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Alternative Approaches

Governments struggle to find policies that will spur renewable-energy industries -- without coddling them

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Since the oil shocks of the 1970s, governments around the world have paid plenty of lip service to renewable energies such as wind and solar power. But only a few governments have been able to engineer policies that have begun to bring alternative energies into wider use.

Renewable fuels provided 18% of the world's total electricity supply in 2004, according to figures from the International Energy Agency, a Paris-based intergovernmental organization.

Almost all of that, though, came from hydropower, a source with limited growth potential because of geographic constraints. The use of wind and solar power is growing, but they still generated only 1% of global electricity production in 2004, the latest year for which figures are available.

In Asia, the U.S. and Europe, governments have spent billions on research and development of renewable energies over the years, but finding effective policies to encourage their use has proved just as challenging as developing new technologies. Most governments have tried approaches like tax credits, subsidies and mandated targets for renewable-energy production. Although approaches differ, the overarching goal is the same: to spur companies to build large-scale renewable-energy plants, such as wind farms or solar installations, so that the costs of clean power come down enough to compete with fossil fuels like oil and coal.

A debate still rages over what kind of government intervention and level of subsidy is appropriate. "Regulators have to try to strike a delicate balance," says Todd Allmendinger of Emerging Energy Research, a research and consulting firm with offices in Cambridge, Mass., and Barcelona, Spain. "They have to provide enough incentive for renewables to grow, but not so much that they coddle the industry and prevent it from becoming more efficient."

Countries in Europe that have led in renewable adoption, including Denmark, Germany and Spain, have pursued unabashedly interventionist programs that require utility companies to buy electricity generated by clean energies at a premium price set by the government. This policy, known as "feed-in tariffs," pushes the extra cost onto consumers in the form of higher energy prices.

In contrast, about two dozen U.S. states, Japan and the United Kingdom have preferred a more market-oriented approach, based on tax credits and "renewable portfolio standards," or RPS. Under this approach, the government sets a target for the percentage of electricity that must come from renewable energy and lets utility companies decide how to meet it. Sometimes financial penalties are imposed if utilities don't meet the targets. In the U.K., utilities that fall short of the targets can fulfill their obligations by buying certificates representing the amount of power they failed to produce from renewable sources. Those funds are then redistributed to companies that met the targets.

The Danish Success

One notable success with the more interventionist approach has been Denmark. Fifteen years ago the country mounted a push to expand the use of renewable fuels, which accounted for 25% of its electricity generation in 2004, up from 3% in 1992. It's a considerable achievement for a country with no hydropower, the cheapest and most common way of making clean electricity.

"Denmark has what is probably the most ambitious support scheme for renewable-energy technologies ever seen," says Jonathan Coony, who wrote a report on Denmark's energy policies for the International Energy Agency and now works at the World Bank.

The Danes established a feed-in tariff that set an above-market rate for electricity made from wind and solar power and from biofuels like wood and straw. The system spurred a wave of investment, mainly in wind, because it gave companies the certainty to proceed with massive investments and construction.

The Danish government also established capital grants for companies that built wind turbines, kicking in 15% to 30% of project costs, and spent aggressively on research in wind power. And it required utilities to build plants that burn wood pellets and straw to generate electricity, with some of those plants also providing heat for nearby homes and offices.

All this has come at a cost: Consumers and businesses in Denmark pay a "public service obligation" or tax on every kilowatt-hour of electricity. According to an analysis by the IEA, the surcharge adds about 3% to the electricity bills of every household and 9% to the cost for businesses. However, higher electricity costs often are more politically palatable in Europe than in the U.S. "People don't really notice the costs of feed-in tariffs in Europe because the cost of electricity [already] is so high," says Robert Dixon, head of the energy-technology policy division of the IEA.

In 1999, the Danish government worried that its subsidies for renewable energies were too generous, says Steffen Nielsen, an energy-supply expert at the Danish Energy Authority. If the government set the price too high for electricity from renewable sources, the producers would have little incentive to refine or improve their technologies to be more cost-effective. "If you had a wind turbine in a good location, you were probably getting overcompensated," says Mr. Nielsen.

A decision was made to shift from a fixed feed-in tariff to a formula in which renewable-energy producers would be paid a certain percentage above the market rate, a change that effectively scaled back support. "The policies have become more market-oriented over time," says Mr. Nielsen.

Wavering in the U.S.

Japan has found some success with a slightly different mix of policies: It spent heavily on research and development in solar panels and gave grants and subsidies to promote their installation. As a result, Japan has the second-largest installed capacity of solar panels in the world, after Germany, which supports solar energy with feed-in tariffs for producers and with subsidies for the installation of panels. Also, in 2002, Japan passed a law that requires 1.35% of the electricity that utilities supply to the nation's grid to be generated from renewable sources; those that don't comply can buy credits from utilities that are meeting the targets.

In the U.S., the federal government instituted feed-in tariffs for wind, solar and other renewable-energy sources after the oil shocks of the 1970s. But implementation was left to the states, which in many cases wrote rules that severely watered down the effect of the federal legislation. Since 1992, federal support for renewable energy has come mostly from the production tax credit, which provides a tax benefit to companies for every kilowatt-hour of electricity a renewable-energy plant produces in its first 10 years of operation.

The policy has led to construction of numerous wind farms. But it has a major weakness: The tax credits periodically expire if not reauthorized, an element of unpredictability that hurts investment. Congress has let the credit expire several times since 1999, and each time construction of wind turbines has dropped as a result. In 2004, for instance, newly installed wind-power capacity in the U.S. dropped to 389 megawatts, from 1,687 MW in 2003, according to the American Wind Power Association. It then bounced back up to 2,431 MW in 2005. "It's simple: no [production tax credit], no wind," says Mr. Allmendinger of Emerging Energy Research.

At the state level in the U.S., renewable portfolio standards -- targets for the percentage of electricity that must come from renewable energies -- are the favored way to spur investment in renewables. "The states have really been the crucible for experimentation" with policies to encourage renewable energy in the U.S., says the IEA's Mr. Dixon.

Texas triggered a burst of investment in wind power with a law passed in 1999 that requires a certain percentage of the electricity sold by utilities in the state to be generated from renewable sources. Those that don't hit the target face financial penalties. But one downside of the Texas experience is that companies have invested almost exclusively in wind power because it's the cheapest alternative -- stunting the development of other promising energy sources, like solar power.

As governments continue to experiment with policy alternatives, the key is that whatever policies they employ must be predictable and reliable -- not subject to constant buffeting by political winds -- says Brandon Owens, associate director of global power for Cambridge Energy Research Associates, a research and consulting firm based in Cambridge, Mass.

"That's the only way to provide market participants with the certainty required to take financial risks," says Mr. Owens. "Investors need to be confident the rug isn't going to get pulled out from under them in the future."

--Ms. Abboud is a staff reporter in The Wall Street Journal's Paris bureau.

THE POLICY PUZZLE

The Issue: How can governments encourage the building of large-scale renewable-energy plants that will make clean power competitive?

The Background: A variety of policies have been tried around the world, but progress has been slow. Most involve tax credits, subsidies or mandated targets for renewable-energy production.

What's Next: The experiment continues, but one lesson is clear: Any policy must be insulated from shifting political winds.
