Coexisting with nature: Shell's NedPower Mount Storm wind farm in West Virginia.

A few miles off the shore of Cape Cod, there could soon be a new source of clean energy: wind. Earlier this year, U.S. Interior Secretary Ken Salazar announced the approval of the $2 billion Cape Wind project, the first offshore wind farm in the U.S. The plan is to install 130 wind turbines, each 440 feet high, in the middle of Nantucket Sound. The turbines will eventually produce enough electricity from ocean breezes to power the homes of about three-quarters of the 225,000 residents who live on the Cape.

Cape Wind is a sterling example of "a clean-energy revolution that is reshaping our future," Salazar told reporters back on April 28, the day the wind farm was approved. During the nearly nine years it took to get the green light, the project faced intense opposition from residents, several Wampanoag Indian tribes, and environmentalists, all of whom questioned its impact on shipping, aviation, fisheries, and, of course, the pristine waterfront views from nearby homes. The project still faces potential lawsuits that could delay its start. "Everyone thinks clean wind energy is great for the country," says John Cusack, president of Gifford Park Associates, a sustainability management and investment consulting firm based in Eastchester, N.Y. "They just don't want to have to look at the equipment involved in producing it." The race to reduce America's use of fossil fuels—and dependence on foreign oil—and to replace their carbon emissions with clean energy solutions is well under way. But as the Cape Wind project clearly demonstrates, the process may be lengthy and subject to plenty of not-in-my-backyard debate.

Already, the U.S. government has pledged $27 billion for energy efficiency and renewable energy research and development.

The economic slowdown and the failure of Congress this year to pass a comprehensive energy and climate bill are certainly part of the reason. And while the American Recovery and Reinvestment Act of 2009 pledged $27 billion for energy efficiency, and renewable-energy research and investment, the absence of details on how to deliver and price wind, solar, and other sources of green energy is slowing development even further. Indeed, according to the American Wind Energy Association, through the end of the third quarter, year-to-date installations of new wind power facilities were down 72% from 2009, the lowest level since 2006. In fact, says AWEA, in 2010, wind projects in the U.S. are being installed at half the rate as in Europe, and a third of the rate as in China.

Still, experts agree that no single clean energy technology is likely to ever replace fossil fuels completely. Says Jim Provias, vice president for renewable energy at Suncor Energy in Calgary, Canada: "There's no silver bullet here. We're looking at a portfolio of alternative sources that together will play an increasingly important role."

And while renewable energy consumption increased by about 8% between 2008 and 2009, according to the U.S. Energy Information Administration (EIA), it still only accounts for roughly 8% of the country's total energy production (see chart, right). Cost is part of the equation: Renewable-energy power plants generally cost more to build and operate than coal and natural gas plants. And while wind is free, the huge turbines needed to convert wind to electricity are not. According to Richard Williams, president of Shell Wind Energy, a division of Royal Dutch Shell PLC, "Every two-megawatt turbine is a $4 million investment."

The U.S. is hardly alone in the drive to develop and promote green power. China, according to the International Energy Agency's World Energy Outlook 2010 report, is now the world's biggest energy user, surpassing the U.S. last year. And China, along with India and other developing countries, are also projected to be the leaders in developing wind, solar, and nuclear capacity over the next two decades.

CORPORATE INNOVATORS

The companies on the ground that are developing, financing, and producing new sources of clean power acknowledge the obstacles ahead, but are optimistic about the future. "I'd like to be a young engineer in this field today," enthuses Williams of Shell Wind Energy. "The opportunities and technologies available today are immense."

Over the past five years, Shell has invested roughly $1.7 billion in alternative energy, including wind, solar, hydrogen, and biofuels. In the wind business, the company has 50/50 joint ventures in eight wind farm projects in the U.S. and three in Europe. Together they generate approximately 1,100 megawatts of emissions-free electricity, enough to power 300,000 homes annually. Shell's wind projects also save more than one million tons of CO_2 a year compared with emissions from coal-fired power plants, claims the company.

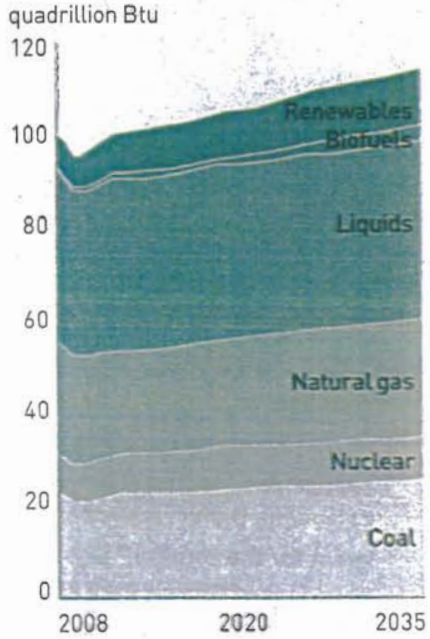
Williams says the world's energy demands will continue to drive the search for alternative sources. "There are three realities of our current situation," he explains. "The world's energy use is going to double in the years ahead, all the easy discoveries in oil have been made, and we are contending with serious environmental stressors that can't be ignored."

One of the more serious challenges in the wind business centers on the issue of transmission, he says. The wind is primarily in the Rocky Mountain and Great Plains states—from Iowa to Texas. Building transmission lines to deliver that power to large metropolitan areas on the coasts is complicated and expensive, sometimes costing as much as $1.5 million per mile. Complicating matters is the issue of who will finance the work. "Is it the wind developer or the transmission company?" poses Williams. "No one wants to make the first move until they know where the money is coming from."

While many environmentalists and energy experts bemoan the absence of cohesive federal energy policies, others say this is no reason for alternative-energy development to limp along. "Wind and solar power technologies do not have to be owned by the government," says Paul Gipe, a member of the steering committee at the Alliance for

AMERICA'S ENERGY PORTFOLIO

Projections on consumption by fuel sector.



Source: U.S. Energy Information Administration

Strong growth in the solar panel market is being buoyed by market demand.

Renewable Energy, a group that advocates energy policy reform.

Gipe points to Gainesville, Fla., as an example of a city that moved ahead on its own. Last year, city leaders approved a plan enabling homeowners who put solar panels on their roofs to sell that power back to the city's municipal utility for twice the standard electricity rate. By paying above-market rates for green electricity, the city is encouraging the use of solar panels and decreasing the amount of emission-producing coal needed to power homes and businesses in the area.

The point at which green energy operations and aesthetics collide is not an insignificant part of the overall conversation. Suncor Energy, an integrated energy company based in Calgary, is committed to understanding the interaction between its operations and the environment. "In terms of negotiating leases with landowners, we look for win-win situations," explains Jim Provias, vice president of renewable energy at Suncor. "We work with local landowners to discuss the opportunities and the benefits of placing wind turbines on their land, while determining ways to minimize the amount of disturbance."

Suncor has four wind power projects in Canada, generating 147 megawatts of electricity, with construction underway on two new projects and currently reviewing new opportunities. It also has an ethanol plant in Ontario that produces 200 million liters annually and is being expanded to produce 400 million liters annually. The ethanol is blended into various gasoline products and helps reduce CO_2 emissions by up to 300,000 tons per year (600,000 tons when producing 400 million liters annually), Suncor claims.

On a cumulative basis Suncor is planning to invest up to $750 million in developing renewable energy by 2012, Provias says. While he acknowledges that the equivalent annual amount is a small portion of Suncor's overall capital expenditure budget, Provias does say it is significant and it gives the company a voice in the conversation about future energy policies and green power. "We're certainly not a pure-play alternative-energy company, but we do look at renewables as part of the portfolio of a sustainable-energy company," Provias says, noting that the corporation's long-term goal is to build a new wind power project every 12 to 18 months.

SHIFTING TO RENEWABLES

As green energy sources become a bigger part of our power supply, the need to provide developers and utilities with the proper insurance and risk-management tools increases, as well. George Stratts, president and CEO of Chartis Global Marine and Energy, a division of insurance giant Chartis, says there are different levels of risk among various alternative and renewable energy sources, and even within the same source. "The risks associated with an offshore wind farm in the Northeast are more complex because the wind turbines are in the open ocean and exposed to salt water corrosion and wind storms," explains Stratts.

Experts are still figuring out how different alternatives like biofuels fit into the nation's overall energy strategy.

To get a handle on those risks, and to help manage the alternative and renewable-energy supply chain, Chartis offers an engineering-centric approach. "If we're working with a wind farm project and the turbines are coming from Europe, we'll make sure they were packed and shipped properly," Stratts explains. At the wind project site, Chartis engineers work with the client, going over operational risks and maintenance requirements. "We make this our standard in traditional energy, as well as in alternative and renewable energy," Stratts says, explaining that Chartis clients are a diversified group that includes pure-play alternative and renewable energy companies, in addition to the major utilities. "Utilities that in the past relied solely on coal and gas for electricity are now figuring solar and wind into their mix," he says. "That's a different level of risk that needs to be addressed."

Going forward, Stratts says warehouse and shopping-mall developers, oil companies, and even individual homeowners will increasingly blend renewable sources into their own energy mix. "We do believe that as we progress, the balance between fossil fuels and renewable sources such as wind and solar, as well as the need to develop more sophisticated ways to measure risk will continue to grow." •