

## SOLAR ENERGY ZONES

Under initiatives announced recently by Secretary of the Interior Ken Salazar and Senator Harry Reid (D-NV), federal agencies will work with leaders in the West to designate tracts of U.S. public lands as prime zones for utility-scale solar energy development, fund environmental studies, open new solar energy permitting offices, and speed reviews of industry proposals.

“President Obama’s comprehensive energy strategy calls for rapid development of renewable energy, especially on America’s public lands,” said Salazar. “This environmentally sensitive plan will identify appropriate Interior-managed lands that have excellent solar energy potential and limited conflicts with wildlife, other natural resources, or land users. The two dozen areas we are evaluating could generate nearly 100,000 megawatts of solar electricity.”

Known as solar energy study areas, 24 tracts of Bureau of Land Management-administered land (encompassing about 1,046 square miles) located in Nevada, Arizona, California, Colorado, New Mexico, and Utah would be fully evaluated

for their environmental and resource suitability for large-scale solar energy production. The objective is to provide landscape-scale planning and zoning for solar projects on BLM lands in the West, allowing a more efficient process for permitting and siting solar development.

Those areas selected would be available for projects capable of producing 10 or more megawatts of electricity for distribution to customers through the transmission grid system. Companies that propose projects on that scale in areas already approved for this type of development would be eligible for priority processing. BLM also may decide to use alternative competitive or noncompetitive procedures in processing new solar applications for these areas.

BLM has received about 470 renewable energy project applications so far, including 158 active solar applications with a projected capacity to generate 97 gigawatts of electricity (the equivalent of 29 percent of the nation’s household electrical consumption). BLM will continue to process existing renewable energy applications, both within and outside of the solar energy study areas.

Only lands with excellent solar resources, suitable slope, proximity to roads and transmission lines or designated corridors, and containing at least 2,000 acres of BLM-administered public lands were considered. Sensitive lands, wilderness, and other high-conservation-value lands, as well as lands with conflicting uses, were excluded.

## DEMAND RESPONSE POTENTIAL

Estimating demand response (DR) potential is complicated by the fact that numerous variables can influence the outcome, such as how many smart meters will be deployed and how customers will respond. Two recent DR studies, which incorporated different scenarios and assumptions, show results with widely varying estimates of peak demand savings achievable from DR programs.

Each study provided three or four different scenarios that change based on smart meter penetration and the level of household participation. For example, a Federal Energy Regulatory Commission (FERC) report released in June 2009 suggested



**TABLE 1**  
**SUMMER PEAK SAVINGS FROM DEMAND RESPONSE,**  
**REALISTIC ACHIEVABLE POTENTIAL**  
 (Megawatts)

<b>Residential demand response</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
Direct load control – central AC	3,128	8,194	11,742
Direct load control – water heating	1,431	2,868	3,931
Price response	1,539	6,918	10,967
<b>Commercial demand response</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
Direct load control – cooling	1,336	3,833	4,822
Direct load control – lighting	364	1,049	1,358
Direct load control – other	256	824	1,159
Interruptible demand	4,337	8,806	19,450
Price response	771	4,018	8,368
<b>Industrial demand response</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
Direct load control – process	413	1,124	2,245
Interruptible demand	2,550	3,973	8,701
Price response	515	2,765	5,697
<b>Total</b>	<b>16,639</b>	<b>44,372</b>	<b>78,441</b>
Percentage of peak	2.0	4.6	7.0

Source: Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the United States (2010-2030), Electric Power Research Institute.

that a national DR program based on “achievable participation” could cut U.S. peak energy demand 14 percent or 138 gigawatts (GW) by 2019 compared to the “no DR” scenario. The achievable participation scenario is an estimate of how much DR would



occur with nationwide deployment of advanced metering infrastructure, a dynamic pricing tariff as the default rate, and other DR programs, such as direct load control, available to those who decide to opt out of dynamic pricing. This is an optimistic scenario especially since the vast majority of customers today do not have dynamic pricing tariffs and smart meters are not yet deployed nationwide.

The FERC “business-as-usual” scenario, which considers the amount of DR that would occur if existing

**A recent EPRI study of achievable potential estimated that DR programs could reduce summer peak demand by 44-66 GW in 2020.**

and currently planned DR programs continued unchanged over the next 10 years, would reduce peak demand by 4 percent (38 GW) by 2019.

Such programs include interruptible and curtailable rates for medium and large commercial and industrial customers, as well as direct load control of large electrical appliances and equipment such as central air conditioning.

Lisa Wood, executive director of the Institute for Electric Efficiency, cautioned that the more aggressive scenarios in the FERC study are probably not realistic but are, in fact, potential estimates to give us an idea of what is possible. A January 2009

Electric Power Research Institute (EPRI) study of achievable potential from energy efficiency and DR estimated that DR programs (including price responsive demand, direct load control, and interruptible demand) could reduce summer peak demand by 44-66 GW in 2020, a figure that Wood believes to be more realistic. (See Table 1.) In an effort to estimate what’s achievable, the EPRI study accounted for market acceptance of such programs as well as barriers to program implementation. The EPRI and FERC studies together, says Wood, can be viewed as book ends for what we might expect to achieve in terms of peak demand reduction nationwide over the next decade.

**A BETTER LIGHTBULB**

**A**s mandated by the Energy Independence and Security Act of 2007, the Department of Energy recently introduced new standards for incandescent and fluorescent lighting that could save between 500 billion and 1.2 trillion kilowatt-hours over the next 30 years, according to Andrew DeLaski, executive director of the Appliance Standards Awareness Project.

The new standards—which take effect in 2012—focus on general service fluorescent lamps (GSFLs) and incandescent reflector lamps (IRLs). By decreasing the electricity used in GSFLs by 15 percent, consumers will save up to \$8.66 per lamp over its lifetime; and by decreasing the electricity used in IRLs by 25 percent, consumers will save up to \$7.95 per lamp over its lifetime.

To meet the standards, manufacturers will have to produce more efficient incandescent bulbs to replace the less efficient models, as some have already done with halogen lighting. According to the rule, a 60-watt lightbulb is required to use only 43 watts but still produce the same amount of light. For example, Phillips’ Halogena line will replace the

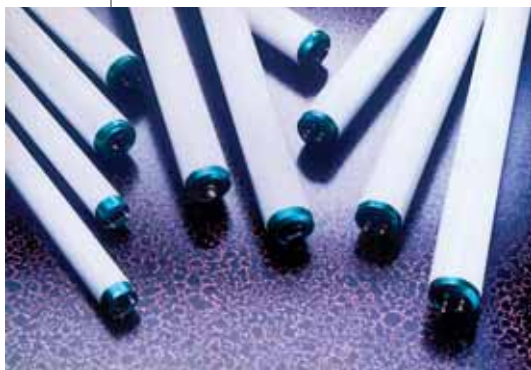
typical 60-watt incandescent bulb with a 40-watt halogen bulb and the 100-watt incandescent bulb with a 70-watt halogen bulb.



Does this mean incandescent lighting is going away altogether? Not yet. Incandescent lighting will just have to become more efficient,

said Steve Rosenstock, manager of energy solutions at Edison Electric Institute. But the more efficient bulbs also are more expensive. Currently, lightbulbs that meet the standards hover around \$5 each but last many times longer.

Fluorescent lights such as the T12 will be replaced with the more efficient T8 and T5 models, requiring some homeowners to update fixtures. "In many cases, a residential customer will find it easier to buy a whole new fixture," said Rosenstock.



Courtesy: Philips

**A new standard in town. The standard aims to replace T12 fluorescent lights with more efficient T8 (above) and T5 models.**

New incandescent models ought to fit existing fixtures.

Limitations on incandescent bulbs have already begun in the European Union, where stores (starting this September) are no longer allowed to buy or import most incandescent frosted bulbs. Retailers can continue selling off their stock until they run out. The clear 60-watt bulb (which uses less energy per lumen than a frosted one) will remain available until at least September 2011, and clear 40-watt bulbs until 2012.

In Germany, sales of incandescent bulbs have increased by 34 percent during the first half of this year, according to GfK, a consumer research organization.

#### ..... **NATURAL GAS ESTIMATES INCREASE**

**A** recent report by the Potential Gas Committee (PGC) suggests that U.S. natural gas supplies are higher than previously thought. The report estimated the U.S. gas base to be 1,836 trillion cubic feet (TCF), higher than the previous estimate of 1,321 TCF and the highest estimate in 44 years. With gas reserves, the total available future supply jumped to 2,074 TCF.

The increase is due largely to a re-evaluation of shale-gas formations, found primarily in the Appalachian basin and mid-Continent, Gulf Coast, and Rocky Mountain areas, which can be tapped via hydraulic fracturing.

Total annual demand for natural gas in the United States reached 21.7 TCF in 2006, according to the Energy Information Administration (EIA). Assuming that consumption levels remain the same and that all estimated gas reserves can be extracted, the nation's gas supply will last approximately 95 years.

According to Dr. John Curtis, director of the Potential Gas Agency at the Colorado School of Mines (which provides technical support to the independent PGC), the report

#### **LIKE A GOOD NEIGHBOR**

**E**ighty-four percent of Americans living near nuclear power plants favor nuclear energy, while an even greater number—90 percent—view the local power station positively, and 76 percent support construction of a new reactor near them, according to a recent public opinion survey commissioned by the Nuclear Energy Institute. The survey focused on people residing within a 10 mile-radius of an operating nuclear power plant and excluded electric company employees.

The survey also found that 88 percent give the nearest nuclear plant a "high" safety rating, 91 percent have confidence in the company's ability to operate the power plant safely, and 86 percent believe the company is doing a good job protecting the environment. This survey shows, consistent with the prior ones, that support for nuclear energy is stronger in communities near nuclear power plants than in the population at large.

In addition, 90 percent think the nuclear energy facility helps the local economy, and 89 percent believe that it provides good local jobs at the plant itself and in nearby businesses providing services to the plant.

The overall approval of nuclear energy was significant, with 84 percent of plant neighbors favoring the use of nuclear energy—58 percent strongly in support compared to 5 percent strongly opposed—as a means of providing electricity.

When asked about the company that operates the nearest nuclear plant, 83 percent state that the company is involved in the community.



AP Images



Corbis

is a reasonable appraisal of what is considered to be the “technically recoverable” gas resource potential of the United States but does not guarantee any price or timeline for its discovery and production.

With natural gas prices at the current low price of \$3 or less per million cubic feet (MCF), it may be difficult to trigger new exploration and production, according to some experts. Many in the gas industry target \$6-\$8 per MCF to make it economical to bring new gas online.

Still, according to EIA, over the next 15 years natural gas demand in the electricity sector will rise more rapidly than in other sectors due to impending legislation limiting greenhouse gas emissions. In 2030, however, as gas prices increase and more renewable energy and clean coal come online, total U.S. natural gas consumption is slated to be only 2.7 TCF higher than in 2006. Natural gas currently fuels 21 percent of electricity generation.

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**THE SOUND OF SILENCE**

**H**ybrids and other battery-powered cars are quiet when operating only with their electric motors. But we’re used to hearing car engines—most of us can make a rough estimate of the distance of an approaching car, and that audible signal is one of the tools we use to stay out of harm’s way. That disconnect may pose a risk to pedestrians, particularly the blind, according to research by Lawrence Rosenblum, a professor of psychology at the University of California, Riverside. In some contexts, pedestrians may have only one second to audibly detect the location of approaching electric cars when the vehicles operate at very slow speeds. Those findings have implications for pedestrians who are blind, small children, the elderly, runners, cyclists, and others, he said.

Dr. Rosenblum and his researchers have found that hybrid vehicles traveling at low speeds had to be around 65 percent closer to someone than a car with a gas engine before the person could judge the direction correctly. At speeds above 20-25 miles per hour

(MPH), hybrid cars likely generate enough tire and aerodynamic noise to make them sufficiently audible.

Last January, the Pedestrian Safety Enhancement Act (H.R. 734) was introduced to direct the Department of Transportation to “study and establish a motor vehicle safety standard that provides for a means of alerting blind and other pedestrians of motor vehicle operation.” Similar initiatives are under consideration in the European Union and Japan.

Most mass-produced hybrids and electric vehicles do not have built-in noise makers. Lotus Engineering, the British sportscar-maker’s consultancy, has developed technologies to synthesize external sound on



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electric and hybrid vehicles to simulate a car with an internal combustion engine. To do this, a road speed signal is taken from the vehicle and a waterproof speaker system positioned next to the radiator makes the realistic sound emanate from the front of the vehicle. Once the car has passed, the sound is no longer heard.

A recent study by Pike Research says there will be 1.7 million new plug-in hybrid electric vehicles on the road worldwide by 2015, with the United States having the lion’s share.



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- Harming your PUBLIC IMAGE
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## WHATEVER FLOATS YOUR REACTOR

Apparently, building a new nuclear power plant on land isn't enough of a challenge. By 2012, Russia's Energoatom Concern plans to launch a floating nuclear powerplant with two 35-megawatt reactors on a barge as big as a football field in the port of Vilyuchinsk, located on the Kamchatka Peninsula in the Russian Far East. With a population of about 45,000 people, Vilyuchinsk was specially built to support Russia's Pacific naval fleet.

A floating nuclear power plant would be useful in regions lacking their own fuel resources or experiencing difficulties in receiving them. In Russia, there currently are six potential regional sites for floating nuclear power plants: Arkhangelsk, Kamchatka, Chukotka, Yakutia, Krasnoyarsk, and Primorsk. Built in a modular fashion and assembled on site, each plant will cost about \$310 million.

Decentralized energy supply zones cover almost two-thirds of Russia's territory. The living standard of the local population—mostly small ethnic communities—depends heavily on energy supply and industrial production. And these areas tend to be abundant in mineral resources waiting to be developed: Chukotka alone has mineral resources worth an estimated \$1 trillion.

Since interconnected energy networks are not a cost-effective solution for this vast scarcely populated area, small nuclear power plants may become the basis of decentralized energy supply systems in the underdeveloped regions of Russia and will substantially improve the social-economic situation in those areas.



Difficult terrain in Chukotka, far eastern Siberia.



Courtesy: Energoatom Concern

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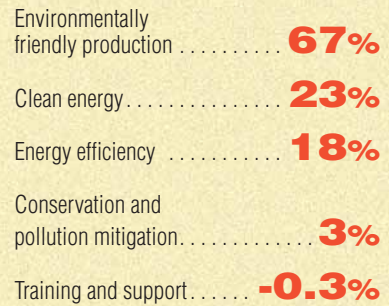
## WHAT IS THE GREEN ECONOMY?

The “green economy” and “clean energy” are popular terms, but what do they actually mean? A recent study by Pew Charitable Trusts highlighted five main green economy categories: clean energy (defined as solar, wind, low-impact hydropower, fuel cells,

marine and tidal power, geothermal energy, and small-scale biopower); energy efficiency; environmentally friendly production (including hybrid diesel bus and liquid biofuel manufacturers); conservation and pollution mitigation; and training and support. (See Figure 1.)

Others see the green economy in a different light. For example, a report last year by The Center for American Progress (CAP) focused on retrofitting

**FIGURE 1  
GROWTH OF JOBS IN THE CLEAN ENERGY ECONOMY, 1998-2007**



Source: Pew Charitable Trusts (2009)

buildings for energy efficiency, expanding mass transit, constructing ‘smart’ electrical grid transmission systems, and expanding wind, solar power, and advanced biofuels. Investing \$100 billion on these initiatives would create 2 million new jobs over two years, according to CAP.

And the United Nations used an even broader brush in its “Global Green New Deal,” describing it much as CAP does, but including wave and thermal power, as well as non-energy-related fields such as sustainable chemical and agricultural industries and waste management.

It all depends on how you define green. According to its definition, the Pew study found that green jobs grew 9.1 percent from 2003 to 2007 (the latest year of data available), compared to a 3.7-percent job expansion in all industries over the same period. Had Pew included nuclear energy, which has no carbon dioxide emissions, these numbers would have changed significantly: Approximately 15,000 new nuclear industry jobs were added at the end of 2008, according to the Nuclear Energy Institute.

It also depends on how you slice it. The Pew study counted actual jobs in the clean energy sector but did not include jobs that use clean energy products and services. In other words, the study accounted for clean energy production, not consumption. ♦

## TOUR DES TREES

With a mission to raise money for tree research and to help the public understand the importance of proper tree care in maintaining the health of our community forests and urban trees, cyclists from across the world raised a total of \$373,543 during this year’s Stihl Tour des Trees, July 19-25, to benefit the Tree Research and Education Endowment (TREE) Fund.

The TREE Fund identifies and funds projects and programs that advance knowledge in the field of arboriculture and urban forestry to benefit people, trees, and the environment. Fund-supported research has led to important developments in understanding air pollution reduction and carbon sequestration by trees, quantifying the costs and benefits of urban trees, improving conditions for tree growth in difficult sites, and managing diseases and pests that afflict urban trees.

The Tour des Trees is America’s largest fundraising event to improve the care of trees through research and education. This year’s tour featured more than 70 cyclists on a 500-mile route beginning in New York City’s Central Park and winding across the Northeast. Since its inception in 1992, the tour has generated more than \$4.4 million and funded a host of projects, such as post-Katrina research on the impact of hurricane flooding on mature trees.

The sponsors of the 2009 event included Stihl, National Grid, Asplundh Tree Expert Company, Duke Energy, Bartlett Tree Experts, and The Davey Tree Expert Company.



Courtesy: Al Gillens