

# Tropical Gardens Sees More Green

## CASE STUDY

**G**rowing tropical plants and flowers in Wisconsin during the middle of the winter can be an expensive undertaking. In fact, heating costs can be as much as 10 percent to 30 percent of a greenhouse's operating expenses during a typical year. John Keck and Richard Barnes, co-owners of Tropical Gardens, a greenhouse located in Mosinee, Wisconsin, know how much it costs to heat their facility "We spent over \$40,000 on natural gas in 2004," Barnes said.

Tropical Gardens has an estimated 70,000 square feet of space in its 28-year-old greenhouse. Natural gas-fired heaters maintain the tropical temperature. In the spring of 2004 the owners of Tropical Gardens received an energy audit provided by Focus on Energy's Agriculture and Rural Business Program. The free energy assessment identified a number of energy saving measures, including a recommendation to install a thermal energy curtain.

A thermal energy curtain, or thermal blanket, provides insulation, reducing heat loss through the greenhouse glazing.

Research indicates that up to 85 percent of heat loss from a greenhouse occurs at night. It is estimated that a single pane glass-glazed greenhouse requires 80 percent of its energy use at night to heat the greenhouse space. A movable energy curtain can reduce heat loss by up to 75 percent when the curtain is closed. There are several types of curtain materials available with different shading levels and estimated energy savings. (See *Thermal Curtain Material sidebar for more information.*) The energy audit results indicated that Tropical Gardens could save over 7,100 therms, or \$6,700 annually, based on 2004 natural gas prices, by installing a thermal energy curtain, in a portion of their greenhouse space.



*The mechanical system of the energy curtain makes deploying and retracting it an easy process. The energy curtain is automatically controlled and uses a small electric motor to open and close the curtain.*

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PROJECT SUMMARY	
Tropical Gardens Greenhouse	
Location:	Mosinee, Wisconsin
Greenhouse material:	Inflated Double Poly (roof only)
Size:	70,000 square Feet
Annual natural gas usage:	45,000 therms (before night curtain was installed)
Install energy curtain and automatic controls project cost:	\$30,000
Focus on Energy grant:	\$3,500
Net cost:	\$19,000
Annual energy savings:	12,000 therms
Annual cost savings:	\$10,800 at 2004 natural gas prices of \$0.90/therm
Time to pay back the investment:	1.8 years (or 2 growing seasons)

### Thermal Curtain Material

Several types of curtain materials are available, each with different advantages and disadvantages. All shade curtain systems can provide some heat savings. However, aluminized and other heat reflective materials provide the most savings; up to 60 percent. Installation costs can range from \$1.10 to \$3.35 (in 2001) depending on the size of greenhouse, blanket material and type of track/drive system used.



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To help fund the project, an incentive from Focus on Energy plus a United States Department of Agriculture grant, helped offset the costs to install the thermal energy curtain at Tropical Gardens.

"I am happy with the Focus on Energy Program and the measures that have been implemented. The equipment is very expensive to start, but the payback was short term. Richard Hasselman is terrific to work with and the program itself is terrific," said Richard Barnes.



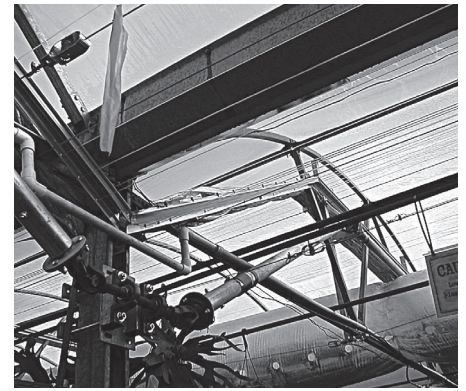
*Energy curtains can provide different levels of shading. Shading and heat loss can also be controlled by only partially deploying the energy curtain during the day. The energy curtain can be used in the summer for shade, helping keep greenhouses cooler during the day.*

The owners of Tropical Gardens chose a night curtain system sold through BFG Supply Company of DeForest, WI. The curtain is set to automatically open during the day and close at night when outdoor temperatures drop below a preset number.

To monitor the energy savings Focus on Energy worked with the University of Wisconsin's Biological Systems Engineering Department to document energy use during the first winter season of operation. The results reveal savings that are 72 percent higher, or over 12,000 therms, than was originally estimated during the energy audit. Some of the additional savings can be attributed to greater use of the energy curtain during cold and cloudy winter days, when there is little to no benefit from the available sunlight for heating or lighting purposes. The payback on the project is less than two years. Future energy savings will depend on weather conditions and the price of natural gas; however the results to date are far exceeding expectations.

"Because we're using less natural gas, we'll be able to pass along these savings to our 900 customers in nine states," said John Keck.

**Tropical Gardens, Inc.** is a green plant wholesaler that distributes quality plants to retailers in nine states.



*It is possible to fit an energy curtain around fairly complex greenhouse structures.*

#### **HOW CAN FOCUS ON ENERGY HELP YOU?**

*"Anyone who is looking to implement thermal curtains should talk to Rich Hasselman (a Focus on Energy Advisor) to see how quick the payback will be. I am installing more heat retention curtains this year and have been talking to Rich about other projects. He has been very helpful with all the projects that have been installed here."*

*- Richard Barnes*

If you are interested in learning more about thermal energy curtains or other energy efficiency opportunities, contact Focus on Energy at 800.762.7077 and ask to speak with an Energy Advisor from the Agriculture and Rural Business Team. Or visit our Web site at [focusonenergy.com](http://focusonenergy.com).