



The business, programs and policies of moving new energy products into the marketplace

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This issue is heavy on **News** items, from retrofitting hydroelectric dams to Honolulu's plan to pump cold sea water from the deep ocean to help cool city buildings.

In **Features** the U.S. Air Force has moved to the forefront in integrating renewable energy and energy efficiency into its national security role. This is stimulating a new partnership among military and civilian agencies adopting these technologies.

Also, check out the story to the immediate right: SolarImpulse — Around the World in a Solar Airplane. You cannot watch the video without thinking about the Wright Brothers at Kitty Hawk over 100 years ago.



[Solar Impulse](#), a prototype Swiss-engineered, solar-powered airplane is built of lightweight carbon fiber covered with a thin layer of photovoltaic cells. The plane's 262-foot wingspan is about the same length as the wingspan of the new Airbus A380 Super Jumbo Jet. But while the A380 weighs about 580 tons, Solar Impulse weighs about 1.5 tons. It is designed to stay aloft for days at a time. [\(video\)](#)

Photo courtesy of [SolarImpulse](#)

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## News

### California pushes renewables and energy efficiency

California Governor Arnold Schwarzenegger recently turned up the heat on utilities, pushing them further toward renewable energy. He signed an executive order requiring the state's utilities to get a third of their electricity from renewable energy sources by 2020.

The state currently has a 20 percent renewable power requirement by 2010 for investor-owned utilities only, but the new executive order extends and increases that mandate to include public power utilities and other electricity providers as well.

In a complementary move, [the state also expanded its "feed-in tariff"](#) that directs large utilities to pay their customers for the power they produce and "feed in" to the grid. The utilities are required to purchase the customer-produced power at standard rates or ["tariffs"](#) that are adjusted to account for the time when the power is produced.

Power produced during times of peak demand earns the highest rate. The [new law](#) also doubles the maximum system size from the current 1.5 megawatts to 3 megawatts and requires long-term agreements that will be in effect for 10 to 20 years.

The law also increases the statewide cap for such feed-in tariff agreements to 750



California continues to aggressively pursue renewable energy use as well as promote energy efficiency in homes and businesses.

Photo courtesy of: [Benjaminwey](#)

megawatts, up from 500 megawatts.

On the energy efficiency side of the equation, the California Public Utilities Commission (CPUC) has approved a \$3.1 billion slate of ratepayer-supported energy efficiency programs for 2010-2012.

One benefit cited by CPUC in making the ruling will be the launching of the nation's largest home retrofit program. Under the [California Statewide Program for Residential Energy Efficiency](#), the state aims to achieve a 20 percent energy savings for up to 130,000 homes over a three-year span.

The CPUC will also provide \$175 million to encourage the construction of net zero energy homes and commercial buildings. The funding will help with design assistance, incentives for new buildings that exceed the state's energy code, and research and demonstration of new energy technologies.

Additionally, the CPUC program sets aside \$260 million for 64 cities, counties and regional agencies. The funding targets public building retrofits and other municipal energy efficiency opportunities.

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## **Dam upgrades**



A new state-of-the-art turbine at the Packwood Lake, Wash. hydroelectric facility will increase low-power efficiency by six percent while also helping to improve downstream fish and wildlife habitat.

Photo courtesy of: [Visitrainier.com](#)

Hydropower tops the charts in renewable energy production, and DOE wants to make it even better. The Department has selected [seven projects to modernize existing hydropower infrastructure and make it more efficient](#).

The targeted hydro generation projects will, on average, have estimated incremental generation costs of less than 4 cents per kilowatt-hour.

Improvements at the selected projects will increase generation by an estimated 187,000 megawatt-hours per year, enough to meet the annual electricity usage of more than 12,000 homes.

The incremental generation will be virtually carbon free, representing a reduction in carbon dioxide emissions of more than 110,000 tons per year compared to typical grid-available electricity.

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## **Recovery Act boosts geothermal energy development**

DOE recently announced up to [\\$338 million in Recovery Act funding for the exploration and development of new geothermal fields and research into advanced geothermal technologies](#).

Recovery Act funding will support 123 geothermal projects in 39 states. The DOE grants will be matched with an additional \$353 million of private and non-federal cost-share

contributions.

“Geothermal energy holds enormous potential,” DOE Secretary Steven Chu said. “These investments in technological innovation will allow us to capture more of this clean, carbon-free energy at a lower cost than ever before.”

Financing has long been an impediment to geothermal energy development, with most projects requiring heavy up-front investment.

A recent [report from Islandsbanki](#), an Icelandic bank with long-time expertise in financing geothermal energy development and other renewable energy projects, found that the U. S., using current technologies, could generate another 40,000 megawatts from geothermal resources.

More importantly , the report estimates that, [with the development of new enhanced geothermal systems, the U.S. could bring an additional 517,800 megawatts online.](#)

Geothermal resources, once developed, have the advantage of providing continuous base-load power at a competitive cost compared with other energy sources. The Icelandic study notes that, "Taking into account the long life span of a geothermal plant, its base-load capacity and predictability, it provides a levelized cost of electricity that is very cost competitive against not only renewable, but also traditional energy sources."

DOE's new Recovery Act geothermal grants are directed precisely at the areas pointed out in the Icelandic study: identifying and developing new geothermal fields and reducing the up-front risk associated with geothermal development through innovative exploration and drilling projects and data development and collection.

A portion of the Recovery Act funding will also be used to demonstrate the deployment of ground source heat pumps for heating and cooling of a variety of buildings in everyday use.

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The earth's molten core holds virtually unlimited thermal potential. DOE is funding enhanced geothermal development to tap this heat as sustainable energy for human use.

Photo courtesy of: [Eniscuola](#)

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## **TVA to buy wind power from Great Plains**

The Tennessee Valley Authority (TVA), the nation's largest public utility, has the capacity to pump out a staggering 32,000 megawatts of electricity. It gets most of this power from hydro, nuclear and coal generation. Now, 450 megawatts of imported wind generation will be added to the list.

[The utility has signed 20-year power purchase agreements](#) with Maryland-based CVP Renewable Energy Co. and Chicago-based Invenergy Wind LLC for electricity generated by wind farms being built in McIntosh County, N.D. and Roberts County, S.D.

TVA's call to purchase up to 2,000 megawatts of renewable energy attracted more than 60 proposals.

Informed sources say that TVA could announce three more wind contracts by year's end. The utility's move mirrors actions by other energy providers to increase wind power

generation. It also spotlights the need for improved and increased transmission lines from the Great Plains wind corridor to population centers in other regions.

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## Honolulu turns to the sea for air conditioning



After years of study, Hawaii is ready to plumb deep into the sea for cold water to help cool buildings in urban Honolulu.

Photo courtesy of: [USNews](#)

Many have long derided it as a pipe dream, but Honolulu, Hawaii, is moving ahead with its [plan to pull cold sea water from the deep ocean to help cool city buildings](#).

The state government recently approved an environmental study of the project, with the goal of helping reduce the state's dependence on fossil fuels while slashing power bills that are the highest in the nation.

The long-studied cooling project by [Honolulu Seawater Air Conditioning](#) would extend plumbing nearly 5 miles offshore, suck 45-degree water from 1,800 feet deep, circulate frosty water into buildings' existing air conditioning systems and then dump it back

into the sea.

Project proponents say that buildings using the system will save up to 75 percent of the electricity they currently use on air conditioning. These savings take into account the electricity needed to power the sea water system's vast pumping requirements.

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## Features



The U.S. Air Force Academy is working to develop the full renewable energy and energy efficiency potential of its Colorado Springs, Colo. campus.

Photo courtesy of: U.S. Air Force

## **Air Force Academy aims for net zero energy use**

[The U.S. Air Force Academy near Colorado Springs, Colo. is committed to be the first institution of its kind to reach net zero energy use](#), producing or purchasing as much renewable energy as it consumes.

As the training institution for 8,200 cadets and leaders in tomorrow's military, the Academy wants to walk the talk as it teaches its cadets the importance of energy efficiency and renewable energy in today's military.

According to Tom Hykes, the Academy's Resource Efficiency Manager, "The cadets we're training here will be deployed into leadership positions all over the world. It is certainly one of our goals to make sure they understand their role in leading the charge towards energy sustainability and security."

What began as a self-imposed initiative at the Academy has now gained the official backing of Air Force Headquarters, the Department of Defense, and DOE. The National Renewable Energy Laboratory has signed on to aid the Academy installation in fulfilling its net zero energy objectives.

While it might be easy to be skeptical of large agencies announcing such a sweeping change, the Air Force already has one of the best records in government in implementing energy efficiency and renewable energy projects.

Sharon Gill, DOE project manager and a former base energy manager for Buckley Air Force Base in Aurora, Colo., said, "You have to realize that

when the Air Force command makes an energy efficiency and renewable commitment, it



Air Force Academy cadets learn the importance of energy efficiency and renewable energy in their military careers.

Photo courtesy of: U.S. Air Force

means it. At Buckley alone, we instituted \$20 million in energy efficiency improvements between 2005 and 2009."

[The Air Force currently uses more green power — 426.2 million kilowatt hours \(kWh\) annually](#) — than any other branch of government, over a third more than the second-place Environmental Protection Agency (EPA) and twice as much as third-place DOE.

[The Air Force has also won top honors from the EPA and DOE's Green Power Awards:](#)

- 2003: Green Power Partner of the Year;
- 2004: Green Power Leadership Award;
- 2005: Green Power Partner of the Year;
- 2008: Green Power Leadership Award.

One of the Air Force's more notable renewable energy applications went operational in 2007, a [14-megawatt solar array at Nellis Air Force Base in Nevada](#). To date, the system has produced 63.8 gigawatts of energy, enough to power 5,300 homes. ([daily power meter](#))

[The Nellis Solar Array](#), compared to conventionally generated electricity, has also reduced emissions of carbon dioxide by over 40,000 tons. Based on [EPA's eGrid calculations](#), this is equivalent to planting nearly 8,200 acres of trees or taking 7,000 cars off the road.

All this adds credence to the Air Force's pledge of making the Academy a net-zero energy user.

While the Academy's Net-Zero Initiative centers on developing a renewable energy supply, approximately one-third of the total savings will come from energy efficiency — shifts in energy use and developing a more energy-efficient infrastructure. Here is how it works:

## **Buildings**

Building improvements are centering on the 6.4 million square feet of facilities already in use. Improvements will include:

- High efficiency mechanical, electrical and HVAC equipment;
- Security and energy efficiency upgrades to window wall systems;
- Improved building insulation;
- Utilization of natural lighting;
- Energy-focused roofing replacements.

The Academy's goal in making these improvements is to have all its buildings reach or exceed the U.S. Green Building Council's [Leadership in Energy and Environmental Design \(LEED\) Gold](#) standard.

## **Transportation**

The Academy is working to reduce the 275,000 gallons of transportation fuel used annually. Strategies include:

- Replace existing 4-wheel-drive vehicles with smaller, more fuel efficient models (an approximately 40 percent fuel savings per vehicle);
- Convert 90 fleet vehicles to hybrid, low speed vehicles;
- Replace 20,000 gallons of conventional diesel with bio diesel produced from waste food oil from one of its dining halls;
- Expand use of compressed natural gas vehicles;
- Deploy 10 electric-powered buses for intra-base shuttle use.

## Renewable Energy

The Academy's 18,500 acre campus offers several possibilities for generation of up to an estimated 12 megawatts of electricity on-site:

- Biomass waste fermentation to power;
- Woody biomass conversion;
- On-site solar array;
- Rooftop solar arrays;
- Small hydropower;
- Low profile wind power;
- Geothermal heat pump applications.

The U.S. Air Force and its Academy are truly pushing the envelope on the new energy frontier.

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## **Air Force actions lead to new renewable energy coalition**

In a first-of-its-kind collaboration, Colorado's elected officials, military and energy leaders have formed the Front Range Renewable Energy Consortium (FRREC) to collaboratively develop and utilize the state's renewable energy and energy efficiency resources.

FRREC now includes:

- Department of Defense and military (Air Force, Army, Colorado National Guard);
- DOE and the National Renewable Energy Laboratory;
- Governor's Energy Office;
- USNORTHCOM/NORAD;
- Xcel Energy;
- Tri-State Generation;
- Colorado Springs utilities.

Larry Posanka, organizer of the consortium, said, "We looked at the Energy Policy Act and the Homeland Security Act and determined that as far as energy is concerned, these acts run on parallel tracks — so let's bring together all the various players, establish some common goals and see how we can work together to reach them.

"The first goal is to use the economies of scale to develop renewable energy projects that utilize the strengths of all the participating agencies.

"Another goal is to build a collaborative effort with the Rocky Mountain Secure Grid Initiative for distributed renewable energy generation — how best to assemble a smart grid that is also a secure grid.

"Ultimately we want the state's military bases to build a strong foundation of secure, renewable energy generation that also incorporates the very best energy efficiency measures. We also want this distributed energy grid to integrate and help strengthen civilian distributed energy development.

"In time of national emergency or attack, a network of distributed renewable energy generation can offer a secure, robust energy supply to keep the planes flying, the satellites in the sky and command and control in operation."

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## Army's Fort Carson joins net zero energy movement

The U.S. Army's [Fort Carson](#), based in Colorado, is [striving to achieve a net-zero energy status](#). Base command hopes to reach this goal by 2015. Their strategies include on-site renewable energy generation as well as renewable energy purchases and energy efficiency projects.



The U.S. Army's Fort Carson wants to become a net zero energy user, relying on wind, solar and biomass energy, plus improved energy efficiency, to reach its goal.

As of the end of 2008, Fort Carson consumed nearly 150,000 megawatt-hours of electricity and 1,200,000 thousand cubic feet of natural gas annually. The Army will consider the base a net zero energy user when renewable energy sources equal or surpass these quantities. The renewable energy needed can also be reduced by improving the energy efficiency of the base. The Army will use both approaches to meet its goal.

Photo courtesy of: U.S. Army

Identified projects include:

- Two megawatt on-site solar array (completed 2007);
- 10 megawatt on-site wind turbines (under evaluation);
- Wind power purchase agreement (under negotiation);
- Wood-fired boiler (under evaluation);
- Energy efficient boiler replacements (under construction);
- Energy efficiency lighting projects (waiting for funding);
- Energy efficiency — Greening the Data Center (initial assessment).

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### News Releases

Nov. 23, 2009

[DOE to invest \\$18 million in small business clean energy innovation projects](#)

Nov. 23, 2009

[Secretary Chu announces \\$45 million to support next generation of wind turbine designs](#)

Nov. 18, 2009

[Department of Energy announces more than \\$104 million for national laboratory facilities](#)

Nov. 18, 2009

[DOE and USDA select projects for more than \\$24 million in biomass research and development grants](#)

Nov. 17, 2009

[Obama administration announces nearly \\$40 million for energy efficiency and conservation projects in Florida and Maine](#)

Nov. 5, 2009

[Secretary Chu highlights support for clean energy and energy efficiency projects in Indian](#)

## Country

Nov. 4, 2009

[Hydropower upgrades to yield added generation at average costs less than 4 cents per kWh - without new dams](#)

Nov. 3, 2009

[Secretary Chu announces more than \\$155 million for industrial energy efficiency projects](#)

Nov. 3, 2009

[Obama Administration announces more than \\$38 million for energy efficiency and conservation projects in Alaska, Kansas, Utah and West Virginia](#)

Nov. 2, 2009

[DOE awards up to \\$5.5 million for X PRIZE to promote clean, energy efficient vehicles](#)

Oct. 30, 2009

[Secretary Chu's weatherization Op-Ed in the Huffington Post](#)

Oct. 29, 2009

[Department of Energy awards \\$338 million to accelerate domestic geothermal energy](#)

Oct. 27, 2009

[Secretary Chu announces \\$24 million loan for Tenneco Inc. for advanced vehicle technology](#)

Oct. 27, 2009

[President Obama announces \\$3.4 billion investment to spur transition to smart energy grid](#)

Oct. 19, 2009

[Vice President Biden unveils report focused on expanding green jobs and energy savings for middle class families](#)

Oct. 16, 2009

[2009 Solar Decathlon winners announced](#)

Oct. 15, 2009

[2010 annual fuel economy guide now available](#)

Oct. 15, 2009

[Secretary Chu announces new investments in cutting-edge wind energy research facilities](#)

Oct. 13, 2009

[DOE announces steps to strengthen enforcement of energy efficiency standards](#)

Oct. 13, 2009

[Team California wins the communications contest at DOE Solar Decathlon](#)

Oct. 12, 2009

[DOE Secretary Chu issues call to action on carbon capture and storage](#)

Oct. 8, 2009

[DOE announces \\$87 million in funding to support solar energy technologies](#)

Oct. 7, 2009

[DOE announces new private sector partnership to accelerate renewable energy projects](#)

Oct. 1, 2009

[DOE Solar Decathlon coming to National Mall](#)

Oct. 1, 2009

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[Obama Administration delivers nearly \\$72 million for energy efficiency and conservation projects in 7 states and territories](#)

Sept. 30, 2009

[DOE announces testing for AeroSys, Inc. products to ensure compliance with appliance standards](#)

Sept. 24, 2009

[Obama Administration delivers more than \\$106 million for energy efficiency and conservation projects in 9 states](#)

Sept. 22, 2009

[Treasury, Energy surpass \\$1 billion milestone in Recovery Act awards for clean energy projects](#)

Sept. 15, 2009

[DOE awards up to \\$14.6 million to support development of advanced water power technologies](#)

Sept. 14, 2009

[DOE to fund up to \\$454 million for retrofit ramp-ups in energy efficiency](#)

Sept. 14, 2009

[DOE delivers more than \\$354 million for energy efficiency and conservation projects in 22 states](#)

Sept. 14, 2009

[Obama Administration delivers more than \\$60 million for weatherization programs in six states and territories](#)

Sept. 14, 2009

[Obama Administration awards more than \\$18.6 million for Oklahoma's state energy program](#)

Sept. 14, 2009

[DOE recognizes green power network leaders](#)

Sept. 10, 2009

[DOE recognizes midwest industrial efficiency leaders](#)

Sept. 4, 2009

[Vice President Biden announces finalized \\$535 million loan guarantee for Solyndra](#)

Sept. 2, 2009

["Cash for Clunkers" replaces 700,000 vehicles with more efficient models](#)

Sept. 1, 2009

[Treasury, Energy announce \\$500 million in awards for clean energy projects](#)

Sept. 1, 2009

[Secretary Chu announces completion of critical energy conservation appliance standards](#)

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## Reader Comments

### October —Louisiana moves toward sugar cane-based ethanol

"It would be great if they could gene splice some genes from the bamboo plant into sugar cane. Bamboo grows about a foot a day, if I'm not mistaken. After some of the sugar is removed for human consumption, the pulp could then be used for making ethanol and what's left could perhaps become plywood or chipboard.

"They should also see if that 'super weed' that's showing up in cotton fields all across the south can be used for making ethanol."

— A. L.

*Editor's note: I'm assuming that the "super weed" that you are talking about is [Cogon Grass](#), an invasive plant that started taking root in the Southern U.S. after it was included as packing material from ships arriving in Mobile, Ala. around the turn of the last century.*

*Ed Brown, a spokesman for the Mississippi Forestry Commission, said, "I've actually seen it taking over a patch of kudzu."*

*Sounds too nasty to cultivate, for sure.*

### **October —Space-based solar power**

"The calculation in the linked article seems incorrect. 1,000 megawatt should be enough (depending on various different calculations) to provide 300,000 to 1,000,000 households with electricity.

— R. L.

*Editor's note: You are correct. [The linked article indicated that only 1,000 homes could be powered by 1,000 megawatts]*

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## **Speeches, Op-Eds and Testimony**

October 27, 2009

[Remarks by President Obama on Recovery Act funding for smart grid technology](#)

Sept. 30, 2009

[Richard Kidd, program manager, FEMP Office of Energy Efficiency and Renewable Energy, before the House Veterans Affairs Committee](#)

Subject: Energy Efficiency at the Department of Veterans Affairs

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## **Events**

*If you have an event scheduled 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](#) or [Julie Behrens](#)*

[Federal Energy Management Program \(FEMP\)](#) — holds technical workshops around the nation throughout the year, plus webinars; check this link for continuously updated information on these events.

[Industrial Technologies Program](#) — holds specialized workshops and on-line webinars year-around. Check this link for a continuously updated schedule.

[Ecobuild America](#) — Dec. 8-10, Washington, D.C.

Ecobuild America educates design and construction professionals on how to improve our built environment. Emphasis on creating high performance, sustainable structures, and doing it faster and more profitably.

[Austin Climate Protection Conference & Expo](#) — Jan. 15-16, 2010, Austin, Texas

Event integrates elements of the Austin Climate Protection Plan such as transportation, green building, water conservation, waste management and energy efficiency.

[International Builders Show](#) — Jan. 19-22, 2010, Las Vegas, Nev.

This show will center on how builders can retool their businesses and educate themselves to be ready when the housing market turns around.

[ASHRAE Winter Conference](#) — Jan. 23-27, 2010, Orlando, Fla.

Conference will seek to advance the state of the art in indoor environmental control by focusing the technical program on the theme "Humidity and Sustainable Indoor Environment"; will include tracks on energy conservation and alternative energy sources, sustainability, humidity and load calculations.

[Better Buildings: Better Business Conference](#) — March 3-5, 2010, Wisconsin Dells, Wis.

Learn how to build homes that deliver the energy savings customers want, about renewable energy technologies that reduce energy costs and how energy efficiency and green building practices keep your business competitive.

[NESEA's BuildingEnergy 2010](#) — March 9-11, 2010, Boston, Mass.

The Northeast Sustainable Energy Association's annual conference will bring together professionals who help shape the practice of sustainability. Nearly 200 presenters will define the leading edge of smart building, energy efficiency and renewable energy.

[2010 IEEE PES Transmission and Distribution Conference](#) — April 19-22, 2010, New Orleans, La.

The conference and exposition will bring together the world's leading power system equipment manufacturers and technical professionals to display their products, explore new technology and enhance existing technologies.

[ACI Home Performance Conference 2010](#) — April 19-23, Austin, Texas

Affordable Comfort Inc.'s 2010 conference will present a variety of information and training sessions related to home energy efficiency, safety and comfort.

[National Green Builders Products Expo](#) — April 27-28, Las Vegas, Nev.

The National Green Builders Products Expo is a trade-to-trade only event.

[National Hydrogen Association Conference & Expo](#) — May 3-6, 2010, Long Beach, Calif.

The NHA Hydrogen Conference and Expo is the largest hydrogen conference in the United States and the longest running annual hydrogen conference in the world.

[National Green Building Conference](#) — May 16-18, Raleigh, N.C.

Sponsored by the National Association of Home Builders, conference will feature a variety of speakers and companies involved in green building technologies and sustainable living.

[SOLAR 2010](#) — May 17-18, Las Vegas, Nev.

One of America's leading conferences on emerging trends, technology and opportunities that shape the new energy economy.

[13th Annual Nanotech 2010](#) — June 21-25, Anaheim, Calif.

The world's largest nanotechnology event, NSTI Nanotech 2010, delivers application-focused research from the top international academic, government and private industry labs.

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