

EERE Program News

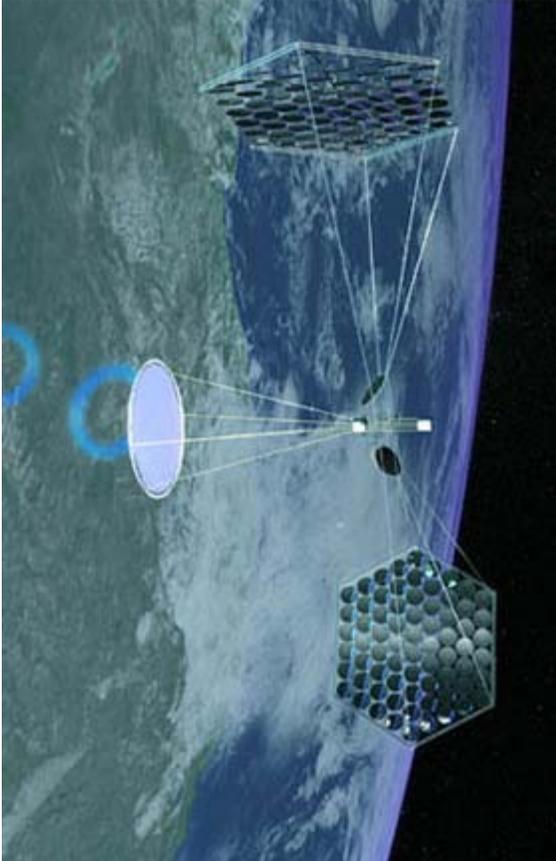
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September, 2008

Editor: [Jack Jenkins](#)

Associate Editor: [John Horst](#)

Media contact: [Mariel Sala](#)



This artist's rendition from the [National Space Society](#) visualizes a space-based solar collector that would beam energy to an earth-based power generator.

Photo courtesy of: [mafic studios](#)

[News](#) this month covers the latest developments on General Motors' electric hybrid, [the Chevy Volt](#), how solar power is taking on an [increasing role in disaster relief](#), and what's happening with [Energy Awareness Month](#).

Additionally, the governors of California and Colorado are asking other states to join them in promoting EcoDriving ([Video](#)), a nationwide effort to increase overall vehicle fuel economy and protect the environment.

On the Gee-Whiz side of things, more people are taking seriously the idea of collecting solar power in space and beaming it to earth to produce electricity ([Video](#)). In an experiment testing technology that could one day be used to transmit [solar energy from satellites to earth](#), researchers have beamed solar energy from one Hawaiian island to another, across a distance of 92 miles. The Discovery Channel sponsored the \$1 million experiment.

[Features](#) follows up on last month's story on zero-net energy buildings. That article prompted a spirited debate about the exact definition of such buildings. This month we talk to building researchers about this, and also show you some [existing, high performance buildings that approach energy parity](#).

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Voice your views on EERE's new Energy Savers Blog

EERE's new [Energy Savers Blog](#) provides a place for you to learn about and discuss energy efficiency and renewable technologies at home, on the road, and in the workplace.

Let DOE staff and others know which energy efficiency techniques work best for you, which don't. Let us know how our efforts can better serve you in saving energy.

The blog supports the [Consumer's Guide to Energy Efficiency and Renewable Energy](#), located on the [EERE Web site](#).

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Chevy Volt moves closer to reality



The much talked about Chevy Volt is due to hit the streets in 2010, giving consumers an opportunity to use all-electric power for in-town commutes.

Photo courtesy of: General Motors

General Motors (GM) announced in mid-September that the [Chevrolet Volt](#), the company's first plug-in hybrid, will hit the streets in 2010.

Rick Wagoner, GM's chairman and CEO, said "The Volt symbolizes GM's commitment to the future." The vehicle will rely on a [400-pound lithium-ion battery pack](#) to give it an approximate 40-mile range without using liquid fuel. Recharge time is several hours.

While running on electric plug-in power GM's new electric vehicle should cost less than 2 cents per mile for fuel, according to GM, compared to 12 cents a mile on gasoline at a price of \$3.60 a gallon. Beyond the initial 40-mile range, the Volt will rely on a small flex-fuel engine to generate enough electricity to drive the car about 300 miles.

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Rethink energy use during October — Energy Awareness Month

Energy Awareness Month is upon us in a few days and it is a good time to think about what we can all do to save energy and money in the winter months ahead.

DOE's [Federal Energy Management Program \(FEMP\)](#) offers a wide range of information for those interested in making energy a top priority. This year's theme is [Working to Secure a Clean Energy Future](#).

FEMP suggests that the fastest way to achieve a clean energy future is to:

- better use energy resources through efficiency and conservation;
- increase use of alternative fuels such as ethanol and biodiesel;
- accelerate the deployment of renewable energy technologies.

Here are some links to some practical energy-savings tips.

[Consumer's Guide](#) (saving energy in our everyday lives)

[Energy Star®](#) (products and techniques to save energy)

[What's Your Excuse](#) (teen and family involvement in saving energy)

[Energy Savers](#) (saving energy at home and on the road)

[Energy Saving Tips](#) (tips for consumers)

[Alternative Fuels and Advanced Vehicles Data Center](#) (resources and information for energy efficient vehicle needs. Includes an alternative fueling station locator)

[Entrepreneur-In-Residence Program](#) (EERE initiative to help move energy efficiency and renewable energy technologies into the marketplace)

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Download EERE's new renewable energy data book

EERE's new [Renewable Energy Data Book](#) (PDF 11.5 MB) ([Download Adobe Reader](#)) is now available. It offers a broad range of up to date information, including charts and graphs, about renewable energy capacity, generation, investment, state rankings, and other information that may be useful in your work.

Some key facts:

- Worldwide, wind energy is the fastest growing renewable energy technology—between 2000 and 2006 wind energy generation worldwide quadrupled. The U.S. experienced similar dramatic growth, as installed wind energy capacity increased 6.5 times between 2000 and 2007.

- In the U.S., renewable energy has been capturing a growing percentage of new capacity over the past few years. In 2007, renewable energy accounted for over 35 percent of all new capacity installations in the U.S. —a large contrast from 2004 when all renewable energy captured only 2 percent of new capacity additions.
- In 2006, the U.S. became the world's leading ethanol producer. Between 2000 and 2007 production of corn ethanol nearly quadrupled, and biodiesel production increased 225 times. Use of ethanol in the U.S. currently accounts for 4% of the total U.S. gasoline pool, up from 1 percent in 2000.

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Solar power aids in disaster relief



Weighing in at just under 80 pounds, the [Solar Stik](#) offers a versatile alternative energy solution that is easily deployable. It can be set up quickly by just one person, and its dual 50-watt solar panels are capable of producing about 80 Amp-hours per day.

Photo courtesy of: [Inhabit](#)

In the spate of major natural disasters such as Hurricanes Ike and Katrina, as well as the recent earthquake in China, emergency response teams often lean heavily on reliable solar power to deal with a crisis.

Critical within the first few hours is configuring essential power needs to coordinate search-and-rescue, medical intervention, advanced communications and rehabilitation efforts. The value of getting a backup power system running immediately cannot be underestimated when regular sources of electricity are knocked out for days and a power source is needed to provide power for water, electricity for homes, hospitals, grocery stores and a variety of other essential services. While traditional diesel and gasoline-powered generators are vital to disaster relief efforts, solar power is also playing an increasing role.

For years, the [Florida Solar Energy Center \(FSEC\)](#), a research institute at the University of Central Florida, has been a leader in disaster relief. Renewable energy equipment such as portable solar energy systems, generators, power totes, flashlights and lighting components are among the tools that FSEC uses to managing managing disaster relief operations.

Bill Young, who has been instrumental in [using solar panels to generate power during disasters](#) such as Hurricane Katrina has documented his experience.

Recently it was reported in the news that a company, Solar Stick, arrived in Galveston, Texas with [solar panels](#)

[capable of charging 100-amps-per-hour batteries](#), used to charge cellular phones, power fans and refrigerators.

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University of Oklahoma joins the renewable energy brigade

The University of Oklahoma recently announced that the school's [main campus will be entirely powered by wind by 2013](#).

Currently about 10 percent of the school's power comes from wind, but in the future, all of the school's electricity will be purchased from the new "OU Spirit Wind Farm" planned to come online in 2010. The wind farm will be built by Oklahoma Gas and Electric near Woodward, Okla.

The university also plans to use more natural gas for transportation and will open a compressed natural gas refueling station on campus.

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Features



DOE recently announced the first phase of [awards, valued at \\$15 million, for the Net-Zero Energy Commercial Building Initiative \(CBI\)](#). Twenty-one companies, including retailers, financial institutions and commercial real estate firms, will team with Pacific Northwest National Laboratory (PNNL) and National Renewable Energy Laboratory (NREL) to speed market adoption of current energy-saving technologies and produce real-building design solutions yielding significant, measurable energy savings in their commercial buildings.

Photo courtesy of: Don Larson, TimeOutofMind

What exactly *is* a zero-net energy building?

On the surface, the definition of a zero-net energy building (ZEB) is simple; it is one that produces as much energy as it uses over the course of a year. Beyond this elementary definition, things get a bit more sticky. Everyone seems to have their own idea on just how to exactly measure energy input and output.

According to Paul Torcellini, NREL buildings researcher, firm definitions have been established for net ZEBs, but there are several categories, depending on the design goals. Each type of ZEB has value in reducing energy impact.

An excellent source for learning more about all this is *Zero Energy Buildings: A Critical Look at the Definition*. ([PDF 477 KB](#))

"It's very important to establish and make known standard definitions for high-energy-performance buildings," said Drury Crawley, research analyst with EERE's Office of Building Technologies.

"Otherwise, the term, zero-net energy building, just becomes a marketing slogan that has no real meaning or value."

[EERE's High Performance Buildings Web Site](#) offers an organized gateway for studying the topic.

Here are the basic definitions:

Net Zero Site Energy

A site zero energy building produces at least as much energy as it uses in a year, when measured at the site. The measurement time frame is annual.

Net Zero Source Energy

A source zero energy building produces at least as much energy as it uses in a year, when accounted for at the source. Source energy refers to the primary energy required to generate and deliver the energy to the site. To calculate a building's total source energy, imported and exported energy is multiplied by the appropriate site-to-source conversion multipliers.

Net Zero Energy Costs

In a net zero energy costs building, the amount of money the utility pays the building owner for the energy the building exports to the grid is at least equal to the amount the owner pays the utility for the energy services and energy used over the year.

Net Zero Energy Emissions

A net zero energy emissions building produces at least as much emissions-free renewable energy as it uses from emission-producing energy sources annually. Carbon, nitrus oxide and sulphur oxide are common emissions that ZEBs offset.

Near Zero Energy

A near zero energy building produces at least 75 percent of its required energy through the use of on-site renewable energy. Off-grid buildings that use some non-renewable energy generation for backup are considered near zero energy buildings because they typically cannot export excess renewable generation to offset for fossil fuel energy use.

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Enter your building in EERE's Zero Energy Buildings Database

[EERE's Zero Energy Buildings Database](#) profiles commercial buildings that produce as much energy as they use over the course of a year. The database highlights projects from across the country and provides ideas that can be applied to any new building.



The Aldo Leopold Legacy Center in Wisconsin uses a combination of energy-savings and PV-generated

power to reach net zero energy.

Photo courtesy of: Aldo Leopold Center

For example, the [Aldo Leopold Legacy Center](#) in Baraboo, Wisc. is a carbon-neutral, net zero energy building (ZEB) that incorporates a 39.6-kW rooftop photovoltaic (PV) array that produces roughly 10 percent more energy than needed to operate the building for a year.

The zero energy buildings database is part of EERE's high performance buildings database that lists many additional projects. Visit the [high performance buildings database](#) to discover more energy efficient building techniques.

If you think you have a building that will qualify as a ZEB, or a High Performance Building, go to [EERE's Building Technologies Program Database](#) to learn how you can list your own project in this worldwide showcase.

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NREL examines six high-performance buildings

Commercial buildings account for approximately 18 percent of the total primary energy consumption in the U.S.

DOE's [Building Technologies Program](#), wanting to improve the energy performance of such buildings, is working to establish the knowledge and technology bases needed to reach the goal of marketable zero-energy commercial buildings (ZEBs) by 2025.

[NREL researchers](#) have studied six widely different low energy, commercial buildings for four years to better understand the interplay of building design, construction, operation and energy use evaluation; [what they have learned](#) will help builders take the next steps in reaching zero-energy buildings.

Lessons learned:

- This set of buildings showed progress toward achieving a ZEB goal in actual commercial buildings. Each exhibits energy savings of 25 to 70 percent, compared to current code.
- The lessons learned in these buildings can be replicated in the marketplace.
- Information leads to better building management and performance. Whole-building energy performance must be monitored, tracked and verified. This provides the necessary informational feedback loop that helps optimize and maintain the efficient performance of the design.
- Owners provide the main motivation for low-energy buildings. Each owner set goals and kept the projects, including operation, on track.
- Setting measurable energy savings goals at project onset is crucial. Architects, engineers, builders and owners setting the most aggressive energy-savings goals came closest to realizing them.
- Building decision-making must be motivated by *value*, not lowest cost.
- Today's off-the-shelf technologies can substantially improve building energy performance. However, these technologies and strategies must be integrated into whole building design, installation and operation to realize sought-after energy savings.
- Whole-building design is a good way to lower energy cost and use.
- Low-energy buildings do not always operate as they were designed. The design community rarely goes back to see how their buildings perform after they have been constructed. Measurements in all six buildings showed that they used more energy and produced less energy than predicted in the design/simulation stage.

NREL has developed excellent descriptions of the six buildings studied; they are well worth exploring:



Photo courtesy of: NREL

**Adam Joseph Lewis Center,
Oberlin College, Ohio ([PDF 1.5 MB](#))**

Oberlin College designed this building with a focus on sustainability. As well as being highly energy efficient, the Center is designed to be a laboratory, trying new strategies to save energy.

The net result is a building with a measured energy savings of 63 percent, as compared to a base case building. The 13,600-square-foot building relies on the sun for daylighting, passive heating and power. The PV system provides more than half of the center's electricity. A closed-loop groundwater heat pump system provides cooling and some heating.



Photo courtesy of: NREL

**Zion National Park Visitor Center,
Utah ([PDF 803 KB](#))**

In creating this visitors center, the National Park Service worked with NREL to create a sustainable building that fits in with Zion's natural beauty.

Primary lighting comes through daylighting. The clerestory windows are part of the lighting system as well as part of the heating and cooling systems.

A computer ensures that all the energy efficiency features work together, collects weather data and makes

energy decisions about the building. Natural shade and landscaping play into the system. A Trombe wall provides most of the heating for the building.



Photo courtesy of: NREL

**Cambria Office Building,
Pennsylvania ([PDF 269 KB](#))**

This 36,000-square-foot building is based on the concept of integrated design. Designers and builders evaluated and minimized energy use and pollution created in the production of the materials used.

Raised access flooring provides an under-floor-supply air plenum for displacement heating and cooling.

Green Mountain Energy purchases all the solar power the building produces at a premium price, and then sells back whatever portion the building actually consumes. This arrangement is a cost benefit to the power company, the building owner, and the building lessee.



Photo courtesy of: NREL

Philip Merrill Environmental Center, Chesapeake Bay, Maryland ([PDF 679 KB](#))

The shed roof of this building allows for easy, efficient harvesting of rainwater and also encourages an open interior design.

Natural light, views and fresh bay air are never far from any desk or meeting room. The design uses operable windows for natural ventilation.

Sensors keep track of outdoor temperatures and humidity and automatically shut down air conditioning and open motor operated windows.

Structurally insulated panels form the building envelope, resulting in a higher R-value than conventional construction.



Photo courtesy of: NREL

**Thermal Test Facility,
NREL, Colorado ([PDF 331 KB](#))**

This facility, built in 1996, takes advantage of integrated design and many cost-effective energy efficient features. The 11,000-square-foot building boasts an energy cost savings of 63 percent for heating, cooling and lighting.

A computer-controlled energy management system monitors temperature, humidity, air pressure, duct pressure, light levels and carbon dioxide levels in the building to determine the most efficient mix of methods for maintaining comfortable working conditions in the building.

For example, at any given time, the system may turn on ceiling fans rather than relying on the more energy intensive main air handling unit.



Photo courtesy of: NREL

**BigHorn Home Improvement Center,
Colorado** ([PDF 698 KB](#))

NREL worked with BigHorn designers to build one of the nation's first commercial buildings to integrate daylighting and natural ventilation cooling systems into a retail space.

A translucent skylight runs the full length of the warehouse, and north-south facing clerestory windows along the length of the retail space provide lighting and passive solar heating in the winter and natural ventilation in the summer. No air-conditioning system is needed.

A 9.0 kilowatt capacity integrated photovoltaic system, laminated onto the metal roof panels, is expected to provide an average of 25-percent of the electricity to run the building.

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EERE News Releases

September 26, 2008

[DOE Awards \\$15 Million in Technical Assistance to Support Major Retailers, Financial Institutions and Real Estate Firms to Adopt Energy-Efficient Technologies](#)

September 19, 2008

[DOE Funds 15 New Projects to Develop Solar Power Storage and Heat Transfer Projects For Up to \\$67.6 Million](#)

September 18, 2008

[DOE Selects Projects for Up to \\$7.3 Million for R&D Clean Technology Water Power Projects](#)

September 12, 2008

[DOE and Ad Council Launch Energy Efficiency Campaign for Youth](#)

September 10, 2008

[DOE to Invest up to \\$4.4 Million in Six Innovative Biofuels Projects at U.S. Universities](#)

September 09, 2008

[U.S. Energy Department Turns on Headquarters' Solar Energy System](#)

September 08, 2008

[DOE Announces \\$6.6 Million in Competitive Grant Selections For Innovative State Efficiency, Renewables Initiatives](#)

August 29, 2008

[DOE Announces Up to \\$7 Million for Technology Commercialization Acceleration](#)

August 28, 2008

[Australia, Iceland and the U.S. Launch International Partnership to Promote Advanced Geothermal Technologies](#)

August 25, 2008

[DOE Kicks Off Old Refrigerator Recycling Effort](#)

August 22, 2008

[DOE Announces \\$26 Million to Develop Energy Efficient Processes for U.S. Industry](#)

August 14, 2008

[DOE announces up to \\$15.3 million for long-term hydrogen vehicle development](#)

August 12, 2008

[DOE to invest up to \\$24 Million for breakthrough solar energy products](#)

August 5, 2008

[DOE to pursue zero-net energy commercial buildings](#)

August 4, 2008

[DOE announces contracts to achieve \\$140 million in energy efficiency improvements to DOE facilities](#)

July 31, 2008

[Climate Change Science Program issues report on climate models](#)

July 31, 2008

[DOE and USDA announce more than \\$10 million in bioenergy plant feedstock research](#)

July 30, 2008

[Assistant Secretary Alexander "Andy" Karsner announces resignation](#)

July 29, 2008

[DOE selects ASE to manage and operate its National Renewable Energy Laboratory](#)

July 24, 2008

[U.S. and New Zealand take steps to launch international partnership to further the development of clean energy on island nations](#)

July 23, 2008

[DOE launches EnergySmart Hospitals to promote improved energy efficiency in healthcare](#)

July 14, 2008

[DOE to Provide up to \\$40 Million in Funding for Small-Scale Biorefinery Projects in Wisconsin and Louisiana](#)

July 13, 2008

[DOE Commits \\$850,000 to Support NGA Energy Initiatives](#)

July 09, 2008

[DOE Headquarters Receives Energy Star Recognition from EPA](#)

July 07, 2008

[DOE and Sweden Sign MOU to Advance Market Integration of Plug-in Hybrid Vehicles](#)

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Reader Comments

August issue: Renewable Energy Bill:

Senators need to continue to work with executives for extending the [renewable energy] bill to: encourage development of renewable energy, and to better compete with European countries for domestic business. — **S.R.**

August issue: general comment from Bangladesh:

Thank you for your 'August EERE Program News -- Connecting the Dots in the Electricity Transmission Puzzle'. This 'EERE Program News' [is] important for us. — **I.I.H.S.**

August issue: Anschutz Transmission Project:

Connecting wind energy from Wyo. to Las Vegas and Calif. is very good, but should not be limited to transmission of wind energy only. What is needed is a new national grid of buried lines that can interconnect and route generic electricity across the country. This is an inherently governmental imperative. A patchwork quilt of State and private initiatives built to separate standards just won't fill the bill. — **J.S.**

August issue: Zero-net Energy Commercial Buildings:

We are under construction of a commercial building which will be a net zero energy building, using vertical wind generators, ICF construction LED lights, passive solar design and planted roofs to achieve the resultant energy usage. In fact, the building will put more energy into the grid than it uses. — **R.L., Grand Prairie, Texas**

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Speeches, Op-Eds and Testimony

July 27, 2008 (as printed in the New York Times)

[Breaking oil addiction: the Energy Secretary's views](#)

I agree with Mr. Friedman's assertion that we must break "our addiction to oil." But it is ridiculous and unfounded to claim that the president's response to this challenge consists only of an effort to expand offshore drilling. ...On the demand side, the president signed into law increases in fuel efficiency standards and financed critical research into gas-saving technologies like advanced batteries and hydrogen fuel cells. ...On the supply side, we've spent more than \$12 billion to advance alternative energy sources.... ...[and announced] the availability of more than \$30 billion in clean-energy project loan guarantees.

July 23, 2008

[Statement of Steven G. Chalk, Deputy Assistant Secretary for Renewable Energy, before the Committee on Energy and Natural Resources, United States Senate](#)

Topic: Reducing gasoline demand and transportation greenhouse gases.

July 17, 2008

[Statement of David Rodgers, Deputy Assistant Secretary for Energy Efficiency, before the Committee on Energy and Commerce Subcommittee on Energy and Air Quality, United States House of Representatives](#)

Topic: Buildings, energy efficiency and greenhouse gases.

July 15, 2008

[Statement of Alexander Karsner, Assistant Secretary for Energy Efficiency and Renewable Energy, before the Committee on Energy and Natural Resources, United States Senate](#)

Topic: The challenges and opportunities of clean energy investment.

July 10, 2008

[Testimony of Steven G. Chalk, Deputy Assistant Secretary for Renewable Energy, before the Subcommittee on Clean Air and Nuclear Safety Committee on Environment and Public Works, United States Senate](#)

Topic: DOE's research and development of the next generation of biofuels.

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Events

If you have an event scheduled within the next year of regional or national interest to the energy efficiency and renewable energy communities, please contact us with pertinent information and a web link and we will include it in EERE Program News. — [Jack Jenkins](#), [John Horst](#), [Mariel Sala](#)

[31st World Energy Engineering Congress](#) — Oct. 1-3, Washington, D.C.

National event to assess the economic and market forces, new technologies, regulatory developments and industry trends shaping our energy future.

[2008 Geothermal Resources Council Annual Meeting](#) — Oct. 5-8, Reno, Nev.

International forum on latest advances in geothermal technologies. Companion (U.S.) Geothermal Energy Association Trade Show exhibits latest geothermal equipment and services.

[Solar Power 2008](#) — Oct. 13-16, San Diego, Calif.

Sponsored by the Solar Energy Industries Association (SEIA) and the Solar Electric Power Association (SEPA), conference will cover market opportunities for U.S. solar industry.

[International Distillers Grains Conference and Trade Show](#) — Oct. 19-21, Indianapolis, Ind.

U.S. Grains Council and USDA's ' Foreign Agriculture Service will bring together approximately 140 major foreign buyers, nutritionists, and feed ingredient importers.

[National Renewable Energy Marketing Conference](#) — Oct. 26-29, Denver, Colo.

Attended by power suppliers and marketers, renewable energy developers, utility executives, and equipment manufacturers, conference will address major issues facing the industry; will also announce 2008 Green Power Leadership Awards.

[2008 Fuel Cell Seminar & Exposition](#) — Oct. 27-30, Phoenix, Ariz.

An expected 2000 participants and 175 exhibiting companies will cover all phases of fuel cell development,

including what's happening internationally.

[NREL's 21st Industry Growth Forum](#) — Oct. 28-30, Denver, Colo.

Join the National Renewable Energy Laboratory at the nation's largest venture event focused exclusively on companies developing clean energy products and services.

[Wind Expo Latin American Wind Energy Association 2008](#) — Nov. 5-7, Guadalajara, Mexico

First Latin American Wind Energy Association (LAWEA) Wind and Renewable Energy Conference and Exhibition, organized by the Latin American Wind Energy Association.

[2008 Congress of Cities & Exposition](#) — Nov. 11-15, Orlando, Fla.

The National League of Cities' Annual Congress of Cities and Exposition is the municipal government marketplace for administrators, city managers, council members, department directors and mayors.

[AES08 - kClean Energy Roundtable:Advanced Energy Storage](#) — Dec. 2-4, La Jolla, Calif.

The meeting's theme is "Advanced Energy Storage: Enabling the Smart Grid, Distributed Generation, and Renewables."

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