



A Tale of Two Cities: Greensburg Rebuilds as a National Model for Green Communities

Greensburg, Kansas, was like any rural community in America until a massive tornado leveled much of the town on May 4, 2007. Key leaders in Greensburg and Kansas made a crucial decision not just to rebuild, but to remake the town as a model sustainable community. To help achieve that goal, technical experts from the U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL) arrived in Greensburg in June 2007.

For three years, the experts worked with city leaders, business owners, residents, and other state, federal, and local agencies to identify ways to incorporate energy efficiency and renewable energy technologies into the town's rebuilding efforts.

Five years after the tornado, Greensburg's per capita ratio of U.S. Green Building Council Leadership in Energy and Environmental Design (LEED®) certified buildings is one per approximately every 129 citizens. In a town of 900 people, that's the highest per-capita concentration of LEED buildings in the United States.

DOE and NREL conducted detailed studies to examine energy use; availability of renewable energy resources; energy options; and potential integrated energy solutions that could also be replicated in other communities recovering from disaster or working toward building green. Those recommendations were incorporated into the Greensburg *Sustainable Comprehensive Master Plan* and furthered the town's vision of becoming an affordable sustainable community. Residents also formed a non-profit organization, Greensburg GreenTown™, to provide resources and support for rebuilding.

Technical assistance provided by DOE and NREL has impacted the following areas in Greensburg.

Energy-Efficient Homes

Through energy modeling, education, training, and onsite assistance, DOE and NREL helped renovate and rebuild homes in Greensburg that on average, use 40% less energy than similar buildings built to code—surpassing the goal NREL originally set to achieve 30% energy savings in residential buildings.

With technical assistance from DOE and NREL, Greensburg has built:

- New homes that average 40% less energy use than code
- Many LEED certified building “firsts” for the country and the state of Kansas, including:
 - City of Greensburg SunChips® Business Incubator—the first LEED Platinum municipal building in Kansas
 - Kiowa County Memorial Hospital—the first LEED Platinum critical access hospital in the United States
 - Prairie Pointe Townhomes—the first residential LEED Platinum building in Kansas
- New and renovated highly efficient commercial buildings, including:
 - USD 422 Greensburg K-12 School—a LEED Platinum building built to be 60% more energy efficient than standard code and generate electricity with an on-site wind turbine
 - Kiowa County Courthouse—renovated with sustainable and energy-saving technologies while maintaining the structure's original design
- A 12.5-megawatt wind farm that produces enough energy to power the entire town and beyond

High-Performance Commercial Buildings

- DOE and NREL conducted modeling and analysis and provided technical assistance in the construction of a new city hall, business incubator, K-12 school, hospital, and other public and private commercial buildings.
- Greensburg's new BTI-John Deere dealership participated in Commercial Building Partnerships, a DOE-sponsored collaborative research project focused on improving energy efficiency in commercial buildings. Complete with two wind turbines producing 4.2 kilowatts (kW) and 1.9 kW of electricity, the LEED Platinum building is a model for other John Deere dealerships.

Distributed Renewable Energy

- To help local distributed system owners get the most value for electricity sent back to the grid, DOE and NREL drafted safety and reliability ordinances, an interconnection agreement, and net-metering policies for the city to consider.
- DOE and NREL assisted with planning for 50-kilowatt wind turbines at the local hospital and school; several small turbines at a local business; solar photovoltaic systems on the town's business incubator; and light emitting diode streetlights in major portions of the community.

"The technical assistance provided by DOE and NREL staff assures that Greensburg's city and county governments, businesses, and other buildings will continue to save large sums of money for a long time to come."

DANIEL WALLACH, EXECUTIVE DIRECTOR AND FOUNDER,
GREENSBURG GREENTOWN

Alternative Fuels and Vehicles

- As part of the master plan for rebuilding green, DOE and NREL conducted studies outlining opportunities for the town to use alternative fuels, electric vehicles, and hybrid-electric vehicles, as well as develop alternative-fuel filling stations.
- In an effort to identify potential business and job creation opportunities, DOE and NREL researched and published a report on developing a local biomass pelletization or briquetting plant that could provide fuel for thermal energy for buildings, ethanol plants, or co-firing in power plants.

Education and Outreach

- DOE and NREL delivered locally targeted presentations, fact sheets, training sessions, and feasibility studies to residents, architects, engineering firms, and builders, and organized a special visit for K-12 students and residents by NREL's mobile RnE2EW education van.
- Project details, successes, and lessons learned were communicated through a buildings database, numerous publications, webinars, a website, and the media.

100% Renewable Energy, 100% of the Time

The Midwestern wind that ravaged Greensburg in 2007 is now being harnessed to help power this rural Kansas community.

Kansas has the third-highest potential for wind energy of any state, making it an obvious choice for green-minded leaders. DOE and NREL provided resource analysis, feasibility studies, and business plans to show Greensburg how it could meet its commitment to rely as much as possible on locally generated wind power.

With its blueprint for success, the City of Greensburg, John Deere Renewable Energy, and the Kansas Power Pool built a new 12.5-megawatt wind facility, the Greensburg Wind Farm, which will generate enough electricity annually to power 4,000 homes. Financing was provided by the Rural Development agency at the U.S. Department of Agriculture.



Winds that destroyed Greensburg are now supplying power to the city, thanks to the 12.5-megawatt Greensburg Wind Farm, which was erected in early 2010. *Photo from Native Energy, Inc., NREL/PIX 17592*

For more information, visit
eere.energy.gov/deployment/greensburg.

Front page photos (l-r) from FEMA (Federal Emergency Management Agency), NREL/PIX 16290; Joah Bussert, Greensburg GreenTown, NREL/PIX 17029; Joah Bussert, Greensburg GreenTown, NREL/PIX 19952

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