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April 2010

# **The Future of Energy**

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# Editor's Note

By Brian Kelly

## Time for a New Energy Debate

Is 'climate change' the best way to think about the issue?



Energy is power. The physics kind and the politics kind. Energy policy—where we get it and what we do with it—is one of the most important questions facing communities and nations. It affects family budgets and national ones; local air quality and global temperatures; trade balances and transfers of wealth. It's also, as our Kent Garber writes this month, one big mess. America's energy strategy is as mired as anything in Washington, but most of the rest of the world isn't much better off.

We have long paid close attention to the evolution of energy, whether new oil booms or new technology breakthroughs. In this special issue on the future of energy, we sort out the complex and critical factors that play into this huge topic. From the possible rebirth of nuclear power in America to China's sudden discovery of the business value of clean energy, there is no shortage of important developments. As always, the place to start is at home. We offer advice on making your home energy-efficient and look at how communities make a virtue out of being green. There are some great technology solutions in the works, including solar. There's certainly government money being unleashed to promote breakthroughs, but is it being used the right way?

And, of course, we look at the climate question. It can fairly be said that in the past decade, the climate debate has dominated all discussions of energy policy—and not necessarily in a good way. A cadre of scientists and their political allies were certain about catastrophic global warming

and unyielding in their demands for draconian action. Now we're seeing a backlash that, while uncovering some major mistakes in the theory, may also be sweeping away legitimate concerns. Where I was once told that the Himalayan glaciers were disappearing because of the exhaust from my car, that now turns out not to be true. But does that mean I'm off the hook? What ever happened to plain old air pollution? And even if dangerous warming is less probable than previously thought, are we willing to take that bet and do nothing?

The goal, it seems, is to find energy that is clean and secure and economical. But can we have all three? Is "climate change" the wrong way to frame the energy debate? Please send your ideas for a workable energy policy to [editor@usnews.com](mailto:editor@usnews.com), and we'll share them with other readers.

Also this month, we debut a different kind of ranking: a look at the safest states for teenage drivers. With auto accidents the leading cause

of death among teenagers—5,000 last year, along with 300,000 injuries—we decided to look at the factors behind the problem on a state-by-state basis. One big factor: States do better when they have laws that ease teens behind the wheel with restrictions that gradually result in a full license. See how your state ranks on Page 10—and go to [usnews.com](http://usnews.com) for more information. ●



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# PROGRESS REPORT



# THE ENERGY

THE UNITED STATES DOESN'T  
HAVE A COHERENT STRATEGY  
FOR CLEAN ENERGY, BUT IT  
NEEDS ONE TO COMPETE

By Kent Garber

It's easy to see inaction. In the Senate, everything crawls. At the climate change talks in Copenhagen, the outcome was disappointing. For those who wanted bold action on energy, the past year has left much to the imagination.

But things are changing, incrementally.



# RACE

A coal plant in West Virginia across a river from wind turbines

In subway cars in New York, there are now ads for job training in renewable energy scattered among ones for English lessons and clinical drug trials. Clean energy is forcing its way into the American narrative.

America has been drunk on fossil fuels for decades. At various points, politicians have intervened, only to walk away defeated. In 2008, gas prices soared, the economy tanked, and another wave of panic emerged.

In 2009, President Obama came into power with energy and climate issues among his priorities. He has vowed not to repeat the mistakes of the past.

The stimulus package is putting \$80 billion into clean energy, the biggest investment of its kind in U.S. history, once it all gets spent. In February, Obama pledged \$8 billion to build the country's first two nuclear reactors in nearly 30 years. The

Energy Department, under Steven Chu, is getting a makeover, with massive investments in new research.

These are pieces. They are starts. They are the beginning of something. But they are certainly not enough. The emerging metaphor in the energy world is that of a race, like the space race or the atomic race. Now there is an energy race. China is the main competitor, spending \$9 billion a month on clean energy projects. There are other competitors, too: India, Europe, Japan, Brazil. Everyone is angling for a spot that could bring supremacy, jobs, and wealth.

Running a race requires a strategy. The U.S. strategy is something of an ill-defined mess. If dirty fuel is an addiction and clean energy a pathway to recovery, the country is still at a stage somewhere after recognition. It's trying to develop a plan for quitting, but it wants to minimize the pain that will come in the process, and it's having trouble thinking long term. Legislation to curb greenhouse gases is stalled in Congress; critics say it will kill jobs and raise energy prices. For its proponents, the bill is the holy grail, the thing that will give businesses the green light to invest in energy technologies.

Any strategy has to be concerned with money: how to fund new projects and how to make clean energy profitable. And the recession has hit not just government money but also private investors. Back in the day, much of it came from the banks; many of those banks no longer exist. Much of the rest came from venture capital, from the cowboys of Silicon Valley. But they're looking east for help now. "Washington and Silicon Valley were two ends of

the spectrum," says Steve Milunovich, a renewables analyst for Bank of America-Merrill Lynch. "Now all these clean-tech venture capitalist guys are going to Washington."

In the absence of a national strategy, the United States has gotten by on piecemeal measures. These have worked as well as they can. The wind and solar industries had record years in 2009, thanks in large part to tax credits for developers. This is despite predictions that 2009 would be a bust year.

**Leading the way.** But these numbers tell only part of the story. In 2008, the United States surpassed Germany as the top producer of wind turbines. The news was greeted with great fervor. After years of ups and downs, of government incentives being granted and revoked by Congress, the American wind industry was coming into its own. In 2009, it was expected to maintain its lead. But that's not what happened. China became the world's top wind turbine manufacturer.

If the United States wants to lead, it is going to have to think harder and longer. It is going to have to think about 2020, not just about 2010. "What we are faced with right

now is that there isn't a long-term market that can be seen for renewable energy," says Matt Guyette, leader of GE's renewable energy marketing. GE would know. GE is the country's top producer of wind turbines. It got into the business in the early part of the past decade, sensing a major opportunity. Since then, it has invested more than \$850 million in wind technology, making turbines that are better, cheaper, more reliable. But it needs customers. "You need that market," Guyette says. "Without that market, how do you keep investing?"

Some buyers have already stepped aside. T. Boone Pickens, the star hedge fund manager, the oil man of the '80s, had grand plans to build the country's biggest wind farm in Texas. Washington swooned over the idea, and the media swooned over Pickens. But last year he gave it up. First there was a problem with financing. Then there was a problem

with transmission, because Pickens needed new electric lines to connect his wind farm in western Texas to the cities on the other side of the state.

Before he walked away, Pickens was advocating the "Pickens plan," a broad strategy to promote wind for electricity and natural gas for fuel. The contents of the plan might have been questionable, but it was still a plan, something broad and coherent and far-reaching. Everyone is still waiting for a plan from Washington. In its absence, the states have stepped in. They are incubating clean energy within their borders. Thirty out of 50 states have policies requiring utilities to generate a certain percentage of their electricity from renewables. Others are likely to follow. And they are getting

creative with financing, too. In California, New York, and many other states, cities are making it easier for homeowners to buy solar panels by awarding special bonds that have no upfront cost.

In the nation's capital, all eyes are on the Senate. A trio of senators, Massachusetts Democrat John Kerry, Connecticut independent Joe Lieberman, and South Carolina Republican Lindsey Graham, started working last year behind the scenes to craft a bill that would cap greenhouse gases and spur all sorts of domestic energy production, from nuclear power to geothermal to offshore drilling. A carbon cap, after all, isn't everything.

Whatever the outcome in Congress, there are others who have given up waiting. The Environmental Protection Agency is moving forward on regulating emissions from large industrial sources. The Securities and Exchange Commission is telling businesses to publicly declare their risk from climate change.

But none of this is a strategy yet. It is a hodgepodge, a smattering. It is action in a vacuum. And the addiction continues. ●



JIM LO SCALZO FOR USNEWS

## AMERICA HAS BEEN DRUNK ON FOSSIL FUELS FOR DECADES.

# REALITY CHECK: The Power

**T**he world must face a glaring fact: Demand for energy is growing, and countries need to expand their energy sources if they want to keep up. The Obama administration made a commitment to clean energy. But here's a source-by-source look at nine types of energy that could change the landscape in the United States. —*Jessica Rettig*

## OIL

**Claim:** Global demand for oil has reached its peak.

**Reality:** According to the International Energy Agency, demand for oil has in fact peaked in Organization for Economic Cooperation and Development member countries, 30 of the world's most developed nations. The agency's chief economist, Fatih Birol, estimates that because of advances in technology, the demand for petroleum in these developed nations probably will never return to the levels seen in 2007.

However, despite the flat demand over the past two years in Europe, Japan, and the United States, the IEA predicts that burgeoning demand for oil in emerging markets such as China and India will offset any declines and that worldwide demand will continue to increase.

With demand growing, the concept of "peak oil"—the theory that the world's supply of accessible oil will reach a high point and then begin to decline—has many people worried and uncertain about oil's prospects. According to Gary Long, the Energy Information Agency's expert on crude oil reserves, while the world supply is finite, there's very little consensus about how much is left or how much technology will progress to extract difficult-to-obtain reserves. But what happens in the future will depend on the available alternatives, Long says.



CHIP CHIPMAN—BLOOMBERG / GETTY IMAGES

## COAL

**Claim:** Carbon capture and storage technologies will make coal a nearly zero-emissions energy source.

**Reality:** Coal-fired power plants add more carbon dioxide to the atmosphere than any other energy source in the United States, and they provide more than half of the nation's electricity. President Obama has devoted \$4 billion to new clean coal technologies, specifically carbon capture and storage, or CCS, with the hope of making the source nearly emissions free. CCS is a process by which carbon dioxide is separated from the production process and stored beneath Earth's surface. Experts say this technology is years, even decades, away from widespread commercial viability, but one project shows promise.

In September 2009, American Electric Power's Mountaineer coal plant in West Virginia launched the largest CCS demonstration project in the world when it implemented a coal-fired system with underground CO<sub>2</sub> storage. The company hopes to move ahead with a commercial-scale demonstration by 2015. But even if the technology proves successful, Gary Spitznogle, AEP's top engineer on the project, sees a potential problem. "Just because we can prove at Mountaineer that you can put CO<sub>2</sub> in the ground doesn't mean that it's viable somewhere else," he says.



SPENCER PLATT—GETTY IMAGES

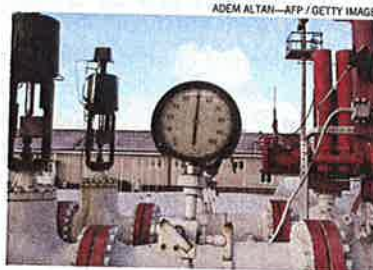
## NATURAL GAS

**Claim:** Natural gas can replace gasoline for use in vehicles.

**Reality:** This idea, most recently promoted by businessman T. Boone Pickens, seems ideal in theory. There's already plenty of natural gas in the United States, natural gas is cheaper than petroleum fuels, and it's reportedly much better for the environment, producing at least 20 percent less in emissions than diesel or gasoline. But the claim is a far reach, given that as of 2008, fewer than 1 percent of the vehicles in the United States use natural gas as a primary fuel.

Efficient natural gas vehicles have been around since the 1990s, so the problem is not the technology but rather the availability of fueling stations and the manufacture of cars. With few people driving natural gas vehicles, fueling stations are less eager to carry natural

gas, but nobody wants to drive one if there's no place to fill the tank. Pickens, backed by Democratic Sen. Harry Reid, has proposed an initiative to invest in natural gas fueling stations; experts say changing the minds of American drivers and car manufacturers may take more time.



ADEM ALTAN—AFP / GETTY IMAGES

# ers That Be

## SOLAR

**Claim:** The cost of solar energy in America will be on par with traditional energy sources by 2015.

**Reality:** Though the solar industry has expanded almost 35 percent over the past five years and the past two years have seen nearly a 50 percent drop in the price of solar photovoltaics, the cost still raises doubts about the industry's ability to widely penetrate the power market. Nevertheless, the Department of Energy and its Solar Energy Technology Program hope to bring solar prices down to competitive levels over the next five years. John Lushetsky, the manager of the DOE program, says costs need to come down 25 to 50 percent for the systems to be economic without subsidies. "We think that the 2015 goals are very realistic for a significant part of the country" because of current research and development, says Lushetsky.

Even if the long-term costs of solar energy drop, the upfront expenses, such as installation in the home, create an unlevel playing field to compete with oil and coal, which carry no upfront investment for the consumer, says Mark Sinclair, vice president of the Clean Energy Group, a nonprofit advocacy group. Nevertheless, he notes that recent statewide incentives and public-financing programs have proved successful.



CHARLIE ARCHAMBAULT FOR USNEWS

## WIND

**Claim:** Wind energy could generate 20 percent of the power needed in the United States by 2030.

**Reality:** As of December, wind accounted for only 1.9 percent of the country's energy consumption. Yet in May 2008, the Department of Energy reported that by 2030, as much as 20 percent of the nation's energy could be derived from wind power. The scenario proposed by DOE could be feasible, but only if the government, the private wind energy industry, and utility companies continue to bolster the rate of installation each year for the next 20 years.

GEORGE FREY—GETTY IMAGES



The good news for wind power is that the rates of installation are already higher than had been predicted, and the United States is adding wind systems more quickly than any other country in the world. In 2008, the United States topped the list with an addition of more than 8,500 megawatts, or enough to serve over 2 million homes. In 2009, the rates increased to 10,000 MW for the year, which

many people attribute to financing that was included in the stimulus bill. Still, because of job losses in the manufacturing sector and reduced private investment, experts worry that the industry won't keep pace for 2030.

## NUCLEAR

**Claim:** The United States will rely more on nuclear power in the future.

**Reality:** As of last May, power from nuclear fission accounted for 19.4 percent of the nation's total energy, according to the Department of Energy's Office of Nuclear Energy. Though established nuclear power plants have been mostly safe, successful, and well regulated, no new plant has been built in the past 30 years, as utilities companies have opted instead for plants fired with natural gas or coal, and environmentalists have expressed concern about the dangers of storing the radioactive byproducts of the process. Now the cost of building a new nuclear reactor, up to \$10 billion each,

JIM LO SCALZO FOR USNEWS



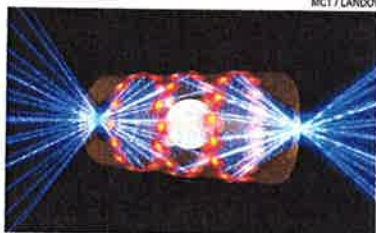
is keeping the industry stagnant.

Obama recently committed \$8.33 billion in loan guarantees for the construction of two new reactors at the Alvin W. Vogtle Electric Generating Plant in Georgia, which will provide electricity to 1.4 million people by 2017. The money Obama pledged came from the Energy Act of 2005, which set aside \$18.5 billion in loan guarantees for nuclear plants. DOE has requested \$36 billion more, according to Ebony Meeks, a DOE representative. Meeks says that without economic guarantees, more of these large-scale projects will be very difficult to get off the ground. Not to mention, each project must pass through the red tape of the Nuclear Regulatory Commission before construction can begin, a process that now has more than two dozen U.S. projects waiting for approval.

## FUSION

**Claim:** There will be a functioning nuclear fusion plant by 2020.

**Reality:** Fusion technology, which will essentially harness the same type of energy found in stars by fusing the nuclei of two atoms, is still in development. Scientists have already conducted fusion reactions; they just require more energy to produce than they currently emit. A number of research groups around the world are working to develop the would-be revolutionary technology that could power whole cities using hydrogen from water, an unlimited source without harmful chemical emissions.



MCT / LANDOV

The National Ignition Facility at the Lawrence Livermore National Lab in California appears to be the global front-runner in the race to fusion energy. In December, it was able to position 192 lasers on a test pellet the size of a BB, heating it in a way that scientists believe may produce the conditions necessary to achieve a controlled fusion reaction. In one to two years, the lab

expects to achieve ignition with pellets consisting of hydrogen atoms, which is a step toward fusion energy. According to Edward Moses, associate director of the NIF, researchers around the world are hopeful that an NIF demonstration fusion power plant could be ready within a decade. Moses says that if the prototype is successful and if the technology can penetrate the market, the potential could be limitless. Hundreds of plants could be built in 30 to 40 years, he says. "Every country could have it," says Moses. "It would change the nature of how people saw their energy future."

## HYDROGEN

**Claim:** Fuel cell vehicles are the future of transportation.

**Reality:** In 2003, President Bush announced a \$1.2 billion initiative for hydrogen fuel cell technology, touting the future of "the hydrogen economy" for the auto industry. Yet last May, with other green auto technologies advancing more quickly and becoming more economically feasible in the short term, the Obama administration cut research into fuel cell vehicles from its budget. Car manufacturers are continuing to develop the technology despite the setback in funding.

The problem with hydrogen fuel cell technology is that hydrogen, while one of the most common elements on Earth, does not exist alone in nature. The majority of hydrogen is now derived from natural gas, the rest from water. Yet the process of obtaining hydrogen, an energy carrier

rather than a source, requires significant energy input itself, and a more efficient production process will be necessary to reduce both costs and environmental effects. In addition, though prototypes of hydrogen-powered autos such as Chevrolet's Equinox have performed successfully, issues with storing and distributing hydrogen pose problems for the widespread use of the technology.



JEFFREY MACMILLAN FOR USNEWS



WARREN BOLSTER—STONE / GETTY IMAGES

## WAVE

**Claim:** Wave power from America's shores can fill up to 6.5 percent of national energy demand.

**Reality:** Wave power was officially redefined as a renewable energy source in 2005, but prior to that, the technology's funding took second place to more popular energy sources, like wind and solar. Since 2005, with somewhat more money heading in its direction, the wave power industry has moved forward. However, wave power technologies are still in the research stage, and no commercial-scale wave energy project exists in the country (story, Page 50).

Roger Bedard from the Electric Power Research Institute estimates that up to 6.5 percent of today's U.S. energy demand could be filled by commercially harvested ocean power, though he says that may take 50 to 100 years. He says that while wave power is important for diversifying the national energy portfolio, especially in coastal regions, it doesn't have the same potential as other renewables and therefore may take longer to develop. Nevertheless, he believes that in terms of environmental impact, ocean wave technologies could be one of the most benign modes of producing electricity. ●