



U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

# Rebuilding It Better

**BTI-Greensburg  
John Deere Dealership**



On May 4<sup>th</sup>, 2007, brothers Kelly and Mike Estes saw their BTI-Greensburg John Deere Dealership ruined by an EF-5 tornado. They were not alone in their loss—95% of the town was destroyed that day. So they were overwhelmed the next morning when more than 100 customers and friends arrived to help them salvage what they could.

To support the community that helped them so much, Kelly, Mike, and their family committed to rebuilding their business in a better, greener way. They wanted the new 28,000 ft<sup>2</sup> prefabricated metal building to house the world's greenest farm machinery business, attain a LEED® Platinum rating, and use the least energy possible. And they did all they could to reach these goals.



## Green Goals

All of Greensburg, Kansas, is working toward becoming a model green community. The residents saw this tragedy as an opportunity to improve where they live. With the help of the U.S. Department of Energy and the National Renewable Energy Laboratory, Greensburg residents are building sustainable, energy-efficient homes, businesses, and government buildings.

The Estes brothers and the John Deere Company support this effort. In fact, the BTI-Greensburg building is the new “John Deere Place” design—a model for dealers who are building and remodeling across North America. The John Deere Company would like to see these energy-saving and environmentally-friendly features incorporated into future dealerships.

### **LEED® Platinum**

The new building is designed to meet the requirements of the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) Platinum designation—the highest designation possible. No other metal prefabricated building has achieved LEED status—let alone LEED platinum.

## Energy Conservation

Kelly and Mike set a goal of saving 42% in energy costs and looked for every opportunity to improve BTI-Greensburg’s efficiency. Experts at the National Renewable Energy Laboratory, with the U.S. Department of Energy’s support, worked with BTI-Greensburg as part of their research to reduce retail building energy use by half. They helped identify, through modeling and life-cycle analysis, the most cost-effective energy efficiency strategies.



*The insulated garage door and skylights at the BTI-Greensburg service center make this large, open area very energy efficient.*

### **Natural Lighting**

Daylighting, using natural instead of electric lighting, is critical in reducing energy use. A good daylighting design brings in diffused light to minimize glare and heat. Daylighting also provides a natural sense of well-being to employees and customers.

The BTI-Greensburg building features:

- 23 skylights in the service shop, parts department, and wash bay.
- 12 tubular daylighting devices in the retail space.
- High-efficiency lights and luminaire fixtures.

To further minimize electricity use, sensors detect occupancy and turn off unneeded lights. The lighting controls also automatically balance electric lighting with daylighting for maximum savings.

### **Improved Insulation**

Insulation is key to keeping any building at the right temperature and minimizing heating and cooling costs. Insulation is measured in R-values—the higher the R-value, the better the insulation. BTI-Greensburg exceeded standard levels in all areas by using:

- R-16 highly insulated wall panels, typically used in refrigerated warehouses: 2 times better than building code.
- R-14 insulated panels in the garage doors: 20 times better than standard practice.
- R-38 insulation in the roof: 2 times better than standard.
- R-3.8 under the slab floor to minimize heat loss.

“

Going green was important to us to be sure we’re being good citizens of Greensburg and helping the environment.

– Kelly Estes

”

*The BTI-Greensburg John Deere Dealership features tubular daylighting devices that bring natural light into the showroom. This reduces electricity use, provides a better environment for employees and customers, and saves BTI-Greensburg money.*





The ground breaking on February 4th, 2008, was the first step toward a new, green BTI-Greensburg building.

### **Efficient Heating, Ventilation, and Air Conditioning**

The BTI-Greensburg building features a highly efficient radiant heating system in the concrete slab floor. The water for it is heated by recycled oil from BTI's normal operations, which reduces the need for natural gas.

A high-efficiency 16 SEER variable-air volume system provides heating, cooling, and outdoor air. Additionally, motion detectors and individual controls help minimize the use of the heating and cooling systems.

### **Power From the Wind**

To help power the dealership, BTI installed two wind turbines (5 kW and 1.8 kW) to offset about 8% of the building's electricity use. Impressed by the 5 kW Endurance model chosen for the site, other family members are now involved in a new venture, BTI Wind Energy. It has become the North American distributor for Endurance, and has created more than 100 new green jobs at dealerships throughout the United States.

## Sustainable Features

To earn a LEED Platinum rating, the Estes family followed other sustainable practices in addition to energy efficiency.

### **Sustainable Site**

- Minimize site disturbance and control erosion.
- Reduce transportation impact by promoting the use of bicycles and fuel-efficient vehicles.
- Maximize the use of native landscaping and open space.
- Manage storm water runoff by using pervious hard surfaces such as recycled crushed concrete.
- Limit the site's heat island effect through white roofing and reflective paving.

### **Water Efficiency**

- Plant drought-tolerant landscaping.
- Irrigate with runoff and rain water that are naturally filtered and stored in a holding pond.
- Aerate the holding pond with a wind-powered system.
- Use waterless urinals and low-flow fixtures.

### **Materials and Resources**

- Manage and recycle construction waste.
- Have a workplace recycling plan.
- Used recycled local and regional steel and certified woods to build the structure.

### **Indoor Environmental Air Quality**

- Control tobacco smoke.
- Ensure thermal comfort with personal heating and cooling controls.
- Use highly efficient filters and fresh air to improve indoor air quality.
- Use adhesives, woods, carpet, and paint with low volatile organic compounds.
- Provide daylight spaces and access to views.

## Design Team

**Owners:**  
The Estes Family

**Builder:**  
Hastco Construction

**Architect:**  
Landmark Architects

**Mechanical, Electrical, and Plumbing:**  
Professional Engineering Consultants

**Site Design:**  
BNIM Architects and John Deere Landscapes

**Floor Plan/Layout Design:**  
John Deere Place

**LEED Consultant:**  
BNIM Architects

**Research Assistance:**  
National Renewable Energy Laboratory

**Commissioning:**  
Midwest Engineering, Inc.

One of the new wind turbines is visible from the entrance of the BTI-Greensburg John Deere Dealership.



# Great Results

The BTI-Greensburg John Deere Dealership is up and running now and being put to the test. To ensure the systems operate as planned, the Estes brothers are undergoing a commissioning process where everything is examined: lighting systems, mechanical systems, materials used, plumbing, and more. This continuous evaluation is critical to keep an efficient, sustainable building running smoothly.

Mike and Kelly are delighted with their building. It is a healthier and more comfortable environment for customers and employees, and BTI-Greensburg is expecting significantly decreased energy bills. “We’re really pleased with how it all turned out,” states Mike Estes.

The Estes are proud to contribute to the community that helped them during a crisis. They provide an excellent example of what can be done to improve the quality and efficiency of commercial buildings. This is something that will not only benefit Greensburg, but our nation as a whole.

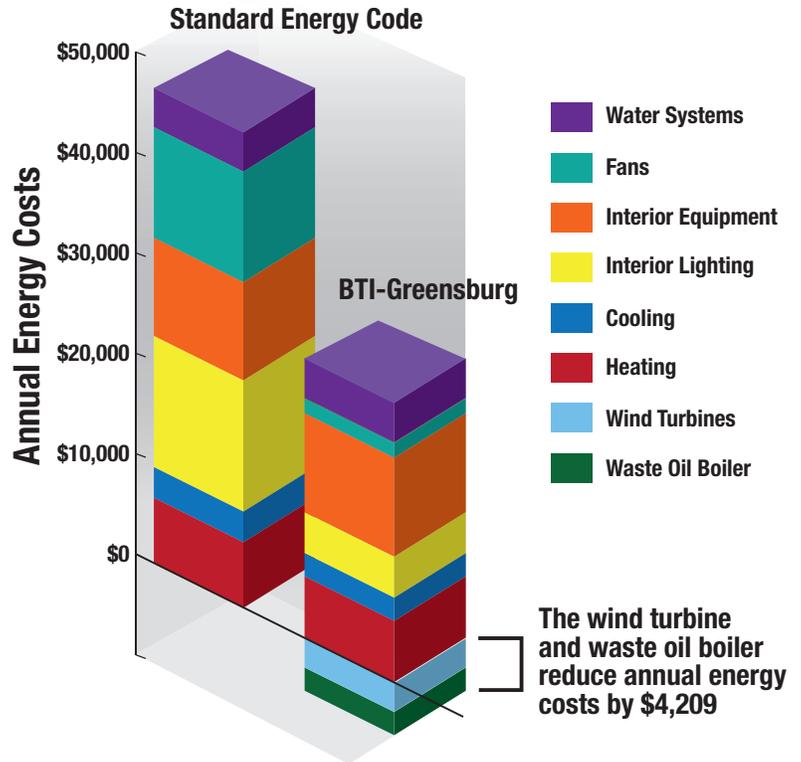


We’re proud of what we accomplished and that BTI-Greensburg is going to be a model for future John Deere Dealerships.

– Mike Estes



# Annual Energy Cost Savings



Energy modeling indicates that annual energy costs for a building similar to BTI-Greensburg built to standard code, the Standard Energy Code column, would be about \$47,000. The right-hand column represents the expected annual energy costs for the BTI-Greensburg facility. The wind turbines and waste oil boiler reduce the total amount of purchased energy, so BTI-Greensburg is expected to spend approximately \$24,000 per year on energy costs—a reduction of about 50%.

### For more information:

- BTI-Greensburg | 15479 US 54, Greensburg, KS, 67054 | (620) 723-3331 | [www.btiequip.com](http://www.btiequip.com)
- Greensburg Sustainable Building Database | [greensburg.buildinggreen.com](http://greensburg.buildinggreen.com)
- Greensburg GreenTown | [www.greensburggreentown.org](http://www.greensburggreentown.org)
- Department of Energy, Building Technologies Program | [www.eere.energy.gov/buildings](http://www.eere.energy.gov/buildings)
- National Renewable Energy Laboratory | [www.nrel.gov](http://www.nrel.gov)

The U.S. Department of Energy and the National Renewable Energy Laboratory have provided technical expertise and support to the residents of Greensburg as they rebuild their homes, businesses, and government buildings.



Energy Efficiency & Renewable Energy



Prepared by the National Renewable Energy Laboratory (NREL)  
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