

## Today's Speakers



**Shanti Pless, Building Energy Efficiency Research Engineer, LEED AP, National Renewable Energy Laboratory**, works with the Commercial Building Research Team integrating building energy efficiency and renewable systems and design processes. Recent applied research work has focused on providing energy efficiency technical support for various zero energy building and research projects, including the commercial and public building projects in Greensburg. He is responsible for helping set up and maintain a Greensburg Sustainable Building Database.



**David Jeffers, Manager, Retail Brand Experience, John Deere Corporation**, has been active in the Greensburg recovery story ever since the Estes family made the decision to rebuild their John Deere dealership as a model of sustainability and energy efficiency. In his role with the company's Retail Brand Experience, he was instrumental in getting the John Deere corporate headquarters involved with the rebuilding of the flagship LEED® Platinum building that is BTI-Greensburg.



**Tom Wind, Owner, Wind Utility Consulting, PC**, specializes in small wind generation projects and in the integration of large wind turbines into the utility grid system. He was employed at Iowa Southern Utilities for 15 years before becoming a self-employed consulting electrical engineer. Tom is a member of the American Wind Energy Association, Utility Wind Integration Group, Institute of Electrical and Electronics Engineers, the U.S. Technical Advisory Group for wind generation for the International Electrotechnical Commission, and is the vice chairman of the Iowa Power Fund Board. He is a consultant on the Greensburg Wind Farm project.



**Chuck Banks is the Principal and Founder of Chuck Banks Associates**, a national consulting firm advising clients on unique economic and community development opportunities. Chuck was the Kansas Director of the U.S. Department of Agriculture (USDA) Rural Development from 2001 to early 2009. Under his leadership the USDA was recognized nationally for its successful support of several economic and community development challenges in Kansas, including the Greensburg. Chuck played a major role in ensuring that the Mennonite Housing project, which erected 23 homes in town, was the greenest blitz build project ever seen in this country.

# Greensburg And Beyond: Buildings for a Renewable City



**Greenbuild 2009**

**Shanti Pless, LEED AP**

**Commercial Buildings  
Research Group**

**NREL**

**December 2009**

# The Destruction in Greensburg

Homes: 1,700  
Destroyed: 961  
Major Damage: 105  
Minor Damage: 67

Businesses  
Major Damage: 110  
Minor Damage: 24  
11 deaths in Greensburg

Hospital, School, City, County,  
Downtown

Over 90% of structures



Credit: Mike Theiss, Greensburg GreenTown

# A Vision for Sustainable City

**Greensburg**  
City of the Future

**Ethanol Plant and Biodiesel Plant**

**Wind Farm**

**Solar Street**

**Alternative Fuels Station**

**Hybrid and Electric Vehicles**

**School**

**Map Labels:** Heavy Industrial, Light Industrial, Rentals Housing, City Hall, Court House, Downtown/Businesses, Community Center (Swimming Pool, Recreations Center, Meeting Rooms), Park (Tennis & Basketball Courts), Single Family Housing, Multi-Family Housing, Hospital, Nursing Home, Senior Center, Museum, Big Well, Nature Trail, School, Main Street, West Street.

# Goals

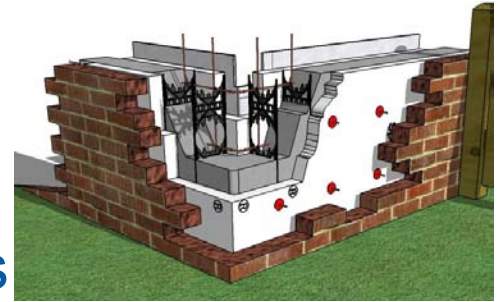
Support an Integrated Building Design Process to design, construct, and operate a low-energy city powered by renewable energy

- Early focus on energy efficiency
  - Set energy goals
- Communicate cost pathways to meet goals
- Use simulation tools to evaluate design decisions
  - Understand interactions between envelope, HVAC, daylighting
  - Evaluate design in relation to energy goals
  - Energy modeling review and training
- Provide objective review and assessments of renewable and efficiency technologies
  - Energy efficiency
  - Biomass assessment
  - Wind assessment
  - PV assessment
  - On-site residential efficiency experts
  - Alternative transportation study

# Concepts

## Cost effective AND energy efficient

- Start early, set measureable energy goals
- Use the climate, architecture, and envelope to reduce as many loads as possible
  - Good Insulation
  - Daylighting
  - Natural Ventilation
- Evaluate design decisions based on life cycle analysis
  - Reduced operating costs vs. first cost
- Marketing and image value added
- Integrate efficiency with disaster resistance
- Keep it Simple and “Do it Right”
- Measure and Verify



# Tools: Master Plan and City Ordinances

## LEED Platinum City Ordinance

- All city buildings over 4000 ft<sup>2</sup>
- Also achieve highest possible LEED Energy savings of 42%
- Only city in US

## Sustainable Comprehensive Master Plan

- Recommends using the 30% AEDGs as a minimum
- 42% when economically justified

*Rebuilding Goal:*

*A Sustainable Future*

- *Economically*
- *Environmentally*
- *Culturally*

*A walkable mixed use community*



Greensburg  
Sustainable Comprehensive Master Plan

Courtesy of BNIM Architects

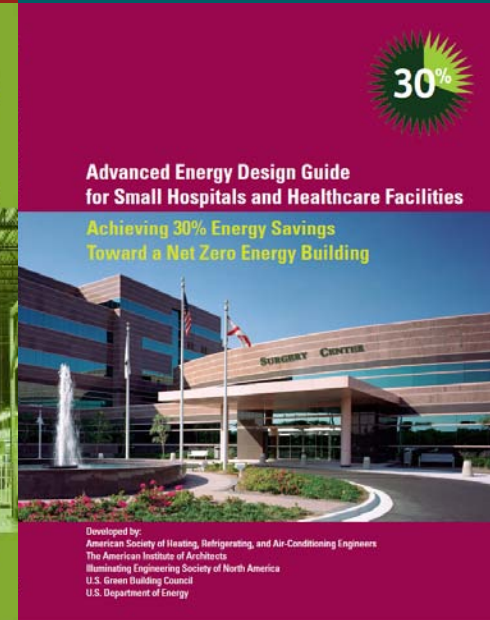
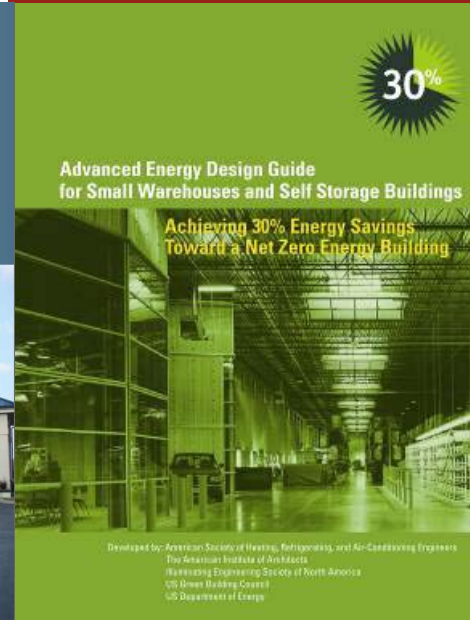
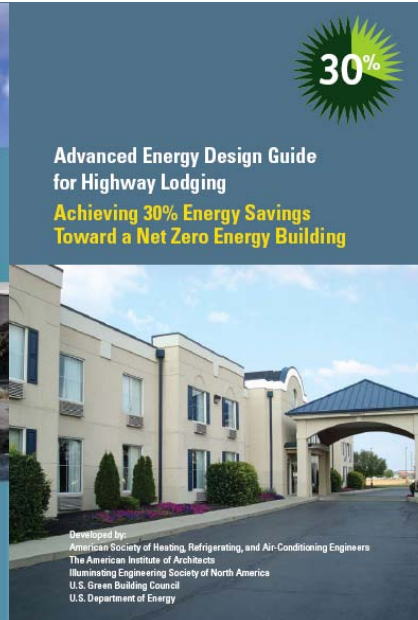
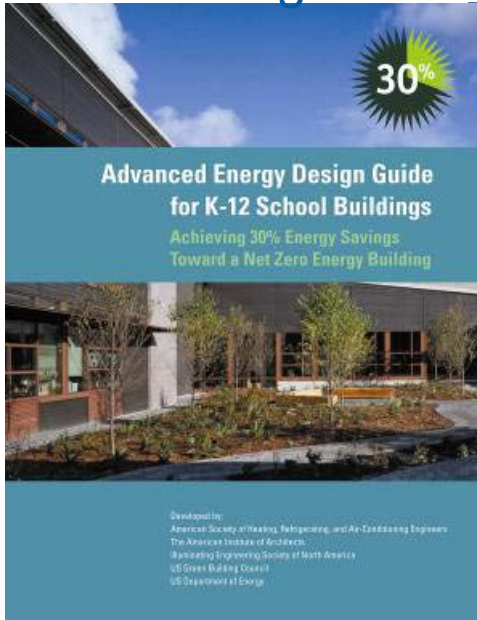
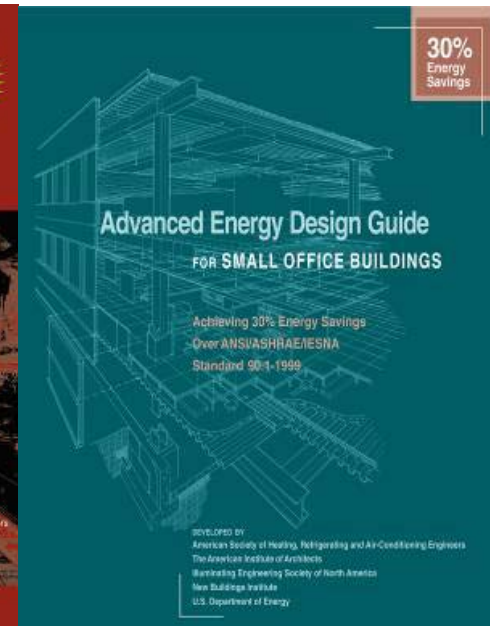
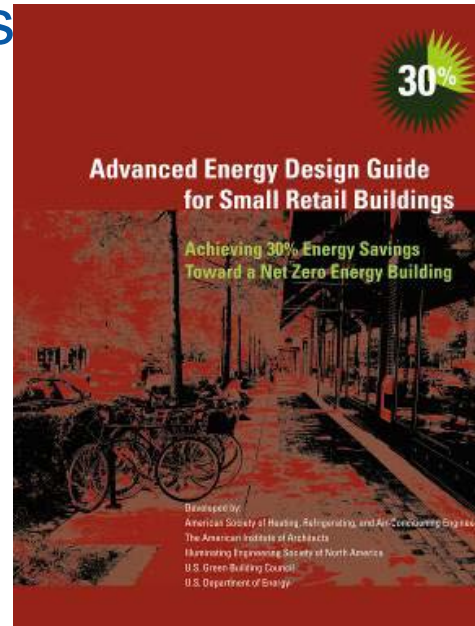
Phase I  
01.16.08 : Draft

# Tools: Guides

Available at [www.ashrae.org/aedg](http://www.ashrae.org/aedg)

## Advanced Energy Design Guides

- Developed by ASHRAE, AIA, USGBC, IESNA, and DOE
- Easy to use guidance to achieve 30% energy savings
- Recommendations by climate zone
- 4 LEED energy points
- Pre-engineered solutions





# Multiple Funding Sources

## Federal

- FEMA
- USDA

## Insurance

## State of Kansas

- Economic Development grants

## Corporate Sponsors

- John Deere
- GM
- Sun Chips (Frito Lay)
- Significant time and equipment from various sources

## Donations

## Personal Investment

# Kiowa County Courthouse



- Goal:

- 35% energy savings
- Submitted Gold

- Efficiency Strategies

- Spray foam added to 17” concrete walls
- Maximized use of existing windows for daylighting
- Ground Source Heat Pumps
- OA energy recovery



# Greensburg SunChips Business Incubator

## Energy Goals

- Certified Platinum
- 50%+ energy cost savings

## Energy Efficiency Strategies

- Fully daylight
- R-22 ICF walls, R-30 roof
- High performance glazing
- Efficient lighting system with occupancy and daylighting controls
- Ground source heat pumps with demand controlled ventilation and exhaust air energy recovery
- 7 kW of PV (courtesy of corporate donor)
  - 8% of total load



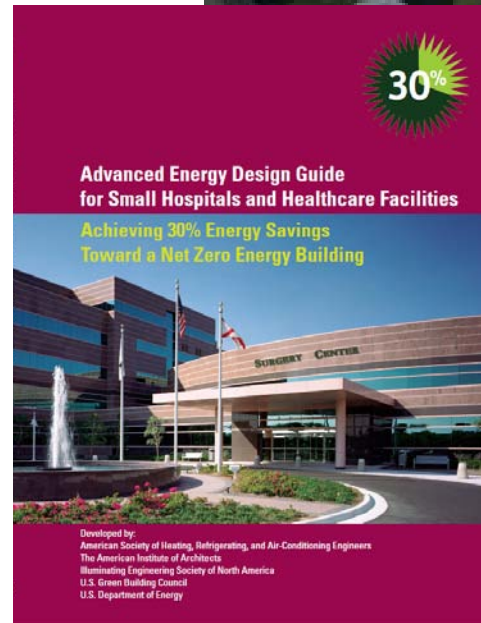
# Greensburg / Kiowa County Hospital

- Goal:

- 40% energy savings
- Submitting Platinum

- Efficiency Strategies

- Daylighting in patient rooms nurse's stations, and transition
- Well insulated envelope
  - Spray foam
- High efficiency chiller
  - water side economizer
  - energy recovery
- VAV
- OA energy recovery
- Wind turbine (50 kW)



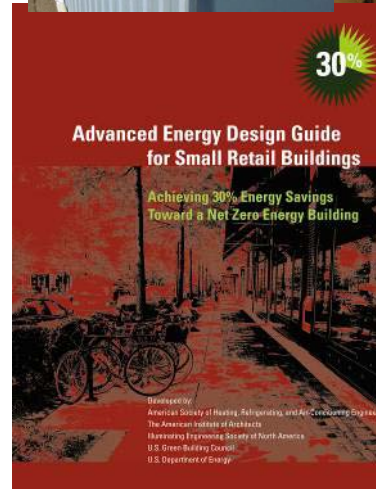
# BTI-Greensburg John Deere

- Goal:

- 50% energy cost savings
- Certified Platinum

- Efficiency Strategies

- Fully daylight retail and service
- Well insulated envelope, including bay doors
- Waste oil boiler
- Radiant heating in service bay
- 16 SEER High efficiency VAV cooling system
- Wind turbines (5 kW, 1.8 kW)
  - ~10% of total load



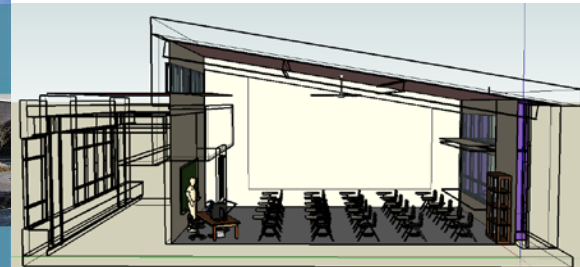
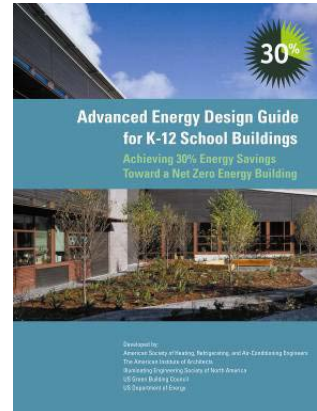
# Greensburg K-12 School



- Energy Goal:
  - 25 kBtu/ft<sup>2</sup> site energy use (50% savings)
  - Submitting Platinum
- Energy Efficiency Strategies
  - Footprint for south and north daylight
  - Fully daylight classrooms, corridors, and gym
  - Well insulated walls and roofs
  - High performance glazing
  - Natural ventilation in classrooms
  - Ground source heat pumps
  - Energy recovery from exhaust air
  - 50 kW Wind Turbine



© BNIM Architects



Courtesy of BNIM architects

# Other Greensburg Commercial Projects

- GM Dealership
  - 30% Savings for a metal building
  - Used the Small Retail AEDG
- Kwik Shop Grocery Store
  - Daylighting, ICFs, LED case lights and high efficiency HVAC
  - Used small retail AEDG
- Banks
  - Used the Small Retail AEDG
  - ICF, Heat pumps
- City Hall (submitting Platinum)
- 5.4.7 Arts Center (Certified Platinum)
- Churches
- Best Western Hotel
  - Highway Lodging AEDG



# Greensburg Commercial Projects Summary

- Over 30 Commercial and Public building projects publically reaching for at least LEED Certified or 30% savings
- Will have the highest density of Platinum projects in the US with 40%-50% energy savings
  - K-12 School (submitting Platinum)
  - Hospital (submitting Platinum)
  - Business Incubator (Platinum certified)
  - John Deere Dealership (Platinum certified)
  - 5.4.7 Arts Center (Platinum certified)
  - Prairie Point Town Homes (Platinum certified)
  - City Hall (submitting Platinum)
- Additional Projects in Design/Fund Raising
  - Big Well Museum
  - County Commons/Library
  - Theater



Courtesy BNIM Architects










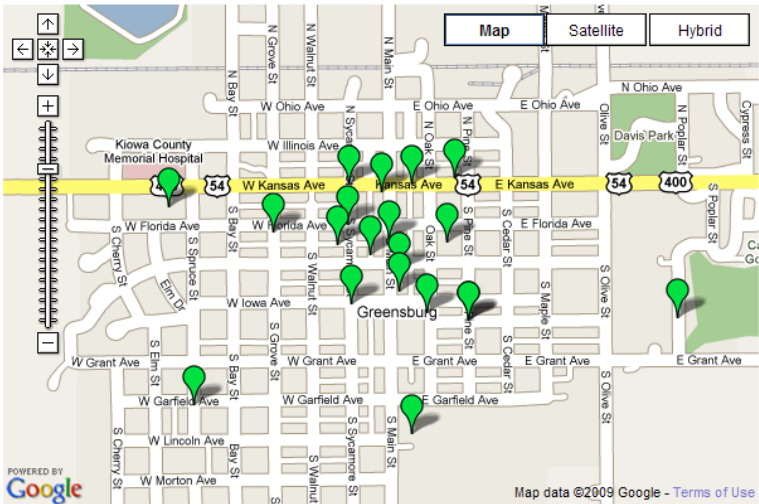
Courtesy McCluggage Van Sickle & Perry Architects



## Selected Projects

Your 23 currently selected project(s) are shown in the table below. [\(click here for help\)](#).

	Picture	Name	Owner	Location	Building Type	Floor Area (ft²)	Annual Purchased Energy (kBtu/ft²)	Ratings
<input type="checkbox"/>		<b>USD 422 Greensburg K-12 School</b>	Greensburg Schools USD 422	Greensburg, KS	K-12 education	120,000		
<input type="checkbox"/>		<b>Kiowa County Memorial Hospital</b>	Kiowa County, Kiowa County Hospital Board	Greensburg, KS	Health care	48,500	140	
<input type="checkbox"/>		<b>BTI-Greensburg John Deere</b>	Estes	Greensburg, KS	Retail	30,000	36.6	LEED-NC v.2.2 in
<input type="checkbox"/>		<b>Prairie Pointe Townhomes</b>	Prairie Pointe Townhomes, L.L.C.	Greensburg, KS	Multi-unit residential; Assembly	24,000		
<input type="checkbox"/>		<b>Kiowa County Courthouse</b>	Kiowa County Kansas	Greensburg, KS	Public order & safety	18,600		
<input type="checkbox"/>		<b>Kiowa County Commons</b>	Kiowa County, KS	Greensburg, KS		14,800		
<input type="checkbox"/>		<b>Business Incubator</b>	City of Greensburg Kansas	Greensburg, KS	Commercial office; Retail	9,580	27.8	LEED-NC v.2.2 in 2009, achievement level: Platinum



# Key Moves to a Renewable Energy City

- Imperative to persistently educate agencies and individuals on life cycle cost of energy in buildings
  - Efficiency first, then renewables
- Full buy-in to energy and green goals
  - 30% - 50% savings
- Tools to communicate cost effective strategies
  - AEDGs
    - Specific guidance on applying to metal buildings
- Disaster resistance value added
  - R-22 ICFs with significant structure
- Daylighting concepts stressed early on
  - North facing
  - South facing with appropriate overhangs
  - Limit use of skylights
- Electric heating systems
  - Reduced loads
  - On-site and community wind
- Extensive M+V



Rendering Courtesy of John Deere Wind Energy

# An Outsider's View

The New York Times

## Real Estate

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION  
NEIGHBORHOODS MORTGAGES GREAT HOMES COMMERCIAL



SMILE 3.25% WIDER.

Lock in a great rate on an FDIC-insured CD.

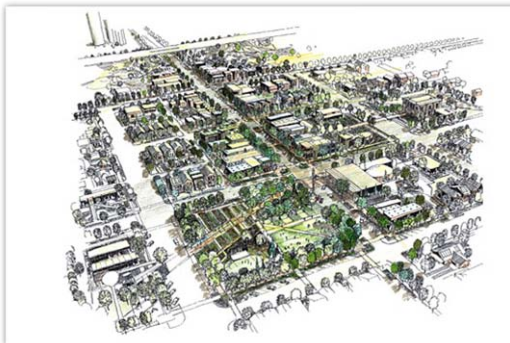
## After a Tornado, a Kansas Town Rebuilds Green



HEMISPHERES

In This Issue · Three Perfect Days · Row 22, Seats A&B · Covers · Contests · About Us · Talk to Us

HEMISPHERES Magazine 007 Dossier



Going Green: Greening Up Greensburg—Interview With Former Mayor John Janssen

CNN.com /technology

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Hot Topics » Don't Click on That » iPhone » Facebook » Solutions » Internet » Science » Planet In Peril » more topics »

## SOLUTIONS

### After tornado, town rebuilds by going green

updated 9:24 a.m. EDT, Mon May 4, 2009

STORY HIGHLIGHTS

- Two years ago, a dev...
- Given a clean slate, th...
- City leaders are using...
- A new nonprofit is bui...

Next Article in Technolo

READ

VIDEO

By Betty Nguyen and Jason Morris  
CNN

TEXT SIZE

GREENSBURG, Kansas (CNN) -- On May 4, 2007, a monster tornado tore through this rural town, killing 11 people and leaving little more than empty slabs and stacks of debris. Greensburg, 109 miles west of Wichita in south-central Kansas, faced the daunting task of rebuilding from scratch.



Like most residents, Greensburg City Administrator Steve Hewitt lost his home and everything he owned. But Hewitt believes the tornado had a silver lining, for it made this town of some 1,400 people regroup and reinvent itself.

planet green

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home > TV > Greensburg

From Discovery Networks and Executive Producer Leonardo DiCaprio

# GREENSBURG

A Story of Community Rebuilding



Inside the Show Meet the People Episode Guide Donors Donate Video Forum

the early show

HOME ENTERTAINMENT LIFESTYLE FOOD HEALTH STYLE MONEY TECH SATUR

Home > The Early Show > Series

PRESENTED BY Dove

GREENSBURG, Kan., April 29, 2008

### Greensburg: A Story Of Revival

Early Show Pitches In As Kansas Town Rebounds From Devastating Twister A Year Ago

Font size Print Email Share 25 Comments



PHOTO (CBS/EARLY SHOW)



(CBS) The story of Greensburg, Kan. is one of determination and sheer will -- of residents who wouldn't and won't let their town die in the wake of a ferocious, massive tornado that laid waste to it on May 4, 2007.

The locals refuse to give up on themselves, or their community. They are rebuilding.

And The Early Show is helping, and chronicling it all in a special, weeklong series: "Tragedy To Triumph: Greensburg Rising."

As residents put the pieces of their lives, and Greensburg itself, back together, they're keeping an eye on the environment, determined to make theirs the greenest town in the land.

Tuesday, April 29, 2008

What Makes Tornadoes Go

Early Show weatherman and features reporter Dave Price stood inside a Greensburg grocery store, pointing to the items the funnel left behind even as it literally sucked most of what was inside, out.

# Sharing the Lessons



## Rebuilding It Better

BTI-Greensburg  
John Deere Dealership



**Case Study Database**  
The Greensburg High Performance Buildings Database highlights building case studies that include design details and energy information for the town's new commercial and residential green buildings. The database provides a standardized format for displaying performance information as well as a system for collecting data on topics including energy, materials, indoor environmental quality, and land use.



BTI-Greensburg, the local John Deere dealership, is designed to meet the requirements of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Platinum designation while using greater than 50% in energy costs and will be used as the model for future John Deere dealerships.

**Stay Tuned...**  
Greensburg is in the early stages of rebuilding, and the Greensburg High Performance Buildings Database will continue to grow as the town does. If you are constructing a green, energy-efficient building in Greensburg, we'd love to hear about it. Visit [greensburg.buildinggreen.com](http://greensburg.buildinggreen.com) and click "submit a project."

To see the Greensburg case studies, visit [greensburg.buildinggreen.com](http://greensburg.buildinggreen.com)

**For Additional Information, Please Contact:**  
Energy Efficiency and Renewable Energy Information Center  
1-877-EERE-INF (1-877-337-3463)  
[www.eere.energy.gov](http://www.eere.energy.gov)

Prepared by NREL, a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

For more information about Greensburg, contact  
(620) 549-3752 or (620) 723-2790  
[info@greensburggreentown.org](mailto:info@greensburggreentown.org)  
204 West Florida  
Greensburg, KS 67054

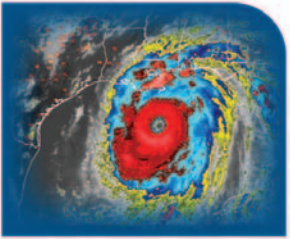
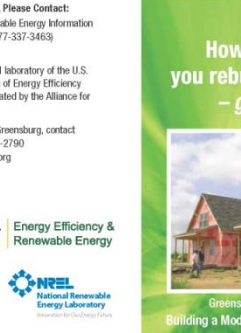


Greensburg, Kansas A Better

*"The biggest success story in Greensburg, to me, has been the resiliency and determination of our citizens to make a difference in their world. We're new pioneers in the sustainability movement."*  
— Greensburg Mayor Bob Dixon

### There's No Place Like Home

Greensburg, Kansas is Midwestern farm country. Its 900 residents are hard-working people who love their home and their way of life. They simply will not give up when it comes to making their community a better place to live.  
After the town was nearly wiped out by a massive tornado in May 2007, citizens saw the opportunity to make Greensburg something even better than it had been before. Living close to the land, they knew the value of solar and wind power and using water efficiently. When they rebuilt, they took those values to heart in a new way. The result: Greensburg is a truly green burg. It's a model of sustainable living and a standard for rural communities everywhere.



## Rebuilding After Disaster: Going Green from the Ground Up



U.S. Department of Energy Energy Efficiency & Renewable Energy  
Development, Office of Community Planning and Development (<http://www.hud.gov/offices/cpd/>)

## From Tragedy to Triumph—Rebuilding Green Homes after Disaster

**About Green Homes**  
A green home can save you thousands in utility bills and make your home a healthier and more comfortable place to live. Green homes save money with energy-saving features such as effective insulation, high-performance windows, tight construction, and efficient heating and cooling equipment and appliances. Green homes are healthier because they perform better and use green products, protecting homeowners against cold, heat, drafts, moisture, indoor pollutants, and noise. Green homes also protect homeowners against future utility rate increases for gas and electricity.  
Green homes encourage the use of renewable energy, which can reduce your home's impact on the environment because it is the cleanest form of energy around. A variety of renewable technologies are available, including small wind energy systems, geothermal heating and cooling, and solar energy systems used to produce electricity and hot water. The most common form of renewable energy used by homeowners is solar energy, which is often financed with a home mortgage. In areas with frequent storms or after a natural disaster, renewable energy can provide emergency power if batteries are integrated into the system.

- Lowers utility bills
  - Provides tax credits to homeowners
  - Improves a home's energy performance
  - Healthier and more comfortable home.
- Green Benefits to the Community**
- Stimulates local economies
  - Restores neighborhood pride
  - Promotes cleaner environment.
- Renewable Energy Benefits**
- Provides electricity from the sun or wind
  - Heats and cools your home quietly and naturally
  - Provides tax credits to homeowners
  - Offers protection against increasing utility bills
  - Supplies reliable power after natural disasters
  - Protects the environment.



How We Use Energy in Our Homes  
Source: 2007 Buildings Energy Data Book



DEPARTMENT OF ENERGY IN GREENSBURG

## Building Database

The Sustainable Building Database is provided by BuildingGreen, LLC, and the National Renewable Energy Laboratory (NREL) as part of the High Performance Buildings Database which fields information on green building projects around the nation.  
For more information please visit <http://buildinggreen.com> and <http://nrel.gov>

**Donations**  
For consistency and presentation, they have not, in the past, been the standard. This is the landmark for a green project and click "view case study" to see more.



# Thank You

Shanti Pless

NREL

[Shanti.pless@nrel.gov](mailto:Shanti.pless@nrel.gov)

## Funding Thanks!

corporate sponsors

Personal donations

Local, federal, and state

Lynn Billman- NREL Coordination

<http://www.greensburggreentown.org/>

<http://www1.eere.energy.gov/buildings/greensburg/>

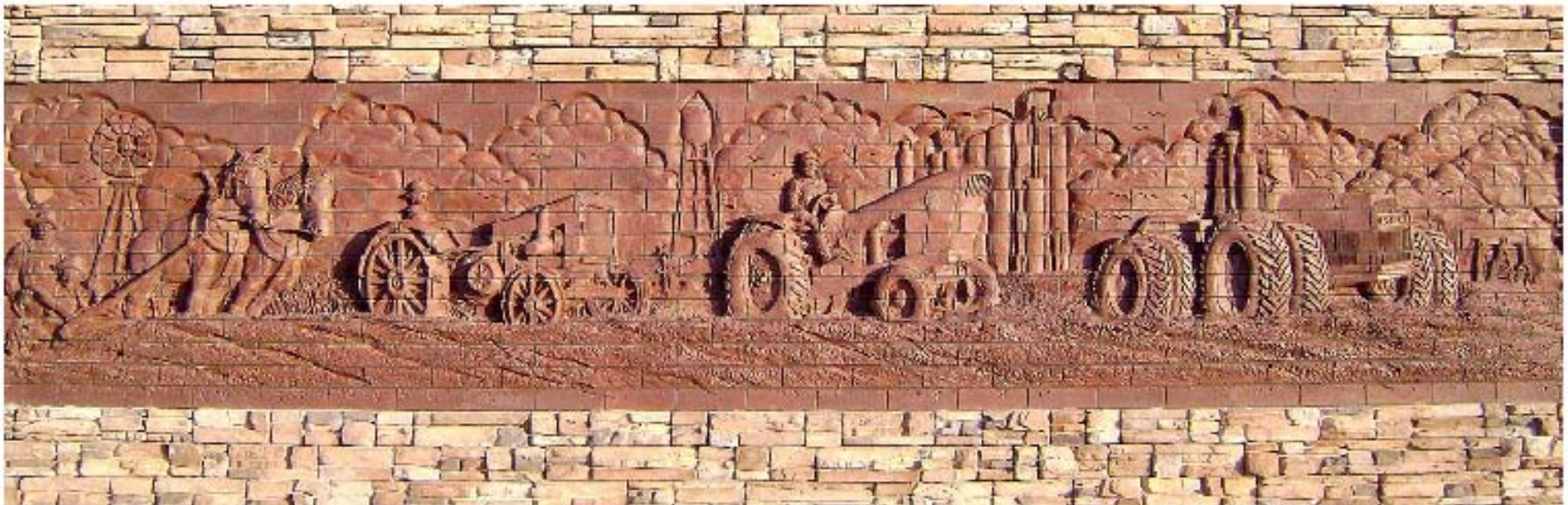
<http://greensburgks.org/>

<http://greensburg.buildinggreen.com>

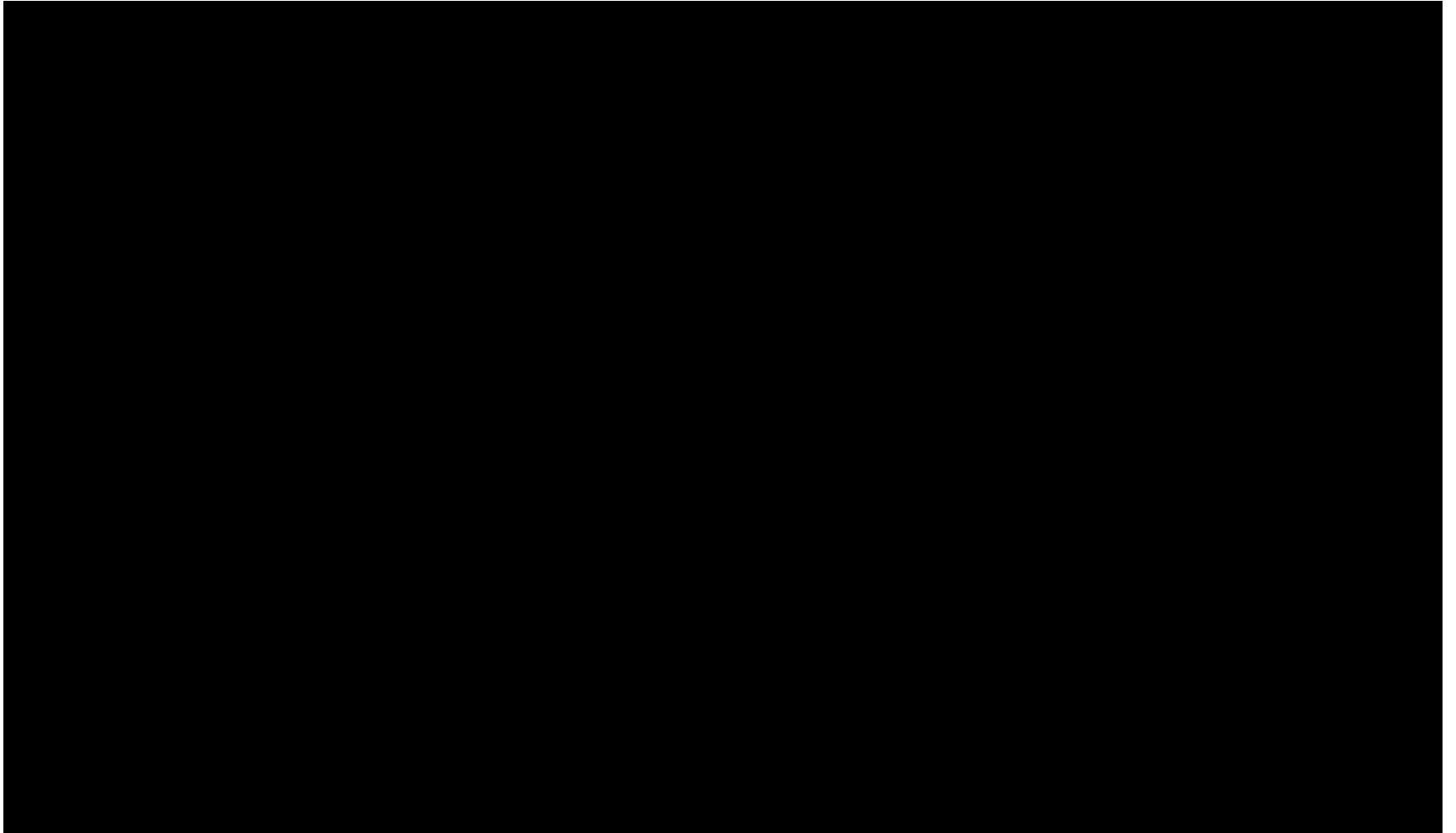




## Greensburg and Beyond – John Deere Place



Science Channel – LEED Rebuilding Plan Video  
[greensburg.johndeere.greentouchscreen.com\](http://greensburg.johndeere.greentouchscreen.com/)



**John Deere Place  
Greensburg  
Kansas**





**54** | **1** | **14** **Total Project Score** Possible Points **69**

Certified 26 to 32 points Silver 33 to 38 points Gold 39 to 51 points Platinum 52 or more points

**10** | **4** **Sustainable Sites** Possible Points **14**

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
		1	Credit 1	Site Selection	1
		1	Credit 2	Development Density & Community Connectivity	1
		1	Credit 3	Brownfield Redevelopment	1
		1	Credit 4.1	Alternative Transportation, Public Transportation Access	1
1			Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1
1			Credit 4.3	Alternative Transportation, Low Emitting Fuel Efficient Vehicles	1
1			Credit 4.4	Alternative Transportation, Parking Capacity & Carsharing	1
1			Credit 5.1	Reduced Site Disturbance, Protect or Restore Habitat	1
1			Credit 5.2	Reduced Site Disturbance, Maximize Open Space	1
1			Credit 6.1	Stormwater Management, Quantity Control	1
1			Credit 6.2	Stormwater Management, Quality Control	1
1			Credit 7.1	Heat Island Effect, Non-Roof	1
1			Credit 7.2	Heat Island Effect, Roof	1
1			Credit 8	Light Pollution Reduction	1

**5** |  |  **Water Efficiency** Possible Points **5**

Y	?	N			
1			Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1
1			Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1
1			Credit 2	Innovative Wastewater Technologies	1
1			Credit 3.1	Water Use Reduction, 20% Reduction	1
1			Credit 3.2	Water Use Reduction, 30% Reduction	1

**14** | **3** **Energy & Atmosphere** Possible Points **17**

Y	?	N			
Y			Prereq 1	Fundamental Commissioning, Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance (ASHRAE 90.1-2004)	
Y			Prereq 3	Fundamental Refrigerant Management	
2			Credit 1.1	Optimize Energy Performance, 14% New, 7% Existing	2
2			Credit 1.2	Optimize Energy Performance, 21% New, 14% Existing	2
2			Credit 1.3	Optimize Energy Performance, 28% New, 21% Existing	2
2			Credit 1.4	Optimize Energy Performance, 35% New, 28% Existing	2
		2	Credit 1.5	Optimize Energy Performance, 42% New, 35% Existing	2
1			Credit 2.1	On-Site Renewable Energy, 2.5%	1
1			Credit 2.2	On-Site Renewable Energy, 7.5%	1
1			Credit 2.3	On-Site Renewable Energy, 12.5%	1
1			Credit 3	Enhanced Commissioning	1
		1	Credit 4	Enhanced Refrigerant Management	1
1			Credit 5	Measurement & Verification	1
1			Credit 6	Green Power	1

**7** | **6** **Materials & Resources** Possible Points **13**

Y	?	N			
Y			Prereq 1	Storage & Collection of Recyclables	
		1	Credit 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors & Roof	1
		1	Credit 1.2	Building Reuse, Maintain 95% of Existing Walls Floors & Roof	1
		1	Credit 1.3	Building Reuse, Maintain 50% Non-Structural Elements	1
		1	Credit 2.1	Construction Waste Management, Divert 50%	1
		1	Credit 2.2	Construction Waste Management, Divert 75%	1
		1	Credit 3.1	Resource Reuse, Specify 5%	1
		1	Credit 3.2	Resource Reuse, Specify 10%	1
		1	Credit 4.1	Recycled Content, Specify 10% (p.c. + 1/2 p.L)	1
		1	Credit 4.2	Recycled Content, Specify 20% (p.c. + 1/2 p.L)	1
		1	Credit 5.1	Local/Regional Materials, 10% Extracted, Processed, Manufactured	1
		1	Credit 5.2	Local/Regional Materials, 20% Extracted, Processed, Manufactured	1
		1	Credit 6	Rapidly Renewable Materials, 2.5%	1
1			Credit 7	Certified Wood, 50% of Wood Based Materials	1

**13** | **1** | **1** **Indoor Environmental Quality** Possible Points **15**

Y	?	N			
Y			Prereq 1	Minimum IAQ Performance (ASHRAE 62.1, 2004)	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increase Ventilation (ASHRAE 62.1, 2004 or CIBSE 1998)	1
1			Credit 3.1	Construction IAQ Management Plan, During Construction	1
1			Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1
1			Credit 4.2	Low-Emitting Materials, Paints & Coatings	1
1			Credit 4.3	Low-Emitting Materials, Carpet Systems	1
1			Credit 4.4	Low-Emitting Materials, Composite Wood & Agrifiber Products	1
		1	Credit 5	Indoor Chemical & Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems, Lighting	1
1			Credit 6.2	Controllability of Systems, Thermal Comfort	1
1			Credit 7.1	Thermal Comfort, Design - Comply with ASHRAE 55-2004	1
1			Credit 7.2	Thermal Comfort, Verification	1
1			Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1
1			Credit 8.2	Daylight & Views, Views for 90% of Spaces	1

**5** |  |  **Innovation & Design Process** Possible Points **5**

Y	?	N			
1			Credit 1.1	Innovation In Design: Environmental Education	1
1			Credit 1.2	Innovation In Design: Recycled Content	1
1			Credit 1.3	Innovation In Design: Water Quality	1
1			Credit 1.4	Innovation In Design: Water Use Reduction	1
1			Credit 2	LEED® Accredited Professional	1

# BTI Greensburg Kansas



Anticipating LEED® Platinum Rating



## Sustainable Site

- 
- Reduced Site Disturbance / Erosion Control
  - Bicycle Storage
  - Fuel Efficient Vehicle / Car Share
  - Native Landscape
  - Bio Swales Wetlands
  - Recycled Concrete Pervious Paving
  - White Roofing / Reflective Paving
  - Cut-Off Lighting

## Water Efficiency

- 
- Draught Tolerant Landscaping
  - Irrigation with Reclaimed Water
  - Solar Powered Irrigation Pump
  - Waterless Urinals + Sensors
  - Low Flow Fixtures



## Materials + Resources

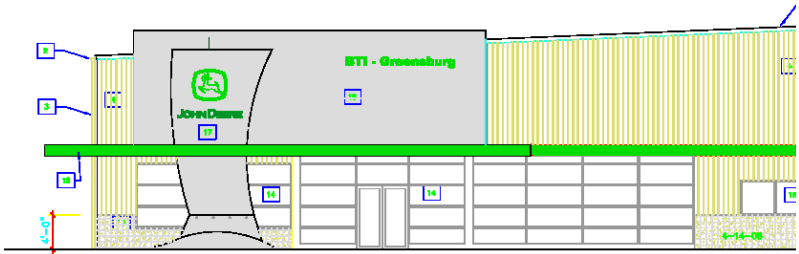
- Construction Waste Management
- Workplace Recycling Plan
- Construction Sorting + Recycle
- Recycled Steel Structure
- Local + Regional Materials : Steel + Concrete
- Certified Woods



## Indoor Environmental Quality

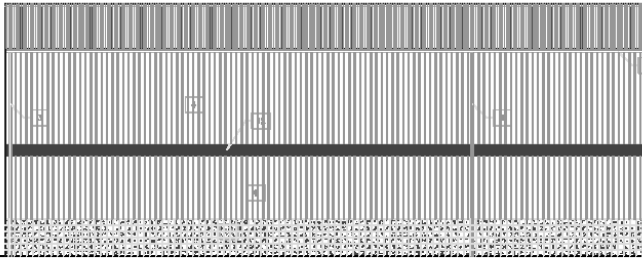
- Tobacco Smoke Control
- Outdoor Air Monitoring
- Thermal Comfort + Personal Controls
- Indoor Air Quality
- Low VOC's in Adhesives, Wood, Carpet and Paints
- Daylight to Spaces
- Access to Views





NORTH ELEVATION





EAST ELEVATION

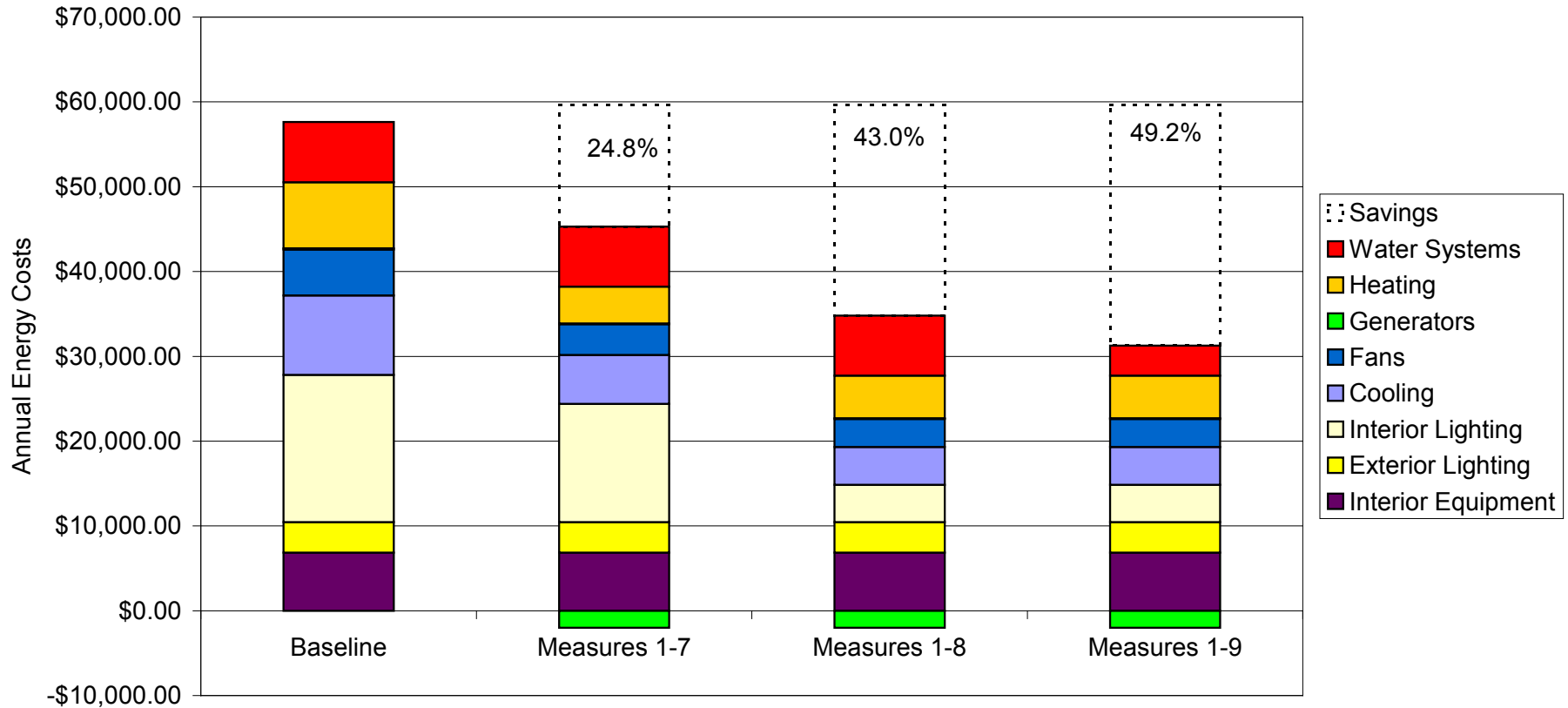
1/8" = 1'-0"





# Green Build Energy Savings

John Deere Place Greensburg Annual Estimated Energy Savings Options:



# Green Build Energy Savings

## Goal:

38% energy savings

LEED Platinum

## Efficiency Strategies

Fully daylight retail and service

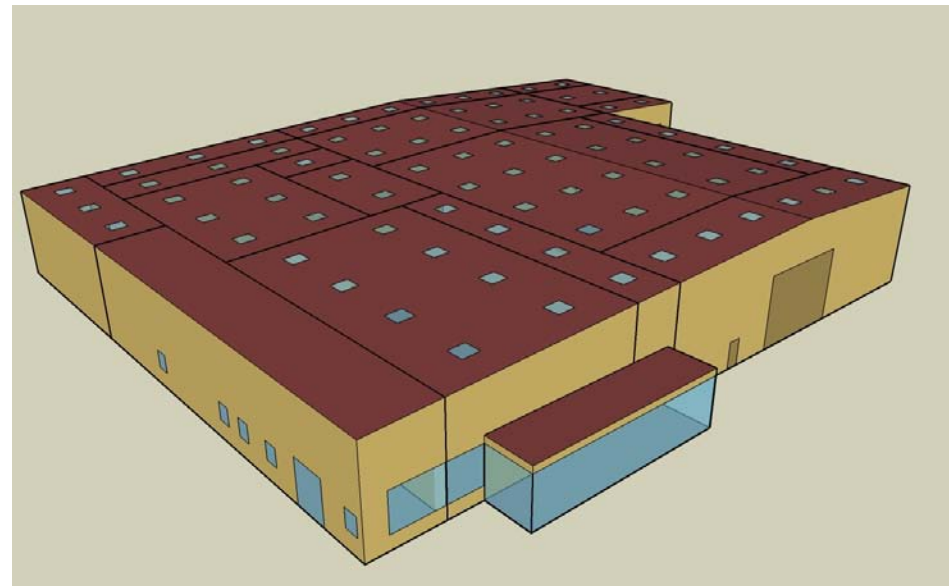
Well insulated envelope,  
including bay doors

Waste oil boiler

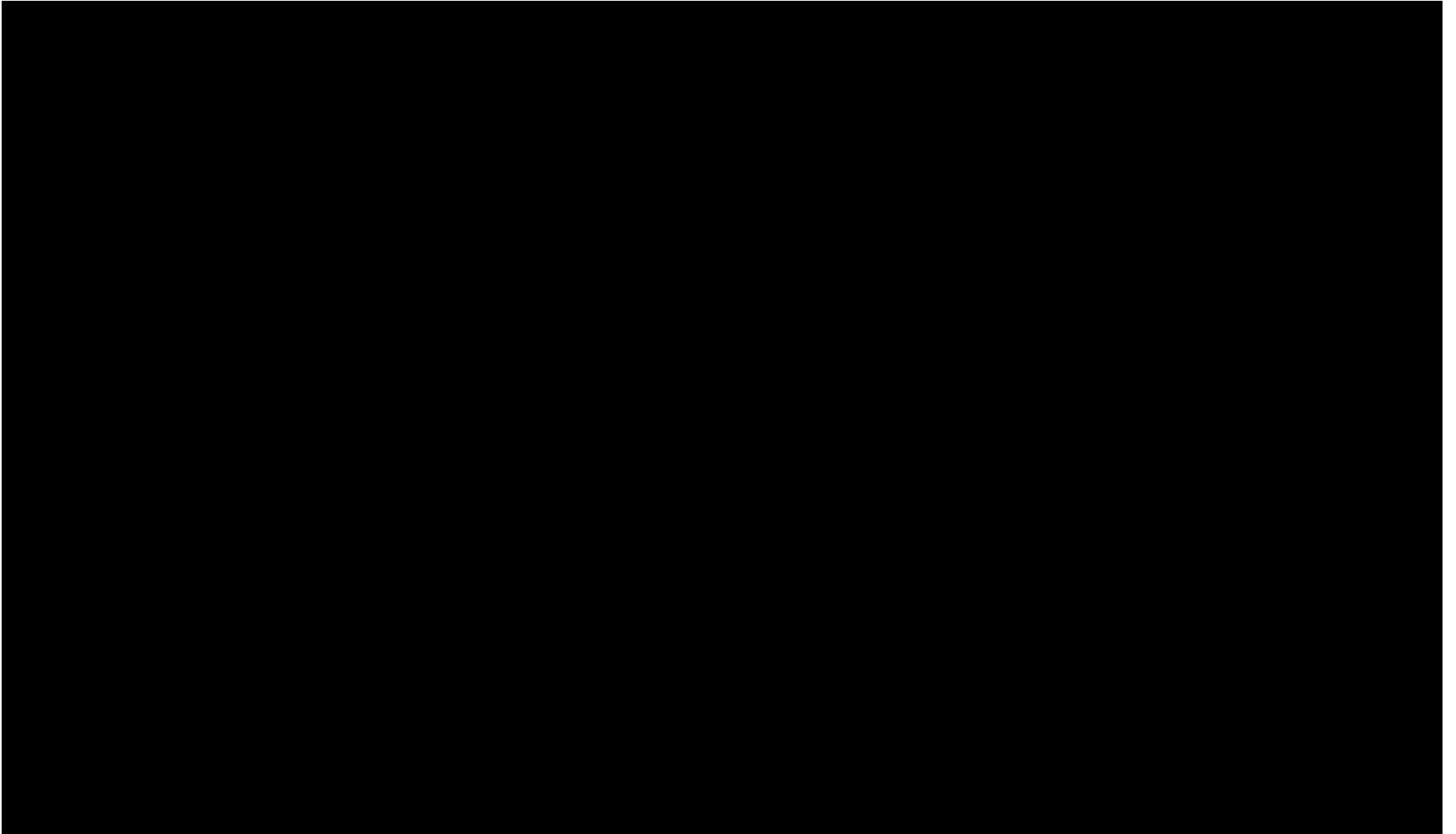
High efficiency VAV  
cooling system

Wind turbines (5 kW, 1.8 kW)

~10% of total load



Facility "Green Features Map"  
[greensburg.johndeere.greentouchscreen.com\](http://greensburg.johndeere.greentouchscreen.com/)







John Deere  
BTI-Crossberg





Retailer Energy Alliance

# Join the Retailer Energy Alliance

### REA Steering Committee Members (1/08)

- Wal-Mart
- Whole Foods
- Target
- Food Lion
- Staples
- Home Depot
- Kohl's
- Best Buy
- McDonald's
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Illuminating Engineering Society of North America (IESNA)



*The U.S. Department of Energy is inviting national retailers throughout the U.S. to join the new Retailer Energy Alliance (REA), designed with both bottom-line and energy savings in mind. The Department of Energy is acting as the facilitator to bring these national retailers together.*

### The REA Will:

- Be independent—developed and directed by national retailers—with facilitation and technical expertise from DOE
- Consider all aspects of energy use and energy sources for achieving energy savings in new and existing buildings
- Emphasize effective engineering design and efficient operation of energy using systems, provide equipment manufacturers with real-world/real-use locations for testing and proving energy saving technology, and help to quickly disseminate results of tests among retailers
- Set specifications and “stretch goals” for equipment energy performance; develop multi-retailer solicitations for low-energy technologies
- Deploy timely and valuable information to manufacturers regarding target markets for their energy-efficient equipment
- Provide immediate access to research results and demonstrations of energy-efficient technologies in similar buildings via DOE’s National Accounts Partnership

### How You Will Benefit as a Member of REA:

- You'll reduce your energy expenses and minimize the impact of volatile energy prices
- You'll reduce the environmental “footprint” for buildings you own or operate
- You'll help drive down technology costs and speed up implementation of significant advances in research and equipment

### To Join REA, Members Agree to:

- Share\*—
  - Your energy, equipment, and building data—to establish retail performance benchmarks for energy use
  - Your best energy efficiency practices in building design, operation, and maintenance
  - Your input on potential future equipment purchases for new construction and retrofit—to help drive manufacturers toward higher-efficiency equipment based on potential market scale
- Participate in two REA meetings per year to establish objectives and direction, six (bimonthly) conference calls, and scheduled equipment tests to determine real-world performance of technologies
- Explore recommended variations to system designs based on geographical locations

*\*No proprietary information will be shared without retailer permission.*

*To learn more about the REA, contact:*

**Dru Crawley**  
Building Technologies Program  
Energy Efficiency and Renewable Energy  
U S Department of Energy  
202-586-2344 or [Drury.Crawley@ee.doe.gov](mailto:Drury.Crawley@ee.doe.gov)



# REA RETAILERS – ALPHABETICAL BY COMPANY

As of 4/28/08

- |                         |                    |
|-------------------------|--------------------|
| 7-Eleven Inc            | Dr. Mark Morgan    |
| A&P                     | Jim Kirk           |
| Advance Auto Parts      | James Curry        |
| Arby's Cooperative      |                    |
| Purchasing              | Walt Taylor        |
| Beall's Inc.            | Dave Robinson      |
| Bed Bath & Beyond       | Matthew Fiorilli   |
| Bed Bath & Beyond       | Kathleen Mobilio   |
| Bed Bath & Beyond       | Larry Guarino      |
| Bed Bath & Beyond       | Jim Brendle        |
| Belk*                   | Jim Harvey         |
| Belk, Inc.              | Roger Grimes       |
| Best Buy                | Dwayne Shmel       |
| Best Buy                | Brenda Mathison    |
| BJ's Wholesale Club     | Kenneth Hayes      |
| BJ's Wholesale Club     | Herbert Zarkin     |
| BJ's Wholesale Club     | John Roberts       |
| Boston Market           | Gregory Tomsick    |
| Brookshire Grocery      |                    |
| Company                 | Jay Hunter         |
| Chipotle                | Josh Lubliner      |
| Costco                  | Richard Galanti    |
| Costco                  | Craig Peal         |
| CVS/ Caremark           | Michael Fex        |
| CVS/ Caremark           | Thomas Ryan        |
| Federal Express (FedEx) | T. Michael Glenn   |
| Food Lion/ Delhaize     | Wayne J Rosa       |
| Food Lion/ Delhaize     | Susan Sollenberger |
| Giant Eagle             | Bill Burdwood      |
| GM                      | Bill Hepburn       |
| Hannaford Brothers      | Harrison Horning   |
| Harris Teeter           | Fred Morganthall   |
| Harris Teeter           | Rod Antolock       |
| Harris Teeter           | Jerry Clontz       |
| Harris Teeter           | Al Lentz           |
| Harris Teeter           | Michal Shepard     |
| H-E-B                   | Charles Butt       |
| H-E-B                   | Bob Loeffler       |
| H-E-B                   | Todd Piland        |
| H-E-B                   | Charlie Wernette   |
| IESNA                   | Rita Harrold       |
| IESNA                   | Kim Mercier        |
| IESNA                   | Kevin Flynn        |
| JC Penney               | Myron Ullman       |
| JC Penney               | Tim Lyons          |
| JC Penney               | Nicole Falagrady   |
| JC Penney               | Richard O'Leary    |
| JC Penney               | Charley Haupt      |
| JC Penney               | Robert Keller      |
| John Deere              | David Jeffers      |
| Kohl's                  | Dan Booher         |

**2010**

**Des Moines IA**

**John Deere Place Facility**

**50%+ Energy Reduction**



# Greensburg KS and Beyond

## **How Communities Can Incorporate Wind Power In Their Electric System**

U.S. DOE Webinar: Greensburg, Kansas, and Beyond  
December 15, 2009

By

Thomas A. Wind, PE  
Wind Utility Consulting, PC  
Jamaica, Iowa

# There are Two Approaches for Adding Wind Power, Which Depend Upon the Ownership of the Electric Utility



Single 900 kW Wind Turbine Owned by the Community of Waverly, Iowa

- **Approach 1:** If there is a locally owned municipal electric utility or rural electric cooperative, then the local utility can install and own a wind turbine on behalf of the community.
- **Approach 2:** If the electric utility is a larger investor-owned utility, then there is no utility involvement and the wind turbines must usually be installed and owned by individual electric customers.

## Approach 1: Local Utility Ownership

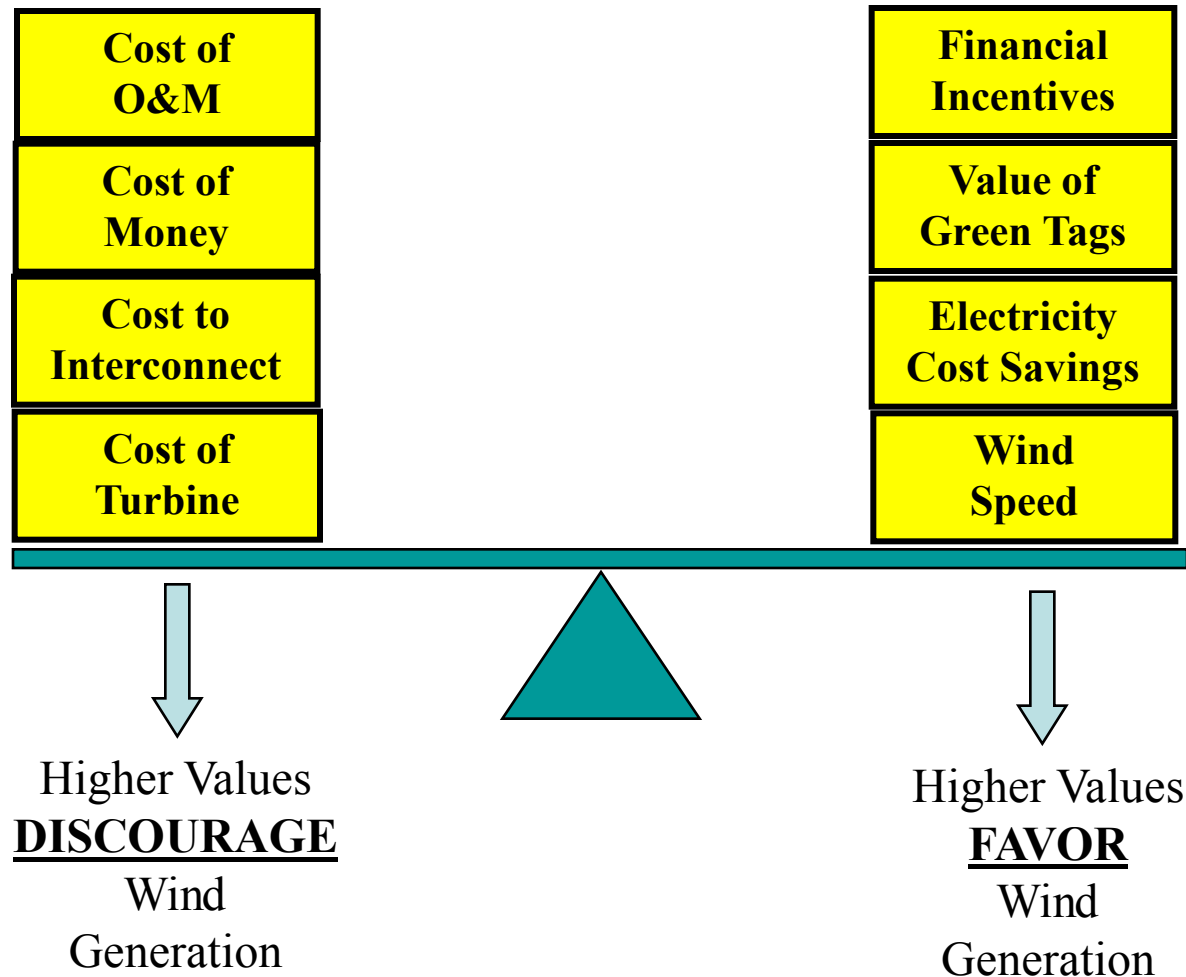
- A locally owned utility usually has the right to install and own electric generators, which would provide power to the community. Their existing wholesale power supply contract may sometimes limit their flexibility.
- Community members could work with their local utility to convince them to purchase a wind turbine.
  - This would require an organized effort by a determined group of community members.
- The local utility could simply purchase and install a large wind turbine, which would then provide green electricity to the community.
  - If local wind resources are not adequate, then the wind turbine could be installed remotely and the power could be wheeled back to the utility.
- The wind turbine cost would be blended in with other power supply costs, and be paid for by all electric customers in the community.

## Key Issues with Local Utility Ownership

- Wind generation is usually the most cost effective renewable resource a utility can install.
- The wind project could simply be a single large turbine or a share in a larger wind farm.
- The economics depend on several factors which vary from community to community.
- Adding wind generation almost always increases near-term power supply costs. Projects are justified by taking a longer-term perspective that considers no fuel costs and no carbon emission costs. Paybacks are typically more than 10 years.



# The Overall Economics of Wind Generation is Determined by a Balance of Factors



# Examples of Municipally Owned Wind Projects

## Wall Lake, Iowa

- Small town of Wall Lake, Iowa was determined to have its own wind turbine
- Finding a suitable site was an issue
  - Because of very low voltage electric system (only 2.4 kV), the turbine had to be close to a substation.
  - There were height restrictions due to a local airport.
- City received \$250,000 CDBG grant to help offset the capital cost.



660 kW Wind Turbine  
Owned by Wall Lake, Iowa 6

# Another Municipally Owned Wind Project Town of Lenox, Iowa



- The local pharmacist had an interest in renewable energy, and he convinced the city to study the feasibility of installing a large turbine.
- The utility management did not initially want to install a wind turbine.
- Major Issues:
  - “All Requirements” provision in the Lenox municipal utility’s wholesale power contract
  - Very weak grid & 4.16 kV distribution system limited size and location of wind turbine
- City received Community Development Block Grant (“CDBG”) of \$250,000 toward a 750 kW wind turbine.

# Example of Seven Towns with Municipal Utilities Collectively Investing in a Small Wind Farm



Three 750 kW Turbines  
at Algona, Iowa Jointly  
Owned by Seven Iowa  
Towns

- Reasons a town might not want to invest in a wind farm:
  - Not windy enough at the town
  - No nearby site is acceptable for other reasons
  - Local utility knows nothing about wind generation and doesn't want the management responsibilities
  - One large turbine may be too much power for a small town to cost effectively utilize
- Towns can band together to install wind turbines at best site if financial and transmission arrangements can be made


# What Does it Take to Get a Locally Owned Utility to Install a Wind Turbine?



- In the best of circumstances, adding a large wind turbine will usually increase near-term power supply costs for a locally owned utility, therefore there is little financial incentive to install a turbine.
- Local residents usually have to exert some pressure on the utility to “green up” their power supply. This effort typically takes a determined “ring leader” or champion.
- A long-term perspective is needed with the belief that there will be some cost penalty for carbon emissions.
- It often takes some type of incentive such as a grant, donation, deal, or special circumstances to “clinch” the decision to proceed with a wind project.

## Approach 2: No Utility Involvement

- If the electric utility is not locally owned, then the local community has no say about installing wind turbines for the community's use.
- Any wind turbines would have to be installed by electric customers who would use the power to offset their electric bills.
- Any locally owned wind farm would need to sell all of its power to the incumbent utility on a wholesale basis. The wind power would be blended in with all of the other power supply resources and used to supply the needs of the larger area. The wind power would not be designated for or committed to the local community.



225 kW wind turbine  
owned by small  
manufacturer in  
Adair, Iowa

# Key Issues with Electric Customer-Owned Wind Generation Projects

- Larger wind turbines produce significantly lower cost power. However, only the 2-3% largest commercial electric customers can effectively use that much power.
- These large customers usually pay the lowest costs for electricity. Their power bills contain both fixed and variable components. A wind turbine usually only reduces the variable component of the bill, which might be 50-60% of the total bill. Therefore, a wind turbine can only reduce part of the customer's electric bill.
- Getting a "Net Metering" option is usually required to make a wind turbine cost effective. Net metering is often not mandated and thus not offered to large customers.
- An alternative to Net Metering is to mandate electric utilities to pay a higher price for customer-owned wind power.
- Although smaller customers pay higher electric rates, smaller wind turbines have much higher generating costs.



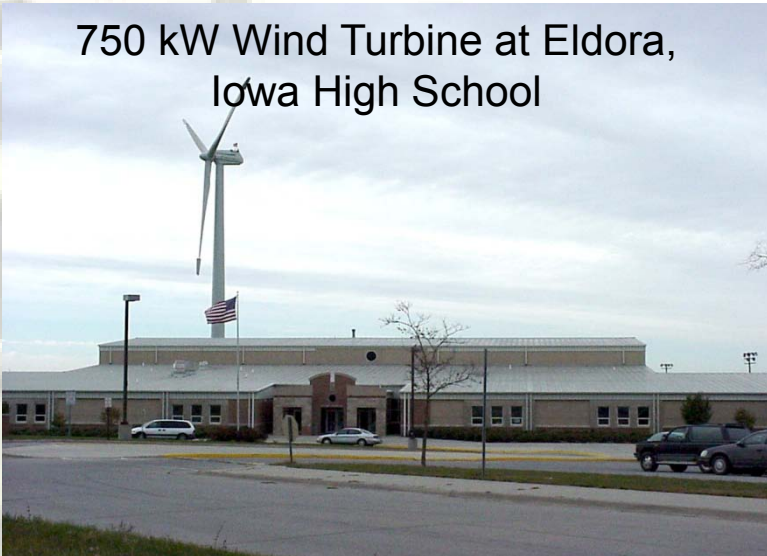
1650 kW Wind Turbine at Iowa Lakes Community College in 2005

# What Factors Make Economically Viable Wind Projects for Customer-Owned Projects

65 kW refurbished turbine owned by motel along 1-35 at Williams, Iowa



750 kW Wind Turbine at Eldora, Iowa High School



- Economics are difficult for customer-owned wind generation projects.
- Large users owned by outside corporations require payback periods on their investments that are much shorter than wind turbine projects can produce.
- Typically, government or educational institutions, such as schools or colleges, have long enough perspectives to justify the long payback periods of 10 to 20 years.
- Electric customers must place some financial value on green power to shorten the long paybacks.
- Financial incentives or some mandate for green power are often required to get projects “over the economic hump”.



## Greensburg's Path to Community Wind

- Since Greensburg owned is electric utility, it initially considered installing a large wind turbine to supplement the wholesale power it purchased.
- John Deere Wind offered to install a larger wind farm near Greensburg and provide green credits for all of the power Greensburg needed at no cost to Greensburg.
  - Since this option required no investment by Greensburg and little effort or management, the City agreed to this generous offer.
- The City has encouraged its customers to install wind turbines or solar PV panels.
- The hospital and school have decided to install 50 kW wind turbines to offset their usage, and other customers have installed a few residential size wind turbines.
- Greensburg has definitely set a very high “Green Power” supply standard for other communities.



Contact Information:

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1639 320<sup>th</sup> Street  
Jamaica, Iowa 5128

515-386-3405

[tomwind@windconsulting.com](mailto:tomwind@windconsulting.com)



**Greensburg Aerial Image  
Prior to May 4, 2007**

# Greensburg, Kansas

The 1.7-mile-wide Category F-5 enhanced tornado, the most powerful to hit the U.S. in eight years, destroyed about 95 percent of the town May 4, 2007



Greensburg following May 4, 2007

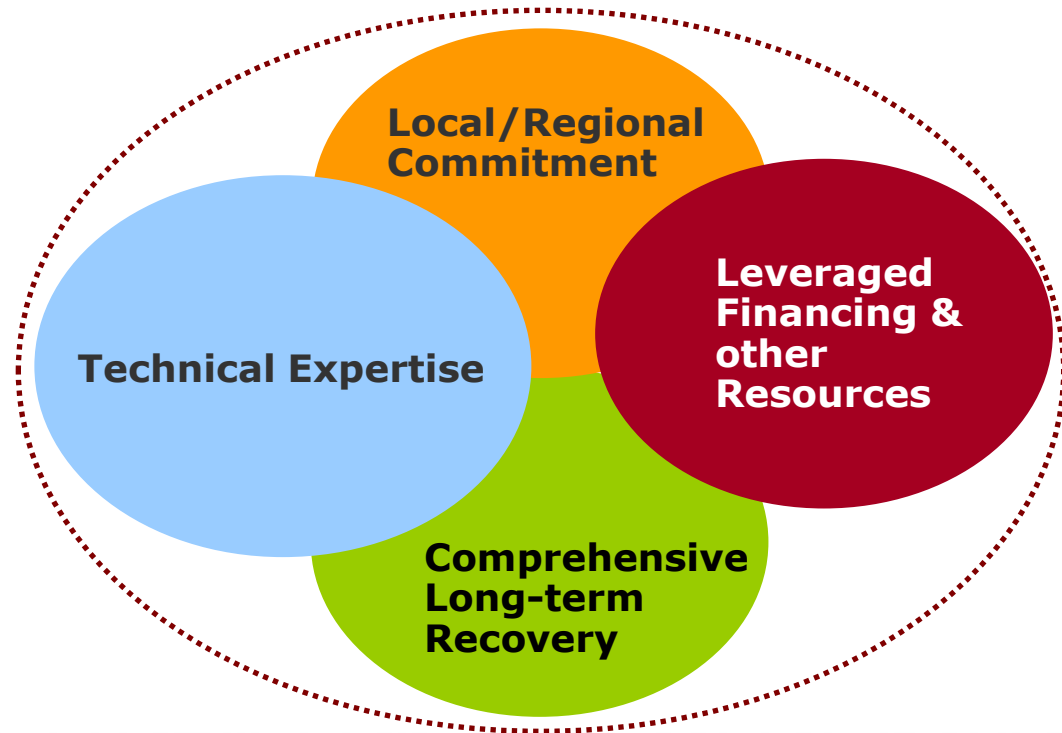


**Greensburg Destroyed**

# Comprehensive Sustainable Project Development

## GOAL:

*Facilitate the comprehensive & sustainable development, **AND** timely completion of essential CLTR projects to support the timely recovery of the Community.*





**Greensburg All-Community Meetings**  
May - October, 2007

# Disaster Recovery Process

## LTCR IS A COMMUNITY-DRIVEN APPROACH TO RECOVERY



Technical Assistance - Long-term Recovery Support





**'Financing Needs Meeting'**  
May 10, 2007

# Disaster Financing Dilemma

*(Comprehensive Sustainable Long-term Recovery)*

- ❖ **Private Insurance - Under-Insured**
- ❖ **FEMA & State – Inadequate Funding**
- ❖ **Funding Gap** - [pre-existing & new assets]
  - **Financing - External Sources**
  - **Technical Assistance - External Sources**

# Greensburg Financing Formula

*(Public Buildings, Infrastructure & Services)*

❖ **Private Insurance** [pre-existing assets]

❖ **FEMA & KDEM** [pre-existing assets]

❖ **External Resources** [pre-existing & new assets]

- *Public - Federal (USDA) & State*
- *Foundations*
- *Private Sector*

# Greensburg Financing Formula

*(Private Sector / Businesses)*

- ❖ **Private Insurance** [pre-existing assets]
- ❖ **SBA** [pre-existing assets]
- ❖ **External Resources** [pre-existing & new assets]
  - *Public - Federal (USDA) & State*
  - *Foundations & Nonprofits*
  - *Private Sector*

# Greensburg Financing Formula

*(Housing Sector / Individual Ownership)*

❖ **Private Insurance** [pre-existing assets]

❖ **FEMA & SBA** [pre-existing assets]

❖ **External Resources** [pre-existing & new assets]

- *Public - Federal (USDA) & State*
- *Foundations & Nonprofits*
- *Private Sector*



**Comprehensive Master Planning Process**  
October 2007 – May 2008

**Greensburg's 12 Goals supporting Long-Term Recovery vision.  
Balanced goals to ensure community's:  
ECONOMIC, ENVIRONMENTAL & SOCIAL SUSTAINABILITY**



COMMUNITY

FAMILY

PROSPERITY

ENVIRONMENT

AFFORDABILITY

GROWTH

RENEWAL

WATER

HEALTH

ENERGY

WIND

BUILT  
ENVIRONMENT



**Public & Non-profit Finance Partnerships**





**Public Sector & Community Partnerships**  
June 2007 - March 2009



**NREL & Community Partnership**



**Energy Efficiency Non-profit Support**

# SUN CHIPS BUSINESS INCUBATOR DEDICATION - APRIL 24, 2009



## SUSTAINABLE FEATURES

- Habitat Restorative Site Development
- Photovoltaic Energy System - 6.8 KW Peak Power Anticipated
- Geothermal Heat Pumps - 57.1% Total Building Energy Savings
- Natural Daylighting
- Rainwater Collection System - 94.5% Total Water Savings
- Recycled Graywater System
- 419,600 lbs of Construction Waste Diverted from the Landfill
- High-Performance building envelope materials including ICF's (insulated concrete forms) and fiber-cement cladding.
- 25% Recycled Building Material Content



GREENSBURG, KANSAS

## PROJECT DESCRIPTION

The City of Greensburg in conjunction with the USDA's Rural Development team partnered together to create the Sun Chips Business Incubator building to provide start-up space for small businesses to start and grow. The first floor contains retail space; the second level houses business offices and a conference room. The facility is designed to be LEED Platinum Level.



MCCLUGGAGE VAN SICKLE & PERRY  
ARCHITECTURE - LANDSCAPE ARCHITECTURE - PLANNING - INTERIOR DESIGN



Professional Engineering Consultants, P.A.



COMPTON  
CONSTRUCTION  
CORPORATION  
GENERAL CONTRACTOR

**Business Development Incubator Project  
Multi-Sector Financing Partnership**



**Greensburg Downtown (Main Street)**  
January 2008



**Business Development Incubator**  
**July 2009**



**Business Development Incubator**  
**July 2009**

**COMING SOON!**

**KIOWA COUNTY UNITED, Inc.**



# **MAIN STREET BUSINESS DISTRICT**

**GREENSBURG, KANSAS**



**ARCHITECTURE & ENGINEERING**

McCluggage Van Sickle & Perry  
Professional Engineering Consultants



Professional Engineering Consultants, P.A.



**MCCLUGGAGE VAN SICKLE & PERRY**  
ARCHITECTURE - LANDSCAPE ARCHITECTURE - PLANNING - INTERIOR DESIGN

**Downtown Business Development Project #2**  
**Multi-sector Investment Partnership**





**Greensburg Business Recovery**  
**February 2009**



**John Deere Dealership**  
May 2009 (dedicated)



**Destroyed Housing**  
**May 2007**



**1.75 mile 'clear view' through Greensburg  
July 2007**



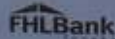
**FEMA Residential Trailers**  
July 2007

# Greensburg Self-Help Program

SPONSORED BY:



Dow Building Solutions



FOUNDATION, INC.



Greensburg 'Multi-Partner Housing Program'



**Affordable Greensburg Housing**  
**September 2008**



**New Homes Constructed**  
**December 2007**





**Greensburg Home**  
**October 2008**



**Housing Rebuilt**  
July 2009



**Public Sector 'End-Financing'**  
**October 2008**



**Multi-Family Housing**  
October 2008



**Greensburg Recovery Progress**  
**July 2009**



# Greensburg Recovery Progress

July 2009



**Greensburg Recovery Happening  
July 2009**



**Greensburg Art Center**





**Greensburg School**



**Kiowa County Hospital**

# Greensburg Wind Farm



## SUPPORT FOR A Community

On May 4, 2007, an EF5 tornado nearly wiped Greensburg off of the map. The twister leveled 95% of the community and left most of its residents homeless. As part of the community's massive rebuilding effort, Greensburg is committed to environmentally friendly, energy-efficient construction. State and federal governments, organizations, major corporations, and local businesses are supporting Greensburg by helping promote, plan and fund this green initiative.

## CLEANER *Greener* POWER

John Deere Wind Energy plans to help make the community a greener place by developing the **Greensburg Wind Farm**. This project will create jobs and reduce greenhouse gas emissions. The company's contribution of Renewable Energy Credits to Greensburg will help the city achieve its green energy goal.

## WHO'S ONBOARD

### CITY OF GREENSBURG

When the project becomes operational, Greensburg will be able to supply 100% of the city's homes and businesses with a clean, green energy source.

### KANSAS POWER POOL

Kansas Power Pool, the municipal energy agency of which Greensburg is a member, will purchase the electrical output from the wind farm.

### NATIVEENERGY

A leader in climate solutions services, *NativeEnergy* is the exclusive marketer of the renewable energy credits (RECs) from the wind farm, providing critical revenues for the project. *NativeEnergy* will qualify the RECs as carbon offsets for sale to its customers.

## NUTS & BOLTS

- 12.5 MW project using ten 1.25 MW turbines
- Enough energy to power ~4,000 homes
- Commercial operation expected 2010
- Wind farm to be located approximately 3 miles southwest of Greensburg





## **Community Wind Project**



**2<sup>nd</sup> Anniversary 'Green Awards' Banquet**



**Greensburg 'Determination' Remains**



**Greensburg's Future Vision**



**Greensburg Thanks Partners**



# Economic Recovery Model

- **Fort Riley BRAC Initiative (2005-09)**
- **Katrina / neKS Relief Initiative (2005-06)**
- **Greensburg Relief Initiative (2007-09)**
- **seKS Relief Initiative (2007-09)**
- **Chapman Relief Initiative (2007-09)**



**Community Support**



**Technical Expertise**

# Comprehensive Sustainable Project Development

## **GOAL:**

*Facilitate the comprehensive & sustainable development **AND** timely completion of projects to support economic and community development.*





FEMA News Photo

# Flood Damage

FEMA News Photo



FEMA News Photo

## Hurricane Damage



## Military BRAC Expansions



**Community Recovery (substandard housing)**





BNIM Design

## Business Redevelopment

***For more information:***

**Chuck Banks Associates, LLC**

***Chuck Banks, Principal***

***chuck@chuckbanks-associates.com***

**785.249.9373**