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Farm Energy Efficiency Case Study
Kloosterman Greenhouses

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Background

Kloosterman Greenhouses is a greenhouse grower located in Mattawan, Michigan. The operation grows mostly annual bedding plants in flats and baskets, as well as potted mums in the fall. The operation has two growing seasons, one that begins in January and goes through May and a second that begins in July and ends in September. The owner grew up in an area where many of his friends and neighbors were in the greenhouse business. Thirty years ago, he decided to buy about 9 acres of property to start his own greenhouse of 9000 square feet.

Kloosterman has made advancements to his operation as he expanded the business. The farm first became interested with solar curtains about seven years ago and have since installed curtains in parts of their greenhouses.

System Implementation

After having an energy audit conducted, Kloosterman Greenhouses decided to install approximately 58,368 square feet of shade level energy curtains. The curtains and motor systems were purchased from VRE systems and installed by the owners of Kloosterman Greenhouses. The only problem they experienced during installation was long wait times on parts. After about a month and a half of work, the system was fully operational.

The shades installed at Kloosterman Greenhouses are 65% UV blocking.

The boxes that were installed to control the power going into the curtains used relays and converters. The owner explained that this helps to tie them into an environment control system. He also stated that no maintenance is needed on the curtains themselves and the boxes require very minimal maintenance. In the ten years he has had curtains installed in sections of his greenhouse, he has enjoyed how user friendly they are and how well they work.

System Impacts

Since the curtains were installed before a colder winter than usual, the savings have not completely matched what was estimated. However, the curtains did prove to be beneficial with the colder winter. Kloosterman Greenhouses was actually able to start earlier in the season because of the curtains, since it was easier to heat the areas where growing occurs. Before the curtains were installed, they were able to hold 45 degrees inside during sub-freezing temperatures, now they able to maintain 65 degrees or more.

The curtains have been beneficial for both heat and shade. Before the curtains, spray shade was used. This was much more time and labor intensive than the curtains, which provide a lot more flexibility.

Considering the grants and energy efficiency programs that have helped to offset some of the installation costs, Kloosterman Greenhouses expects a payback period of six years. The owner explained that this estimate only considers heat savings, disregarding the added benefit of the plants growing better due to the better growing environment.

In addition to the better environmental conditions for the plants, working conditions have also improved for employees at the greenhouse. The owner believes that the comfort of the employees working in warmer greenhouses in the winter and cooler ones in the summer is a significant benefit of the system. He thinks that their new ability to control the environment will help decrease the payback time.

Conclusions

Overall, the owner of Kloosterman Greenhouses is very satisfied with the outcome of their energy saving measures. He strongly recommends it to others, even though it can be expensive upfront. He stated, “It’s a big expense, and it’s hard for a lot of people to spend, but it’s definitely worth it and I’m glad I did it.” He is very pleased with the positive impacts the project has made on his business. The improved environment for the plants and the workers have helped with productivity thanks to the energy curtains that have been installed. In the future, Kloosterman Greenhouses hopes to add energy saving curtains to the remaining bays without them.