

This New Jersey State Summary educates policymakers and the public about EERE investments and their positive impacts in New Jersey.

New Jersey

The U.S. Department of Energy (DOE) is pursuing an all-of-the-above approach to developing every source of American energy. The Office of Energy Efficiency and Renewable Energy (EERE) leads DOE efforts to build a strong clean energy economy, a strategy that is aimed at reducing our reliance on foreign oil, saving families and businesses money, creating middle-class jobs, and reducing pollution.

This strategy will position the United States as the global leader in clean energy, increasing our nation's economic competitiveness. In 2012, \$268 billion was invested globally in clean energy, a 500% increase since 2004.¹ Trillions of dollars will be invested in the coming decades. Clean energy represents one of the most important economic development races of the 21st century. We face a stark choice—the clean energy technologies of tomorrow can be invented and manufactured in New Jersey and the rest of the United States for domestic use and export around the world, or we can cede global leadership and import those technologies from China, India, Germany, and elsewhere.



New Jersey's Clean Energy Resources and Economy

- Clean Economy Jobs (2010): 94,200+
- Average Annual Growth Rate of Clean Economy Jobs (2003–2010): 4.7%
- Average Annual Wage of Clean Economy Jobs (\$2009): \$43,809²

New Jersey's two currently predominant renewable energy resources are wind and solar, as evidenced by rapid market growth in both areas. As the state carries almost 100,000 megawatts of wind potential on land and offshore—enough to generate all of the current electricity needs of the state—it is no surprise that New Jersey is home to six facilities that manufacture components for wind turbines. Solar photovoltaic growth is also considerable, and at 1,000 megawatts, the state now ranks second in the nation in terms of installed capacity.³ In large part, this growth has been due to state policies that facilitate solar system installation (such as net metering) and state sales tax and rebate incentives for renewables. The state has committed to generating 22.5% of its electricity from renewable sources by 2021 through its Renewable Energy Portfolio Standard.⁴

In 2010, utility companies in New Jersey also invested an impressive \$198 million in energy efficiency and recorded savings of 497 million kilowatt hours or enough electricity to power more than 43,000 homes for one year. The utilities' investment supports four grant programs for energy efficiency offered by New Jersey's Public Service Electric & Gas Company, as well as a loan program and a rebate program offered by New Jersey Natural Gas.⁵



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



EERE and New Jersey

EERE helps create New Jersey’s clean energy economy today, developing and delivering innovative, market-driven solutions for the following:

- **Sustainable transportation** – making transportation cleaner and more efficient through solutions that put electric drive vehicles on the road and replace oil with clean domestic fuels
- **Renewable electricity generation** – reducing the cost of renewable energy through solutions that squeeze more usable power from sustainable resources and improve the economics of manufacturing and installation
- **Energy-saving homes, buildings, and manufacturing** – developing cost-effective energy-saving solutions, which help make our country run better through increased efficiency, providing better plants; manufacturing processes; products; new homes; ways to improve older homes; and buildings in which we work, shop, and lead our everyday lives.

EERE Investments in New Jersey

EERE invests in New Jersey through a broad range of clean energy projects, including fuel cell, solar, wind, and other technologies. Through the research, demonstration, and deployment activities we conduct with New Jersey and its businesses, universities, nonprofits, and state and local governments, EERE is supporting industries, communities, and families to develop innovative, cost-effective clean energy solutions.

Sustainable Transportation



Manufacturing Facility Opened Using EERE-Supported Low-Cost Fuel Cell Manufacturing Methods



Florham Park, New Jersey, and Somerset, New Jersey
EERE investment: \$ 1.9M

Working with **BASF** of Florham Park, EERE-supported efforts led to a 75% reduction of the manufacturing cost of gas diffusion electrodes (GDEs)—a key component of fuel cells. To accomplish this cost reduction, BASF developed a higher throughput coating process, modeled the impact of defects on fuel cell performance, and developed more efficient manufacturing specifications. The company opened a new pilot manufacturing facility that incorporates these advances in Somerset, New Jersey.

Deploying Alternative Fuel Vehicles and Fueling Stations



Statewide
EERE investment: \$30K annually to each coalition

EERE coordinates a network of nearly 100 Clean Cities coalitions—self-organized groups of local community, government, and business stakeholders whose efforts to adopt smart transportation solutions have displaced more than 4.5 billion gallons of gasoline and diesel since 1993. The **New Jersey Clean Cities** coalition leveraged EERE funds to support the deployment of 272 alternative fuel vehicles and four new compressed natural gas (CNG) fueling stations statewide. At one CNG fueling station in Camden, 80 slow-fill pumps serve Waste Management’s fleet of natural gas-powered trucks, and one pump is open to the public. This one project is expected to displace the equivalent of more than 1,750,000 U.S. gallons of gasoline per year, and annually reduce more than 600,000 pounds of greenhouse gas emissions. The New Jersey Clean Cities coalition invested an additional \$38.7 million in this effort. In 2011, the New Jersey coalition leveraged DOE’s support to raise more than \$13.3 million from businesses, local governments, other organizations, and non-DOE grants.⁶



EERE has partnered with BASF of Florham Park to significantly reduce the cost of manufacturing fuel cells. *Photo from BASF*

Production Cost of Essential Material Reduced for Electric Vehicle Batteries



Iselin, New Jersey
EERE investment: \$2.5M

BASF Catalysts, formerly Engelhard Corporation, of Iselin matched EERE’s investment to develop a process for low-cost domestic production of lithium-ion battery cathode



materials. The process will reduce the production cost of cathode material for electric vehicle batteries and meet the plug-in hybrid electric vehicle requirements for a 40-mile all-electric range. The EERE investment resulted in the demonstration of a low-cost process that produced materials of the same quality as the standard process and took 25% less time.

Renewable Electricity Generation



EERE-Supported Technology Used in the World's Largest Distributed Solar Electricity Project



South Plainfield, New Jersey
EERE investment: \$5.8M

Partnering with **Petra Solar** of South Plainfield, EERE supported the development of the company's innovative SunWave™ Smart Energy Module. This microinverter feeds electricity onto the electrical grid from individual panels and allows utilities to monitor and manage each panel, combining distributed solar energy generation with smart grid communications capabilities.⁷ Petra Solar is installing 200,000 photovoltaic panels with this technology on utility and streetlight poles around the state under a \$200 million contract with Public Service Electric & Gas. In addition to private equity investment totaling \$54 million, Petra Solar has leveraged \$3.3 million in funding from the State of New Jersey to manufacture related technologies.⁸

Groundbreaking Technology Generates Electricity from the Ocean's Waves



Pennington, New Jersey
EERE investment: \$8.3M

Partnering with **Ocean Power Technologies (OPT)** of Pennington, EERE is supporting the demonstration of the company's full-scale, 150-kilowatt PowerBuoy system—known as the PB150—that captures the kinetic energy of waves to drive a generator that produces electricity. In August 2012, the company announced that it had received approval from the Federal Energy Regulatory Commission to deploy up to 10 devices, generating enough electricity for approximately 1,000 homes. OPT also plans to scale the PowerBuoy system up to 500 kilowatts, which will help move the project toward commercialization and promises to add tremendous value to the wave energy industry, reinforcing utility-scale viability of this groundbreaking technology, collecting environmental impact data, and exploring avenues for cost reduction.⁹



Ocean Power Technologies of Pennington's new 150-kilowatt PowerBuoy system captures the kinetic energy of waves to drive a generator that produces electricity. *Photo from Ocean Power Technologies, NREL 22857*

DOE and the U.S. Department of Defense Demonstrate Fuel Cell Backup Power Units



Picatinny Arsenal, New Jersey, and seven other military installations across the nation
EERE/DOD joint investment: \$6.6M

EERE and the **U.S. Army Corps of Engineers** are installing 18 fuel cell backup power systems at several installations, including the Picatinny Arsenal, to accelerate clean energy technology deployment at military facilities. The demonstrations will provide valuable data that help identify future research areas for fuel cells. They will also provide two years of performance data—necessary information for implementing future installations at lower cost and risk—and will help advance the U.S. Department of Defense's efforts to diversify its fuel sources, improve energy reliability at military installations, and help reduce its fossil fuel use overall.¹⁰



Tapping the Offshore Wind Energy Resource



Multiple Locations
Off the New Jersey Coast

DOE and the U.S. Department of the Interior announced a Memorandum of Understanding in June 2010 that will strengthen opportunities for the future development of commercial renewable offshore energy projects off the coast of New Jersey and neighboring states. Tapping into this renewable resource would not only supply the state’s electricity needs, but also drive economic growth in New Jersey by attracting potential investment, building local supply chains, and creating jobs. EERE is supporting offshore wind research, testing, and demonstration—including investing \$70 million in two world-class testing facilities—to promote U.S. leadership in developing offshore wind turbines technology. New Jersey is poised to be a leader in capitalizing on these investments.¹¹

Wind Powering America Improves Stakeholders’ Understanding of Wind Power



Statewide

EERE’s **Wind Powering America** is a nationwide initiative designed to educate, engage, and enable critical stakeholders to make informed decisions about how wind energy contributes to the U.S. electricity supply. It has supported the New Jersey Wind Working Group, which assists the New Jersey Board of Public Utilities Office of Clean Energy, conducts various wind resources analysis exercises, supports a loan program that makes funding available to colleges and universities in the state to collect wind resource data, and assists school wind projects at elementary schools in Brigantine and Cape May.

Energy-Saving Homes, Buildings, and Manufacturing



Exploring Energy-Saving Opportunities in the Information and Communications Technology Industry



Basking Ridge, New Jersey

EERE’s National Renewable Energy Laboratory (NREL) just entered into a first-of-its-kind Technical Services Agreement with **Verizon** to increase the energy efficiency of one of the most energy-intensive industries in the world on a square-foot basis. The agreement will bring NREL and

Verizon together to share expertise and resources related to energy efficiency and energy management at Verizon’s facilities and data centers, as well as to advance Smart Grid technologies and best practices. The information and communications technology industry consumes 3% of U.S. electricity. Verizon’s agreement with NREL will not only increase the energy efficiency of the company’s facilities and data centers, including its Basking Ridge operations center, but it will also help provide Verizon’s customers with intelligent efficiency solutions.¹²

Bringing a Combined Heat and Power System to a Hospital



Plainsboro, New Jersey
EERE Investment: \$1.9M

Using EERE-leveraged funds, **NRG Energy** and the **University Medical Center of Princeton** partnered together to install an onsite “Energy Center,” a central utility plant, a 4.6-megawatt Combined Heat and Power facility, and a thermal energy storage system that will produce electricity, steam, and chilled water. The “Energy Center” is expected to produce 228 million British thermal units of energy per year and nearly 30,000 megawatt hours of electricity. Additionally, the project will prevent 6,700 tons of carbon dioxide emissions and will create approximately 45 construction and 10 permanent jobs.

Creating Community Jobs and Long-Term Energy Savings for an Urban Center in South Jersey



Camden, New Jersey
EERE investment: \$5M

Partnering with state and local partners that comprise **Camden POWER** (Program Offering Widespread Energy Recovery), the City of Camden is leveraging \$5 million in seed funding from EERE’s Better Buildings Neighborhood Program to model a unique approach to bringing long-term energy and financial savings to low-income homeowners in its community, while also improving long-term energy affordability for the city’s urban small businesses. The Better Buildings Neighborhood Program is working with more than 40 state and local governments to help communities across the country, including Camden, to upgrade the energy efficiency of more than 100,000 buildings. The program uses a variety of innovative approaches to establish the infrastructure for a self-sustaining residential energy-efficiency market that the private sector can operate. Camden also is seeking to partner with a local institution that offers workforce training and Building Performance Institute certification, so residents and contractors can actively engage in their communities and leverage jobs created from Camden POWER.¹³



New Jersey is a leader in offshore wind research, testing and demonstration. *Photo from HC Sorensen, Middelgrunden Wind Turbine Cooperative, NREL 17856*

Projects to Watch

EERE has recently provided funds for these projects as it continually invests in new, promising energy efficiency and renewable energy technologies.

Improving the Efficiency of Solid State Lighting



Princeton, New Jersey
EERE Investment: \$1.8M

Lightscape Materials recently received EERE funding to improve the efficiency of solid state lighting by developing new, more efficient nitride-based phosphors. These phosphors, which are used to convert the colored light generated by light-emitting diodes into white light, improve the quality of light emitted at reduced cost.

Retrofitting Heating, Ventilation, and Air-Conditioning Systems to Improve Efficiency



Passaic City, New Jersey
EERE Investment: \$614K

Passaic City is in the process of using funds EERE provided to retrofit and replace the heating, ventilation, and air-conditioning systems at its Municipal Complex to make the facility more energy efficient.

Testing New Wind Measurement Technologies for Offshore Wind Installations



Hoboken, New Jersey
EERE Investment: \$700K

The **Stevens Institute of Technology** of Hoboken is evaluating two light detection and ranging (LIDAR)-based technologies for measuring wind in the offshore environment. Data collected by these LIDAR systems, which are mounted on towers and buoys, will allow researchers to characterize and analyze potential offshore wind resources.

Making Jet Fuel from Vegetable Oil



Plainfield, New Jersey
EERE Investment: \$150K

Exelus of Plainfield is developing a catalyst that will enable the efficient production of “drop-in” jet fuel-grade hydrocarbons from vegetable oil.

Deploying Clean Energy Solutions in New Jersey Communities

EERE invests in the deployment of energy efficiency and renewable energy projects in communities across the Garden State, catalyzing economic development, creating jobs, generating clean energy, and reducing utility bills. Of the more than \$268 million in American Recovery and Reinvestment Act (ARRA) funds allotted to the State of New Jersey from EERE specifically for deployment projects, more than 96% has been spent as of March 2013 through the Energy Efficiency and Conservation Block Grant Program, State Energy Program, and Weatherization Assistance Program.

Building Clean Energy Infrastructure

With financial and technical support from EERE, energy officials at the state level and in 76 communities have selected and overseen completion of hundreds of projects that are delivering the benefits of clean energy to citizens throughout New Jersey. EERE allocated more than \$149 million in ARRA funds to support activities that

- Increased energy efficiency and cost savings for nearly 2,600 buildings (more than 25 million square feet) through building retrofits
- Installed more than 50 renewable energy systems, with a total capacity of approximately 40,000 kilowatts of solar energy systems
- Funded nearly 100 workshops, teaching nearly 900 people to perform energy audits and install renewable energy systems
- Installed more than 800 energy-efficient streetlights and more than 300 energy-efficient traffic signals.¹⁴



Weatherizing Homes for Lower Income Families

New Jersey has spent more than 99% of the more than \$119 million of ARRA funds it received since 2009 to weatherize approximately 23,000 homes, exceeding its goal. This effort has resulted in total annual energy savings of nearly 700 billion British thermal units, and more than 60,000 metric tons of carbon pollution have been averted to date, which is the equivalent of taking more than 12,000 passenger vehicles off the road for a year.¹⁵ The projects have enabled income-eligible families to save hundreds of dollars per year on heating and cooling bills by improving their homes' energy efficiency, as well as the health and safety of home environments.

Deployment Project Examples

Brownfield Solar Farm Project Powers Local Homes



Kearny, New Jersey
EERE investment: \$8.5M

Partnering with the **New Jersey Meadowlands Commission (NJMC)**, EERE supported the deployment of a 3-megawatt solar array on a capped section of a state-owned landfill in Kearny, New Jersey, which opened in May 2012.¹⁶ The Kearny Landfill Solar Farm contains more than 12,500 solar panels that power 450 to 675 single-family homes in the surrounding area and makes use of a piece of land that is not very desirable and where uses aren't easily permitted. Using these funds, NJMC also built a 170-kilowatt solar parking lot canopy system at the Meadowlands headquarters in Lyndhurst. Partners also include PSE&G and SunDurance Energy, headquartered in Edison.



New Jersey now ranks second in the nation in photovoltaic installed capacity at 260 MW. *Photo from iStock 8938706*

Reducing Energy Bills for Camden's Families



Camden, New Jersey

The Northgate II, a 308-unit apartment building, was treated with Aeroseal, thanks to a grant from **New Jersey's Multifamily WAP**. Aeroseal, developed at DOE's Lawrence Berkeley National Laboratory, uses airborne adhesive particles to seal leaky air ducts. The Aeroseal treatment is expected to reduce Northgate II's energy consumption by 217,000 kilowatt hours per year, saving its residents an estimated \$34,000 annually.

Making Woodbridge More Efficient



Woodbridge Township, New Jersey
EERE Investment: \$900K

Woodbridge Township has retrofitted numerous buildings with efficient lighting, heating, and cooling systems. These renovations are expected to save the township \$120,000 per year in energy costs.

Powering Edison with the Sun



Edison Township, New Jersey
EERE Investment: \$700K

Edison Township has installed a solar array capable of generating 165 kilowatts of electricity on its municipal building. This installation is expected to save the township \$30,000 per year in energy costs.



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A Proven Track Record

Snapshot of National Outcomes from EERE Investments

EERE's Return on Investment for Clean Energy Technologies

- EERE's \$931 million investment in vehicles combustion engine R&D from 1986 to 2007 achieved a net benefit of \$69 billion (2008 dollars) in fuel savings for users of heavy-duty diesel trucks.¹⁷
- EERE's \$3.7 billion investment in solar photovoltaic R&D from 1975 to 2008 resulted in a net economic benefit of \$15 billion (2008 dollars) due to module efficiency and reliability improvements.¹⁸
- EERE's \$1.7 billion investment in wind energy R&D from 1976 to 2008 resulted in a net economic benefit of \$8.7 billion (2008 dollars) due to wind turbine efficiency, energy capture, and reliability improvements.¹⁹
- A 2001 National Academy of Sciences analysis found that investments of \$1.6 billion in energy efficiency R&D in the first two decades of DOE's existence from 1978 to 2000 realized a net economic benefit of approximately \$30 billion (1999 dollars).²⁰

Sustainable Transportation

- EERE research has helped reduce production costs of automotive lithium-ion batteries by more than 50% since 2008 and is on track to reach its goal of enabling cost-competitive market entry of plug-in hybrid electric vehicles within the next 10 years.
- EERE's activities to achieve cost-competitiveness for biofuels have resulted in the recent achievement of reaching a modeled cellulosic ethanol production cost of \$2.15 per gallon of ethanol (or \$3.27 per gallon of gasoline equivalent).
- EERE's efforts have reduced the projected costs of automotive fuel cells (assuming high-volume manufacturing) by more than 35% since 2008 and 80% since 2002—doubling the durability of fuel cells from 950 hours of demonstrated operation in 2006 to more than 2,500 hours of operation on the road.²¹

Renewable Electricity Generation

- Without EERE involvement, the average solar photovoltaic (PV) module production cost per watt would have been \$5.27 in 2008, rather than \$1.92. EERE has accelerated solar industry progress by an estimated 12 years.²²
- Without EERE involvement, cumulative wind power deployment through 2008 would have been less than a third of actual 2008 levels. EERE has accelerated the overall progress of the wind industry by an estimated 6 years.²³

Energy-Saving Homes, Buildings, and Manufacturing

- More than 6,200,000 homes have been weatherized with EERE funding provided to states or leveraged from other sources with EERE support since 1976—creating an average energy savings of \$350 or more per year and avoiding \$1.6 billion in energy costs during winter 2005 alone for all households weatherized.²⁴
- Due to EERE appliance standards implemented through 2012, a typical household today already saves about \$180 per year off its utility bills. Households can expect to save more than \$300 per year by 2030, as they replace their existing appliances with newer models that use less energy—a cumulative savings to consumers of more than \$900 billion by 2020, and more than \$1.6 trillion through 2030. The cumulative energy savings of these standards phased in through 2012 will be about 70 quadrillion British thermal units (quads) of energy through 2020, and will amount to 120 quads through 2030. (The United States consumes a total of about 100 quads of energy per year.)²⁵
- EERE and its partners in the manufacturing sector have successfully launched 220 new, energy-efficient technologies, received 78 R&D 100 Awards, and delivered technical assistance to more than 33,000 industrial plants.²⁶
- Since 2005, EERE has facilitated \$3.1 billion of efficiency investments in federal government facilities from performance-based contracts, which will result in energy cost savings of approximately \$8.5 billion over the life of the energy-saving measures. The savings on utility bills and operation and maintenance created through the facility upgrades will be used to pay for the project over the term of the contract, and the agencies will continue to save money and energy after the contract term has ended.²⁷

The Office of Energy Efficiency and Renewable Energy is at the center of creating the clean energy economy today. We lead U.S. Department of Energy efforts to develop and deliver market-driven solutions for renewable electricity generation; sustainable transportation; and energy-saving homes, buildings, and manufacturing. To learn more about the activities of the Office of Energy Efficiency and Renewable Energy, visit eere.energy.gov. If you have questions or comments about the information in this document, please contact us at EE.Communications@ee.doe.gov.