and the technology continues to improve. He said

the technology could also be used for skylights in office buildings or garden seating areas in restaurants.

The Dwyer Greens installation includes an upgraded computerized system that controls heating, cooling, lighting and the curtains. The system also can feed information to an off-site computer for remote monitoring. The equipment is distributed by Wadsworth Control Systems in Arvada.

"It conserves considerable energy because it only allows the equipment to run when it should rather than when a person has time to go over and turn it on or off," Weakland said.

**Garfield Clean Energy
CLEER**

520 S. Third St., Ste. 29
Carbondale CO 81623
970-704-9200

info@cleanenergyeconomy.net
www.cleanenergyeconomy.net
www.garfieldcleanenergy.org