Renewables are Doable

FED STUDY TOUTS WIND

BY DAN ARVIZU

CAN WE CREATE A FUTURE IN which a significant fraction of America's electricity comes from a renewable domestic resource like the wind?

The answer is, "Yes, we can." First, it's doable. And second, it's desirable.

It's no longer a discussion of whether renewable energy – and wind in particular – is a viable opportunity. Wind is a clean, inexhaustible, indigenous energy resource, and using more of it will benefit our nation's security, economy and environment. Coupling the abundant wind resources that flow across our country and the readiness of the marketplace, the opportunity for accelerating the wind industry with next-generation technologies is here.

How much wind power can we harness? It is feasible that 20 percent of America's electricity could come from wind by 2030.

Twenty percent in a little more than 20 years is an ambitious goal. That's as much electricity as nuclear reactors provide, and they have been commercially operating here since 1957.

Wind power generates about 1 percent of our electricity today. The good news is that the industry is on a growth spree. Our wind power capacity has experienced a 30 percent annual growth rate over the past five years. In 2007 alone, industry invested $9 billion in wind power, and wind capacity grew by 45 percent. This year promises even more, with $3 billion in new generating capacity installed in the first quarter. As a result of committed research and large-scale investment, the cost of wind energy has declined to about 5 cents a kilowatt-hour today.

But to reach "20 percent by 2030," we'll need to install more than 75,000 additional wind turbines to produce 300,000 megawatts of power. And those turbines will have to be more sophisticated, more efficient and, in many cases, larger than today's models.

How we can do it is detailed in "20% Wind Energy by 2030," a new U.S. Department of Energy report. The DOE's National Renewable Energy Laboratory extensively helped to prepare the study with other national laboratories and 50 organizations. NREL's Wind Deployment System Model developed by the laboratory's Strategic Energy Analysis and Applications Center was instrumental in the project.

The report makes it clear that we cannot realize the 20 percent scenario through a business-as-usual approach.

TECHNOLOGY The 20 percent wind scenario will require building the new turbines with improved performance and reliability and reduced operating

Dan Arvizu
PHOTO BY RAYMOND DAVID/NREL

NewsFlash

NUCLEAR CANISTERS

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The U.S. Department of Energy has asked two companies to design and build canisters to transport and store spent nuclear fuel at the proposed federal Yucca Mountain facility in Nevada.

The contracts with NAC International and Areva Federal Services last five years and are each worth up to $7.3 million.

costs. This means developing taller, more advanced towers and bigger rotors, as well as associated improvements to controls, drive trains and electronics. Many of these turbines will be more on the scale of offshore oilrigs with rotors 100 meters in diameter. At the same time, we need a range of smaller turbines that can operate efficiently in lower wind-speed sites that cover vast areas of the Great Plains, the Great Lakes coastlines and shallow areas of the Eastern Seaboard.

Developing a new generation of turbines is risky. We will need new manufacturing capacity, comprehensive evaluation, certification and performance validation to ensure that our new technology will compete on the global market and operate effectively. This includes the next-generation of full-scale test facilities and a national program to monitor fleet performance. At NREL's National Wind Technology Center, we work closely with manufacturers to advance wind turbine science, improve turbine performance and lower the cost of wind-generated electricity.

SITING To reach 20 percent wind, these new technologies must go to the right locations where the wind meets commercial resource requirements and transmission is cost effective. This means responsibly pursuing shallow and deep-water offshore turbine installation, where a huge resource awaits. On land, the amount of land for new turbines would be relatively small, but the needed transmission infrastructure would increase wind's footprint noticeably. We will need improved siting and approval processes that increase our rate of installation while addressing environmental risks, wildlife impacts and community concerns.

TRANSMISSION The 20 percent wind scenario will require an expanded transmission system, especially to cities from remote areas. Some of these improvements are overdue because our aging grid already is under strain. New transmission capacity is needed if we are going to integrate a substantial new power source from many points, while also resolving current congestion and peak demand issues. The system also will need new energy storage systems, smart grid and load management controls. Historically, wind's intermittent nature as a weather-dependent fuel source has been a barrier to its expansion. At NREL, we are helping utilities understand the operational and cost effects of integrating wind power into the system.

THE AVERAGE RATEPAYER WOULD PAY AN ADDITIONAL *50 cents* PER MONTH.

Despite these challenges, the benefits are clear. Wind diversifies the U.S. energy portfolio with a more secure domestic resource. It creates well-paying jobs in many sectors of the economy and new revenues for communities and landowners.

Environmentally, it would be a big step toward addressing global climate change. The scenario would save 7.6 cumulative gigatons of CO_2 by 2030 and reduce CO_2 emissions by 825 million metric tons annually thereafter. The scenario reduces water use and its associated costs by 8 percent compared with conventional power.

How much would 20 percent wind cost? Despite a substantial up-front investment, the scenario would only cost 2 percent more than expanding the nation's power supply without wind power. The average ratepayer would pay an additional 50 cents per month.

The 20 percent wind scenario is an opportunity, not a promise. The report identifies steps to achieve this ambitious goal. By looking at the situation more holistically with industry and policymakers, it suggests one way that renewable energy can significantly contribute to building a safer, cleaner and more prosperous America.

What's needed next is a serious national commitment to making that scenario a reality.

Dan Arvizu has been director of the National Renewable Energy Laboratory in Golden, Colo. since 2005.

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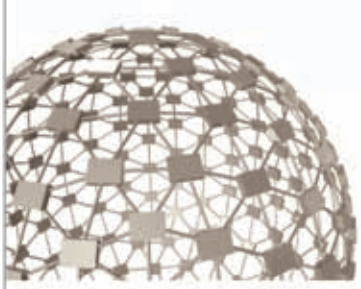

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