

# Department of Energy Program Summary: Greensburg, KS



Lynn Billman  
Project Lead  
October 7, 2010

# Project Overview

## Purpose

- Greensburg, KS was essentially destroyed by a tornado on May 4, 2007.
- Our purpose was to help them rebuild as a sustainable, green community – not only for their own benefit, but also as an inspiration and example to other rural communities

## Goals

- City recovery and rebuilding plan (community master plan) would adhere to sustainable principles in design and energy planning
- New residential and commercial buildings would average 30% lower energy use than current building code
- City would maximize its use of renewable energy

## Background

- The near-total destruction in Greensburg presented a rare opportunity to rebuild an entire community from the ground up.
- Greensburg had some leaders who wanted to rebuild differently – “green” – but limited knowledge of how to do that.
- As a typical declining midwestern farm community, Greensburg had no city funds to hire technical expertise to help on the scale needed.

## Opportunity

- Greensburg has received immense publicity via the Discovery Channel, DOE outreach documents and other media, City leaders and DOE team on national speaker circuit, John Deere Corp support, etc.
- Greensburg is influencing hundreds of communities around the US and in other countries

# Many Helping Hands

GREENSBURG  
GreenTown™



GREENSBURG, KANSAS



KANSAS.gov



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# DOE's Involvement

- DOE offered **technical assistance** to the city leaders in Greensburg within a month of the tornado.
- DOE **investment**: \$2.55 million over 3 years (thru Sept 2010).
- DOE has provided assistance in **all aspects of energy** planning, project implementation where warranted, policy development, and outreach.
- Specific types of assistance provided:
  - Energy planning guidance
  - Technical feasibility studies
  - Business strategy studies
  - Policy recommendations and drafts
  - Formal goal and project recommendations
  - Reviews of green business proposals
  - Partnership development
  - Outreach and communications

Mary Werner, ID lead, signing one of the wind turbines at the Greensburg Wind Farm groundbreaking, 10/23/09.



Signing of an MOU between City of Greensburg and National Association of Home Builders Kansas Affiliate, brokered by the DOE team



# DOE/NREL Work Scope

**Reduce  
Building  
Energy Use**

High-Performance Homes (Webinar 3, John Holton)  
High-Performance Public and Commercial Buildings  
(Webinar 2, Shanti Pless)

**Use  
Renewable  
Energy**

Renewable Energy – Community Scale (Webinar 2, Tom  
Wind)  
Renewable Energy – Distributed Scale

**Reduce  
Gasoline/  
Diesel Use**

Alternative Transportation  
Biomass Utilization

**Tell the  
Greensburg  
“Green”  
Story**

Publications, Outreach Documents, Websites, Webinars,  
Conferences/Speaking Engagements, Journals

Onsite Coordination /Project Mgmt

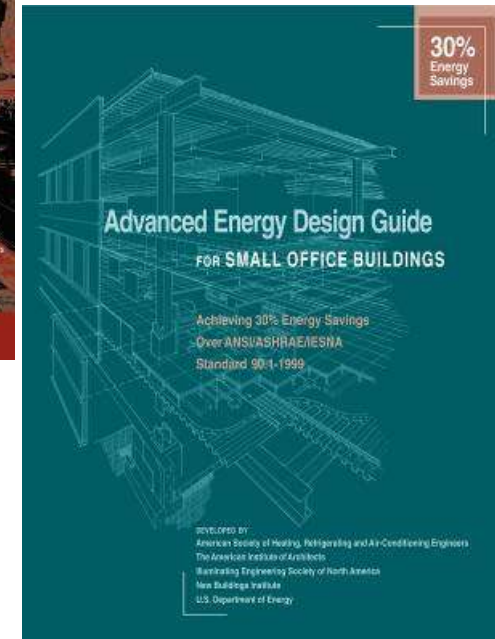
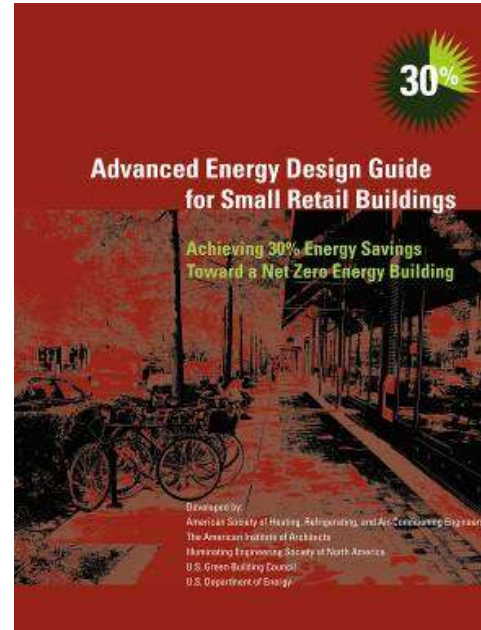
# Community Master Plan (BNIM\*)



- \* Berkebile Nelson Immenschuh McDowell Architects, Kansas City, MO.
- Award-winning master plan.
- DOE/NREL provided most of the energy section of the plan.

# Commercial Building Efficiency Activities (business, public and non-profit)

- Gave presentations to City Council and business community on energy savings
- Recommended and gave copies of Advanced Energy Design Guides (pre-determined solutions for 30% savings in six common commercial buildings)
- Worked extensively with design teams on selected high-profile projects
- Coached several local firms on energy modeling
- Reviewed or briefly consulted on a wide variety of commercial projects



<http://www.ashrae.org/publications/page/1604>

# Commercial Building Efficiency Results

- City Resolution – all city buildings > 4,000 gsf will be LEED Platinum
- Over 30 Commercial and Public building projects publically reaching for at least LEED Certified or 30% savings
- Will likely 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)
- Two major green restorations
  - County Courthouse (submitting Gold)
  - Robinett Building on Main Street
- Additional Projects in Process
  - Big Well Museum
  - County Commons/Library
  - Twilight Theater



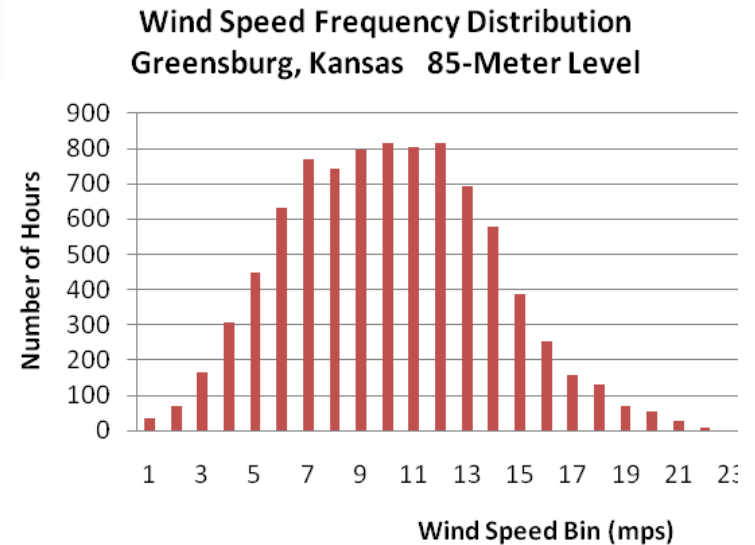
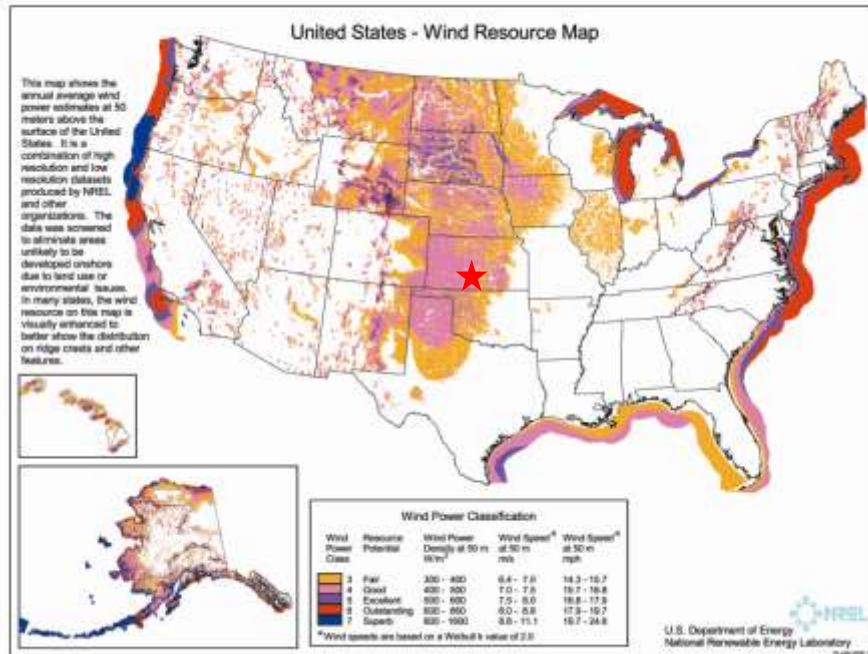
Shank Motors GM Dealership



Kiowa County Courthouse

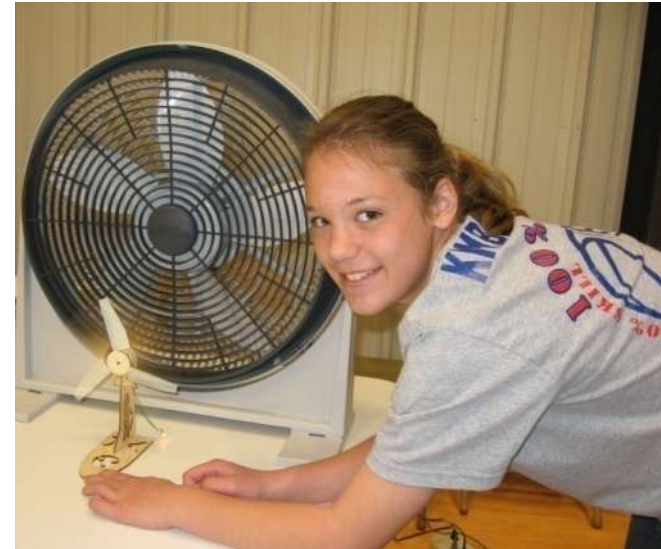
# Greensburg Wind Resource: "A Screamer"

Class 5: 7.8 mps at 50 meters  
9.1 mps at 85 meters



# Community Electricity Generation Activities

- Pre-tornado conditions:
  - 4 megawatts peak, 2.3 megawatts average
  - Municipal utility, with old diesel/natural gas gensets for peak
  - Long-term power purchase agreement with Sunflower co-op
  - Immediately after tornado, drafted a new long-term Sunflower agreement
- NREL Activities:
  - Gave presentation on community wind energy
  - Prepared three rounds of wind resource data
  - Developed technical feasibility studies and wind energy options for individuals and community
  - Organized and led three meetings of key stakeholders (City, State Energy Office, Sunflower execs)



# Community Electricity Generation Activities (Continued.....)

- Organized a site visit to Lamar and Springfield, Colorado
- Developed business strategy for City-owned turbines (partnership flip structure)
- Identified a renewables-friendly power purchaser and assisted the City in understanding their options
- City decided to change long-term Sunflower agreement to Kansas Power Pool
- John Deere Wind Division offered an alternative project
- We supported the John Deere proposal as best for Greensburg (slightly lower cost, turbines in hand)



Rendering Courtesy of John Deere Wind Energy

# Community Electricity Generation Results

- Greensburg Wind Farm consists of ten 1.25 MW Suzlon turbines with a total capacity of 12.5 megawatts
- About 3 miles southwest of Greensburg.
- John Deere Renewables is the owner and operator.
- USDA Rural Development is provided project financing.
- NativeEnergy, Inc., has also invested in the project, and is the exclusive marketer of available RECs and offsets.



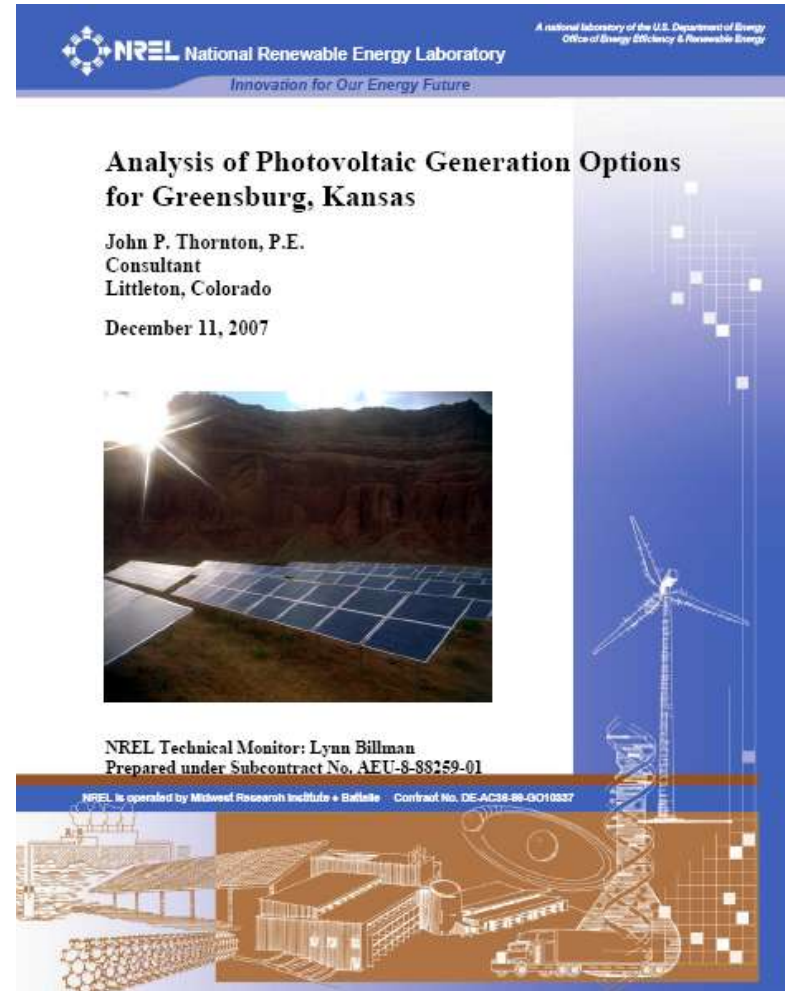
Signing one of the wind turbines at the groundbreaking, Oct 2009

## Community Electricity Generation Results(continued)

- Kansas Power Pool is purchasing energy from the project under a long-term power purchase agreement.
- Will produce enough electricity to power approximately 4,000 homes.
- The project will allow Greensburg to provide 100% of their homes and businesses with a clean, green energy source.
- Commercial operation is expected in Spring 2010.

# Distributed Renewables Activities

- Prepared Combined Heat and Power Concept Study for Downtown District
- Prepared Solar Energy Feasibility Study
- Gave presentations to city council on solar energy options
- Provided technical assistance on PV-powered and LED streetlights



# Distributed Renewables Results



Drilling geothermal wells at the Courthouse

- Several ground source heat pumps on commercial and residential buildings
- Photovoltaics on three buildings
- 50-kw wind turbines at school, hospital, John Deere, and maybe motel



7 kW Photovoltaics (roof, top right) on Sunchips Business Incubator

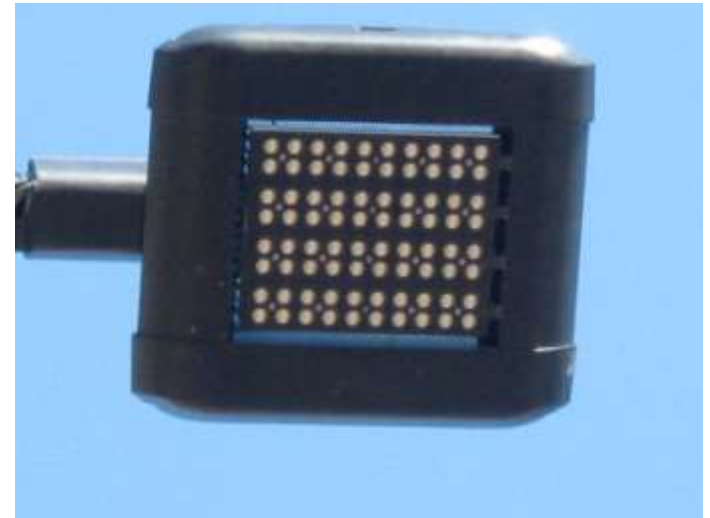


2 kW Photovoltaics for GreenTown Eco-Silo Home

# First Community in U.S. to Have All LED Streetlights

40% more energy efficient

70% less operating costs



# Alternative Transportation Activities and Results



Schofield Honda in Wichita donated two vehicles powered by compressed natural gas, and a small filling station to refill the vehicles.

- Feasibility study on alternative fuels and vehicles options recommended:
  - Electric vehicles for some city staff
  - Organizing fleet owners for building E-85 and biodiesel markets
- Some hybrid, compressed natural gas, hybrid electric, E-85 vehicles donated
  - Schofield Honda
  - General Motors
  - Ford Motors

# Biomass Utilization: Activities and Results

## Wood Residues

Eastern Red Cedar

## Agricultural Residues

Corn stover

Wheat straw

Sorghum residue

Soybean residues



County	Residues Available (bdt/yr)									
	Wheat	Corn	Sorghum	Soybean	Sunflower	Cotton	Logging Residues	Other Forestry Removals	Corn Cobs	Total
Barber	25,283	407	4,004	1,337	46	210	161	2,818	623	34,888
Barton	74,604	17,556	47,399	14,320	222	-	22	-	14,760	168,882
Clark	469	-	9,681	345	-	-	-	-	218	10,713
Comanche	3,835	285	5,357	627	-	-	-	-	450	10,554
Edwards	31,955	39,921	18,599	21,961	60	-	-	-	31,913	144,409
Ford	55,368	22,632	53,883	10,214	136	-	-	-	21,533	163,765
Harper	96,815	146	9,270	1,821	65	436	0	-	135	108,687
Hodgeman	21,536	2,228	18,130	1,287	-	-	-	-	4,200	47,380
Kingman	78,586	5,270	8,869	6,458	185	-	-	-	3,810	103,177
Kiowa	17,281	15,562	12,205	12,255	24	-	-	-	15,113	72,438
Pawnee	59,127	21,710	35,327	16,494	52	-	-	-	18,915	151,626
Pratt	58,679	38,472	19,270	17,711	377	1,122	-	12,500	33,533	181,663
Reno	89,693	13,495	51,240	22,829	1,253	-	15	-	13,118	191,642
Rice	111,254	14,194	50,816	15,130	931	-	24	-	8,190	200,539
Stafford	35,258	18,182	20,366	14,845	85	-	-	-	31,935	120,670
<b>Total</b>	<b>759,742</b>	<b>210,058</b>	<b>364,416</b>	<b>157,632</b>	<b>3,435</b>	<b>1,768</b>	<b>222</b>	<b>15,318</b>	<b>198,443</b>	<b>1,711,034</b>



# Making Change Last: City Policies

## Completed City RE policies

- Interconnection agreement
- Net billing policy
- Wind ordinance
- Solar ordinance
- Detailed white paper on wind turbines in residential areas



## Green Building Program

- Voluntary residential: MOU with Kansas chpt of National Association of Home Builders
- Training for Green Building Professionals held Nov 4-6, 2009 in Wichita
- Two Greensburg representatives attended
- NAHB will train two Certified Raters to work in the area
- Adoption of energy-efficient building codes (IECC 2009) under consideration

# Outreach – Greensburg “Green Day”

- March 2008
- Partnered with Greensburg GreenTown
- Celebrate green successes and sustain momentum
- Education
  - NREL Renew Van
  - Taught K-12
- Community meeting
  - Presentation on DOE/NREL work
  - Panel discussions on green projects
  - Info and exhibitors
  - 200+ people



# Greensburg Green Day (continued)



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## Third and Final DOE Webinar

WEDNESDAY, JANUARY 6, 2010 AT 09:38PM BY [CATHERINE HART](#)

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image credit: supportforums.blackberry.com

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Greensburg GreenTown is a charitable, nonprofit organization working in Greensburg, Kansas to rebuild the town following the devastating tornado in May of 2007. The town has made a remarkable comeback, reinventing itself as a model for sustainable building and green living now recognized around the world. GreenTown's mission is to make green building and living easily understood, appealing and accessible to all.

For contact info, click [here](#).

# http://www1.eere.energy.gov/buildings/greensburg

Building Technologies Program: Rebuilding Green in Greensburg, Kansas - Microsoft Internet Explorer

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**GREENSBURG, KS**  
STRONGER, BETTER, GREENER!

### About Rebuilding Green in Greensburg

- Technical Assistance
- Publications
- Related Links

### Rebuilding Green in Greensburg, Kansas

The city of Greensburg, Kansas, is rebuilding as a model green community with the help of the U.S. Department of Energy (DOE) and its [National Renewable Energy Laboratory \(NREL\)](#). After Greensburg was devastated by a tornado in 2007, DOE committed renewable energy and energy efficiency technical assistance valued at \$2.15 million to redevelop the rural community. DOE and NREL are assisting Greensburg with incorporating ambitious renewable energy and energy efficiency strategies to realize the town's vision of becoming an affordable sustainable community.

On this Web site you can learn about:

- How Greensburg is [rebuilding green](#)
- DOE's [technical assistance](#) in Greensburg
- [Publications](#) on rebuilding green after a disaster
- [Related links](#) to energy efficiency, renewable energy, and sustainable development resources


**For more information, e-mail:**  
[Steve Lindenberg](#)

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#### FEATURES

 **Greensburg Webinar November 23**  
Learn more and register >

The town of Greensburg, Kansas, which was nearly destroyed by a massive tornado, is committed to rebuilding as a model sustainable community.



start | Secure Access... | Building Techn... | 102309 Lynn | Inbox - Micros... | 2 Microsoft O... | 9:39 PM

# Sharing the Lessons and Telling the Story



## Greensburg, Kansas A Better, Greener Place to Live

"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



Courtesy of EPA

### 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 is a model of sustainable living and a standard for rural communities everywhere.

Blessed with a unique opportunity to create a strong community devoted to family, fostering business, [and] working together for future generations.

— Greensburg's Community Vision Statement

### A Vision for the Future

Within months of the tornado, Greensburg residents came together to create a new vision for the future. They wanted to do more than rebuild. They turned disaster into opportunity—not just for themselves but for communities like theirs all over the world.



Courtesy of EPA

A Better, Greener Place to Live

Greensburg, Kansas



U.S. DEPARTMENT OF ENERGY  
Energy Efficiency & Renewable Energy

## Rebuilding It Better

BTI-Greensburg  
John Deere Dealership



The Efficient Choice




U.S. DEPARTMENT OF ENERGY  
Energy Efficiency & Renewable Energy

## 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, photovoltaic heating and cooling, and solar energy systems used to produce electricity and heat water. The most common form of renewable energy used by homeowners is solar energy, which is often combined with a home's water heating system. In areas with frequent storms or after a natural disaster, renewable energy can provide emergency power if batteries are integrated into the system.

Green Benefits to Homeowners

- Lowest 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
- Boosts neighborhood pride
- Promotes cleaner environments

Renewable Energy Benefits

- Provides electricity from the sun or wind
- Heats and cools your home quietly and sustainably
- Provides tax credits to homeowners
- Offers protection against increasing utility bills
- Supplies reliable power after natural disasters
- Protects the environment

Green homes 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.



This home in Ohio uses a roof-integrated solar electric system to offset energy consumption.










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

# Greensburg Sustainable Building Database

<http://greensburg.buildinggreen.com>

## 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 (ft <sup>2</sup> )	Annual Purchased Energy (kBtu/ft <sup>2</sup> )	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	3	
<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



# Greensburg Media Coverage

May 2007 – June 2010

- 59 significant news and magazine articles, videos and video series, radio stories
  - 2010 – 13
  - 2009 – 20
  - 2008 – 21
  - 2007 – 5



# Greensburg Media Coverage Continued

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## Gallery: Nine Of The World's Most Promising Carbon-Neutral Communities

In the global race to reduce carbon emissions, these eco-minded communities, from Kansas to the Maldives, lead the pack, men's how they're making their carbon footprints disappear.

By Patrick Di Jorio | Posted 6/17/10 at 10:10 AM | 6 Comments



### Best U.S. Project

Greensburg, Kansas  
Size: 1.0 square mile  
Population: 500  
Annual carbon emissions per person: 22 tons  
Annual amount to be offset: 10,500 tons  
Equivalent to 320,000 trees planted  
Carbon neutral by: 2017

On May 4, 2007, a tornado ripped through central Kansas. When it was over, nearly 95 percent of the small town of Greensburg was destroyed. Turning tragedy into opportunity, the community decided to rebuild itself as a model green town, powered by a mix of geothermal, solar and wind. A few of the city buildings even power themselves with their own wind and solar generators, and a 15-turbine wind farm outside of town went online in March.

TAGS: Science

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World

Turned Green by a Twister

By STEPHEN LEE | Posted Feb 10, 2008




The tornado that hit Greensburg on May 4 took its time, rolling up Main Street like it was on a Sunday walk to church. But thank the stars of the Kansas town's...  
Greensburg, Kan.

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Master Chef

## After a Tornado, a Kansas Town Rebuilds Green



The town's new Arts Center uses three times as much renewable energy including geothermal wells, wind turbines and solar panels.

By KETH SCHREIBER  
Published: September 21, 2008

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June 12, 2008 | 1 Comment

## Putting the "Green" in Greensburg: A Tornado-Ravaged Town Reinvents Itself

Can a small Kansas town leveled by a twister revive its fortunes by becoming an energy-efficient, low-carbon town?

By Chris Verme



GREENSBURG, Kan.—On the north side of this Midwestern town, an enormous white grain silo—one of few structures that survived a 2007 tornado—stands watch over construction in the business district along U.S. Route 64.

This commercial strip is still being rebuilt, along with the rest of Greensburg. Now low-slung, ranch-style homes line cross streets. Others are packed by neatly open lots straddled with "for sale" signs. Streets

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### Town goes green after tornado

By CNN

Following a devastating tornado, the town of Greensburg, Kansas, is rebuilding itself — green.

U.S. News - Healthcare, Science and Video from CNN.com

Special Coverage: Building Up America

# Greensburg Media Coverage Continued

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**Going Green in Obama's Greensburg** 1:30:36

Greensburg, Kansas is rebuilding green two years after it was devastated by a tornado. WSJ's Amy Jordan notes the decision was based on a complex calculus that included tax breaks and PR, as well as ambition and a concern for the environment.

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Messages & News » The Greening of Small-Town America

**AMERICA THE BEAUTIFUL**

**The Greening of Small-Town America**

By Eric White | Original Content | January 15, 2012 | Comment (1) | Post | Like 4

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**Greensburg, Kansas**

Much like the story of Sikkler's Grove, a natural disaster almost wiped Greensburg, Kansas, off the map in May 2007. An EF5 tornado tore through the town of 1,500, leveling most of its homes and buildings and killing 11 people. Just days after the tragedy, the people of Greensburg vowed to rebuild their community and make it what they call a sustainable "GreenTown."

"It has been amazing to watch what is possible in coming through a tragedy when there is hope to give the adversity meaning, like rebuilding as a model [community] for the world," says Daniel Wallach, the executive director of Greensburg GreenTown, a nonprofit organization working to rebuild the town. "Creating beauty out of chaos is art and can be enormously rewarding. I think many residents feel this."

Photo: Sikkler Town USA

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**Tornado-ravaged Kansas town rebuilds 'green'**

Updated 9/2/2012 9:23 PM | Comment (1) | Recommend (0) | Email | Save | Print | Reprints & Permissions | 0/0

By Emily Bazzer, USA TODAY

After a monster tornado devastated Greensburg, Kan., one year ago this Sunday, the city faced tragedy as the daunting task of rebuilding from scratch.

It also got an opportunity, Mayor John Jantzen says.

This rural county seat 109 miles west of Wichita has made "green" its rebuilding mantra, declaring itself a national model for environmentally conscious living — and winning attention and resources in the process.

**PHOTO GALLERY: Going green in Greensburg**

"The tornado was one of the biggest blessings to hit our town," Jantzen says. "We were like every other town in the Rust Belt and the Midwest. We were dying a slow, agonizing death. Suddenly, we don't have a town. So we're rebuilding a new green town."

The decision to rebuild in an environment-friendly manner is not just about feeling good, he says. Environmentally conscious design can continue to help, but the costs are made up through energy savings, he says. The city hopes to attract new residents and businesses committed to green.

**THE GREENING OF CITY HALL**

Greensburg holds the first city in the nation to pledge that all city-owned buildings, including the planned city hall (shown below), will get the highest rating of the U.S. Green Building Council.

Green plan | May 4, 2007 | Old city hall

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**Building a Greener Greensburg**  
 By Brian Lippman | December 9, 2009 12:00 PM | Comments (0)

Last year, we wrote about a progressive green community with a fitting name—Greensburg, Kansas—that continues to set new standards in eco-development.

After a May 2007 tornado ravaged this town of 1,500 residents, the community vowed to rebuild Greensburg as energy-efficient as possible. According to a New York Times article, community leaders' goals were to "build a haven of economic opportunity that would generate new businesses and jobs and persuade Greensburg's isolated young people not to leave."

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# Major Lessons for Federal Technical Assistance

## Planning and Leadership

- Encourage designation of a strong champion to deal effectively with diverse (political) agendas
- Be flexible to accommodate wide variations in knowledge of energy
- Leadership and planning is needed at several levels: community, interest groups, specific projects
- Set specific and quantitative goals where possible, but also be flexible
- Manage expectations in the community

## Communication and involvement

- Absolutely critical
- Repeat and repeat for/with multiple audiences
- Seek broad involvement
  - Business community, Chamber of Commerce, Econ Dev council
  - Schools at all levels
  - Faith groups, Lions/Rotary, Scouts, Gardeners club, Civic Improvement groups, etc

# Major Lessons (continued)

- Financing assistance (information and/or cash) is as important as technical assistance
- Disaster recovery is a very difficult environment to influence
- Cultural change would have been very challenging without encouragement of City leadership, State leadership, Greensburg GreenTown, Discovery Channel, BNIM, and U.S. Green Building Council.

# Project Benefits to DOE and American Public

- Established a model for the nation
  - Showed how sustainable energy principles and practices can be incorporated into a community rebuilding after a disaster
  - Demonstrated the appropriate priorities for energy improvements in a community – planning, efficiency , and then most cost-effective local renewable energy resource
  - Documented the practical experiences – successes and failures -- of a rural community embracing to a green-oriented community direction and values, to inspire and inform similar communities
- Assisted DOE Program goals
  - Expansion of DOE Commercial Building Partnership with a key new partner (John Deere) (Bldgs)
  - Helped launch a new community-scale wind turbine company (BTI Equipment) that is providing new wind-related jobs in 32 states (Wind)
  - Provided an ideal community hospital partner for the DOE Smart Hospital program (Bldgs)
  - Developed first-ever energy efficiency guidelines for metal (Butler) buildings
- Influenced federal agency practices
  - USDA Rural Development and FEMA have a better understanding of energy efficiency and clean energy technologies (definition, need, cost, design)
  - USDA Rural Development has requested further assistance on green residential buildings and shown broad interest in NREL's deployment projects

# Specific Impact Summary

## Specific Communities and Conferences with Communities Attending

- *Greensburg Current Mayor and City Administrator) - 33 communities outside of Kansas plus a couple dozen, at least, in Kansas*
- *GreenTown - 28 locations*
- *NREL Team – 6 major presentations outside NREL/DOE*

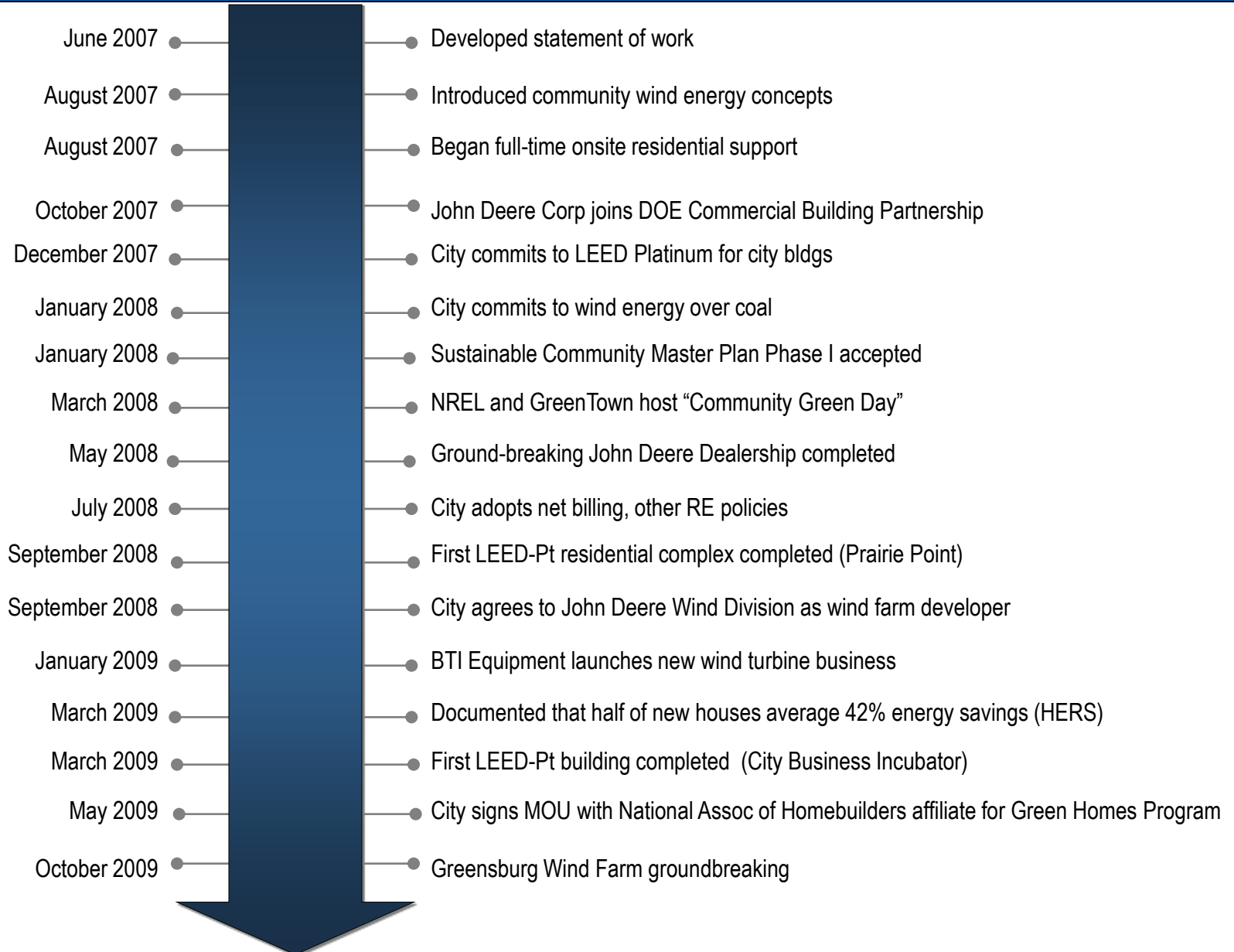
## Specific Major Companies Now Doing Business Differently

- *BTI Equipment/John Deere.*
- *John Deere*
- *Several architectural and design firms*
  - *BNIM, Health Facilities Group of Wichita, Mennonite Housing, Professional Engineering Corporation, Hastco Builders of Emporia, MVP Architects, Manske and Associates, Wardcraft*

## Specific Government Agencies Directly Impacted

- *Department of Energy, Housing and Urban Development, USDA, FEMA*

# Timeline of Major Events



# Accomplishments To Date – Specific Tasks

- Energy planning guidance – developed energy section of Community Master Plan
- Technical feasibility studies
  - Wind Energy – at scales for the entire community, major users such as the school and hospital, and larger businesses
  - Solar Energy – for businesses and homes
  - Biomass – ag residues for pelletizing
  - CHP – for downtown district
  - Alternative Transportation Options – E-85, biodiesel, CNG, implementation guidelines
- Business strategy studies
  - Community-owned wind farm business model
  - Biomass heating pellet business concepts for county cooperative
- Policy recommendations and drafts
  - Net billing policy, interconnection agreement and ordinances for distributed wind, solar
- Formal goal and project recommendations
  - LEED Platinum recommendation for city-owned buildings
  - First-ever energy efficiency guidelines for metal buildings (Butler buildings)
  - Newly developed recommendations on use of wind turbines within a residential area
  - Green Building Program for residential and commercial, both code upgrades and voluntary compliance

# Accomplishments To Date – Specific Tasks (cont'd)

- Reviews of green business and product proposals – reviewed claims of several “off-the-wall” promoters
- Partnership development
  - John Deere Corporate with DOE/NREL, as the first dealership-model business in the DOE Commercial Building Partnership
  - City of Greensburg with Kansas Power Pool, as an alternative to long-standing power purchases from coal-based Sunflower Rural Electric Cooperative
  - USDA Rural Development with DOE/NREL, to support USDA growing interest in energy efficiency and clean energy
  - City of Greensburg with Greensburg GreenTown, local non-profit that can help the resource-deficient city continue towards a green future
  - City of Greensburg with National Association of Homebuilders and Kansas affiliate, for support to Green Home Program (voluntary)

# Accomplishments To Date – Outreach

Community Green Day, with one day spent with each school class in K-12, and one day for a community meeting of presentations, panel discussions, and celebration of Greensburg green progress since the tornado (March 2008)

*Rebuilding after Disaster—Going Green from the Ground Up:* A 24-page brochure that covers the why and how of energy planning in disaster recovery.

*Greensburg, Kansas—A Better, Greener Place to Live:* An 8-page brochure that presents the overall story of Greensburg's recovery to illustrate successful disaster rebuilding and inspire others.

*From Tragedy to Triumph—Rebuilding Green Homes after Disaster:* A 4-page fact sheet for homeowners.

*From Tragedy to Triumph—Rebuilding Green Buildings after Disaster:* A 4-page fact sheet for commercial and public building owners.

*From Tragedy to Triumph—Information Resources for Rebuilding after Disaster:* A 4-page fact sheet for builders, architects, and engineers.

*From Tragedy to Triumph—Using Renewable Energy after Disaster:* A 4-page fact sheet for community leaders and individuals.

*Rebuilding It Better—BTI-Greensburg John Deere Dealership:* A 4-page fact sheet highlighting energy saving and generating features and NREL contributions to this premier example of rebuilding green.

*How Would You Rebuild a Town Green?:* A trifold brochure on the Greensburg Sustainable Building Database, showing examples of the variety of buildings and projects that can save a community energy and increase renewable energy use.

## Accomplishments To Date – Outreach (cont'd)

*Rebuilding Greensburg, Kansas, as a Model Green Community: A Case Study:* Technical report documenting the activities of the DOE/NREL team in Greensburg

Extensive technical appendices to the Case Study above (feasibility studies, presentations, training materials, developed for and used in Greensburg)

Ten different 24 x 36-inch posters conveying energy features of ten prominent public buildings, displayed in the building and at various conferences attended by building owners

New Website to make documents available

New Sustainable Building Database and website, to make available technical details on all green buildings (owner voluntary basis) and projects in Greensburg; patterned after DOE's High-Performance Buildings Database; 24 projects recorded to date

Two Greensburg seminars at the November 2009 GreenBuild conference

Extensive mailing list for above documents

Three Webinars (Nov and Dec 2009; Jan 2010) on various aspects of the Greensburg story

Four additional four-page brochures on energy-saving features of the City Business Incubator, City Hall, School, and Hospital (in process as of Jan 2010)