

Green 2.0

Renewables can promote economic recovery, increase energy security and protect the environment.

BY GLEN ANDERSEN

Shiny silicon-covered rooftops generate electricity. Crops share fields with towering wind turbines. Technology taps the Earth's heat to release a constant, reliable source of clean electricity.

Although these scenarios already exist, state renewable energy efforts will soon bring them to far more people.

Propelled by a desire for energy security, economic development and environmental protection, states are taking steps to increase the production of renewable energy. To ensure measurable increases, 29 state legislatures have adopted production targets, called renewable portfolio standards. Three other states created voluntary goals. With half of the electricity supply in the country now under these requirements, the electric industry is the process of significantly transforming the way energy is created and delivered.

State policies call for about 70 gigawatts of power—enough for 56 million homes—to come from renewable sources, according to Ryan Wisler, a scientist in the Electricity Markets and Policy Group at Lawrence Berkeley National Laboratory.

"We are talking about the need for major changes in how we plan and operate the electricity system," he says.

The discussion focuses on how realistic state goals are, what effect a dramatic energy transformation will have on the economy, and how larger amounts of renewable electricity will affect rates and reliability.

Glen Andersen tracks energy issues for NCSL.



MOVING TARGETS

With U.S. energy consumption expected to grow 23 percent by 2030, states are seeking to add sustainable, clean and cost-effective energy sources to their portfolios. States are requiring utilities to produce a specified percentage of their energy from renewable sources, ranging from a relatively modest 12 percent in states such as North Carolina and Wisconsin to as high as 27 percent by 2020 or 2025 in states such as Connecticut, Illinois and Minnesota.

The nation today receives about 7 percent

of its energy from wind, solar, geothermal, biomass and hydropower. Most comes from hydropower and the burning of biomass—wood chips and agricultural waste—although that is likely to change as most of the new requirements don't count large hydropower projects or renewable energy sources built before the standards went into effect.

In several states, lawmakers revised the standards upward to create more economic development and innovation. In Colorado, lawmakers recently doubled the standard after seeing the ease with which the lower one was met.

"The standards created an economy based on renewable energy, creating demand for workers to build and maintain wind farms in areas that have suffered from a shrinking tax base," says Representative Jack Pommer of Colorado. "Some rural areas are now growing from the economic influx."

The majority of states are still taking their first steps toward meeting what some believe are very ambitious goals.

"Initially we had pushback, with people saying the standard was unattainable and would hurt our competition with surrounding states," says New Jersey Assemblyman Douglas Fisher. "But the energy crisis



REPRESENTATIVE
JACK POMMER
COLORADO



ASSEMBLYMAN
DOUGLAS FISHER
NEW JERSEY

changed a lot of minds, with people feeling we must reduce foreign energy imports. The standard is good for the environment, creates jobs and increases self-sufficiency.”



SENATOR
PATTY BIRKHOLZ
MICHIGAN

Senator Patty Birkholz, who introduced one of the first bills in the Michigan Legislature to start renewable portfolio standards, found businesses were the strongest proponents. “The more I spoke with people, the more I learned you need a standard to get businesses to move to the state,” she says.

Michigan is relying on renewables to help pull itself out of a multi-year recession brought about by a struggling auto industry. “Our manufacturers are moving from building car components to wind and solar components. Even though Michigan has many well-trained workers, manufacturers had to ship everything out of state.”

Utility executives in Colorado were initially hesitant about renewable requirements, concerned about maintaining the level of reliability customers expect given that wind and solar are intermittent sources. “Once they [Xcel Energy officials] got into it and learned how to manage renewable energy, however, they really got on board,” says Pommer.

A report by the Lawrence Berkeley National Laboratory found that creating standards drove approximately 76 percent of all new renewable energy development. This percentage is likely to increase as state programs proceed.

According to the report, most states are reaching their targets, although many are just beginning their programs. Minnesota, which now ranks third nationally in wind power production, is one of 12 states with standards in place for more than four years. All utilities there are on track to meet the 2010 goal of 7 percent. Xcel Energy, which has a higher requirement of 15 percent by 2010, is also on target, and has been building wind farms and planning new transmission lines to deliver renewable energy to the cities. Meeting the 25 percent standard by 2025, however, will not be easy. Moving the energy from where it’s generated to where it’s needed is the biggest challenge.

Other barriers exist as well. Arizona has seen compliance rates below 50 percent because of a lack of funding. Other states are seeing setbacks because of various reasons, including project delays, failed contracts and changing regulations.

BENEFITS ABOUND

Legislators who support standards believe renewable energy will benefit both the economy and the environment.

“We passed the Renewable Energy Standard because it was deemed a ‘win-win’ for Minnesota,” says Minnesota Senator Yvonne Prettner-Solon. “Not only will it foster the use of renewable energy and

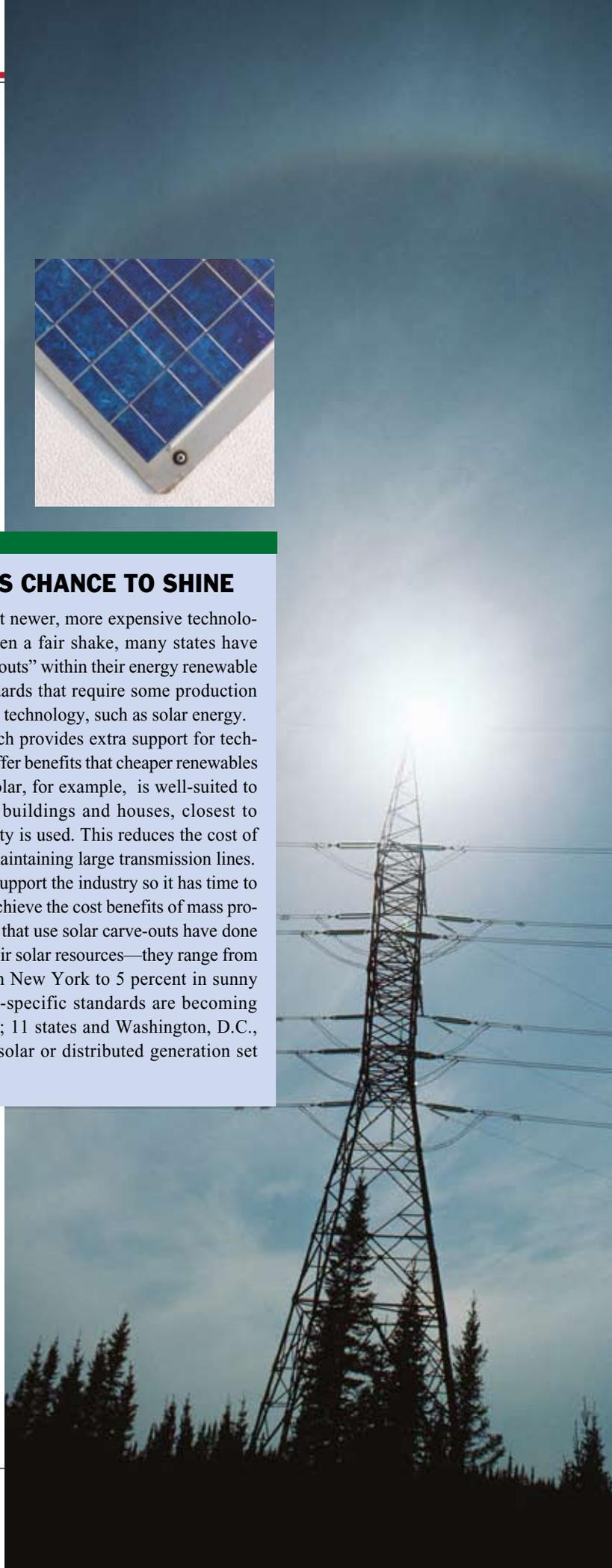


SOLAR’S CHANCE TO SHINE

To ensure that newer, more expensive technologies are given a fair shake, many states have special “carve-outs” within their energy renewable portfolio standards that require some production from a specific technology, such as solar energy.

This approach provides extra support for technologies that offer benefits that cheaper renewables often don’t. Solar, for example, is well-suited to placement on buildings and houses, closest to where electricity is used. This reduces the cost of building and maintaining large transmission lines.

Carve-outs support the industry so it has time to innovate and achieve the cost benefits of mass production. States that use solar carve-outs have done so based on their solar resources—they range from 0.15 percent in New York to 5 percent in sunny Nevada. Solar-specific standards are becoming more common; 11 states and Washington, D.C., have adopted solar or distributed generation set asides.



KEEN ON GREEN



A potential partial solution to rising unemployment and economic instability is creating jobs in renewable energy, green building and public transit. Developing the green economy can reduce pollution, generate domestic energy and keep jobs in the country.

Higher education will play a vital role in training a skilled “green collar” workforce. President Obama is proposing 2.5 million green jobs by 2011, and 16 states have considered or passed legislation to develop and encourage green jobs. Some lawmakers support a carbon tax or carbon cap-and-trade program to spur green jobs as well.

The National Association of Manufacturers and others, however, fear the economic impacts of environmental policies, such as a greenhouse gas cap-and-trade program. They cite potential job losses from higher energy and compliance costs and overseas competition.

But proponents say “de-carbonizing” the economy will produce jobs, millions of them. Inefficient buildings will be upgraded; the electric grid modernized; alternative fuel vehicles designed and built; and renewable energy developed and connected to the grid. In 2007, the green economy included more than 9 million jobs and produced \$1.05 billion in revenue. By 2030, one study estimates 37 million green jobs, more than 17 percent of all U.S. anticipated employment.

“The development of wind and other renewable resources has undoubtedly created many jobs across Minnesota,” says Senator Yvonne Prettner-Solon. “Many of these projects have been local, community-based projects and have brought significant economic benefits to these communities.”

Green jobs may not present a quick solution, but the long-term benefits are a more sustainable economy and a cleaner environment.



SENATOR

YVONNE

PRETTNER-SOLON

MINNESOTA

reduce greenhouse gas emissions, but it also will result in thousands of jobs and millions of dollars of investment coming to Minnesota.”

New Jersey was initially motivated by environmental concerns. “We have one of the most industrialized and densely populated states,” says Fisher. “We have to do everything we can to protect air quality in our state.”

State lawmakers see other reasons to support renewable portfolio policies, believing they can:

- ◆ Use the relatively stable electricity prices from renewable energy plants as a buffer against the volatile costs of oil and natural gas.
- ◆ Promote energy independence and domestic energy production.
- ◆ Reduce greenhouse gases and reach air pollution reduction goals.
- ◆ Support job growth in the development, manufacturing, construction and operation of renewable energy production facilities.

CONTROLLING COSTS

Although producing electricity from renewable resources is often more expensive than from fossil fuel or nuclear power plants, rates have not shot up in places where renewables are being used. A report by the Lawrence Berkeley laboratory found the addition of renewable energy has increased electricity rates by less than 1 percent in states with

portfolio standards.

California, a large consumer of renewable energy, has yet to see marked increases in rates, since most renewable energy installed since 2002 has cost less than building new natural gas plants.

“I think by the time wind and solar come on line, the rate impact will be much lower than people thought,” says Fisher.

Texas found, in a study by the state’s main transmission planning group, that building \$4.9 billion of transmission lines to reach prime wind resources would pay for itself in three years and save ratepayers money by decreasing natural gas prices.

Wind power production has exploded over the past few years; it provides just over 1 percent of the nation’s electricity. It is the resource many states favor to reach renewable targets, mostly because of its relatively low cost.

The Minnesota Legislature requested a comprehensive study of the impact of the state’s portfolio standards and found utilities could integrate 25 percent wind power into their energy portfolio at a cost of about half a cent per kilowatt hour, about a 5 percent increase. Other states have produced similar cost estimates for adding up to 30 percent wind.

The United States has more than enough wind to satisfy the nation’s electricity appetite. A 2008 U.S. Department of Energy report found the country could reasonably meet 20 percent of its energy consumption with wind power by 2030. About 0.5 percent of the nation’s land would need to contain wind turbines to reach this goal.

The country could also become a solar superpower. Covering 100 square miles of Nevada with solar panels could supply all of the United States with electricity, according

TIME FOR AN UPDATE

to the U.S. Department of Energy. Or each state would need to cover about 17 square miles of unused land, parking lots and rooftops in solar panels to fulfill the nation's energy needs. Although converting solar energy into electricity is currently costly, prices are expected to fall, making solar energy from photovoltaic panels competitive with conventional sources by 2015.

RELYING ON RENEWABLES

Since the wind doesn't always blow and the sun doesn't always shine, can we really expect to harness large amounts of these intermittent energy resources? Although not without challenge, research and experience have shown that integrating significant amounts of these resources into the energy grid is possible. Successful and cost-effective integration will require adjustments in the design and operation of transmission, generation and market systems to ensure reliable, cost-effective delivery.

Many of these changes are under way. Studies have found that the relative costs of increasing wind power to levels as high as 30 percent is unlikely to drive consumer costs up sharply, although studies do show a potential for small increases in electricity rates.

Integrating solar can be easier, since it is more predictable and has the advantage of producing energy during the day when energy consumption is highest. Solar energy production falls off before the daily consumption peak is over, however, although some new solar plants are able to store energy to use after the sun goes down.

Achieving renewable energy on a broad scale will require modernization of the electric grid, but there are plenty of hurdles.

The hefty price tag, public opposition to building more power lines, and state-federal jurisdictional issues make upgrading the aging infrastructure a touchy subject. Some experts estimate \$1 trillion will be needed in maintenance costs through 2030, and that's only for repairs of the current grid. The dated system of switches and analog controls is a challenge not only to integrating renewable energy into the grid, but also for increasing demand and the push toward advanced utility-consumer communication and greater efficiency.

Under the 2005 Energy Policy Act, the energy secretary designated National Interest Electric Transmission Corridors in the Mid-Atlantic and Southwest, which face severe transmission constraints and congestion. The law provided the Federal Energy Regulatory Commission—the agency that oversees interstate energy rates—the authority to grant permits for interstate lines in the name of national interest if a developer faces objection from local entities.

State lawmakers can promote the development of new and updated infrastructure by involving all the various players early in the process and encouraging state-federal cooperation. Proponents argue that clean energy will spur economic growth, strengthen national security and reduce environmental harm. The shortcomings of the electric grid should not stand in the way.

FEDERAL INFLUENCE

Congress considered legislation to set a national renewable portfolio standard last year. Although it failed, the likelihood of passing a national standard has increased with the new administration. States are justifiably concerned, however, about how a national standard would affect their own standards.

Congressional discussions have revolved around two alternatives. One preempts state standards, and the other, like the Clean Air Act, sets a standard but allows states to surpass it.

The challenge of restructuring how the United States produces and distributes elec-

tricity has been met head-on by states that are trying innovative techniques to improve the quality, reliability and stability of the electric grid while increasing the amount of domestically produced clean energy. Since states have tailored their renewable portfolio standards to fit their own resources and needs, any federal policy should be modeled after successful state policies and not preempt a state's higher standards. 

 **CHECK OUT** more about portfolio standards and other renewable energy issues at www.ncsl.org/magazine.




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