

Wind Power

Photo Essay by Steven J. Dundas



Alternative THINKING

The explosive development of renewable energy technologies

STEVEN J. DUNDAS | Many environmentalists were cheering over Gov. Jon S. Corzine's unveiling of the state's updated energy master plan in late October. The long-awaited plan, revised from an April draft, calls for an even greater reliance in the state on sources other than traditional fossil fuels to produce electricity for businesses and residents. By 2020, New Jersey should have 30 percent of its electricity produced from solar and wind power and other renewable sources.

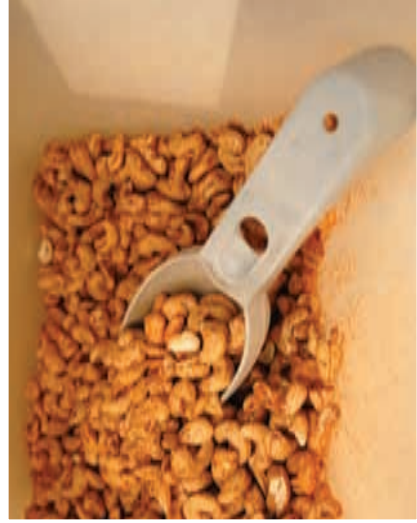
This was welcome news for groups like the New Jersey Environmental Federation, who have long been chanting, "Down with dirty coal!" The nation is in the midst of a severe energy crisis and many argue that dependence on fossil fuels

is weakening the economy and the environment. Growing demand, rising prices, and concern over global warming have prompted businesses and governments to explore investments in alternative energies. In addition to the ambitious 2020 energy goals, the state's Clean Energy program, established in January 2003, provides numerous incentive programs to help businesses, municipalities, and private residents invest in alternative energy projects.

Regular reports announcing new technological ventures reflect New Jersey's commitment to a new energy outlook. For example, in October SolarWorks NJ LLC, a Turnersville-based solar energy company, announced plans to develop a solar farm on 12 acres of land in Williamstown. The \$14 mil-

lion project will be the largest solar farm energy system in South Jersey and one of the largest systems in the state. Also in October, the Board of Public Utilities approved a \$4 million grant for an offshore wind project. In March, Ocean City awarded a \$4 million contract to install solar systems on various public buildings, with goals of offsetting 17% of its electrical needs. Last year, Fuel Bio began commercial production of biodiesel at its Elizabeth facility.

The photos on the following five pages capture five alternative energy technologies in motion. Each of these renewable sources, including wind, solar, hydroelectric, Aquifer Transfer Energy Systems (ATES) and biodiesel, are helping design the altered landscape of New Jersey's energy future. ■



The Whole Earth

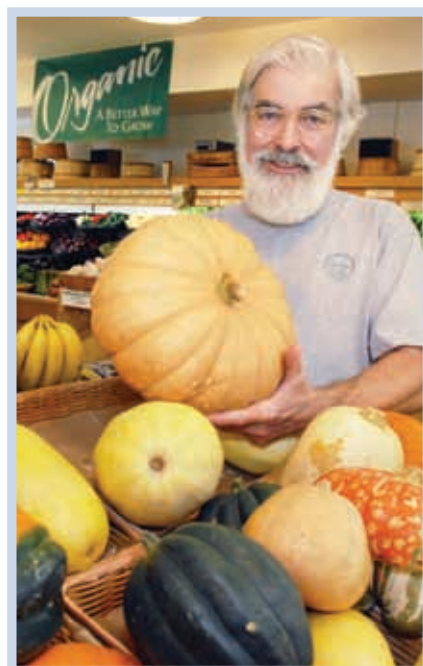
above Whole Earth Center, a not-for-profit natural foods store in Princeton, was the first organic grocery store to purchase wind power from the New Jersey Clean Power Choice program. The store has also installed solar panels on its roof and used recycled construction materials in its recent expansion.

left Whole Earth's recently expanded produce department sells only organically grown fruits and vegetables and caters to a wide variety of local crops. The store buys fresh foods from some 20 New Jersey and Pennsylvania organic farmers. Produce manager, Mike Atkinson, restocks the shelves with local organic peppers.

right Bill Moran, customer service manager, shows off the fall harvest. Moran explained that the new café's tabletops were crafted from fallen trees by a local Princeton area artist. Each component of Whole Earth's operations promotes sustainability and a sense of community.

Buying in Bulk

top left Whole Earth Center encourages the reduction of waste by offering a variety of bulk foods, including these seasoned cashews. The store urges customers to bring their own jars or bags for bulk items and offers a 10¢ savings for each customer container.



Wind Harvest

opposite The Jersey-Atlantic Wind Farm near Atlantic City includes five 1.6 Megawatt turbines that stand 262 feet in the air. The turbines operate at full capacity with wind speeds between 12 and 45 miles per hour. The power produced is used to operate the Atlantic County Utilities Authority (ACUA) wastewater treatment plant located on the site.



Solar



Sun for Sale

above Some 3,388 New Jersey residents, businesses, and public entities have installed solar systems that harness sunlight to produce electricity. Jesse Grossman, CEO of Soltage Inc. in Jersey City, discusses the firm's project at Mazza and Sons Recycling in Tinton Falls with colleague, Stephen Goodbody. Soltage provides the initial capital and directs all aspects of power station construction, engineering and maintenance and then sells the electricity to the client at a fixed rate.



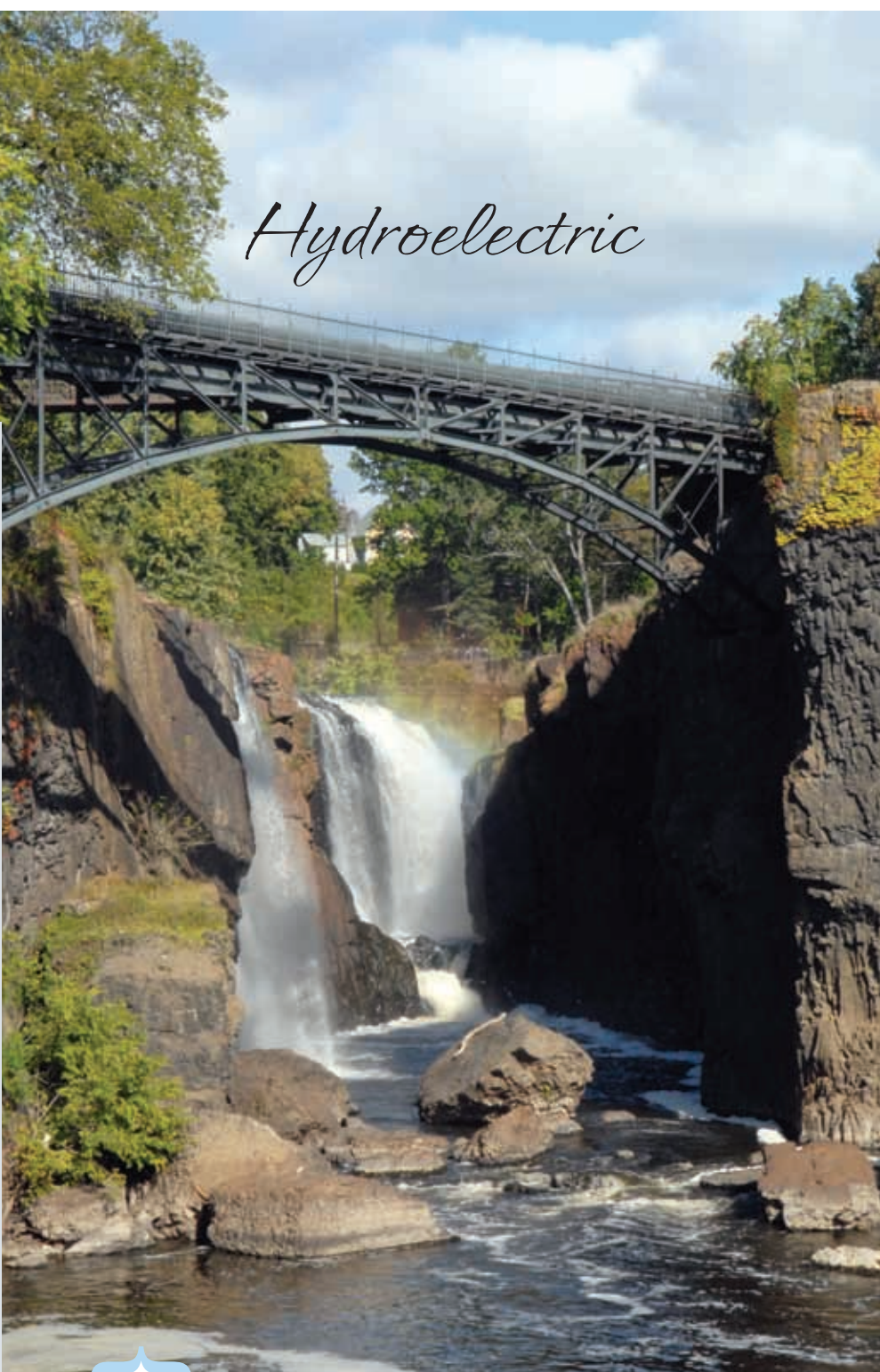
Energy Innovation

one Mazza and Sons, a 34-year-old recycling and demolition facility, contracted Soltage to build a solar power station on one of its buildings. The 282-kilowatt system will produce about 310,000 kilowatt hours of electricity and offset some 513,000 pounds of carbon dioxide emissions per year.

two Photovoltaic cells on the roof collect energy from the sun and conduct a direct current (DC) down to the power station. The inverter, shown here, takes the DC power and converts it to Alternate Current (AC) power, the form in which electricity is delivered to homes and businesses.

three Grossman says, "New Jersey has positioned itself as a leading market for renewable energy development." Here, Goodbody walks among the solar panels on the Mazza rooftop.

Hydroelectric



River Power

above Hydroelectricity generates electricity from the gravitational force of falling water spinning turbines. Here, the Great Falls plunge 77 feet into a rocky ravine on the Passaic River in Paterson. The site was one of the first major water power systems in the U.S. Alexander Hamilton devised the idea to harness the natural power of the falls in 1791. Today, the plant is near the falls and operates as a river run-off facility. The river is only high enough to produce electricity in late winter and spring.



Twisting Turbines

one Three turbines are maintained at the current hydroelectric station on the Passaic River by Algonquin Power of Oakville, Ontario Canada. When the pond is elevated enough and water can flow freely, the turbines can produce 10.5 megawatts of electricity a day.

two A historic turbine is kept onsite as a reminder of the past. Thomas Edison's Electric Company created the original designs for the hydroelectric plant, which operated from 1914 until 1969.

three The plant was re-licensed by the federal government in September 1985. The electricity produced here by Algonquin is sold to Public Service Enterprise Group. The annual average expected production is 19,250 megawatt hours, enough to power about 1,500 homes.



Bio Diesel

The New Petrol?

right Fuel Bio opened its facility in Elizabeth in August 2006 and began full-scale production of bio diesel from soybean oil in May 2007. Due to the rising prices of soybeans and other related crops, the adaptable plant is now producing its renewable fuel from chicken fat.



Biodegradable By the Gallon

above Plant manager Thakoordeo "Sunny" Harnanan is negotiating the flow of the finished fuel product into massive storage tanks. When at full capacity, explains Harnanan, Fuel Bio produces 120 gallons a minute, the equivalent of 60 million gallons a year.

left The bio fuel has no hazardous inputs or byproducts and can be used in any diesel engine. Vehicles can eliminate carbon emissions and 78 percent of total emissions.



Aquifer Thermal Energy Storage (ATES)

Campus Innovation

left Alice M. Gitchell at Richard Stockton College of New Jersey checks on a wellhead that pumps groundwater once air temperatures start to dip. The water is sent to a cooling tower and the cold water is then injected back into the aquifer and stored for use in the college's cooling system in warmer months. It is the first of its kind in the U.S.

below The three campus wells help educate students and visitors on the process.

