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Greenhouse Energy Efficiency Case Study
Bloemenberg Growers, Inc.

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Background

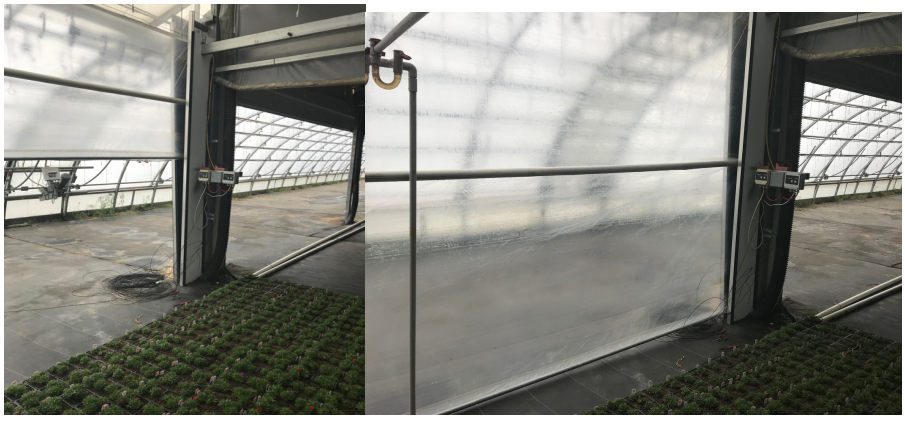
Bloemenberg Growers, Inc. is a family-owned, wholesale grower of annual bedding flowers and hanging baskets located in Allendale, Michigan. The operation started in 1991 with approximately 12,000 square feet and by 1992 the size of the greenhouse space had doubled. Over the next few years, additions were made and now the owners are operating at 200,000 square feet. They have invested in many upgrades along the way, including many cost saving initiatives. One of the upgrades was a trial heat retention curtain in their propagation house, and they were amazed by the results they witnessed.

After finding out about funding opportunities through their local extension agent, Bloemenberg decided to have an energy audit conducted. The owners at Bloemenberg said that the audit was straight forward, and their objective was to determine how long the trial curtain would be closed as well as a percentage of total time. When asked about the numerous variables that needed to be considered following the audit, Andrew DeGroot, son of the owner of Bloemenberg Growers, said, “We like to take the simplest route possible when there are complex situations like this.”

System Implementation

The main project implemented by Bloemenberg Growers was to install thermal curtains in a phase of its greenhouse operation. The heat retention curtain installation covered 28,080 square feet of the operation. This process started in late 2016, when Bloemenberg contacted Luiten Greenhouse Tech to receive quotes. In August of 2017, Bloemenberg purchased and began to install the thermal curtains. The installation process took approximately a month and the labor was performed by Bloemenberg. DeGroot said the biggest challenge with the self-installation was the lack of system instructions or a manual. On this topic, DeGroot stated, “The manufacturers were really good about stopping by if we had a couple questions, but I think a manual would have gone a long way.” By September of 2017, the system was operational.

The main curtain project consisted of covering 28,080 square feet of roof area with Obscura XLS 18 Fire Break shade cloth



The other ECM implemented was partitioning a lean-to with a 117 foot long twin roll-up of ILS Hortiroll W/W cloth

System Impacts

Since installation in 2017, Bloemenberg has witnessed savings of about 1.25 million BTU, equating approximately 50% of their usage. These savings are dependent on weather, but even during a bad winter with the curtains, Bloemenberg experienced ~40% savings compared to a lighter winter without the system.

The energy curtains allowed Bloemenberg to expend their operations. A year before installation, Bloemenberg consumed 101,418 BTUs and the year the curtains were installed they consumed 103,587 BTUs. The owners believed that the reason for slightly higher usage was because they were able to open different parts of the greenhouse at different times. Normally, their season begins in the middle of February. However, with the energy curtains, they were able to start growing two months earlier in the first week of December.

There is not much maintenance required for the actual curtains, only the motors, pulleys, and cables that are associated with the opening and closing mechanisms. These have a very

minimal maintenance cost of about $200 per year. The curtains lifespan is 12-15 years. The cables that hold the curtains are nylon and are replaced occasionally when needed.

The curtains have proved to be very beneficial to the plants and the growing schedule. The plants do not have to be watered as many times per day with the curtains, since the greenhouse is cooler and there is less light. The curtains are also useful because they can either be opened gradually to let plants acclimate to the cooler air coming in, or they can be opened fully right away. This can shock the plants to stunt growth and make them go dormant for a day if needed.

The manufacturer of the curtains has a 72% energy savings in the listed quote. However, Bloemenberg believes that they will only use the curtains 33% of the estimated time since they will have the curtains closed for about 8 hours a day. Based on their calculations, with the addition of some hard to quantify, qualitative benefits, it is anticipated that the payback period will be 5-6 years.

Conclusions

Overall, the owners of Bloemenberg are very satisfied with the outcomes of their energy saving projects. The owners are currently looking into implementing more energy conservation measures and are anticipating quotes on the other 3 acres of their greenhouses. Along with energy curtains, the owners are considering installing a solar system on their farm to capture more energy savings to offset production costs.

The curtains have proven to help not only the plants, but also the morale of the workers in the greenhouse. “The employee morale when it is much warmer out is better when we close the shade cloth,” DeGroot said. He also exclaimed, “Lower temperatures in that area when the shade cloth is closed help to lower the amount of watering needed as well, which helps to grow better plants.”

Bloemenberg has expressed being very happy with the outcome of the project and said that they are willing to do whatever it takes to keep their business running smoothly while keeping costs as low as possible.