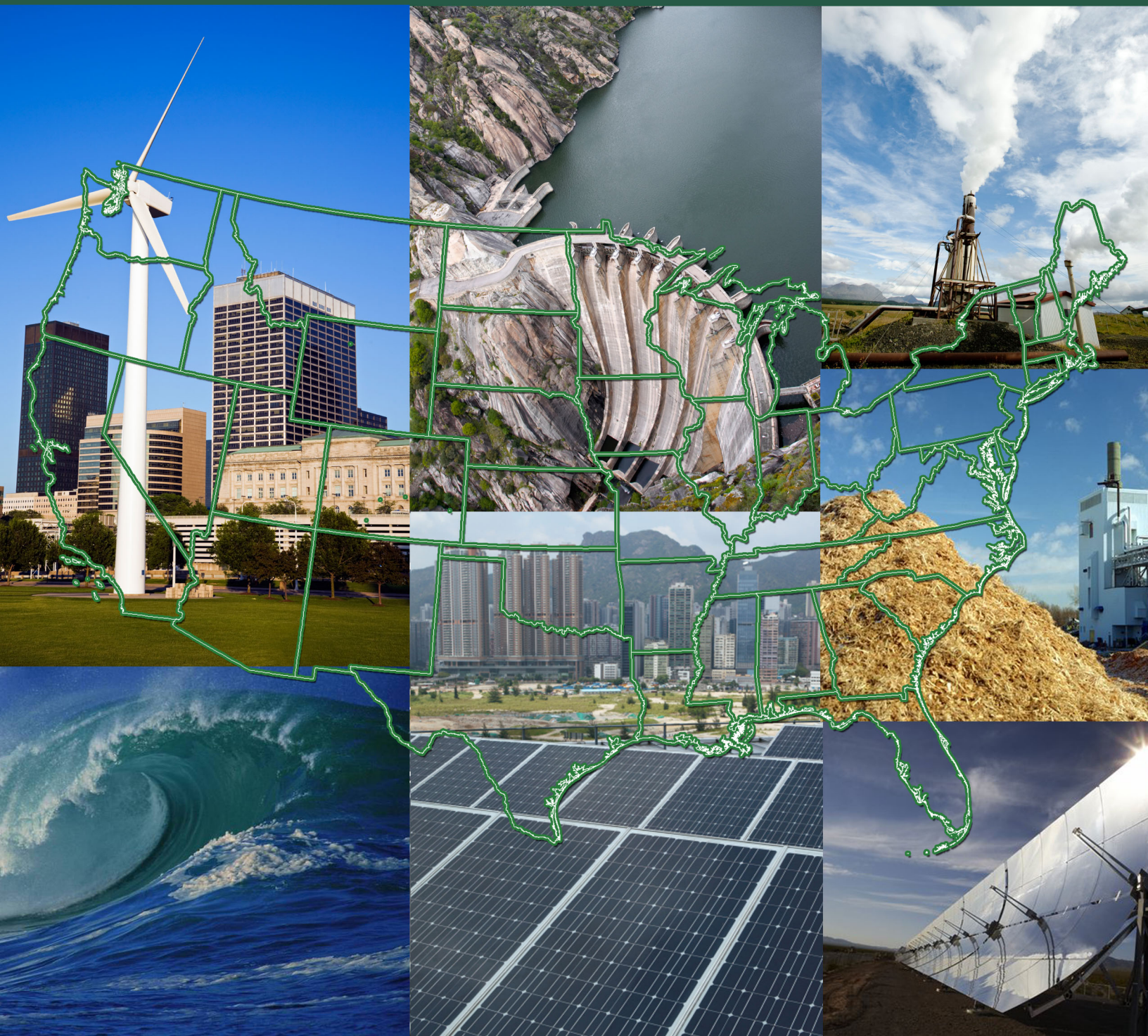


# Renewable Energy in the 50 States

American Council On Renewable Energy (ACORE)



2012 Edition



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# About ACORE

The American Council On Renewable Energy (ACORE), a 501(c)(3) non-profit membership organization, is dedicated to building a secure and prosperous America with clean, renewable energy. ACORE provides a common educational platform for a wide range of interests in the renewable energy community, focusing on technology, finance and policy. We convene thought leadership forums and create energy industry partnerships to communicate the economic, security and environmental benefits of renewable energy.

The scope of ACORE's membership spans all constituencies in the renewable energy sector, including financial institutions, government leaders, educators, end-users, professional service providers and allied non-profit groups.

ACORE accomplishes much of its work by convening the thought leaders in each of these constituencies, publishing collaborative research and facilitating communications among our members, their stakeholders and the media. Additional information is available at [www.acore.org](http://www.acore.org).

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National Renewable Energy Laboratory (NREL)

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# User's Guide

## Overview

This report is intended to provide an executive summary on the status of renewable energy implementation at the state-level. To accomplish this objective, the report provides a two-page, high-level overview on the key developments that have shaped the renewable energy landscape in each state, including information on installed and planned capacity, market trends, economic development, resource potential, and policy.

The report does not attempt to evaluate or rank success in state utilization of renewable energy. There is no one silver bullet for success in the industry; rather, it is a combination of policies and investment in addition to resources that lead to well-established markets. All factors are not explored in this report, but there is emphasis on strong market drivers such as policies, investment trends, proximity to supply chains, resource potentials, and related factors that cause investors and companies to develop renewable energy projects, manufacturing plants, and research centers within a state's borders.

Although states have taken great strides in the advancement of many clean technologies, the technologies profiled in this report are renewable energy technologies exclusively. The report assumes some familiarity with the renewable energy industry, and technical terms are defined in glossary.

Each state summary is divided into the following sections:

- Summary
- Capacity Chart
- Market
- Economic Development
- Resource Maps
- Policies

## Capacity Chart

The capacity chart reflects the nameplate capacity of renewable energy projects that were in operation before the end of the last full year. The capacity is represented in megawatts (MW) for electricity and million gallons per year (mGy) for fuels. The information in this section is provided by public sources, and ACORE does not independently verify the data or guarantee its accuracy. The sources used are well-cited within the industry and include: the American Wind Energy Association (AWEA), the Interstate Renewable Energy Council (IREC), the Solar Energy Industries Association (SEIA), the Renewable Fuels Association (RFA), the Geothermal Energy Association (GEA), Biodiesel Magazine, Bloomberg New Energy Finance (BNEF), and the U.S. Energy Information Agency (EIA). The sources for each section include:

- Wind data reflects utility-scale wind power installations and is from AWEA's *Fourth Quarter 2011 Market Report*.
- Solar photovoltaic (PV) data is from IREC's *U.S. Solar Market Trends 2011* report. The report's data was obtained from state agencies; organizations administering state incentive programs; utility companies that manage incentive programs and/or interconnection agreements; and nonprofit organizations (through surveys).
- Geothermal power data is from GEA's *Annual US Geothermal Power Production and Development Update*, released in April 2012. Information is provided by developers or public sources, and is not independently verified by GEA.

- Ocean power data and concentrating solar power data are derived from the BNEF project database. Ocean power data includes tidal, wave, and ocean thermal energy conversion (OTEC) technologies.
- Hydropower data and biomass power data are derived from the Energy Information Agency's Form EIA-860.
- Bioethanol data is from RFA's *2012 Ethanol Industry Outlook* and represents nameplate capacity in million gallons per year (mGy).
- Biodiesel data is from the Biodiesel Magazine USA plants list and represents nameplate capacity in million gallons per year (mGy).

## Market

This section of the report includes highlighted characteristics and developments of the state's renewable energy industry, including information on existing and proposed projects, manufacturing, research and development, and other market trends. The information was collected from state Energy Department and Public Utility Commission websites, other state-funded resources, Bloomberg New Energy Finance (BNEF), and news articles.

## Economic Development

This section provides information from various reports, databases, and state energy websites about the economic impact renewable energy has had in each state. It should be noted that some of the totals in this section also reflect investment in other "green" sectors, like energy efficiency, in addition to renewable energy.

Bloomberg New Energy Finance (BNEF), a world leader in industry information and analysis, provided information on renewable energy venture capital, private equity and asset finance transactions. The report's Economic Development section indicates the aggregate disclosed transaction values for completed, BNEF-tracked deals, as well as the total number of tracked deals (disclosed/total). Venture capital and private equity transactions reflect new investment in renewable energy technology and early stage companies. Asset finance transactions reflect the funds committed for newly-built renewable energy projects, including debt and equity finance and funding from internal company balance sheets.

Jobs data provided for the report, by the Bureau of Labor Statistics (BLS), estimates all jobs (public and private) created by the "green goods and services" (GGS) industry. BLS defines GGS jobs as: "Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources. These goods and services are sold to customers, and include research and development, installation, and maintenance services." Jobs in this industry fall into one or more of the following five categories: energy from renewable sources; energy efficiency; pollution reduction and removal, greenhouse gas reduction, and recycling and reuse; natural resources conservation; and/or environmental compliance, education and training, and public awareness. For more information, visit: <http://www.bls.gov/ggs/ggsfaq.htm>.

Data on Recovery Act (also known as the American Recovery and Reinvestment Act of 2009) investment is derived from the Recovery.gov website. Information is divided into two sums: (1) funds awarded to entities in the state through the U.S. Department of Energy, via energy-related contracts, grants and loans, as of September 31, 2012; (2) payments to awardees for specified renewable energy property in lieu of tax credits, via the 1603 Cash Grant program, as of September 10, 2012. The 1603 program provides a direct federal grant in lieu of the Section 48 Investment Tax Credit to cover 30% of a renewable energy project's qualifying costs (or 10% for microturbines and geothermal electric systems and heat pumps). Projects must have commenced construction before the end of 2011 and must complete construction by the end of 2016.

## Resource Maps

Each state section contains two renewable energy technology resource maps and a brief description of each. The maps are intended to show the relationship between current renewable energy development and the state's potential. As a general rule, the technologies included in this section are either those with the most potential in the state or those that have been the most developed. It should be noted that these technologies are not the only resources that can be feasibly developed within the state and are not necessarily the best options. The maps are courtesy of 3TIER and the National Renewable Energy Laboratory (NREL).

The resource estimates accompanying the maps were also compiled by NREL, in the report *U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis*. It is important to note that the technical potential estimates do not take into account technology costs or other market constraints, and instead are meant as a theoretical upper-boundary for development potential.

## Policies

The policies profiled in this report reflect major state-level rules, regulations, financial incentives, and other policies for renewable energy that were enacted and operating as of the date shown on each profile. A main source for this information is the Database of State Incentives for Renewables & Efficiency (DSIRE), a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. The website is funded by the U.S. Department of Energy and is an ongoing project of the North Carolina Solar Center and IREC. ACORE also utilized the U.S. Department of Energy's Alternative Fuels Data Center for information on biofuels incentives and laws.

Not all of the renewable energy policies in each state are included. Preference is given to policies implemented at the state level with the most significant impact. The policies highlighted include: renewable portfolio standards (RPS) and goals, net metering programs, interconnection standards, rebates, tax incentives, production incentives, public benefit funds, grants, loans, renewable fuel mandates/standards, and other major state-level policies. These terms are defined in the glossary.

The highlighted policies are for informational purposes only and should not be used as legal guidance in any way. The reader should refer to state government websites, the DSIRE database, or the Alternative Fuels Data Center for more information.

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*Renewable Energy in America* was crafted to illustrate a snapshot of renewable energy of each state, highlighting the state's progress in utilizing its available resources to increase renewable energy's share in its existing energy mix. This report does not attempt to be fully comprehensive, forecast success or failure, or compare one state against another. Instead, it is intended to educate the reader about what each state is actively doing to tap into its renewable energy resources.

Renewable Energy in America is a "living" document that will continue to evolve with updates and periodic revision. The renewable energy landscape is changing continually at the state-level, and ACORE will strive to maintain the accuracy of the report by updating annually.

*Please note that this report contains a collection of research and data from well-cited, reliable sources, which was not independently verified by ACORE. The report should not be used to make decisions on project development or for legal advice.*

# Glossary

**Ad Valorem Taxation:** A tax based on the assessed value of real estate or personal property. Property ad valorem taxes are the major source of revenues for state and municipal governments.

**Alternative Compliance Payment (ACP):** In lieu of standard means of compliance with renewable portfolio standards, electricity suppliers may make alternative compliance payments to make up for deficiencies (in megawatt-hours) between the amount of electricity from renewable resources mandated and the amount actually supplied. Payment amount varies among states.

**American Recovery and Reinvestment Act (Recovery Act):** The Recovery Act was signed into law by President Obama on February 17, 2009. A direct response to the economic crisis, the Recovery Act has three immediate goals: create new jobs and save existing ones; spur economic activity and invest in long-term growth; and foster unprecedented levels of accountability and transparency in government spending. The Recovery Act has since allocated \$1.64 billion (as of August 2010) to develop clean renewable resources in order to double America's supply of renewable energy and boost domestic renewable manufacturing capacity.

**Anaerobic Digestion:** The complex process by which organic matter is decomposed by anaerobic bacteria. An anaerobic digester optimizes the anaerobic digestion of biomass and/or animal manure, and possibly recovers biogas for energy production.

**Avoided Cost:** An investment guideline describing the value of a conservation or generation resource investment by the cost of more expensive resources that a utility would otherwise have to acquire.

**Bagasse:** The fibrous material remaining after the extraction of juice from sugarcane. It is often burned by sugar mills as a source of energy.

**Bi-Directional Meter:** A single meter used in net metering that allows for the monitoring of energy consumption by a residential system and the amount of excess energy exported back into the grid.

**Biodiesel:** A biodegradable transportation fuel for use in diesel engines that is produced according to strict quality specifications. Biodiesel is produced through the transesterification of organically-derived vegetable or animal oils or fats. It may be used either as a replacement for or as a component of diesel fuel.

**Bioenergy:** Useful, renewable energy produced from organic matter, which may either be used directly as a fuel or processed into liquids and gases.

**Bioethanol:** Ethanol produced from biomass feedstocks. This includes ethanol produced from the fermentation of crops, such as corn, as well as cellulosic ethanol produced from woody plants or grasses.

**Biofuels:** Liquid fuels and blending components produced from biomass (plant) feedstocks, used primarily for transportation. Biofuels include ethanol, biodiesel, and methanol.

**Biogas:** A combustible gas derived from decomposing biological waste under anaerobic conditions. Biogas normally consists of 50 to 60 percent methane. See also landfill gas.

**British Thermal Unit (Btu):** A measure of the heat content of fuels. It is the quantity of heat required to raise the temperature of 1 pound of liquid water by 1°F at the temperature that water has its greatest density (approximately 39°F). 1 kilowatt hour of electricity equals 3,412 Btu.

**BXX (i.e. B20):** A blend of petroleum diesel with a percentage of biodiesel. For example, B20 contains 20% biodiesel and 80% petroleum diesel. B100 is pure biodiesel and contains no petroleum diesel.

**Camelina Feedstock:** A rapid growth, omega-3 rich oilseed and non-food feedstock.

**Capacity:** The load that a power generation unit or other electrical apparatus or heating unit is rated by the manufacture to be able to meet or supply. Installed generator nameplate capacity is commonly expressed in

megawatts (MW) and is usually indicated on a nameplate physically attached to the generator (referred to as “nameplate capacity”).

**Cellulosic Ethanol:** While conventional ethanol is derived from soft starches (corn for example), cellulosic ethanol is derived from a wide variety of sources of cellulose (cell wall) plant fiber. These range from stalks and grain straw to switchgrass and quick-growing trees (poplar and willow)—and even municipal waste.

**Combined Cycle:** An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. Such designs increase the efficiency of the electric generating unit.

**Combined Heat & Power (CHP):** Also known as co-generation, CHP is the simultaneous production of electricity and heat from a single fuel source such as natural gas, biomass, biogas, coal, waste heat or oil.

**Concentrated Solar Thermal (CSP):** A solar energy conversion system characterized by the optical concentration of solar rays through an arrangement of mirrors to generate a high temperature working fluid which generates steam to drive a turbine to produce electricity .

**Conservation Reserve Program (CRP):** The Conservation Reserve Program (CRP) provides technical and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with Federal, State, and tribal environmental laws, and encourages environmental enhancement. The program is funded through the Commodity Credit Corporation (CCC). CRP is administered by the Farm Service Agency, with NRCS providing technical land eligibility determinations, conservation planning and practice implementation.

**Consumer-Owned Utility:** A municipal electric utility, a people’s utility district or an electric cooperative.

**Cord:** The measure of an amount of wood that is 4 x 4 x 8 feet, or 128 cubic feet.

**Crop Residue:** Agricultural crop residues are the plant parts, primarily stalks and leaves, not removed from the fields with the primary food or fiber product. Examples include corn stover (including stalks, leaves, husks, and cobs), wheat straw, and rice straw.

**Distributed Generation (DG):** Small, modular, decentralized, grid-connected or off-grid energy systems located in or near the place where energy is used.

**Electric Cooperative:** A member-owned electric utility company serving retail electricity customers. Electric cooperatives may be engaged in the generation, wholesale purchasing, transmission, and/or distribution of electric power to serve the demands of their members on a not-for-profit basis.

**EXX (i.e. E15):** A blend of gasoline with a percentage of ethanol. For example, E15 contains 15% ethanol and 85% gasoline. E100 is pure ethanol without any added gasoline. The U.S. Environmental Protection Agency has approved E15 for use in model year 2001 and newer cars, light-duty trucks, medium duty passenger vehicles (SUVs), and all flex-fuel vehicles (FFVs).

**Feasibility Project:** Analysis and evaluation of a proposed project to determine if it (1) is technically feasible, (2) is feasible within the estimated cost, and (3) will be profitable. Feasibility studies are almost always conducted where large sums are at stake.

**Federal Energy Regulatory Commission (FERC):** An independent federal agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC also reviews proposals to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as licensing hydropower projects. The Energy Policy Act of 2005 gave FERC additional responsibilities as outlined in FERC’s Top Initiatives and updated Strategic Plan.

**Feed-in Tariff:** A policy that requires utilities to pay a fixed, premium rate for renewable energy generation



guaranteed for a set time period.

**Feedstock:** Any material used as a fuel directly or converted to another form of fuel or energy product.

**Flat Plate Collector:** A solar thermal collection device in which heat collection takes place through a thin absorber sheet backed by an array of tubing that is placed within an insulated casing.

**Forest Residue:** Logging residues and other removable material left after carrying out silviculture operations and site conversions. Forest slash or logging residues are the portions of the trees that remain on the forest floor or on the landing after logging operations have taken place.

**Fuel Cells:** One or more cells capable of generating an electrical current by converting the chemical energy of a fuel directly into electrical energy. Fuel cells differ from conventional electrical cells in that the active materials such as fuel and oxygen are not contained within the cell but are supplied from outside.

**Gasification and Catalytic Processes:** A method for converting coal, petroleum, biomass, wastes, or other carbon-containing materials into a gas that can be burned to generate power or processed into chemicals and fuels. A refining process using controlled heat and pressure with catalysts to rearrange certain hydrocarbon molecules, there by converting paraffinic and naphthenic type hydrocarbons (e.g., low octane gasoline boiling range fractions) into petrochemical feedstocks and higher octane stocks suitable for blending into finished gasoline.

**Geothermal Heat Pumps (GHP):** A heat pump in which the refrigerant exchanges heat (in a heat exchanger) with a fluid circulating through an earth connection medium (ground or ground water). The fluid is contained in a variety of loop (pipe) configurations depending on the temperature of the ground and the ground area available. Loops may be installed horizontally or vertically in the ground or submersed in a body of water.

**GW(h):** One billion watt-hours (gigawatt-hour).

**Independent Power Producer (IPP):** A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility.

**Interconnected:** Two or more electric systems having a common transmission line that permits a flow of energy between them. The physical connection of the electric power transmission facilities allows for the sale or exchange of energy.

**Interconnection Standards:** The technical and procedural process by which a customer connects an electricity-generating system to the grid. Interconnection standards include the technical and contractual arrangements that system owners and utilities must abide by. Standards for systems connected at the distribution level are typically adopted by state public utility commissions, while the Federal Energy Regulatory Commission (FERC) has adopted standards for systems connected at the transmission level. Most states have adopted interconnection standards, but some states' standards apply only to investor-owned utilities - not to municipal utilities or electric cooperatives.

**Investment Tax Credit (ITC):** The ITC is a federal tax credit based on a percentage of a taxpayer's investment in qualifying energy property. For example, if the taxpayer's investment in qualifying energy property is \$100 and the credit rate is 30%, the amount of the ITC is \$30. In general, the investment in energy property is the cost of the facility.

**Investor-Owned Utility (IOU):** A privately-owned electric utility whose stock is publicly traded. An IOU is rate regulated and authorized to achieve an allowed rate of return.

**Kinetic Energy Capture:** Energy available as a result of motion that varies directly in proportion to an object's mass and the square of its velocity.

**kW(h):** One thousand watt-hours (kilowatt-hour).

**Landfill Gas:** Gas that is generated by decomposition of organic material at landfill disposal sites.

**mGy:** Million gallons per year.

**Municipal Solid Waste** – Any organic matter, including sewage, industrial and commercial wastes, from municipal waste collection systems. Municipal waste does not include agricultural and wood wastes or residues.

**Municipal Utility:** A provider of utility services owned and operated by a city government.

**MW(h):** One million watt-hours (megawatt-hour).

**Nacelle:** The back-end of a wind turbine that houses the gearbox, drive train and control electronics.

**Net Excess Generation (NEG):** The amount of gross generation less the electrical energy consumed at the generating station(s) for station service or auxiliaries.

**Net Metering:** For electric customers who generate their own electricity, net metering allows for the flow of electricity both to and from the customer – typically through a single, bi-directional meter. When a customer's generation exceeds the customer's use, electricity from the customer flows back to the grid, offsetting electricity consumed by the customer at a different time during the same billing cycle.

**Original Equipment Manufacturer (OEM):** An OEM manufactures products or components that are purchased by a company and retailed under the purchasing company's brand name.

**Perennial Grasses:** Unlike corn, which must be replanted every year, perennial grasses, such as switchgrass and Miscanthus, preserve and increase carbon stores in the soil. These and other grasses have been proposed as high-energy alternative feedstocks for biofuel production.

**Photovoltaic (PV) Module:** An integrated assembly of interconnected photovoltaic cells designed to deliver a selected level of working voltage and current at its output terminals, packaged for protection against environment degradation, and suited for incorporation in photovoltaic power systems. It is also known as a solar module or solar panel.

**Polytaconic Acid:** A water soluble polymer with a 2 million metric ton per year market potential as a replacement for petrochemical dispersants, detergents, and super-absorbents.

**Power Purchase Agreement (PPA):** A legal contract in which a power purchaser purchases the energy produced, and sometimes the capacity and/or additional services, from an electricity generator.

**Primary Mill Resource:** Mill residues that include wood materials (coarse and fine) and bark generated at manufacturing plants (primary wood-using mills) when round wood products are processed into primary wood products, such as slabs, edgings, trimmings, sawdust, veneer clippings and cores, and pulp screenings.

**Production Incentives/Performance-Based Incentives:** Performance-based incentives (PBIs), also known as production incentives, provide cash payments based on the number of kilowatt-hours (kWh) or BTUs generated by a renewable energy system. A "feed-in tariff" is an example of a PBI.

**Production Tax Credit (PTC):** A federal tax credit based on the per kWh of electricity sold by a taxpayer from a qualifying facility to an unrelated entity. For facilities selling electricity generated from wind, closed-loop biomass and geothermal sources, the PTC rate is 1.5 cents per kWh, which is adjusted for inflation and is 2.1 cents per kWh in 2009. For persons selling electricity generated from open-loop biomass, landfill gas, trash, qualified hydropower or marine and hydrokinetic sources, the credit rate is half the credit rate for wind (1.1 cents per kWh in 2009). The PTC can be made for sales in the first 10 years from the time the facility is originally placed in service.

**Property-Assessed Renewable Energy (PACE) Financing:** A Property Assessed Clean Energy loan program provides residential and commercial property owners with a loan for energy efficiency and renewable energy

measures which is subsequently paid back over a certain number of years via an annual charge on their property tax bill.

**Public Benefit Funds (PBF):** Public benefits funds (PBFs), or clean energy funds, are typically created by levying a small fee or surcharge on electricity rates paid by customers (i.e., system benefits charge [SBC]). The resulting funds can be used to support clean energy supply (i.e., renewable energy, energy efficiency, and combined heat and power [CHP]).

**Renewable Energy Credit (REC):** A REC, also known as a green tag or renewable energy certificate, represents the property rights to the environmental, social, and other non-power qualities of renewable electricity generation. A REC, and its associated attributes and benefits, can be sold separately (unbundled) from the underlying physical electricity associated with a renewable-based generation source or together (bundled). When unbundled, it is also known as a tradable renewable energy certificate (TREC). A solar renewable energy credit (SREC) is a REC specifically generated by solar energy.

**Renewable Energy Resources:** Energy resources that are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Renewable energy resources include: biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action.

**Renewable Energy Zones (REZ):** Renewable energy zones are special areas designated for renewable energy generation based on land suitability, resource potential, and existing renewable energy generation. Electric transmission infrastructure is constructed in those zones to move renewable energy to markets where people use energy.

**Renewable (Green) Diesel:** Renewable diesel is produced by hydrotreating or hydrocracking plant oils or animal fats. Unlike biodiesel, it has chemical properties identical to petroleum diesel.

**Renewable Portfolio Standard (RPS):** A regulatory mechanism requiring that retail electricity suppliers procure a minimum quantity of eligible renewable energy by a specific date, in percentage, megawatt hour, or megawatt terms.

**Revolving Loan Fund:** A capitalized fund, typically maintained by a state government, that provides low-interest loans for energy efficiency improvements, renewable energy, and distributed generation. As the loans are repaid, they are deposited back into the fund for redistribution as subsequent loans.

**Salvage Value:** The estimated value that an asset will realize upon its sale at the end of its useful life.

**Secondary Mill Resource:** Materials leftover after the processing of wood scraps and sawdust from woodworking shops, furniture factories, wood container and pellet mills, and wholesale lumberyards.

**Solar and Wind Access Laws:** Solar and wind access laws are designed to establish a right to install and operate a solar or wind energy system at a home or other facility. Some solar access laws also ensure a system owner's access to sunlight.

**Solar Thermal:** A solar energy system that collects or absorbs solar energy for heat or electricity. Solar thermal systems can be used to generate high temperature heat (for electricity production and/or process heat), medium temperature heat (for process and space/water heating and electricity generation), and low temperature heat (for water and space heating and cooling).

**Switchgrass:** A native warm-season, perennial grass indigenous to the Central and North American tall-grass prairie into Canada. The plant is an immense biomass producer that can reach heights of 10 feet or more. Its high cellulosic content makes switchgrass a candidate for ethanol production as well as a combustion fuel source for power production.

**Systems Benefit Charge:** See **Public Benefit Fund**.

**Metric Ton:** A metric unit of measurement equal to 1000 kilograms, used to measure biomass.

**Ton:** An imperial unit of measurement equal to 2240 pounds.

**Waste Heat to Power (WH2P):** Capturing industrial waste heat for power generation.

**Wood Pellet:** Saw dust compressed into uniform diameter pellets to be burned in a heating stove.

*Glossary sources: Database of State Incentives for Renewables & Efficiency (DSIRE), Department of Energy Office of Energy Efficiency and Renewable Energy (EERE), Energy Information Administration (EIA), Environmental Protection Agency (EPA), National Renewable Energy Laboratory (NREL), International Energy Agency (IEA).*



# Renewable Energy in Alabama

## Summary

As the leading generator of hydropower in the South, Alabama is currently upgrading its aging hydroelectric facilities to increase their efficiency and reduce their environmental impact. Energy production from non-hydro renewable technologies comes almost entirely from bioenergy, aided by the state's catalogue of tax incentives, grants, and loans. Although resources for other renewable technologies like solar power and offshore wind power exist, these markets will likely grow slowly until additional policy support is put in place to attract developers.

| Installed Renewable Energy Capacity, 2011 |          |               |                  |
|-------------------------------------------|----------|---------------|------------------|
| Wind                                      | 0 MW     | Ocean         | 0 MW             |
| Solar Photovoltaic                        | 0.5 MW   | Biomass Power | 636 MW           |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 0 mGy            |
| Geothermal                                | 0 MW     | Biodiesel     | 13 mGy           |
| Hydropower                                | 3,280 MW | <b>Totals</b> | 3,916 MW; 13 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Utilities are working with the U.S. Forest Service to explore the feasibility of using wood from forest thinning activities as an energy source and blending it with coal. Elsewhere, companies are using biomass to co-fire coal plants at a larger scale, including a 110 MW plant operating in Mobile, Alabama.
- Several facilities utilize biomass for combined heat and power operations. Many have been constructed near paper mills, thereby effectively utilizing products formerly regarded as waste.
- Alabama is home to a pilot-scale cellulosic ethanol gasification plant that uses wood chips, sawdust, and other wood waste to produce biofuel.

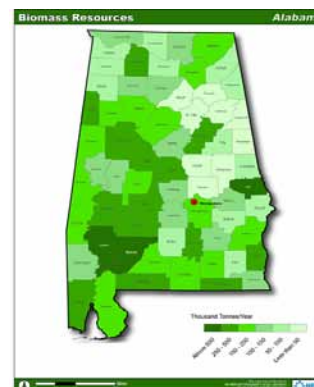


**Solar Resources**– With between 185 and 200 W/m<sup>2</sup> of solar radiation, Alabama possesses a total estimated technical potential for utility-scale photovoltaics of 35,853 GWh.

## Economic Development

| Employment                                                          |                   |
|---------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                 | 44,288            |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                            | \$0.0m, 0/2 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals |
| Recovery Act Funding (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                    | \$336.9m          |
| 1603 Cash Grant Program                                             | \$0.5m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources**– Alabama has the potential to produce over 500,000 metric tons of biomass a year in certain areas (indicated in dark green) and between 150 and 500 metric tons in others. In total, Alabama has a technical potential for 15,000 GWh of biopower.

# Alabama

## Policies

**Tax Incentives:** Alabama's Wood-Burning Heating System Deduction statute provides individuals a deduction for the purchase and installation of wood-burning heating systems. The incentive is for the conversion of an existing gas or electric system and equals the total cost of purchase and installation of a wood burning system.

Companies that construct a biofuel production facility may be eligible for a tax credit of up to 5% of the capital costs of the project. The credit may be applied to the state income tax or the financial institution excise tax liability that the project generates each year for up to 20 years.

**Grant Program:** Industrial, commercial and institutional facilities; agricultural property owners; and city, county, and state government entities are eligible to receive up to \$75,000 in interest subsidy payments to offset the interest expense on loans for biomass projects. The program initially focused on wood waste, but now also promotes the use of landfill gas. Technical assistance is also available through the program.

**Loan Program:** Alabama's Local Government Energy Loan Program offers zero-interest loans to local governments, K-12 schools, and public colleges/universities for biomass, hydropower, geothermal, wind, and solar energy systems. Governments and school campuses can borrow up to \$350,000, and K-12 school districts can borrow up to \$500,000.

AlabamaSAVES is a revolving loan fund that provides Alabaman businesses and industries up to ten year loans for renewable energy and energy efficiency projects. The program is funded by the American Recovery and Reinvestment Act and has a budget of \$50 million.

# Renewable Energy in Alaska

## Summary

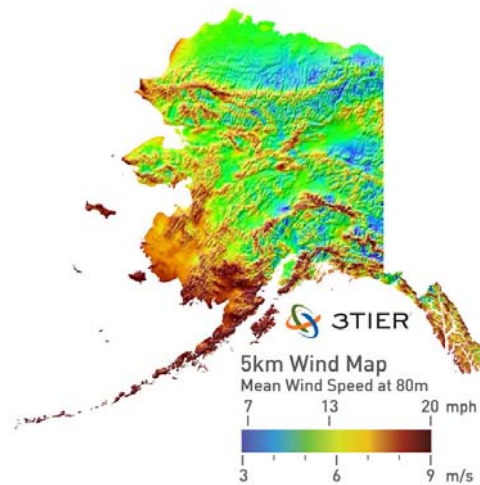
With some of the highest electricity and gasoline prices in the nation, Alaska has the opportunity to economically deploy a variety of renewable energy projects throughout its diverse geographic regions. The state’s extensive hydroelectric systems already account for roughly a quarter of state-wide energy production. State initiatives have traditionally supported small-scale projects, which feed into larger transmission grids and the 150 remote, stand-alone grids serving rural villages. However, the development of Alaska’s renewable energy industry may continue to be subject to “fits and starts” until a more aggressive strategy is set in place.

| Installed Renewable Energy Capacity, 2011 |        |               |                 |
|-------------------------------------------|--------|---------------|-----------------|
| Wind                                      | 10 MW  | Ocean         | 0 MW            |
| Solar Photovoltaic                        | 0 MW   | Biomass Power | 0 MW            |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 0 mGy           |
| Geothermal                                | 0.7 MW | Biodiesel     | 0.3 mGy         |
| Hydropower                                | 420 MW | <b>Totals</b> | 431 MW; 0.3 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- Over 20 communities in Alaska generate electricity from wind power. Alaska’s first commercial-scale wind power project was commissioned in October 2012 on Fire Island. The project has 17.6 MW of capacity—enough to power 6,000 homes.
- Wood is used for heating statewide, generating both heat and electricity at community-level biomass thermal facilities in at least ten communities.
- In the summer of 2012, the Joint Base Elmendorf-Richardson commissioned Alaska’s first landfill gas to energy facility, which converts the methane produced from a local landfill into electricity. The facility can meet about half of the base’s electricity demand and is expected to save the base about \$30 million over its lifetime.

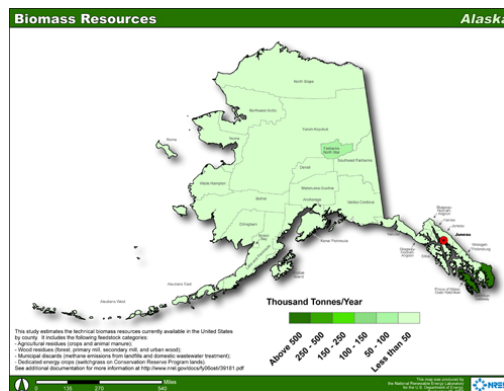


**Wind Resources:** With 98,669 km<sup>2</sup> of windy land area, Alaska possesses an estimated technical on-shore wind potential of 1,373,433 GWh.

## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 11,460             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$65.0m, 1/2 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals  |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$97.1m            |
| 1603 Cash Grant Program                                             | \$0.7m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources:** Darker green indicates a greater concentration of biomass resources. Alaska’s primary biomass resources are wood, wood waste, fish byproducts and municipal waste.

# Alaska

## Policies

**Net Metering and Interconnection:** Electric utilities with annual retail sales of over 5 gigawatt hours are required to offer net metering to customers that own renewable energy systems up to 25 kW. Overall enrollment is limited to 1.5% of a utility's sales from the previous year. Net excess generation is credited to the customer's next bill at the "non-firm power rate." These dollar amount credits do not expire and can be applied to subsequent monthly bills. Interconnection guidelines were approved in May 2011, and apply to net metered systems. Utilities can require customers to have liability insurance and to pay for external disconnect switches if they are needed.

**Loans:** The Power Project Loan Fund provides loans to local government, municipal utilities, regional and village corporations, village councils, and independent power producers for the development or upgrade of small scale power production facilities, conservation facilities, and bulk fuel storage facilities, which includes facilities that produce renewable energy. The loan term is related to the life of the project.

**Grants:** Administered by the Alaska Energy Authority, the Renewable Energy Grant Fund issues recommendations to the state legislature to fund feasibility studies, reconnaissance studies, energy resource monitoring, and work related to the design and construction of eligible facilities for in-state commercial, local government, tribal government, and utility renewable energy projects. The program receives funding through state appropriation and intends to provide \$50 million in funding annually for five years from its inception through 2013. However, funding for 2011 was lowered to \$25 million.

Also overseen by the Alaska Energy Authority, the Emerging Energy Technology Fund provides grants to utilities, independent power producers, governmental entities, businesses and nonprofits to build demonstration projects designed to test emerging energy technologies that are within five years of becoming commercially viable.

**Tax Incentive:** Alaska authorizes municipalities to provide a property tax exemption for the value added by residential renewable energy systems, including wind, hydro and solar.

**Other Policies:** In June 2010, Alaska dramatically cut the royalties geothermal developers must pay on projects, as well as lightened the regulatory burden on renewable schemes. The legislation increases the economic viability of geothermal power projects in the state.



# Renewable Energy in Arizona

## Summary

With Arizona's ideal combination of land area and resource potential for solar power, a number of large and small solar PV and CSP facilities are both in operation and under development in the state. Arizona's modest renewable energy standard of 15% by 2025 and industry recruitment measures have been successful in attracting renewable energy companies to the state, although certain policies have recently been at risk of being scaled back by the state government.

### Installed Renewable Energy Capacity, 2011

|                            |          |               |                   |
|----------------------------|----------|---------------|-------------------|
| Wind                       | 138 MW   | Ocean         | 0 MW              |
| Solar Photovoltaic         | 397 MW   | Biomass Power | 38 MW             |
| Concentrated Solar Thermal | 3 MW     | Bioethanol    | 55 mGy            |
| Geothermal                 | 0 MW     | Biodiesel     | 48 mGy            |
| Hydropower                 | 2,718 MW | <b>Totals</b> | 3,294 MW; 103 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Arizona is a major producer of solar panels, including crystalline and thin film, and serves as the headquarters for leading solar energy companies. Its favorable business climate and proximity to major solar markets have attracted both domestic and foreign firms.
- The state has around 3 GW of solar PV and CSP in the development pipeline, a good portion of which is on a timeline to be commissioned within the next few years.
  - When complete in 2014, the 290 MW Agua Caliente PV project in Yuma County is expected to provide electricity to power about 100,000 homes per year.
  - The Solana Project near Phoenix, a 280 MW solar trough plant with thermal storage, could meet the needs of 80,000 homes. It is expected to begin operation in 2013.
- Academic institutions and companies in Arizona are conducting research in algae-based biofuel, which is well suited for development in the state's arid climate.



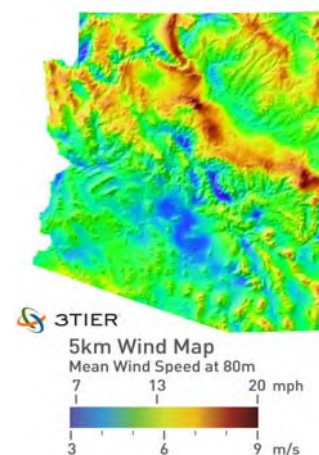
**Solar Resources**– Arizona has the technical potential to generate 11.8 million GWh from rural utility-scale photovoltaics. The state could likewise generate over 12 million GWh from concentrating solar power.

## Economic Development

### Employment

|                                                                            |                     |
|----------------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                        | 49,717              |
| <b>Private Sector Investment</b> (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                                   | \$5.1bn, 4/24 deals |
| Venture Capital & Private Equity, 2010-2011                                | \$35.8m, 8/8 deals  |
| <b>Recovery Act Funding</b> (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                           | \$467.7m            |
| 1603 Cash Grant Program                                                    | \$409.1m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources**– With roughly 2,000km<sup>2</sup> of windy land, Arizona has an estimated potential to generate 26,036 GWh from wind.

# Arizona

## Policies

**Renewable Energy Standard (RES):** Arizona's RES mandates that 15% of the electric load from investor-owned utilities (IOUs) and electric power cooperatives serving retail customers be from qualifying renewable energy sources by 2025, with 30% of the target derived from distributed energy technologies (~2 GW). One-half of the distributed renewable energy requirement must come from residential applications and the remaining half from non-residential, non-utility applications. Bundled renewable energy credits (RECs) acquired in any year can be used to meet annual requirements. Extra credit multipliers of up to two times the REC may be awarded for in-state solar installations and for projects using in-state manufactured content. A surcharge is applied to electric utility bills to allow utilities to recover RES costs.

**Net Metering and Interconnection:** To qualify for net metering, eligible systems cannot exceed 125% of the customer's total connected load. Net excess generation (NEG) from each source will be carried over to the customer's next bill at the utility's retail rate, with remaining NEG at the end of the calendar year paid to the customer. The Arizona Corporation Commission (ACC) issued a rulemaking process to establish interconnection rules in 2007, and official rules have still not gone into effect. Utilities are encouraged to use the "Interconnection Document" as a guide, which applies to systems up to 10 MW in capacity.

**Tax Incentives:** *Renewable Energy Production Tax Credit* – Qualified renewable energy systems over 5 MW are eligible for a personal or corporate tax credit based on the amount of electricity produced annually for a 10-year span. The credit for wind and biomass equals \$0.01/kWh for the first 200,000 MWh produced in a calendar year. The solar tax credit starts at \$0.04/kWh in year one and gradually decreases to \$0.01/kWh in year ten. No one system can claim more than \$2 million per year of the \$20 million annual cap. Unused credit can be carried forward for five years.

*Renewable Energy Business Tax Incentives* – Arizona provides income tax credits of up to 10% and property tax incentives for renewable energy companies that establish or expand their manufacturing facilities or corporate headquarters in Arizona. In order to qualify for the incentives, the business must pay their employees above a certain income level and/or invest at least \$25 million in their facilities, equipment, land and infrastructure.

*Solar and Wind Tax Credits* – (1) Nonresidential: Corporate or personal tax credits are provided for 10% of the installed cost of renewable energy systems, available to all nonresidential entities (including those that are tax-exempt). There is a maximum incentive of \$25,000 per building and \$50,000 per business in one year. Third parties that finance, install or manufacture systems are able to claim the credit. Unused credits can be carried forward for up to five taxable years. The program budget is \$1 million annually. (2) Residential: A personal tax credit is available for 25% of the installed cost of solar or wind energy devices at Arizona taxpayer residences, with a maximum credit of \$1,000 per residence. Excess credit can be carried forward five years.

*Sales Tax Exemption* – A sales tax exemption is provided for the retail sale and installation of solar and wind energy devices, including both electric and thermal energy generating systems.

*Property Tax Incentives* – (1) A property tax exemption is provided for the value added by renewable energy equipment on commercial, industrial and residential buildings, including both electric and thermal energy generating systems. (2) Renewable energy equipment owned by utilities and other entities operating in Arizona is assessed at 20% of its depreciated cost when determining property tax.

*Qualifying Wood Stove Deduction* – A personal deduction of up to \$500 is offered for the cost of converting an existing wood fireplace to a qualifying wood stove.

# Renewable Energy in Arkansas

## Summary

Arkansas relies on imported coal to meet about half of its electricity demand and is exploring further use of its in-state energy resources like natural gas and hydropower. Although non-hydro renewable energy contributes very little to the state's overall energy supply, Arkansas has had substantial success in attracting large manufacturers of wind components to build facilities in the state, which has generated millions of dollars of investment. With its vast biomass resources and opportunities for wind and solar energy development, Arkansas has the potential to further develop its renewable energy economy. Nevertheless, few state incentives currently exist to help jumpstart the industry's growth.

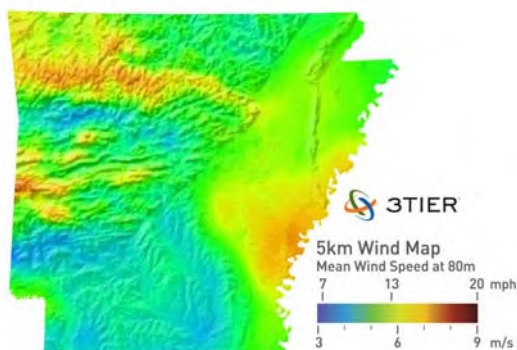
### Installed Renewable Energy Capacity, 2011

|                            |          |               |                   |
|----------------------------|----------|---------------|-------------------|
| Wind                       | 0 MW     | Ocean         | 0 MW              |
| Solar Photovoltaic         | 1.1 MW   | Biomass Power | 399 MW            |
| Concentrated Solar Thermal | 0 MW     | Bioethanol    | 0 mGy             |
| Geothermal                 | 0 MW     | Biodiesel     | 119 mGy           |
| Hydropower                 | 1,321 MW | <b>Totals</b> | 1,721 MW; 119 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Arkansas is home to manufacturers of wind turbine blades that are frequently sold to wind farms in Texas.
- Over 150 distributed solar photovoltaic systems exist throughout Arkansas, mostly on rooftops (National Renewable Energy Laboratory Open PV Project).
- Higher education facilities in Arkansas conduct research and development to advance the development of next-generation ethanol, higher efficiency solar cells, and advanced transmission.
- Arkansas is home to biomass facilities that produce heat, fuel and/or electricity, including those situated near paper mills and landfills as well as stand-alone plants.

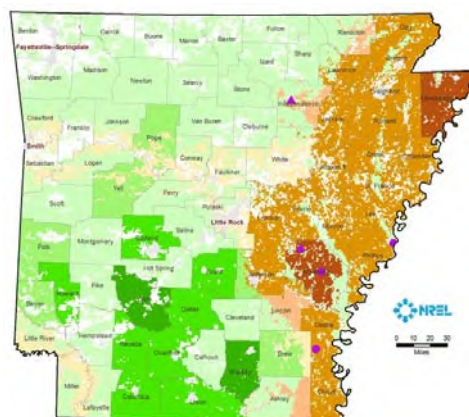


**Wind Resources-** With 1,840km<sup>2</sup> of windy land area, Arkansas has the technical potential to generate 26,036 GWh from its wind resource.

## Economic Development

| Employment                                                          |                   |
|---------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                 | 33,280            |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                            | \$0.0m, 0/0 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals |
| Recovery Act Funding (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                    | \$136.5m          |
| 1603 Cash Grant Program                                             | \$0.3m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Arkansas ranks 6th in forest residue resources, and has a biopower technical potential of 15,444 GWh.

# Arkansas

## Policies

**Net Metering:** The Arkansas Public Service Commission (PSC), which regulates investor-owned and cooperative utilities, established rules for residential systems up to 25 kW and non-residential systems up to 300 kW utilizing solar, wind, hydroelectric, geothermal, fuel cells, and/or biomass systems. Customers retain ownership of the renewable energy credits (REC) associated with the system. Net excess generation is credited to the customer's next bill at the retail rate and is granted to the utility at the end of the 12-month billing cycle. The PSC is authorized to increase the fee for net metered customers at any time if its costs are greater than the net metering benefits.

**Interconnection Standards:** Net metered systems must meet all performance standards established by local and national electric codes. Additionally, utilities may require facilities to meet additional safety and performance standards approved by the PSC, which are paid for by the customer. Customers must install an external disconnect switch, which may be waived under certain circumstances.

**Tax Incentives:** The Wind Energy Manufacturing Tax Incentive provides full and partial income tax exemptions for manufacturers of wind turbine blades or components that meet certain criteria. To be eligible for the exemption, these businesses must show significant investment and job creation, among other criteria.

**Grants and Rebates:** The Arkansas Alternative Fuels Development Program provides grants for the production and distribution of alternative fuels. Alternative fuel producers may qualify for \$0.20 per gallon of fuel produced, not to exceed \$2 million. Feedstock processors may qualify for the lesser of \$3 million or 50% of the project costs of feedstock processing facilities. Alternative fuel distributors may qualify for the lesser of \$300,000 or 50% of the project costs of biofuels distribution facilities.



# Renewable Energy in California

## Summary

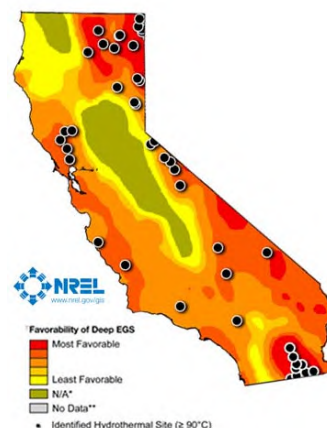
With a population of over 36 million people and the eighth largest economy in the world, California has faced many challenges and opportunities for its renewable energy economy. To support the growth of the sector, the state has enacted ambitious policies, like its 33% renewable portfolio standard. California leads the nation in electricity generation from non-hydroelectric renewable energy sources, including geothermal power, wind power, biopower and solar power. California’s rich resource base and its early, sustained support for the renewable energy industry has been successful in attracting and incubating leading renewable energy companies which, in turn, has created many high-quality jobs.

| Installed Renewable Energy Capacity, 2011 |           |               |                    |
|-------------------------------------------|-----------|---------------|--------------------|
| Wind                                      | 3,927 MW  | Ocean         | 0 MW               |
| Solar Photovoltaic                        | 1,564 MW  | Biomass Power | 1,200 MW           |
| Concentrated Solar Thermal                | 393 MW    | Bioethanol    | 255 mGy            |
| Geothermal                                | 2,615 MW  | Biodiesel     | 79 mGy             |
| Hydropower                                | 10,046 MW | <b>Totals</b> | 19,745 MW; 333 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- California is a global hub for renewable energy research and development, with a strong innovation to commercialization track record and an attractive environment for start-ups. The Lawrence Berkeley National Laboratory is located in California and is on the forefront of cleantech research and development.
- California has the largest market for solar photovoltaic applications in the nation, with over 542 MW of grid-tied PV installed in 2011 alone. Many companies have located manufacturing plants and headquarters in the state and its neighbors for proximity to California’s market.
- The state’s CSP development pipeline has surpassed 6 GW of trough, tower and dish projects, over 875 MW of which is under construction. This includes the 392 MW Ivanpah solar tower facility.
- Over 80% of U.S. geothermal electric capacity is concentrated in California. Geothermal represents about 10% of in-state commercial electricity generation.



**Geothermal Resources**– The state has by far the largest hydrothermal resource in the U.S., with potential to generate 130,921 GWh. California could also generate over 1.3 million GWh from advanced geothermal systems.

## Economic Development

| Employment                                                          |                        |
|---------------------------------------------------------------------|------------------------|
| Green Goods and Services Jobs, 2010                                 | 338,445                |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                        |
| Asset Finance, 2010-2011                                            | \$28.1bn, 47/116 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$3.4bn, 155/161 deals |
| Recovery Act Funding (Total Awarded)                                |                        |
| Energy Contracts, Grants & Loans                                    | \$1.8bn                |
| 1603 Cash Grant Program                                             | \$2.2bn                |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of



**Solar Resources**– Combined urban and rural utility-scale photovoltaics have the technical potential to generate over 9 million GWh. California’s concentrating solar power resource is also strong, with the potential to generate nearly 8.5 million GWh.



# California

## Policies

**Renewable Portfolio Standard (RPS):** California requires its electric utilities to derive 33% of their retail sales from eligible renewable energy resources by 2020. There are interim targets of 20% by 2013 and 25% by 2016. In January 2011, the California Public Utilities Commission (CPUC) authorized the use of tradable renewable energy credits (TREC)s for RPS compliance, i.e. using generation sources other than those they own, to meet up to 25% of their RPS requirement by 2013 and 10% by 2017.

**Net Metering and Interconnection:** California's net metering law requires all utilities, with one exception, to provide net metering for renewable energy systems of up to 1 MW, until the utility meets 5% of its customer peak demand or 5 MW for systems owned and operated by a university or local government. After 12 months, customers have the option of rolling over net excess generation (NEG) month-to-month indefinitely or receiving financial compensation from their utility for the remaining NEG. The customer retains ownership of RECs. California also allows virtual net metering for multifamily affordable housing units and local governments. California's interconnection standards apply to distributed generation systems in investor-owned utility (IOU) territories. Systems that generate electricity for on-site use only and all net metered systems can qualify for fast track interconnection. Other systems may apply for interconnection through a detailed study process.

**Go Solar California! Campaign:** The Go Solar California! Campaign is a joint effort of the California Energy Commission (which runs the California Solar Initiative (CSI)) and the California Public Utilities Commission (which runs the New Solar Homes Partnership (NSHP)) to install 3,000 MW of solar power capacity by the end of 2016 and 2,000 solar hot water systems by the end of 2017. Its state-wide budget is \$3.3 billion.

CSI provides incentives for existing residential homes and existing and new commercial, industrial, and agricultural properties. It consists of a PV and solar thermal electric rebate program; solar hot water rebate program; single and multi-family affordable homes rebate programs; and solar RD&D grant program. The PV and solar thermal electric incentives can be taken as an one-time payment based on the system's expected performance (if system is under 30 kW) or as a monthly payment based on how much the system produces (if system is 30 kW or larger).

NSHP provides incentives for solar PV on new home construction, as long as the systems do not produce more than the home's electric load. The program awards rebates based on the expected performance of each system. To learn more about Go Solar California, visit: [www.gosolarcalifornia.com](http://www.gosolarcalifornia.com).

**Other Incentives:** *The Self-Generation Incentive Program* offers incentives ranging from \$0.50/W to \$2.25/W to customers who install wind, biogas, energy storage, waste heat, CHP, or fuel cell systems. Incentive payment is capped at 3 MW, and projects over 1 MW receive reduced rates after the first megawatt.

**Renewable Auction Mechanism (RAM):** The RAM program requires California's three IOUs to purchase electricity from distributed renewable energy systems within their service territories between 3 and 20 MW in capacity. Each utility is responsible for procuring an allocated share of the 1 GW program total. Competitive auctions are held twice annually for two years.

**Feed-in Tariff (FiT):** In 2012, the CPUC implemented a new pricing mechanism and program rules for California's FiT program. The rules allow customers of IOUs to enter into 10, 15 and 20 year standard contracts to sell electricity produced by qualifying renewable energy systems of up to 3 MW at prices set by Renewable Market Adjustment Tariff (Re-MAT). The CPUC anticipates the starting price to be \$89.23/ MWh. Publicly-owned utilities with 75,000 or more customers must develop feed-in tariff programs within the parameters established by the state by July 1, 2013. The tariffs will be available until statewide cumulative capacity of eligible generation reaches 750 MW for the general FiT program (which applies to IOUs and publicly-owned utilities), and 250 MW for the bioenergy FiT program (which only applies to IOUs).

**Tax Incentives:** California provides a state sales and use tax exemption for expenses relating to the industrial design, manufacture, production, and assembly of clean energy or advanced transportation technologies.

California provides a full property tax exclusion for solar electric and thermal systems, or for 75% of a system's value for dual use equipment.

**Property Assessed Clean Energy (PACE):** The CaliforniaFIRST Program offers financing for renewable energy systems on non-residential properties that property owners can pay back through their property taxes.



# Renewable Energy in Colorado

## Summary

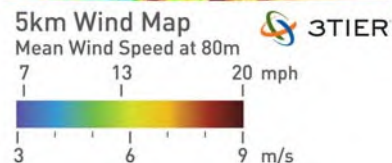
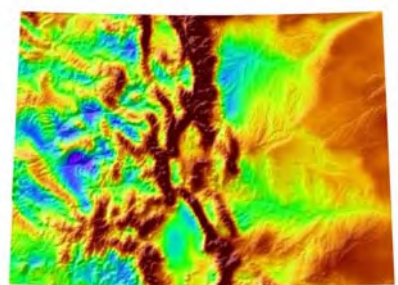
Colorado has an abundance of renewable energy resources, particularly in the wind, solar, biofuels, and geothermal sectors. With one of the most ambitious renewable portfolio standards in the nation (30% by 2020), a substantial rebate program, a strong net metering policy, and a host of other market incentives, Colorado has the third largest solar photovoltaic market and the 12th largest wind market in the U.S. The state is also home to the National Renewable Energy Laboratory, one of the leading research, development and deployment facilities of the Department of Energy focused on renewable energy and energy efficiency.

| Installed Renewable Energy Capacity, 2011 |          |               |                   |
|-------------------------------------------|----------|---------------|-------------------|
| Wind                                      | 1,800 MW | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 197 MW   | Biomass Power | 18 MW             |
| Concentrated Solar Thermal                | 4 MW     | Bioethanol    | 125 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 0 mGy             |
| Hydropower                                | 645 MW   | <b>Totals</b> | 2,664 MW; 125 mGy |

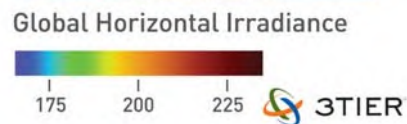
Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Colorado is home to one of the world's largest concentrating photovoltaic facilities, the 30 MW Alamosa CPV plant. In addition to its growing utility solar market, Colorado's commercial and residential markets are also strong.
- Wind power accounted for 9.2% of Colorado's electricity generation in 2011. The state ranks ninth in the nation for installed wind capacity. Two large wind projects were commissioned in 2011, including an 250 MW addition to the Cedar Creek Wind Farm in Weld County and the 252 MW Cedar Point Wind project, which spans across the Elbert, Lincoln and Arapahoe counties.
- The state's wind industry has attracted major original equipment manufacturers (OEMs) to locate manufacturing hubs in the state.
- Work has been halted on what would be the nation's largest solar factory in Aurora. The factory requires an investment of \$600 million and will be capable of producing 400 MW of thin film panels per year. In July 2012, the manufacturer said that it remains committed to the project despite the delay.



**Wind Resources-** Colorado has an excellent wind resource, with the total estimated technical potential for wind power exceeding 1 million GWh



**Solar Resources-** With over 300 days of sunshine per year, Colorado could produce approximately 8.8 million GWh from rural utility-scale photovoltaics.

## Economic Development

| Employment                                                          |                       |
|---------------------------------------------------------------------|-----------------------|
| Green Goods and Services Jobs, 2010                                 | 72,452                |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                       |
| Asset Finance, 2010-2011                                            | \$1.1bn, 5/11 deals   |
| Venture Capital & Private Equity, 2010-2011                         | \$410.1m, 14/17 deals |
| Recovery Act Funding (Total Awarded)                                |                       |
| Energy Contracts, Grants & Loans                                    | \$704.1m              |
| 1603 Cash Grant Program                                             | \$445.7m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.

# Colorado

## Policies

**Renewable Portfolio Standard (RPS):** Based on the first citizen-initiated RPS passed in 2004, Colorado's current RPS requires 30% renewable energy from eligible resources by 2020 for investor-owned utilities (IOUs), and 10% by 2020 for electric cooperatives and municipal utilities. Distributed generation must account for 3% of IOU's requirement. Tradable renewable energy credits (TREC's) may be used to satisfy the standard. Renewable energy generated in-state receives 125% credit for RPS compliance purposes. Other credit multipliers may be available for projects installed in the service areas of cooperatives and eligible municipal utilities, including a 150% credit for community-based projects; a 300% credit for solar electricity installed before mid-2015; and a 200% credit for projects up to 30 MW that are interconnected to electrical transmission and distribution lines and installed prior to the end of 2014.

**Net Metering and Interconnection:** Colorado's net metering policy is available for customers of IOUs with renewable energy systems sized up to 120% of the customer's annual average consumption. It is also provided for nonresidential systems of up to 25 kW, and to municipal and cooperative customers with systems up to 10 kW. Net excess generation is applied as a credit to the customer's next bill. Net metering is also provided for some community solar systems of up to 2 MW in IOU service territories. Colorado's rules for interconnection include provisions for three levels of interconnection for systems up to 10 MW, which follows the Federal Energy Regulatory Commission (FERC) standards.

**Tax Incentives:** *Sales Tax Exemption* – The sale, storage, and use of renewable energy components is exempt from state sales and use tax through July 1, 2017.

*Property Tax Exemption* – Solar power systems installed at residences are exempt from property taxes.

**Loans:** Colorado provides loans of over \$100,000 for solar water heat, PV, wind and other distributed generation technologies. The program is funded by American Recovery and Reinvestment Act (ARRA) and has a budget of \$13 million.

**Grants:** The Bioscience Discovery Evaluation Grant Program provides grants to research institutions for biofuels research projects.

The Colorado Corn Blender Pump Program provides fuel stations grants of up to \$5,000 for dispensing mid-level ethanol blends.

**Permitting:** Colorado prevents state and local government agencies from charging excess permitting fees for solar energy systems.



# Renewable Energy in Connecticut

## Summary

Despite Connecticut's small size, the state has created a growing market for residential and commercial solar energy, sustained by rebates and distributed generation programs. The state's 27% renewable portfolio standard encourages generation from renewable sources of biomass, among other renewable energy technologies. Significant opportunities remain for the diversification of the state's renewable energy sector, including the development of its wind, marine, biomass and thermal renewable energy resources. In June 2011, Connecticut passed a landmark energy bill that is expected to create at least 300 MW of new renewable generation within the next decade, which creates a new state energy department, incentive programs for residential solar, and an expanded renewable energy credit program.

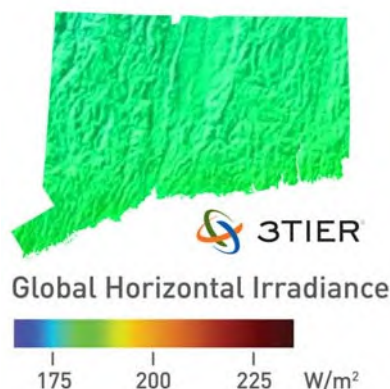
### Installed Renewable Energy Capacity, 2011

|                            |        |               |               |
|----------------------------|--------|---------------|---------------|
| Wind                       | 0 MW   | Ocean         | 0 MW          |
| Solar Photovoltaic         | 31 MW  | Biomass Power | 221 MW        |
| Concentrated Solar Thermal | 0 MW   | Bioethanol    | 0 mGy         |
| Geothermal                 | 0 MW   | Biodiesel     | 4 mGy         |
| Hydropower                 | 119 MW | <b>Totals</b> | 371 MW; 4 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- The bulk of renewable energy generation in Connecticut is derived from waste-to-energy plants throughout the state. In addition, at least two anaerobic digester projects operate at dairy farms.
- A \$225 million, 38 MW biomass project is under development on industrial-zoned land in Plainfield, which will use recycled wood waste to produce energy. It is expected to open at the end of 2013.
- As a result of the state's incentives, a number of large and innovative renewable energy projects are under development, including two ocean power pilot facilities, a utility-scale cellulosic ethanol plant, as well as wind, solar and biomass facilities.

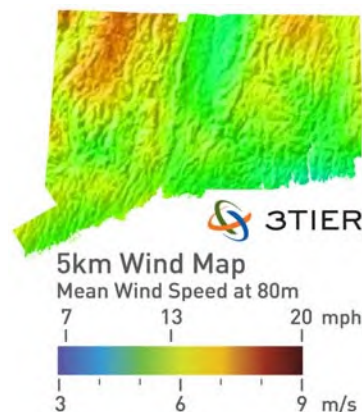


**Solar Resources**– Connecticut has the technical potential to generate nearly 20,000 GWh from rural utility-scale photovoltaics.

## Economic Development

| Employment                                                          |                   |
|---------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                 | 39,207            |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                            | \$0.0m, 0/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.2m, 1/1 deals |
| Recovery Act Funding (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                    | \$185.2m          |
| 1603 Cash Grant Program                                             | \$40.1m           |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources**– While its onshore wind resources are not as high as other states, Connecticut has the potential to generate 26,545 GWh from offshore wind power.



# Connecticut

## Policies

**Renewable Portfolio Standard (RPS):** Connecticut's RPS requires investor-owned utilities (IOUs), municipal utilities, and retail suppliers to supply at least 23% of their retail load by using renewable energy by 2020 and at least 4% of their retail load by using combined heat and power (CHP) systems and energy efficiency in and after 2010. Electric providers must meet the standard with at least 20% Class I resources (solar, wind, fuel cells, landfill gas, ocean power, newer small hydro, sustainable biomass) and 3% Class I or Class II resources (waste-to-energy, older hydropower, other biomass) by January 1, 2020, and 4% Class III sources (CHP, energy efficiency, and heat recovery) in and after 2010. The requirements may be satisfied by purchasing electricity generated using Class I or Class II resources within the jurisdiction of the regional independent system operator, with certain restrictions. The RPS covers over 93% of the state's electricity load.

**Net Metering and Interconnection:** Connecticut's two IOUs are required to provide net metering for its customers using "Class I" resources (see RPS description). The maximum system size is 2 MW. Net excess generation (NEG) is credited to the customer's next bill at the retail rate and is reconciled annually at the avoided cost rate. Connecticut's interconnection guidelines apply to IOUs for systems up to 20 MW in a three tier system based on capacity, modeling FERC's standards. Legislation passed in 2011 requires utilities to provide municipal utility customers with virtual net metering.

**Connecticut Clean Energy Fund (CCEF):** Funded by a \$0.001/kWh surcharge on ratepayer's utility bills, the CCEF develops programs and funds projects to support the deployment of low-impact, sustainable renewable energy systems. Programs of the CCEF include grants, rebates, solar leases, demonstration projects and others. The program's budget is \$20 million annually. Beginning July 1, 2011, the CCEF became part of the newly created Clean Energy Finance and Investment Authority (CEFIA), the nation's first full-scale clean energy finance authority that leverages both public and private funds to scale-up clean energy.

**Rebates:** *Solar PV*— Connecticut offers rebates for customer-owned solar PV residential systems between 1 kW and 10 kW, for \$2.275/W for first 5 kW and \$1.075/W for next 5 kW (for up to \$16,750). A performance-based incentive of \$0.30/kWh is offered for third party-owned systems.

*Solar Water Heating*—The state also offers rebates for up to 50% of the project costs of residential solar water heating systems.

**Loans:** Connecticut offers low-interest loans for solar PV, wind, fuel cells and CHP/cogeneration customer-side projects between 50 kW and 65 MW in capacity, with a maximum loan of \$150 million. Up to ten year loans are also available for energy improvements made on single and multi-family homes.

**Grants:** The Biodiesel Production and Distribution Grant Program offers incentives to biodiesel producers for up to five years. Incentives range from \$0.10-\$0.30 cents per gallon, depending on how much biodiesel is produced. The maximum incentive per producer is \$3 million.

Higher education and agricultural research institutions engaged in research to promote biofuel production from certain feedstocks or to test the quality of biofuels may qualify to receive grants.

**Tax Incentives:** A sales and use tax exemption is offered for passive and active solar energy equipment and geothermal resource systems. It is also offered for equipment, machinery and fuels used to manufacture solar (thermal and electric), wind, or geothermal systems.

A property tax exemption is offered for "Class I" renewable energy systems and hydropower facilities that generate power for private residential use, and/or active or passive solar heating systems for homes.

Renewable energy facilities are not required to pay the state tax on electric power plants that generate and upload electricity the regional bulk power grid.

# Renewable Energy in Delaware

## Summary

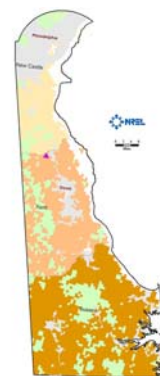
Delaware’s renewable portfolio standard of 25% by 2025, with a 3.5% carve-out for solar, helps to reduce the state’s reliance on imported coal and natural gas. The state’s net metering policy and incentives for renewable energy procurement also provide a policy foundation for continued, diversified renewable energy development. Delaware possesses extensive biomass resources and promising offshore wind resources that are becoming more recognized through the state’s commitment to increasing renewable energy’s role in its overall economy.

| Installed Renewable Energy Capacity, 2011 |       |               |              |
|-------------------------------------------|-------|---------------|--------------|
| Wind                                      | 2 MW  | Ocean         | 0 MW         |
| Solar Photovoltaic                        | 27 MW | Biomass Power | 8 MW         |
| Concentrated Solar Thermal                | 0 MW  | Bioethanol    | 0 mGy        |
| Geothermal                                | 0 MW  | Biodiesel     | 5 mGy        |
| Hydropower                                | 0 MW  | <b>Totals</b> | 37 MW; 5 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- In October 2012, the U.S. Department of the Interior and the Bureau of Ocean Energy Management issued a lease for commercial wind development on approximately 11 nautical miles off the coast of Delaware.
- Delaware commissioned its first utility-scale solar plant in August 2011. The 10 MW AC Dover SUN Park was estimated to cost \$60 million.
- After becoming the world’s first laboratory dedicated to PV research and development in 1972, the University of Delaware has been responsible for a number of ground-breaking innovations in the solar PV industry.
- A fuel cell manufacturer is constructing a facility at a shuttered auto factory in Newark, helped by state funding of up to \$16.5 million tied to anticipated job creation (up to 900 full time direct jobs and 600 full time indirect jobs).

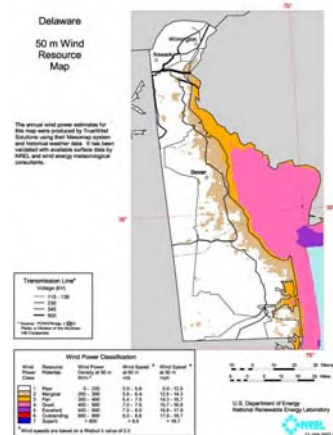


**Biomass Resources-** Delaware could produce 898 GWh from biopower. Crop residue (dark brown in the map) accounts for about half of its total biomass resource.

## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 7,978              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$60.0m, 1/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$5.5m, 4/4 deals  |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$79.5m            |
| 1603 Cash Grant Program                                             | \$46.6m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources-** Offshore, Delaware has the potential wind resource to generate 60,654 GWh. Purple represents an excellent resource area while blue and purple indicate outstanding to superb resources.

# Delaware

## Policies

**Renewable Portfolio Standard (RPS):** Delaware's RPS requires its investor-owned utility (IOU), retail electric suppliers, municipal utilities, and rural electric cooperatives to source 25% of the electricity sold in-state from renewable sources generated in-state by compliance year 2025-2026. This includes a 3.5% target for solar PV. Utilities that fail to comply with the standard's requirements must pay into the Delaware Green Energy Fund an alternative compliance payment, with increasing rates for repeated shortfalls, and higher payments for failing to comply with the PV requirement. Suppliers receive a 300% credit toward RPS compliance for in-state customer-sited PV generation and fuel cells using renewable fuels that cannot be applied to the PV requirement; a 150% credit for energy generated by wind turbines; a 350% credit for offshore wind facilities; and additional 10% credits for using a minimum of 50% of the equipment made in-state and/or using a minimum 75% in-state workforce. Utilities must purchase solar renewable energy credits (SRECs) to comply with the solar carve-out or pay a solar alternative compliance payment (SACP).

**Net Metering and Interconnection:** The maximum capacity of a net metered system is 25 kW for residential customers; 100 kW for farm customers; 2 MW per meter for non-residential customers of Delmarva Power and Light (DP&L); and 500 kW per meter for non-residential customers of Delaware Electric Cooperative (DEC) and municipal utilities. Net excess generation (NEG) is carried over to the customer's next billing cycle at the utility's retail rate until the end of a 12-month period. Customers have the choice to carry over their NEG indefinitely or request a payment at the energy supply rate. There is an aggregate capacity limit of 5% of peak demand, which utilities have the choice to increase. The program was amended in July 2010 to allow homes and businesses to sell back 110% of their aggregate consumption to the grid, to allow aggregate net metering, to allow leased systems to qualify, as well as to allow other adjustments. The Delaware Public Service Commission has not adopted mandatory interconnection standards, although law requires it to develop rules using Interstate Renewable Energy Council and Department of Energy model rules as guides. However, DP&L allows interconnection for all distributed generation systems of less than 10 MW in capacity under four basic levels. All interconnection systems must be equipped with external disconnect switch.

**SREC Program:** The Sustainable Energy Utility (SEU) operates a pilot SREC procurement program to assist in the creation of a market for SRECs. Solar generators are ranked in different tiers based on their capacity.

**Public Benefit Fund:** The Green Energy Fund, which supports state renewable energy incentive programs, is subsidized by DP&L customers on a per kWh basis. The program collects approximately \$3.2 million a year on average for renewable energy and energy efficiency programs and for clean energy research and development, and \$0.8 million a year for low-income assistance programs. Fund regulations were under revision as of July 2012.

**Loans:** The Delaware Sustainable Energy Utility (SEU) offers unsecured loans of \$1,000-\$20,000 for energy efficiency improvements at residences, including renewable energy installations if made with other improvements. Loans are for up to ten years and interest rates either 3.99% or 6.99%. The program is funded by the American Recovery and Reinvestment Act.

# Renewable Energy in D.C.

## Summary

There are currently no utility-scale renewable energy systems installed or under development in the District of Columbia. Renewable energy credits purchased from producers in other states mostly satisfy the state's renewable portfolio standard (RPS). However, distributed generation has been increasing in significance within the District, and there are now over 400 solar electricity systems installed on residential, commercial and government properties. Given the federal government's commitment to generating and purchasing renewable energy, the District's suitable solar and wind resources, its supportive policies, and the large amount of unused roof space, renewable energy is positioned for further growth.

| Installed Renewable Energy Capacity, 2011 |         |               |                |
|-------------------------------------------|---------|---------------|----------------|
| Wind                                      | 0 MW    | Ocean         | 0 MW           |
| Solar Photovoltaic                        | 11.6 MW | Biomass Power | 0 MW           |
| Concentrated Solar Thermal                | 0 MW    | Bioethanol    | 0 mGy          |
| Geothermal                                | 0 MW    | Biodiesel     | 0 mGy          |
| Hydropower                                | 0 MW    | <b>Totals</b> | 11.6 MW; 0 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- In 2008, the Department of Energy acquired a roof-mounted solar array, a 205 kW system on its Forrestal Building that provides up to 8% of the building's energy during peak hours.
- American University is installing one of the largest solar electricity systems in D.C. (505 kW) as well as the largest urban solar hot water system on the East Coast. The full project is expected to be online by Autumn 2012.
- The average size of a D.C. solar installation is 4.5 kW, which can meet about 50% of power needs from a typical household (DC United Solar Neighborhoods).



**Solar Resources**– Washington, D.C. has the potential to generate 2,490 GWh from rooftop photovoltaics.

## Economic Development

| Employment                                                          |                   |
|---------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                 | 26,941            |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                            | \$0.0m, 0/0 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals |
| Recovery Act Funding (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                    | \$308.4m          |
| 1603 Cash Grant Program                                             | \$1.9m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources**– Washington D.C.'s wind resource is best suited for small scale systems.

# District of Columbia

## Policies

**Renewable Portfolio Standard (RPS):** D.C. electric suppliers must purchase renewable energy credits (RECs) to meet 20% of their electricity sales by 2020, and purchase solar renewable energy credits (SRECs) to meet 2.5% of their electricity sales by 2023. In 2020, only “Tier 1” resources may be used to satisfy requirements, and include solar electric or thermal, wind, biomass, landfill gas, wastewater treatment gas, geothermal, ocean, and fuel cell energy systems. “Tier 2” resources must make up a declining percentage of the requirement in the years up to 2020, and include hydropower (other than pumped-storage) and municipal solid waste. According to a 2011 amendment, qualifying solar systems must not be larger than 5 MW and must be located inside the District or in locations served by a distribution feeder serving the district. As a penalty for noncompliance, suppliers must pay into the D.C. Renewable Energy Development Fund a \$0.05 per kWh of shortfall from Tier 1 resources, a \$0.01 per kWh of shortfall from Tier 2 resources, and a \$0.50 per kWh of shortfall from solar resources.

**Net Metering and Interconnection:** The District’s only investor-owned utility, Pepco, is required to offer net metering to renewable energy systems with capacity up to 1 MW. If the utility chooses to install an additional meter on the residence, it must be at the utility’s expense. Net excess generation (NEG) for systems of 100 kW or less is credited to the customer’s next bill at the full retail rate, or at the generation rate for systems larger than 100 kW. Interconnection standards apply to all distributed generation systems up to 10 MW that are operated in parallel with the electric distribution system. Interconnection rules have four levels of review, generally based on system capacity.

**Public Benefits Fund:** The Sustainable Energy Trust Fund supports energy efficiency and renewable energy incentives and demonstration projects and is financed by a surcharge on the electric and natural gas bills of utility customers (with some exceptions). Its budget is \$20 million in 2012.

**Rebates:** D.C. offers rebates for solar thermal and electric systems that do not exceed on-site energy consumption. Rebates for PV systems range from \$0.5-\$1.5/watt for PV systems, and rebates for solar thermal systems equal to 15% of the installed costs of non-residential systems (up to \$7,000) and 20% of residential systems (up to \$5,000). The program has a \$2 million budget for the year 2012.



# Renewable Energy in Florida

## Summary

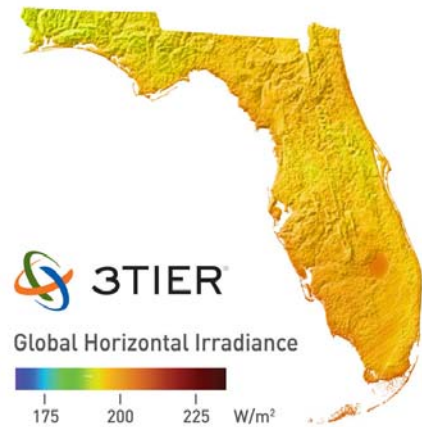
Florida’s attractive business climate has spurred the growth of leading renewable energy companies and stimulated private investment in large renewable energy projects and manufacturing facilities. Although it does not have a renewable portfolio standard, Florida is among the leading states in both solar photovoltaic and biomass power capacity. This is in part due to strong local initiatives, such as the creation of the first U.S. municipal feed-in tariff in Gainesville, and robust available resources. Nevertheless, the future of Florida’s renewable energy industry could be uncertain without targeted renewable energy policy, especially in the face of growing interest from government leadership to expand offshore gas and oil drilling.

| Installed Renewable Energy Capacity, 2011 |       |               |                  |
|-------------------------------------------|-------|---------------|------------------|
| Wind                                      | 0 MW  | Ocean         | 0 MW             |
| Solar Photovoltaic                        | 95 MW | Biomass Power | 1,195 MW         |
| Concentrated Solar Thermal                | 75 MW | Bioethanol    | 0 mGy            |
| Geothermal                                | 0 MW  | Biodiesel     | 39 mGy           |
| Hydropower                                | 56 MW | <b>Totals</b> | 1,421 MW; 39 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- Gainesville’s municipal feed-in tariff has made the city into one of the world’s leaders in per capita solar power installations.
- When it was commissioned in 2011, the 75 MW Martin Next Generation Solar Energy Center became the world’s first hybrid solar facility to connect to an existing combined cycle plant.
- Public and private research centers conduct innovative solar, advanced bioenergy, and ocean energy R&D across the state. Florida’s technology incubators and support infrastructure for clean energy companies help to speed innovations to market.
- As the largest producer of biomass in the country, Florida has attracted many companies working to commercialize the next-generation of biofuels to build projects using algae, waste, grasses and other cellulosic materials as feedstocks.
- The proposed 200 MW Sugarland Wind Farm would be the first wind power facility in Florida, to be situated in the Everglades Agricultural Area.

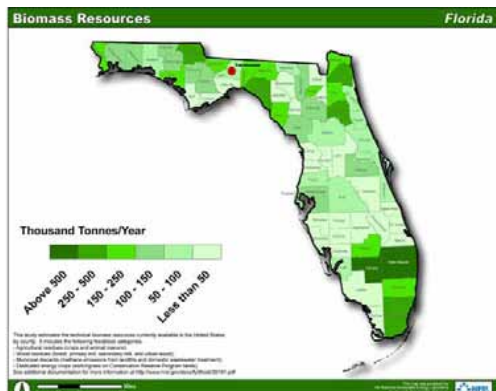


**Solar Resources-** Florida has good solar potential throughout the state, most notably in the southern half of the state, and has the potential to generate over 5 million GWh from rural utility-scale photovoltaics.

## Economic Development

| Employment                                                          |                      |
|---------------------------------------------------------------------|----------------------|
| Green Goods and Services Jobs, 2010                                 | 95,963               |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                      |
| Asset Finance, 2010-2011                                            | \$616.0m, 4/12 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$1.9m, 5/5 deals    |
| Recovery Act Funding (Total Awarded)                                |                      |
| Energy Contracts, Grants & Loans                                    | \$951.2m             |
| 1603 Cash Grant Program                                             | \$220.7m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Florida’s biomass resource is concentrated in the northern part of the state, and it could produce up to 13,358 GWh from biopower.

# Florida

## Policies

**Net Metering and Interconnection:** Florida's net metering and interconnection laws apply to customers of investor-owned utilities (IOUs) with systems up to 2 MW in capacity. Net excess generation (NEG) is carried forward to a customer's next bill at the retail rate for up to 12 months. At the end of the period, the utility pays the customer for any remaining NEG at the utility's avoided-cost rate. Interconnection rules include provisions for three tiers of net metered renewable energy systems, based on capacity. Municipal utilities and electric cooperatives are also required to develop standard interconnection agreements and net metering programs.

**Tax Incentives:** *Solar and CHP Equipment Sales Tax Exemption:* Florida exempts solar PV and thermal heating systems (used for water and space heating and cooling) from the state's sales and use tax. The exemption is permanent by law.

*Renewable Energy Production Tax Credit:* Florida offers an annual corporate tax credit of \$0.01/kWh for the electricity produced and sold from a renewable energy system during a given tax year.

*Biofuels Investment Tax Credit:* Florida offers an income tax credit to entities that produce, store, or distribute biodiesel, ethanol, or other renewable fuels. The credit covers 75% of all capital operation, maintenance, and research and development costs. If there is any excess credit in any one tax year, it may be carried forward through 2018.

**Alternative Fuel Mandate:** All gasoline sold or offered for sale by a terminal supplier, importer, blender, or wholesaler in Florida must contain 9-10% biofuel by volume.

**Local Feed-in Tariff:** Florida's Gainesville Regional Utilities (GRU) launched the first city-based solar feed-in tariff program in the United States in early 2009. GRU purchases energy from qualified PV systems via a standard offer contract at predetermined rates for 20 years. In 2012, the fixed rate for the life of the contract starts at \$0.19/kWh or \$0.22/kWh, depending on system size and application, and declines for new projects each year. The program, currently full, will reopen to new subscribers in 2013.

# Renewable Energy in Georgia

## Summary

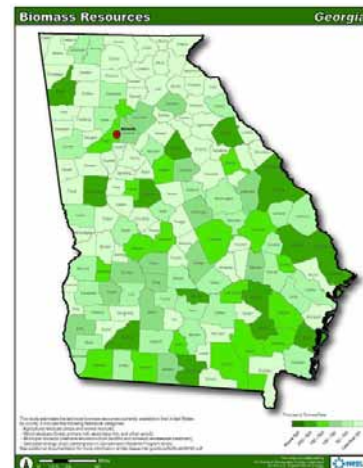
Georgia is heavily dependent on imported fossil fuel for its electricity supply. Georgia's technological innovation, resource potential, tax credits, and mission to become energy independent have helped move its bioenergy industry to the forefront of the Southeast. Favorable solar and hydro resources provide the opportunity for increased deployment of renewable energy. However, a lackluster policy environment limits the full growth potential of these energy markets.

| Installed Renewable Energy Capacity, 2011 |          |               |                   |
|-------------------------------------------|----------|---------------|-------------------|
| Wind                                      | 0 MW     | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 7 MW     | Biomass Power | 702 MW            |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 100 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 64 mGy            |
| Hydropower                                | 1,930 MW | <b>Totals</b> | 2,638 MW; 164 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Georgia is home to a 100 million gallon per year bioethanol project that was the first large-scale bioethanol project in the southeastern U.S. Production began in October 2008, and it remains the largest biofuel producer in Georgia.
- Georgia is home to a crystalline silicon solar cell manufacturing facility that produces 170 MW per year. A number of other companies manufacture components for the wind industry.
- The world's largest wood pellet plant opened in Waycross, Georgia in May 2011, which exports up to 750,000 metric tons of wood pellets annually to Europe. The \$175 million project created 85 jobs, filled by the local workforce.
- A biomethane generator at Fort Benning converts landfill gas into renewable energy and can power the equivalent of 250 homes.



**Biomass Resources-** Georgia ranks first in primary mill resources and third in forest residue. Georgia has the technical potential to generate 16,903 GWh from biopower.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 81,996              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$213.0m, 2/5 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$94.4m, 1/1 deals  |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$406m              |
| 1603 Cash Grant Program                                             | \$101.2m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Solar Resources-** Georgia has some of the best solar resources in the southeast, with the potential to generate nearly 5.5 million GWh from rural utility-scale photovoltaics.

# Georgia

## Policies

**Net Metering and Interconnection:** Georgia requires all utilities to offer net metering for solar PV, fuel cells, and wind turbines, with a capacity limit of 10 kW for residential systems and 100 kW for commercial systems. The aggregated capacity of net metered systems cannot exceed 0.2% of a utility's peak demand. The use of a bi-directional meter or single directional meter is determined by how the system is connected to the grid. Customers can choose to sell all of the electricity generated from their system to the utility if they are connected ahead of the meter. Net excess generation is credited to the customer's next bill at a predetermined rate.

Interconnection standards apply to residential electricity customers with interconnected, net metered systems. Rules comply with national standards and allow the Georgia Public Service Commission to adopt additional safety, power quality and interconnection requirements.

**Tax Incentives:** Georgia offers a 35% personal or corporate tax credit toward the project cost of a renewable energy system or the maximum dollar amount specified for the technology (for *residential systems*: \$2,500 for solar water heat; \$10,500 for PV, active space heat and wind energy; and \$2,000 for geothermal heat pumps; and for *commercial systems*: \$500,000 for solar PV, solar thermal electric, active solar space heating, biomass and wind; and \$100,000 for solar hot water, geothermal heat pumps, and energy efficiency projects), whichever amount is least. The credit must be taken in four equal installments over four consecutive taxable years. Leased systems are also eligible for the credit. The program's budget is \$5 million annually through the end of 2014.

Georgia exempts entities from the state's sales and use tax for the purchase of biomass materials used in the production of electricity, steam, or both electricity and steam.

Manufacturers of products for use in battery, biofuel, and electric vehicle enterprises may qualify for an annual tax credit per eligible new full-time job for five years.

Individuals who purchase or lease a new alternative fuel vehicle or convert a vehicle to operate 100% on alternative fuel may qualify for an income tax credit of 10% of the vehicle cost, or up to \$2,500.

# Renewable Energy in Hawaii

## Summary

Hawaii has one of the most diverse renewable energy generation opportunities of any state, but the transmission of electricity to areas of high demand remains a challenge. The state has excellent wind, solar, geothermal, biomass, hydropower, and ocean resources, and is a leader in ocean thermal research. Notably, Hawaii's Clean Energy Initiative with the U.S. Department of Energy aims for 70% clean energy by 2030. The initiative aims to decrease Hawaii's reliance on imported oil, which is nearly 90% of its primary energy supply.

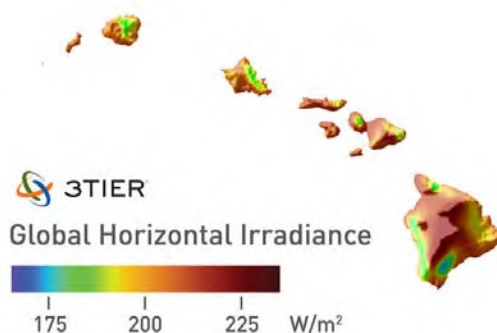
### Installed Renewable Energy Capacity, 2011

|                            |       |               |                  |
|----------------------------|-------|---------------|------------------|
| Wind                       | 93 MW | Ocean         | 0.04 MW          |
| Solar Photovoltaic         | 85 MW | Biomass Power | 227 MW           |
| Concentrated Solar Thermal | 2 MW  | Bioethanol    | 0 mGy            |
| Geothermal                 | 43 MW | Biodiesel     | 12 mGy           |
| Hydropower                 | 25 MW | <b>Totals</b> | 474.9 MW; 12 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Hawaiian solar power installations doubled in 2011, with over 40 MW of commercial and residential systems added.
- Almost all of the major U.S. ocean thermal energy conversion (OTEC) experiments are located in Hawaii. The Natural Energy Laboratory of Hawaii Authority (NELHA) has been recognized as the world's foremost laboratory and test facility for OTEC and OTEC-related research.
- The Air Force and Hawaii signed an MOU in June 2012 to use and evaluate clean energy fuel technologies at the Joint Base Pearl Harbor Hickam.
- Electric utilities and companies are evaluating the feasibility of employing local biomass resources for electricity and renewable gasoline, diesel and jet fuel. Commissioned facilities utilize sugar crops, municipal solid waste, and liquid biofuels to generate electricity.



**Solar Resources**– Despite its small size, Hawaii has the potential to generate 38,033 GWh from rural utility-scale photovoltaics.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 15,583              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$195.5m, 4/8 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$37.2m, 6/6 deals  |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$67.2m             |
| 1603 Cash Grant Program                                             | \$94.9m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources**– Hawaii has the strongest offshore wind potential of any state, with an estimated technical potential over 2.8 million GWh.



# Hawaii

## Policies

**Renewable Energy Portfolio Standard (RPS):** Hawaii's RPS mandates investor-owned utilities (IOUs) and rural electric cooperatives (representing 100% of the electricity load) to generate 40% of their net electricity sales through "renewable electrical energy" by 2030. Three intermediate targets of 10%, 15%, 25%, and 40% must be met by the last day of 2010, 2015, 2020, and 2030 respectively. The energy savings brought about by the use of energy efficiency technologies or renewables to displace or off-set electricity demand can be used toward compliance until January 2015, after which the RPS must be met entirely by electricity generated by renewable energy. The Public Utilities Commission (PUC) can establish standards that prescribe what portion of the RPS shall be met by specific types of renewable electrical energy resources.

**Net Metering and Interconnection:** Hawaii's net metering law applies to all utilities for eligible renewable energy systems up to 50 kW or 100 kW (depending on the utility). All utilities were mandated in 2008 to develop a pilot program to allow net metering to a limited number of systems 100 kW to 500 kW in capacity. Net excess generation is credited to customer's next bill at the retail rate, but is forfeited to the utility at the end of 12-month billing cycle. Through the Hawaii Clean Energy Initiative, an agreement was made that provides that there should be no system-wide caps on net metering, and that net metering should transition towards a feed-in tariff. Changes are being considered to meet this agreement.

Hawaii has simplified interconnection rules for distributed generation systems. Small inverter-based and net metered systems qualify for a simplified interconnection procedures.

**Tax Incentives:** The *Hawaii Energy Tax Credits* program offers income tax credits to both individuals and corporations for 20% of the cost of equipment and installation of a wind energy system and 35% of the cost of equipment and installation of a solar energy system. Excess credit may be carried forward until exhausted.

Ethanol producers may be eligible for a tax credit equal to 30% of their production facility's nameplate capacity, if between 500,000 and 15 million gallons per year.

**Rebates:** Residential customers of the Hawaiian Electric Company (HECO) and its subsidiaries are eligible for a one-time rebate of \$750 for installing a solar water heater. As of January 1, 2010, this rebate is not available for systems installed on new residential construction. Commercial customers may receive custom incentives of \$250 per 12,000 BTU derated capacity.

**Feed-in Tariff:** Hawaii established a feed-in tariff (FiT) in September 2009 that applies to all IOUs in the state and is applied at a fixed rate for 20-year contracts. There are three rate tiers, which range from \$0.138 per kWh to \$0.315 per kWh, differentiated by technology and system size. Eligible systems include solar PV, concentrating solar power, onshore wind, biomass, and in-line hydropower of up to 5 MW in capacity.

**Loan Program:** Hawaii offers loans for agriculture and aquaculture-based PV, hydroelectric, wind power, methane generation, biodiesel, and ethanol projects. Loans may provide up to 85% of the project cost, up to a maximum of \$1,500,000 for a term of up to forty years. Interest rates are 3% for agriculture 5% for aquaculture, with a 40-year term.

Funded by the American Recovery and Reinvestment Act, GreenSun Hawaii partners with banks and credit unions to offer more favorable terms and lower interest rates for loans made to investments in renewable energy and energy efficiency.

**Public Benefits Fund (PBF):** The Hawaii Energy Efficiency Program is funded by a surcharge on customers' utility bills (excluding customers of the Kauai Island Utility Cooperative (KIUC)). The total fund for June 2012 to June 2013 is \$21.6 million for direct incentives. Programs supported by the PBF include rebates for industrial energy efficiency, and solar water heaters, among other technologies.

**Building Code:** Hawaii requires solar water heating systems to be installed on new single-family homes.

**Renewable Fuel Standard:** Hawaii mandates that 85% of gasoline sold or supplied to retailers must contain 10% ethanol.

# Renewable Energy in Idaho

## Summary

Idaho's rivers offer some of the best hydroelectric power resources in the nation. Consequently, hydropower supplies 80% of the state's electricity, making electricity rates among the lowest in the country. Idaho's geothermal resource is one of the nation's best. The state's wind power generation is also notable for a state without an official target for renewable energy, in part due to past tax incentives and other supportive policies. However, in 2011, Idaho removed two arguably vital incentives for its renewable energy industry, which has since stifled development.

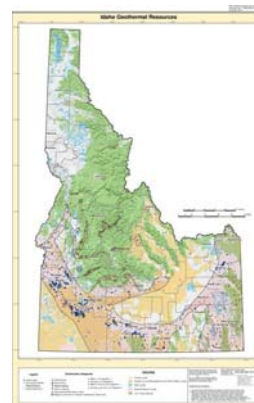
### Installed Renewable Energy Capacity, 2011

|                            |          |               |                  |
|----------------------------|----------|---------------|------------------|
| Wind                       | 618 MW   | Ocean         | 0 MW             |
| Solar Photovoltaic         | 0.4 MW   | Biomass Power | 139 MW           |
| Concentrated Solar Thermal | 0 MW     | Bioethanol    | 54 mGy           |
| Geothermal                 | 16 MW    | Biodiesel     | 6 mGy            |
| Hydropower                 | 2,536 MW | <b>Totals</b> | 3,309 MW; 60 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Idaho's first major solar facility is under construction and is on schedule to come online in January 2013. Located near the Boise airport, the facility will have a capacity of 10 MW.
- Idaho's wind industry has flourished in the past years, developing into an export market. With over 100 MW under construction and more in the project pipeline, Idaho is poised to pass the 1 GW mark.
- Idaho is consistently among the leading dairy producers in the nation and is home to several anaerobic digesters currently feeding power to the grid.
- In 1892, the nation's first geothermal district heating system was established in Boise and is still in use today. District heating systems continue to heat residences and businesses in the state, including the state capitol.



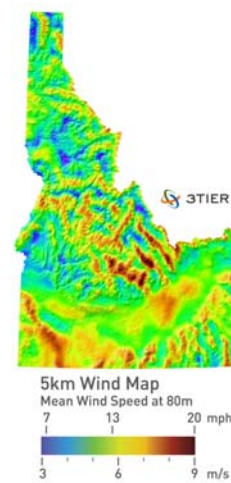
**Geothermal Resources-** Pink indicates areas of known or potential geothermal resources. Hydrothermal systems could generate 17,205 GWh in Idaho.

## Economic Development

### Employment

|                                                                            |                     |
|----------------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                        | 22,192              |
| <b>Private Sector Investment (Disclosed Amount, Disclosed/Total Deals)</b> |                     |
| Asset Finance, 2010-2011                                                   | \$57.0m, 2/28 deals |
| Venture Capital & Private Equity, 2010-2011                                | \$0.0m, 0/0 deals   |
| <b>Recovery Act Funding (Total Awarded)</b>                                |                     |
| Energy Contracts, Grants & Loans                                           | \$641.7m            |
| 1603 Cash Grant Program                                                    | \$337.9m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources-** Idaho has strong winds across its southern plains suitable for utility-scale production. The state has the potential to generate 44,320 GWh from 3,615km<sup>2</sup> of available windy land.

# Idaho

## Policies

**Net Metering:** Idaho does not have a statewide net metering policy. However, each of the state's three investor-owned utilities has a net metering tariff on file with the Idaho Public Utilities Commission. Each utility: (1) offers net metering to customers that generate electricity using solar, wind, hydropower, biomass or fuel cells; (2) limits net metering to 0.1% of its retail peak demand in a baseline year; (3) limits residential systems to 100 kilowatts; and (4) prohibits any single customer from generating more than 20% of the aggregate capacity of the net metering program.

**Tax Incentives:** *Residential Alternative Energy Tax Deduction* – Idaho offers an income tax deduction for the cost of residential solar, wind, geothermal, or certain biomass systems. The deduction is 40% of the system's cost in the year that the system is installed and 20% per year for the three following years. The maximum deduction in any one year is \$5,000, and the total maximum deduction is \$20,000.

*Property Tax Exemption* – Idaho law exempts commercial wind operators and geothermal energy producers from property tax on real estate, fixtures or property related to renewable energy systems. It instead requires them to pay a tax of 3% of their gross energy earnings.

**Loan Program:** Idaho administers a low-interest loan program for active renewable energy projects. The interest rate is 4% with a 5-year repayment term. The maximum loan available for residential applications is \$15,000. For all other applications, the maximum loan amount is \$100,000.

**Bond Program:** The Idaho Energy Resources Authority offers bonds to independent power producers of renewable energy in the state.

# Renewable Energy in Illinois

## Summary

Illinois is one of the top electricity-generating states in the nation and a leading net exporter of electricity to other states. It is also home to some of the most extensive wind and biomass resources in the nation. The state has attracted large amounts of investment capital due in large part to an aggressive renewable portfolio standard and progressive state and local incentives. Thanks to the state's public benefit fund and state backed renewable energy bonds, Illinois has fostered a supportive environment for its citizens and the commercial, industrial and utility sectors to invest in these growing industries.

### Installed Renewable Energy Capacity, 2011

|                            |          |               |                     |
|----------------------------|----------|---------------|---------------------|
| Wind                       | 2,743 MW | Ocean         | 0 MW                |
| Solar Photovoltaic         | 16 MW    | Biomass Power | 137 MW              |
| Concentrated Solar Thermal | 0 MW     | Bioethanol    | 1,486 mGy           |
| Geothermal                 | 0 MW     | Biodiesel     | 174 mGy             |
| Hydropower                 | 40 MW    | <b>Totals</b> | 2,936 MW; 1,660 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Illinois is a national leader in the wind energy supply chain. The state is home to over 100 companies involved in wind energy, and Chicago serves as headquarters to major wind power manufacturers.
- Illinois ranks third in nation for ethanol production capacity and fourth for biodiesel production capacity. A pilot next generation biodiesel plant in Peoria began producing fuel in June 2012 and uses algae technology to ferment plant sugars into specifically designed oils.
- Phase I of a planned 62 MW solar PV farm in Rockford came online in September 2012. When fully operational, the facility will be one of the largest of its kind in the Midwest, capable of providing power to over 50,000 homes.

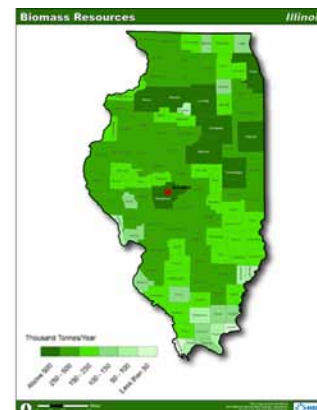


**Wind Resources-** With 49,976km<sup>2</sup> of windy land available, Illinois has the potential to produce 649,468 GWh from its wind resource.

## Economic Development

| Employment                                                          |                       |
|---------------------------------------------------------------------|-----------------------|
| Green Goods and Services Jobs, 2010                                 | 139,830               |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                       |
| Asset Finance, 2010-2011                                            | \$1.2bn, 4/13 deals   |
| Venture Capital & Private Equity, 2010-2011                         | \$183.0m, 10/10 deals |
| Recovery Act Funding (Total Awarded)                                |                       |
| Energy Contracts, Grants & Loans                                    | \$816.8m              |
| 1603 Cash Grant Program                                             | \$931.7m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Dark green indicates a strong resource potential. Illinois has the most robust biopower resource of any state, with the potential to generate over 31,960 GWh.

# Illinois

## Policies

**Renewable Portfolio Standard (RPS):** Illinois requires investor-owned utilities (IOUs) and retail electric suppliers (together covering 88.5% of the electricity load) to produce 25% of their energy from qualifying renewable energy sources by compliance year 2025 – 2026. Qualifying renewable energy sources include solar, landfill gas, wind, biomass, hydroelectric and biodiesel facilities located in the state. As part of the requirement, IOUs must produce 75% of their annual requirement from wind, and retail electric suppliers must produce 60% of their annual requirement from wind. Both utilities and retail electric suppliers must produce 6% of their annual requirement from solar power in and after compliance year 2015-2016. IOUs must also produce 1% of their annual requirement from distributed generation in and after compliance year 2015-2016. Requirements may be met through energy bundled with renewable energy credits or through the purchase of tradable renewable energy credits.

**Net Metering and Interconnection:** Illinois requires IOUs to offer net metering for most conventional renewable energy systems up to 2 MW in capacity. Utilities must provide net and dual metering to customers until 5% of their peak demand (from the previous year) is reached. Net excess generation (NEG) is credited only to non-competitive customers: non-hourly customers are credited on their next bill at the retail rate, and any remaining NEG at the end of the 12-month billing cycle is granted to the utility; and hourly customers receive energy credit and delivery service credit based on the hourly rate. Illinois has established interconnection standards for projects up to 10 MW with four levels of review and separate standards for projects of 10 MW or larger that are not already subject to federal or regional rules.

**Public Benefit Fund:** The Renewable Energy Resources Trust Fund (RERTF), administered by the Illinois Department of Commerce and Economic Opportunity (DCEO), was established to disperse grants, loans and other incentives for renewable energy projects. Funding for the program is subsidized through surcharges on IOU customers' electricity bills. Municipal and cooperative utilities may voluntarily participate in the program. RERTF is expected to collect a total of \$100 million from its inception in 1998 to 2015.

**Loans:** Illinois business owners, nonprofit organizations, and local governments may qualify for a rate reduction for loans on certain energy efficiency upgrades and renewable energy systems. The reduction is made available through the Green Energy Loan program, in partnership with eligible banks in the state. The rate reduction can apply for up to five years of the loan, and loan amounts range from \$10,000 to \$10 million.

**Rebates and Grants:** Illinois provides a rebate for 80% of the incremental cost of purchasing an alternative fuel vehicle or converting a vehicle to run on alternative fuels, of up to \$4,000. Eligible fuels include E85, B20, natural gas, propane, electricity, and hydrogen.

Companies that construct or expand biodiesel or ethanol production facilities with a capacity of at least five million gallons per year may be eligible for a grant equal to the lesser of 10% of the total construction costs or \$4 million.

Illinois offers rebates for solar power, solar thermal, and wind energy systems that range from \$1.50-\$2.60/watt or up to 40% of project costs.

**Bond Program:** The Illinois Finance Authority (IFA) has been authorized to issue tax-exempt bonds for renewable energy projects that provide a significant public benefit for the citizens of Illinois.

**Tax Incentives:** Illinois provides state and local sales tax exemptions for building materials incorporated into commercial wind powered facilities over 0.5 MW that meet minimum investment and job creation requirements.

Entities that purchase ethanol or biodiesel may qualify for a sales and use tax reduction. The sale of fuels containing E10 or B1-B10 are taxed at 80% of the proceeds from their sale. Fuels containing E70-E90 or B11-B100 qualify for a full exemption from sales and use tax.



# Renewable Energy in Indiana

## Summary

Like many of its Midwestern neighbors, Indiana is endowed with plentiful wind and biomass resources. It is ranked fifth in the nation for ethanol capacity. So far, project construction and wind turbine component manufacturing have brought thousands of jobs and substantial investment to the state. In an effort to decrease coal's dominance of Indiana's energy portfolio and increase in-state power generation, the state set a goal in 2011 to obtain 10% clean energy by 2025. Although it is not a binding standard, this commitment to clean energy is expected to further encourage the sector's growth.

| Installed Renewable Energy Capacity, 2011 |          |               |                     |
|-------------------------------------------|----------|---------------|---------------------|
| Wind                                      | 1,340 MW | Ocean         | 0 MW                |
| Solar Photovoltaic                        | 4 MW     | Biomass Power | 56 MW               |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 1,147 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 121 mGy             |
| Hydropower                                | 92 MW    | <b>Totals</b> | 1,492 MW; 1,268 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Several wind farms are scheduled to come online in Indiana toward the end of 2012. A 100 MW farm in West Lafayette is expected to be commissioned by December, and a 200 MW project in Tipton and Madison counties will also begin operations before the new year.
- A number of companies in Indiana manufacture wind turbine components.
- In September 2012, commercial operations resumed at a Linden bioethanol plant after idling since June. The facility will once again generate 110 million gallons per year of bioethanol and 315,000 tons of dry distillers grain.

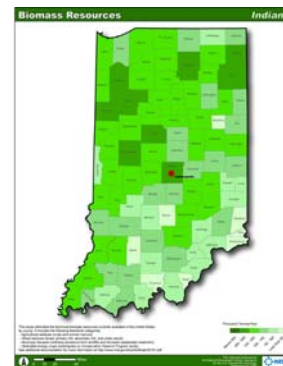


**Wind Resources-** Indiana's onshore wind resource is composed of nearly 30,000 km<sup>2</sup> of land, with the potential to generate 377,604 GWh.

## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 67,948             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$30.0m, 1/3 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.3m, 1/1 deals  |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$794.1m           |
| 1603 Cash Grant Program                                             | \$347.7m           |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Indiana's biomass resource is concentrated in the farming areas in the northern region of the state. Over 17,920 GWh could potentially be generated from biopower in the state.

# Indiana

## Policies

**Renewable Portfolio Goal:** The Clean Energy Portfolio Goal was passed in May 2011 and sets a voluntary goal of 10% clean energy by 2025. The goal, and the ability to receive incentives for compliance projects, only pertains to public utilities that apply to participate. Eligible technologies include renewable energy technologies like wind, solar, certain biomass, hydropower, fuel cells, hydrogen, waste-to-energy, and geothermal energy, as well as “clean energy” technologies like coal bed methane, industrial byproduct technologies, waste heat recovery, energy efficiency, nuclear energy, combined heat and power systems, and natural gas that displaces electricity.

**Net Metering and Interconnection:** The Indiana Utility Regulatory Commission (IURC) requires the state's investor-owned utilities (IOUs) to offer net metering to all electric customers with renewable or clean energy systems that have a maximum capacity of 1 MW. The aggregate amount of net metering capacity is limited to 1% of its most recent summer peak load. Net excess generation (NEG) is credited to the customer's next monthly bill indefinitely, with any unused credit reverting to the utility if the customer ceases the use of net metering. Utilities are required to assume all costs and fees associated with meter installation, and customers can elect a single or dual meter configuration.

Indiana's interconnection rules require the state's investor-owned utilities, regulated municipal utilities and regulated electric cooperatives to provide three levels of interconnection to customer-generators.

**Tax Incentives:** Indiana offers a property tax exemption for renewable energy systems and their affiliated equipment, which is allowed every year that an eligible system is generating energy.

Indiana allows taxpayers who install a solar-powered roof fan/vent/attic fan in their residence a 50% tax deduction for the cost of the materials and installation labor, up to \$1,000.

The state offers tax credits of up to 15% of qualified investments for the manufacture or assembly of alternative fuel vehicles. Manufacturers must meet wage requirements and maintain operations for at least ten years in order to qualify.

A state sales and use tax exemption is offered for certain manufacturing equipment, machinery, and tools used in the production of wind, solar PV, landfill gas, biomass and hydroelectric systems.

Ethanol producers may qualify for a tax credit of \$0.125 per gallon of ethanol produced. The maximum credit for the production of cellulosic ethanol is \$20 million (for 20 million gallons or more), and the maximum credit for grain ethanol is \$2 million (for 40-60 million gallons) or \$3 million (for 60 million gallons or more).

Biodiesel producers may qualify for a tax credit of \$1.00 per gallon of biodiesel produced. The maximum incentive is \$3 million (but may be increased to \$5 million with approval from the Indiana Economic Development Corporation). A biodiesel blender may receive a credit of \$0.02 per gallon of blended biodiesel produced. The maximum incentive is \$3 million. In addition, the personal, non-commercial use of B20 qualifies for an exemption from the \$0.16 per gallon license tax.

**Grants:** The Community Conservation Challenge Program provides grants ranging from \$25,000 to \$250,000 to non-residential entities for community energy conservation projects that use commercially-available technologies. The project must have at least one community partner.

# Renewable Energy in Iowa

## Summary

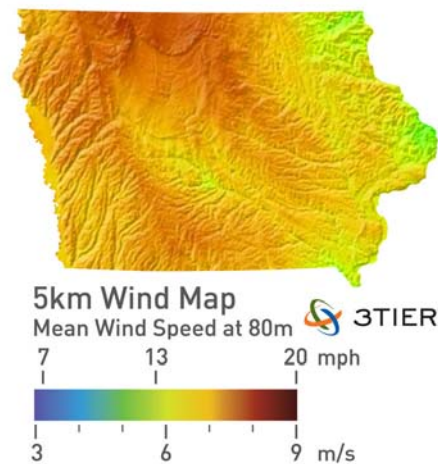
A leading state in the production of renewable energy from wind, ethanol and biodiesel, Iowa has seen significant renewable energy growth in recent years. The state's strong manufacturing and agricultural sectors coupled with its early policy support create an attractive business climate for companies interested in researching, developing and manufacturing renewable energy technologies in the state. Nevertheless, the delay of a federal production tax credit extension in 2012 has triggered the closure of wind manufacturing facilities in Iowa, and reduced federal support in 2013 may further delay the growth of Iowa's wind market.

| Installed Renewable Energy Capacity, 2011 |          |               |                     |
|-------------------------------------------|----------|---------------|---------------------|
| Wind                                      | 4,322 MW | Ocean         | 0 MW                |
| Solar Photovoltaic                        | 0.10 MW  | Biomass Power | 15 MW               |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 3,625 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 305 mGy             |
| Hydropower                                | 132 MW   | <b>Totals</b> | 4,468 MW; 3,930 mGy |

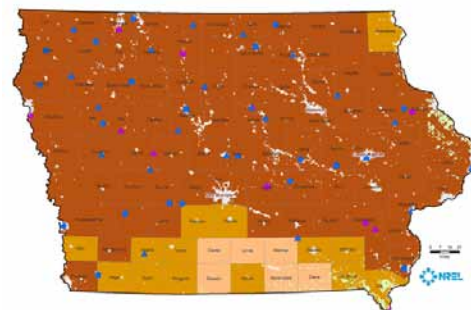
Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- In 2011, Iowa ranked second in the nation for installed wind power capacity. More than 20% of Iowa's total generated electricity comes from wind power, one of the greatest shares of any other state.
- Production of biofuels in Iowa soared 700% between 2000 and 2011. The state is home to nearly a quarter of U.S. ethanol production capacity and over 10% of U.S. biodiesel production capacity.
- Two ambitious proposals for transmission lines in north-central and southern Iowa seek to alleviate congestion in key grid areas. The new lines would allow power generated from Iowa's wind farms to better reach customers in Wisconsin and Illinois as well.



**Wind Resource-** Iowa's greatest wind resources are located in the northwestern part of the state and along the Loess Mountain Range. In total, Iowa has the potential to generate over 1.7 million GWh from its 114,143 km<sup>2</sup> of windy land.



**Biomass Resource-** Iowa's strong agricultural base offers great potential for alternative fuels (ethanol and biodiesel) and biomass energy production has the technical potential to generate nearly 29,000 GWh. NREL's highest ranked biomass resources (dark brown) are located in all but a few counties.

## Economic Development

| Employment                                                          |                      |
|---------------------------------------------------------------------|----------------------|
| Green Goods and Services Jobs, 2010                                 | 39,097               |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                      |
| Asset Finance, 2010-2011                                            | \$590.0m, 3/16 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals    |
| Recovery Act Funding (Total Awarded)                                |                      |
| Energy Contracts, Grants & Loans                                    | \$157.7m             |
| 1603 Cash Grant Program                                             | \$363.5m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.

# Iowa

## Policies

**Alternative Energy Law (AEL):** Iowa requires its two investor-owned utilities (IOUs) to own or contract for a combined total of 105 MW of renewable energy generating capacity and associated energy production. The utilities are currently fulfilling their obligation almost entirely from wind power production, with a small amount from biogas production. Additionally, all electric utilities operating in Iowa are required to offer green power options to their customers. These programs allow customers to make voluntary contributions to support the development of renewable energy sources in Iowa.

**Net Metering and Interconnection:** Although not explicitly authorized, the Iowa Utilities Board (IUB) has implicit authority to mandate net metering for customers of Iowa's two investor-owned utilities. There is no explicit limit on either the size of a net metered system or on total enrollment; however, separate rule waivers have allowed the utilities to limit individual systems to 500 kW. Net excess generation is credited indefinitely to the customer's next bill at the retail rate. Iowa's interconnection rules were adopted in May 2010 and mandate that, for all facilities not subject to Federal Energy Regulatory Commission (FERC) regulation, interconnection standards apply to distributed generation facilities of up to 10 MW. For facilities larger than 10 MW, the standards are used as a starting point. Iowa set four levels of review for interconnection requests based on system capacity and other specifications.

**Tax Incentives:** Under Iowa Code § 476C, personal and corporate production tax credits of 1.5¢ per kWh are available for energy generated and sold by eligible wind energy generators and other renewable energy facilities of above 750 kW. The law also offers \$4.50 per million BTUs of biogas used to generate electricity or heat for commercial purposes.

Under Iowa Code § 476B, personal and corporate production tax credits of 1.0¢ per kWh are available for electricity generated by eligible wind power facilities between 2 MW and 30 MW. Tax credits can be carried forward up to seven years, and may be transferred more than once.

Iowa provides 15% personal and corporate tax credits for solar electric, solar process heat, and solar water heating systems. The maximum amount is \$15,000 for the corporate tax credit and \$3,000 for the personal tax credit, and excess credit may be carried forward for up to ten years.

Real and personal property used to utilize waste for energy is exempt from property taxation.

The market value added to a property by a solar or wind energy system is exempt from the state's property tax for five full assessment years. In certain cases, geothermal heat pumps are also exempt.

Equipment used to manufacture, install or construct wind energy systems is exempt from the state sales tax. Solar energy systems are also exempt.

In lieu of a property tax on generation facilities, Iowa imposes a replacement generation tax of 0.06 cents per kWh on energy generated from landfill gas, wind, hydroelectric systems, and self-generators.

Fuel retailers that sell a certain percentage of renewable fuels as part of their total motor fuel sales may qualify for a tax credit of up to \$0.08 per gallon of pure ethanol blended into gasoline. In order to be eligible, retailers must meet annual renewable fuel goals, which increase to 25% of sales by 2020. Retailers close to meeting goals receive reduced incentives. In addition, retail stations that dispense E15 may be eligible for a tax credit of \$0.03 per gallon, and stations that dispense E85 may qualify for a credit of \$0.16 per gallon.

Retailers that sell at least 50% biodiesel as a proportion of their total diesel sales may qualify for a state income tax credit of \$0.045 per gallon of biodiesel sold in 2013 to 2017 for B5 and above.

**State Loan Program:** The Alternate Energy Revolving Loan Program (AERLP) provides loan funds to individuals and organizations that seek to build renewable energy production facilities in Iowa. The AERLP provides 50% of the total loan at 0% interest, up to a maximum of \$1 million for up to 20 years. The remainder of the loan is provided by a lender at the market rate.

Nonprofits, schools, local and state governments, and institutional entities can apply for 1%, 15-year loans from the Iowa Energy Bank to finance the implementation of cost-effective energy projects.

Iowa offers forgivable and low-interest loans for the production of alternative fuels, which vary based on the size of the award.



# Renewable Energy in Kansas

## Summary

Kansas has one of the most promising wind resource potentials in the country and is on track to double its installed capacity from wind power in 2012. In addition, Kansas is home to multiple bioethanol plants and is ranked ninth in the nation in bioethanol production capacity. The state has a 20% renewable energy portfolio standard and provides numerous tax incentives and loans to promote large and small scale renewable energy generation and attract renewable energy businesses into the state.

| Installed Renewable Energy Capacity, 2011 |          |               |                   |
|-------------------------------------------|----------|---------------|-------------------|
| Wind                                      | 1,274 MW | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 0.20 MW  | Biomass Power | 7 MW              |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 492 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 4 mGy             |
| Hydropower                                | 3 MW     | <b>Totals</b> | 1,284 MW; 496 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Kansas added the most wind capacity of any state in 2012 through the third quarter. Development is underway on the second phase of the Flat Ridge Wind Farm, which will add 419 MW to the grid and create 30 permanent jobs. The phase is expected to be complete by the end of 2012.
- Development continues in Hugoton on one of the nation's first cellulosic ethanol plants, which will use agricultural waste, non-feed energy crops, and wood waste to produce fuel as well as electricity. The plant secured a \$132.4 million loan guarantee from the Department of Energy in the fall of 2011, and developers expect to commence ethanol and power production in 2013. The plant will create 65 permanent jobs.

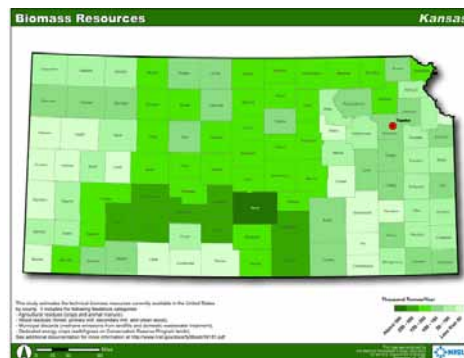


**Wind Resources-** Kansas has an exceptional wind resource, second only to Texas in on-shore potential. With 190,474 km<sup>2</sup> of windy land, Kansas could generate over 3 million GWh annually.

## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 27,856             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$1.2bn, 3/4 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$2.5m, 1/1 deals  |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$151.2m           |
| 1603 Cash Grant Program                                             | \$101.9m           |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Kansas has the potential to generate over 12,857 GWh from its biopower resources. Darker green indicates counties with the greatest biomass resources.



# Kansas

## Policies

**Renewable Portfolio Standard (RPS):** Kansas requires investor-owned utilities (IOUs) and cooperative utilities to either generate or purchase 20% of their peak demand capacity by 2020 and onward from qualifying renewable energy technologies, including solar (thermal and electric), landfill gas, biomass, wind, hydroelectric, and fuel cells using renewable fuels. Unlike in many other states, Kansas' standard is based on generation capacity rather than on retail electric sales. The utilities are allowed to purchase only a certain percentage of renewable energy credits (RECs) in order to comply with the RPS. Utilities can also purchase capacity from other renewable energy producers for compliance.

**Net Metering and Interconnection:** Kansas requires IOUs to offer customers net metering for residential systems up to 25 kW and for non-residential systems up to 200 kW. In addition, utilities are required to provide their customers bi-directional net meters at no cost. Any net excess generation (NEG) will be rolled over to the next billing cycle at the full retail rate, with any remaining NEG granted to the utility at the end of the calendar year. The program is offered to customers until the aggregated net metered capacity reaches 1% of the utilities peak demand as calculated from the previous year. Utilities obtain ownership of the RECs created as part of the net metering program, and can use them toward their RPS requirements. General interconnection standards apply to net metered systems. The utility may not require the customer to purchase additional liability insurance, but may require the installation of an external disconnect switch.

**Tax Incentives:** Companies that manufacture solar or wind components are eligible for up to \$5 million in financing from the Kansas Department of Commerce. To be eligible, the project must hire at least 200 new employees within 5 years and pay an average salary of \$32,500 per employee. In addition, the project must create at least \$30 million of new investment in Kansas.

Kansas offers a 100% property tax exemption for renewable energy equipment that is used primarily to produce electricity. In addition, any property used to treat, refine, or transport landfill gas is eligible to this exemption.

Kansas offers an income tax credit for 40% of the incremental or conversion cost for qualified alternative fuel vehicles, of up to \$40,000.

Retail motor fuel dealers may qualify for a quarterly tax incentive for the sale and dispense of renewable fuels, of \$0.065 for every gallon of renewable fuel sold and up to \$0.03 for every gallon of biodiesel sold.

Kansas offers a property tax exemption for storing or blending petroleum-based fuel with biofuel.

**Production Incentive:** Biodiesel producers may qualify for a production incentive of \$0.30 per gallon of biodiesel sold. Ethanol producers may qualify for a production incentive of \$0.035 per gallon of ethanol sold to an alcohol blender that is in excess of the producer's base sales.

**Bonds:** Biomass facilities that produce at least 500,000 gallons of cellulosic ethanol may qualify for a state revenue bond to cover the costs of construction or expansion.

# Renewable Energy in Kentucky

## Summary

As the third largest producer of coal and with some of the lowest electricity prices in the nation, Kentucky remains largely dependent on fossil fuel sources to generate electricity. The state has identified biomass, wind, solar, hydro, and geothermal energy as potential new energy sources in its energy plan, and offers an array of tax incentives that promote renewable energy power and fuels production. However, utility-scale growth is limited to just a few planned biomass facilities, with no announced plans to develop the state's other untapped, available renewable energy resources.

| Installed Renewable Energy Capacity, 2011 |        |               |                |
|-------------------------------------------|--------|---------------|----------------|
| Wind                                      | 0 MW   | Ocean         | 0 MW           |
| Solar Photovoltaic                        | 3 MW   | Biomass Power | 110 MW         |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 35 mGy         |
| Geothermal                                | 0 MW   | Biodiesel     | 63 mGy         |
| Hydropower                                | 804 MW | <b>Totals</b> | 917 MW; 98 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

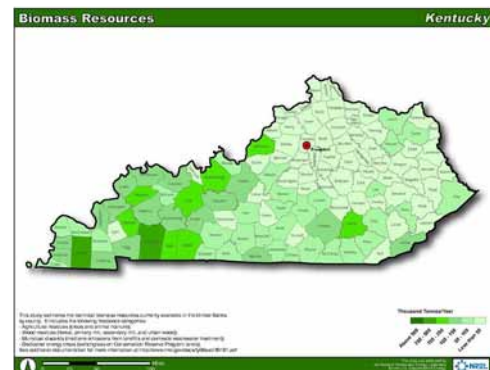
## Market

- Biomass power is produced from combined heat and power (CHP) facilities that use black liquor and forestry residues as feedstocks, and from at least four landfill gas facilities.
- Although utility-scale photovoltaic development is not in Kentucky's immediate future, the state is home to small companies that install solar pool heaters, attic fans, and PV panels.
- Kentucky is home to at least four operating ethanol and biodiesel plants that use agricultural residue and industrial waste as feedstocks.

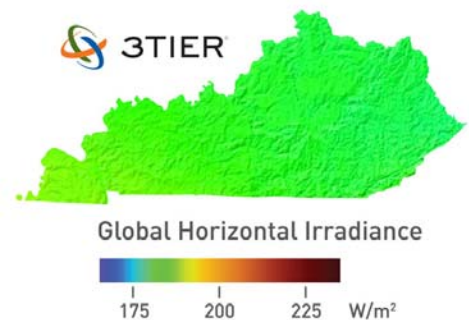
## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 32,096             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$12.5m, 1/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$2.5m, 2/2 deals  |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$262.3m           |
| 1603 Cash Grant Program                                             | \$2.4m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources**– Kentucky has the potential to generate 8,322 GWh from biopower. Dark green indicates counties with the most substantial resource.



**Solar Resources**– Kentucky has the potential to generate about 1.8 million GWh from rural, utility-scale photovoltaic installations.

# Kentucky

## Policies

**Net Metering and Interconnection:** Kentucky requires investor-owned utilities (IOUs), with the exception of Tennessee Valley Authority (TVA) distribution utilities, and rural electric cooperatives to offer single bi-directional net metering, for most conventional renewable energy systems up to 30 kW in capacity. Any net excess generation (NEG) is credited on the customer's next billing cycle at the utility's retail rate and carries forward indefinitely. Once the aggregate amount of capacity for net metered systems reaches 1% of a utility's single hour peak load, the obligation to offer net metering becomes limited. Kentucky requires IOUs and electric cooperatives operating in Kentucky, with the exception of TVA, to establish a two-tiered system for the interconnection of net metered systems.

**Grants:** The Office of Agriculture Policy developed the On-Farm Efficiency & Production Incentives Program with funding from the 2009 American Recovery and Reinvestment Act (ARRA). Incentives are available for on-farm biomass energy crop production and equipment for on-farm energy production.

**Tax Incentives:** Kentucky offers personal and corporate state income tax credits for solar, wind and geothermal systems, of \$3/W DC for photovoltaic systems and 30% of the eligible costs for other systems. Excess credit may be carried forward one year. For the personal tax credit, the maximum credit is \$250 for the installation of geothermal systems, and \$500 for solar hot water, wind, and photovoltaic energy systems. For the corporate tax credit, the maximum credit is \$1,000 for installations on multi-family residential rental units or commercial property and \$500 for single family residential rental units.

Under Kentucky's Incentives for Energy Independence Act, companies that build or renovate renewable energy facilities are eligible for (1) a sales and use tax incentive of up to 100% for the materials, machinery and equipment used to construct the project, (2) a wage assessment of up to 4% for associated employees, and (3) an income or limited liability entity tax incentive of up to 100%. Solar power systems must generate at least 50 kW of electricity and be sold to an unrelated party, while other eligible renewable energy systems must generate at least 1 MW of electricity and be sold to an unrelated party. The company must invest a minimum of \$1 million in the project, and the credits it receives must not exceed 50% of the capital investment.

Biodiesel producers or blenders may qualify for an income tax credit of \$1.00 per gallon of B100 or renewable diesel produced or used in the blending process. Unused credits may not be carried forward. Ethanol producers may qualify for an income tax credit of \$1.00 per gallon of ethanol produced.

Businesses that construct, retrofit or upgrade alternative fuel production or gasification facilities may qualify for tax incentives to recover up to 50% of their capital investment. These include (1) a refund of up to 100% for state sales tax on personal property used to construct the facility, (2) a credit of up to 100% of the state income tax and limited liability entity tax that the project generates, (3) an up to 4% wage assessment of those employed in the construction, retrofit, upgrade and operation of the facility, and (4) a credit for up to 80% of the severance tax paid for fossil fuel liquids used as a feedstock.

# Renewable Energy in Louisiana

## Summary

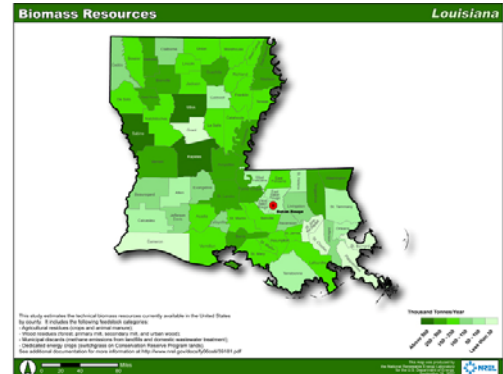
Louisiana has viable resources for solar and biomass which, combined with its tax incentives and supportive net metering program, provide opportunities for renewable energy expansion. In order to further diversify its energy portfolio, the state has authorized analysis of its offshore wind resources to determine the viability of installing offshore wind turbines. The state is also conducting a pilot program to determine the feasibility of implementing a renewable portfolio standard.

| Installed Renewable Energy Capacity, 2011 |        |               |                |
|-------------------------------------------|--------|---------------|----------------|
| Wind                                      | 0 MW   | Ocean         | 0 MW           |
| Solar Photovoltaic                        | 13 MW  | Biomass Power | 366 MW         |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 2 mGy          |
| Geothermal                                | 0 MW   | Biodiesel     | 94 mGy         |
| Hydropower                                | 192 MW | <b>Totals</b> | 572 MW; 96 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Louisiana is home to operating pilot and demonstration-scale cellulosic ethanol projects that are used to test different feedstocks for process optimization, including energy crops, wood waste, and sugarcane bagasse.
- Once it becomes operational in early 2013, a facility at the Port of Greater Baton Rouge will produce 450,000 metric tons of wood pellets per year for use in electricity generation in Europe.
- In July 2011, Louisiana State University received a \$997,000 award from the Department of Energy to evaluate the technical and economic feasibility of geothermal technologies that increase heat extraction.



**Biomass Resources-** Dark green indicates a strong resource potential. Biopower could produce as much as 14,873 GWh per year in Louisiana.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 34,289              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$407.7m, 1/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals   |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$238.1m            |
| 1603 Cash Grant Program                                             | \$8.5m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Solar Resources-** With an estimated 50,000 km<sup>2</sup> of land available, Louisiana has the technical potential to install 2,394 GW of rural utility-scale photovoltaics.

# Louisiana

## Policies

**Net Metering and Interconnection:** Louisiana requires all utilities to offer net metering and interconnection standards to customers generating electricity from solar, wind, hydropower, geothermal or biomass systems. Residential systems must not exceed 25 kW and commercial systems must not exceed 300 kW. Utilities must provide a bi-directional meter, and any net excess generation (NEG) is credited to the customer's next bill indefinitely. The customer is responsible for fees associated with the interconnection and installation of the meter to measure the flow of electricity in both directions. The Public Service Commission does not regulate municipal utilities, but they are required to develop their own net metering programs based on the statute. Interconnection standards are applicable for net metered systems.

**Tax Incentives: Personal and Corporate Tax Credits** – Louisiana offers a tax credit equal to 50% of the first \$25,000 of the cost of a solar (thermal and electric) or wind energy systems installed at a residence or rental apartment complex. There is a maximum incentive of \$12,500 per installed system. The credit may be applied to personal, corporate, or franchise taxes, depending on the purchaser of the system. Excess credit is refundable.

*Property Tax Exemptions* – Any solar energy equipment attached to a house for heating and cooling is considered personal property and is exempt from ad valorem taxation.

*Sales and Use Tax Credit* – Companies that manufacture, produce or extract unblended biodiesel may be exempt from paying sales and use taxes on certain property and equipment.

*Green Jobs Tax Credit* – Corporate or income tax credits are available for alternative fuel projects, worth 10% to 25% of project costs (up to \$1 million per project). Companies may qualify for an additional 10% tax credit on the payroll if they meet certain employment requirements.

**Loan Program:** The Louisiana Department of Natural Resources (DNR) offers five-year loans for homeowners to improve the energy efficiency of their existing home, which includes installation of solar PV, solar heating systems, and geothermal heat pumps. The DNR subsidizes half of the financing at a low interest rate to participating lenders for up to five years, up to a maximum DNR subsidy of \$6,000.

**Renewable Energy Pilot Program:** Louisiana is conducting a pilot program to determine the feasibility of a renewable portfolio standard in the state. There are two components of the program, the Research Component and the Request for Proposals (RFP) Component. The Research Component requires investor-owned utilities (IOUs) to develop a minimum of three renewable energy projects, which are either self-built or acquired through a standard offer tariff option. For the standard offer option, utilities must develop a tariff and associated contract to purchase renewable energy for avoided cost plus \$0.03 per kWh for five years (after which the project developer will continue to receive avoided cost payments). Utilities may not purchase more than 5 MW from a single project and each utility may not exceed 30 MW of contracted projects. The RFP Component requires IOUs and cooperative utilities to issue RFPs to acquire 350 MW total of new renewable energy projects that come online between 2011-2014, with contracts offered for 10 to 20 years. Projects that supply to IOUs must deliver at least 2 MW and projects that supply to co-ops must deliver at least 1 MW.

**Renewable Fuel Standard:** Louisiana mandates that at least 2% of the total gasoline sold by volume in the state must come from denatured ethanol once the monthly production of denatured ethanol produced in the state equals or exceeds a minimum annualized production volume of 50 million gallons. In addition, the state mandates that at least 2% of the total diesel sold by volume in the state must come from biodiesel produced from domestically grown feedstock once the monthly production of biodiesel equals or exceeds a minimum annualized production volume of 10 million gallons. Blenders and retailers have six months to meet these standards once the monthly production thresholds are met.



# Renewable Energy in Maine

## Summary

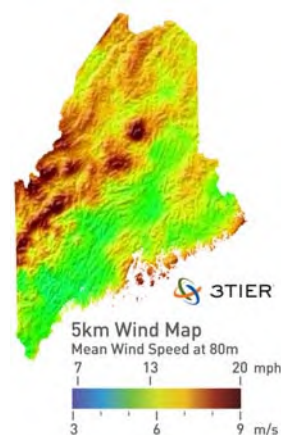
Maine is endowed with plentiful bioenergy, on and offshore wind, hydropower, and ocean energy resources, rendering it New England's largest renewable energy producer. Non-hydro renewables are responsible for 27% of in-state generation, the highest amount of any other state. Through sustained research and development, supportive policies, and eased permitting requirements, the state is developing strong, nationally-recognized markets. Notably, offshore renewable energy development could create hundreds of megawatts of clean energy to meet both mainland demand and the demand of Maine's numerous offshore islands.

| Installed Renewable Energy Capacity, 2011 |        |               |                 |
|-------------------------------------------|--------|---------------|-----------------|
| Wind                                      | 397 MW | Ocean         | 0.06 MW         |
| Solar Photovoltaic                        | 1 MW   | Biomass Power | 768 MW          |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 0 mGy           |
| Geothermal                                | 0 MW   | Biodiesel     | 2 mGy           |
| Hydropower                                | 733 MW | <b>Totals</b> | 1,899 MW; 2 mGy |

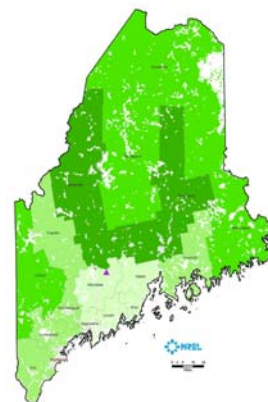
Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Maine is committed to transforming its traditional logging industry into a sustainable bioenergy industry. Many biomass generation facilities are housed in the state, a majority of which use forestry residue as feedstock.
- Maine is home to the first tidal energy device in North America to generate electricity for the power grid. The turbine is stationed on the bottom of Cobscook Bay and can generate enough electricity to power 30 homes.
- A Norwegian oil company has requested a commercial lease to build an offshore, floating wind farm with a capacity of 12 MW.



**Wind Resources-** Maine's substantial offshore wind resource has the technical potential to generate 631,960 GWh. Onshore, the state could produce 28,743 GWh from 2,250 km<sup>2</sup> of windy land.



**Biomass Resources-** Dark green indicates excellent potential from forestry residues. Biopower in Maine has the potential to generate 4,398 GWh.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 13,925              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$195.0m, 3/5 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$6.1m, 2/2 deals   |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$237.8m            |
| 1603 Cash Grant Program                                             | \$258m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.

# Maine

## Policies

**Renewable Portfolio Standard:** Maine's Renewable Resource Portfolio requirement requires investor-owned utilities (IOUs) and retail electric suppliers, which together cover over 98% of the load, to supply at least 40% of their total retail electric sales from renewable energy and certain energy efficiency resources by 2017, of which 10% must be from "Class I resources" constructed after 2005 (which, unlike "Class II resources," does not include municipal solid waste facilities, combined heat and power (CHP) systems, and hydropower facilities that do not pass fish passage requirements). To qualify, electricity must be generated by a facility no greater than 100 MW (excluding new wind, which may exceed this requirement). Additionally, Maine passed a law to have 8,000 MW of wind power by 2030 (with an interim goal of 2,000 MW by 2015), 5,000 MW of which must come from coastal waters or offshore.

Utilities may pay an alternative compliance payment (ACP) if they do not meet portfolio requirements. ACP income supports the Renewable Resource Fund, the state's public benefits fund, and was set at \$62.10 per MWh in 2011.

**Net Metering and Interconnection:** All of Maine's electric utilities must offer net metering for individual customers. IOUs must offer net metering to eligible facilities with capacity limits up to 660 kW, while municipal utilities and electric cooperatives must provide net metering to customer-generators up to 100 kW. Net excess generation is credited to the customer's next bill at the retail rate for up to 12 months, at which point any remainder is granted to the utility. Shared net metering is allowed if customers share the costs of the facility and the resulting benefits. Interconnection standards apply to all transmission and distribution utilities in the state and are based on the Interstate Renewable Energy Council's model interconnection standards. There are four levels of review, depending on system size and use. No size limit is specified.

**Rebate Program:** Through the Solar and Wind Energy Rebate program, Maine offers a maximum incentive up to \$2,000 and \$4,000 for residential and commercial respectively, for solar water heat, solar space heat, PV and wind. The program is funded through an assessment on the state's utilities of up to 0.005 cents/kWh and with money allocated from the American Recovery and Reinvestment Act (ARRA), for a total of \$1 million annually.

**Public Benefit Fund:** Maine's Renewable Resource Fund is a voluntary program allowing customers to contribute to a fund via their monthly electric bill, which supports renewable energy and energy efficiency projects. The fund supports grants for renewable energy research and development, and demonstration projects.

**Production Incentive:** The community-based Renewable Energy Pilot Program offers two incentive options for locally owned renewable energy systems that are no larger than 10 MW. Up to 50 MW of generating capacity is permitted under the program, and 10 MW is reserved for both small program participants and participants who are customers of cooperative transmission and distribution utilities. Two incentive options are available under the program. (1) Generators can enter into an up to 20-year contract with IOUs for the purchase of their energy, capacity resources or renewable energy credits (RECs). The contract price for large generators (1 MW or greater) is the lesser of \$0.10/kWh or the cost of the project, and the incentive for small generators (less than 1 MW) is \$0.10/kWh. (2) Program participants may sell their community-based generated RECs for 150% of the cost of the electricity.

**Tax Incentives:** Biofuel producers may qualify for an income tax credit of \$0.05 per gasoline gallon equivalent of biofuel produced. Unused credits may be carried over for up to ten taxable years.

Individuals that produce biodiesel for personal use or for family members are exempt from the state fuel excise tax.

# Renewable Energy in Maryland

## Summary

Maryland is seeking to diversify its electricity portfolio through increased wind and solar power generation, which show strong potential in the state. With its solar generation requirement and the capability of meeting two-thirds of the state's total energy demand through offshore wind, Maryland is positioned to meet its renewable portfolio standard of 20% by 2022. Maryland also boasts numerous tax incentives and rebates at the state and local levels designed to increase residential and commercial-sited renewable energy generation.

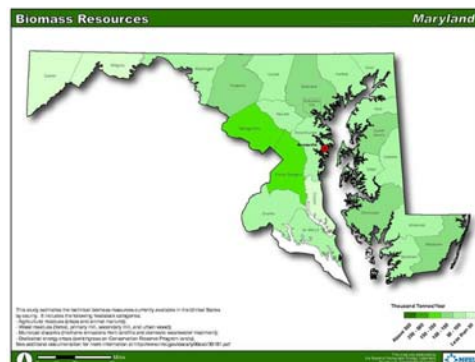
### Installed Renewable Energy Capacity, 2011

|                            |        |               |               |
|----------------------------|--------|---------------|---------------|
| Wind                       | 120 MW | Ocean         | 0 MW          |
| Solar Photovoltaic         | 37 MW  | Biomass Power | 163 MW        |
| Concentrated Solar Thermal | 0 MW   | Bioethanol    | 0 mGy         |
| Geothermal                 | 0 MW   | Biodiesel     | 8 mGy         |
| Hydropower                 | 551 MW | <b>Totals</b> | 871 MW; 8 mGy |

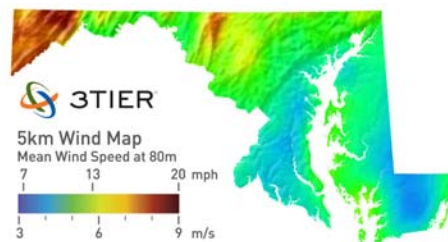
Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- A renewable energy developer has begun construction on the largest solar photovoltaic system in Maryland. The 23.5 MW project will be located at a state prison and is planned for completion by the end of 2012. The owner of the project is expected to pay \$460,000 in annual land lease payments to the state.
- Several facilities produce electricity and fuel from Maryland's waste products. The state's largest waste-to-energy plant in Montgomery processes an average of 1,500 metric tons per day of solid waste.
- As a member of the Atlantic Offshore Wind Consortium, a group of states working with the U.S. Department of the Interior to develop offshore wind off the Atlantic coast, and the developer of a regional offshore wind memorandum of understanding with neighboring states, Maryland has shown great initiative in facilitating developer interest in offshore wind projects.



**Biomass Resources-** The brightest green indicates resources of 150-250 thousand metric tons per year. The state has the technical potential to generate 3,329 GWh from biopower.



**Wind Resources-** With an estimated 10,382 km<sup>2</sup> available for offshore installations, Maryland has the potential to generate over 200,000 GWh from its wind resource.

## Economic Development

| Employment                                                          |                      |
|---------------------------------------------------------------------|----------------------|
| Green Goods and Services Jobs, 2010                                 | 87,408               |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                      |
| Asset Finance, 2010-2011                                            | \$203.9m, 3/11 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$1.4m, 1/2 deals    |
| Recovery Act Funding (Total Awarded)                                |                      |
| Energy Contracts, Grants & Loans                                    | \$511.7m             |
| 1603 Cash Grant Program                                             | \$102.7m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.

# Maryland

## Policies

**Renewable Portfolio Standard (RPS):** Maryland requires all electricity suppliers to use renewable energy sources to generate a minimum portion of their retail sales. By the end of 2022, retail sales must reach a level of 18% from Tier 1 resources (which include most traditional renewable electricity sources as well as biomass thermal energy), and an additional 2% from solar energy (the 2% solar mandate must be met by 2020). The mandate for Tier 2 resources (large hydroelectric power) is 2.5% through 2018, after which they no longer qualify for compliance. Electricity suppliers purchasing solar renewable energy credits (SRECs) directly from a solar energy system owner must enter into a contract for at least 15 years if the system is over 10 kW. Utilities that fail to meet compliance standards must pay a price per kWh which corresponds to the category the supplier fails to meet.

**Net Metering and Interconnection:** Maryland requires all utilities to offer net metering to their customers until statewide aggregate capacity of all net metered systems reaches 1,500 MW. Most conventional renewable energy systems are eligible as long as system capacity is under 2 MW, except for micro-CHP resources, which are limited to 30 kW. Net excess generation (NEG) is carried over to the customer's next bill at the utility's retail rate, until the end of a 12-month billing cycle when the customer receives compensation for remaining NEG at the commodity energy supply rate. Meter aggregation is allowed for farms/agriculture, non-profits, and municipal governments. Maryland's rules for interconnection include provisions for systems of up to 10 MW. There are four levels of review based on the system size and usage.

**Rebates and Grants:** Maryland's Windswept Program offers rebates for wind systems up to 750 kW of \$3,000 per kW. The maximum incentive is the lesser of \$100,000 or 50% of net installation costs after incentives.

Maryland's solar energy grant program offers rebates for residential and non-residential solar PV systems (that are up to 20 kW and 200 kW in capacity, respectively) and solar water heating systems. Solar PV grants are awarded at \$1,000 for residential systems and \$30-60 per kW for non-residential systems (depending on total capacity) and solar water heating grants are awarded at \$500 per installation for residential systems and \$10-20 per square foot for non-residential systems (depending on total panel area).

Maryland offers rebates for residential geothermal heat pumps of \$3,000 per project and non-residential heat pumps of \$90-180 per ton, for a maximum of \$4,500 per project.

The Clean Burning Wood Stove Grant program offers grants of \$400 for stick burning wood stoves and \$600 for pellet burning wood stoves.

**Tax Incentives:** Maryland offers a broad array of tax incentives to benefit most renewable energy technologies, which include: a full sales and use tax exemption for solar, wind, wood heating and geothermal heat pump equipment; a sales and use tax exemption for the sale of electricity from solar and wind systems to residential customers; a full property tax exemption for solar and wind systems; a state income tax for 10% of qualified research and development expenses for cellulosic ethanol technology; and a personal or corporate income tax credit for bio-heating oil of \$0.03 per gallon. The state also provides personal and corporate income tax credits of \$0.0085 per kWh for electricity generated from renewable energy systems (or \$0.005/kWh for co-fired electricity). The program has a maximum incentive of \$2.5 million of total credits during a five-year period.

**Loans:** The Jane E. Lawton Conservation Loan Program (JELLP) provides loans to install cost-effective renewable energy systems. The revolving loan program allots up to \$500,000 per loan at a 2.5% interest rate (with a payback of 10 years or less) for non-residential renewable energy systems. The program has a \$1.75 million budget for 2013.

**Production Incentive:** Ethanol and biodiesel producers may qualify for production incentives of \$0.20 per gallon of ethanol from small grains, \$0.05 per gallon of ethanol produced from other agricultural products, \$0.20 per gallon of biodiesel produced from soybean oil, or \$0.05 per gallon for biodiesel produced from other feedstocks.

# Renewable Energy in Massachusetts

## Summary

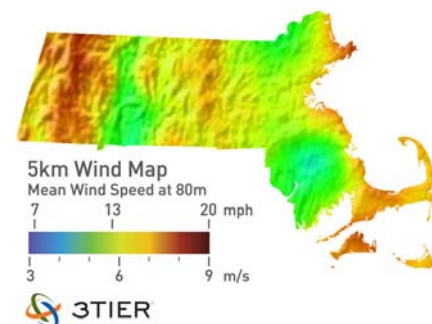
With a combination of steady investments from the private sector and broad and diverse policy measures such as the target to cut greenhouse gas emissions to 25% below 1990 levels by 2020, Massachusetts has become an early leader in clean energy research and innovation. The state is host to multiple renewable energy resources, including offshore wind and ocean power. By further leveraging its scientific expertise, academic and innovation resources, highly educated workforce, cutting-edge cleantech businesses, and institutional and financial services assets, Massachusetts can continue to advance its renewable energy economy.

| Installed Renewable Energy Capacity, 2011 |        |               |                 |
|-------------------------------------------|--------|---------------|-----------------|
| Wind                                      | 46 MW  | Ocean         | 0 MW            |
| Solar Photovoltaic                        | 75 MW  | Biomass Power | 367 MW          |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 0 mGy           |
| Geothermal                                | 0 MW   | Biodiesel     | 0.5 mGy         |
| Hydropower                                | 272 MW | <b>Totals</b> | 759 MW; 0.5 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Massachusetts is a global hub for the research and innovation of high-tech renewable energy technologies. R&D organizations and leading university researchers are engaged in energy sciences research, next-generation project development, and other cleantech innovation.
- Although it has received all required permits, offshore wind project Cape Wind continues to face legal and financial challenges delaying its construction. Although its price tag exceeds \$2 billion, a report released in early 2012 claims the project would reduce the price of electricity in the New England region by more than \$7 billion over 25 years (Charles River Associates). In addition, two other developers have announced plans to build offshore wind farms off the state's coast.
- Due to its strong solar incentives, Massachusetts added 18.2 MW of solar energy in the first quarter of 2012 alone, the fifth most of any other state (Solar Energy Industries Association).

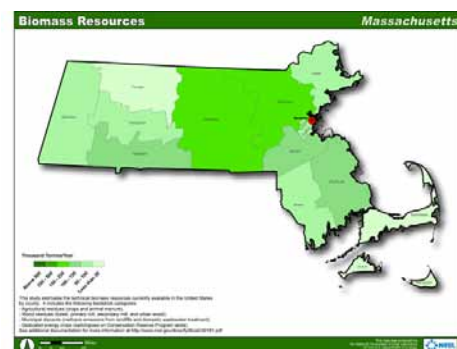


**Wind Resources-** Massachusetts' onshore wind resource is limited, but offshore, the state has the technical potential to generate nearly 800,000 GWh from wind power.

## Economic Development

| Employment                                                          |                       |
|---------------------------------------------------------------------|-----------------------|
| Green Goods and Services Jobs, 2010                                 | 79,307                |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                       |
| Asset Finance, 2010-2011                                            | \$91.0m, 3/20 deals   |
| Venture Capital & Private Equity, 2010-2011                         | \$261.3m, 21/21 deals |
| Recovery Act Funding (Total Awarded)                                |                       |
| Energy Contracts, Grants & Loans                                    | \$542.8m              |
| 1603 Cash Grant Program                                             | \$125.7m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Massachusetts has biomass resources throughout the state from the forestry and agricultural sectors. Bright green indicates a moderate potential.



# Massachusetts

## Policies

**Renewable Portfolio Standard (RPS):** Massachusetts mandates that investor-owned utilities (IOUs) and retail suppliers, covering 86% of the load, procure 15% of their electricity supply from new renewable energy resources (Class I) by 2020 and 7.1% from existing renewable energy resources (Class II) in 2009 and thereafter. Class I requirements include a carve-out for retail suppliers to build 400 MW of in-state solar photovoltaics. Class II requirements include a waste energy minimum standard of 3.5% each year. Compliance is demonstrated through the purchase of renewable energy credits (RECs), or solar renewable energy credits (SRECs) to meet the solar carve-out for the Class I requirement. Retail suppliers that do not comply may make alternative compliance payments at a higher rate than the cost of RECs and SRECs.

**Solar Renewable Energy Credits (SRECs):** Unlike SREC programs in other states, Massachusetts' program creates a price cap and floor to allow long-term project financing based on SREC revenue and contains self-correcting adjustments to prevent market oversupply.

**Net Metering and Interconnection:** Net metering rules apply only to the state's investor-owned utilities, although municipal utilities may offer net metering voluntarily. The aggregate capacity of net metering is limited to 6% of each utility's peak load, with half allocated for private entities and the other half for government and municipal entities. There are different net metering categories for systems under 60 kW, systems between 60 kW and 1 MW, and systems between 1 MW and 2 MW that generate electricity from agricultural projects, solar energy or wind energy. "Neighborhood net metering" is offered for facilities owned by groups of ten or more residential customers. Treatment of net excess generation (NEG) varies by facility class and customer type. Massachusetts's interconnection standards apply to the state's four IOUs, with three levels of review. According to legislation in August 2012, the Massachusetts Department of Public Utilities must develop an interconnection timeline for distributed generation facilities, which it must complete by November 2013.

**Public Benefit Fund:** The Renewable Energy Trust Fund provides grants, contracts, loans, equity investments, energy production credits, bill credits, and rebates to support renewable energy. It is funded by a systems benefit charge of \$0.0005 per kWh, and its annual budget is \$23 million.

**Tax Incentives:** *Personal Tax Credit* – The state offers an income tax credit of 15% (up to \$1,000) for the net expenditure of a renewable energy system installed on a primary residence. Excess credit can be carried forward three years.

*Property Tax Exemption* – A 20-year, local property tax exemption is offered for the value added by solar and wind energy systems.

*Renewable Energy Equipment Sales Tax Exemption* – Massachusetts provides a state sales tax exemption for solar power, wind power, and heat pump equipment used on residences.

*Excise Tax Incentives* – Businesses may deduct the amount paid to purchase or install a solar or wind climate control system from their net income for state excise tax purposes, and are not taxed under the tangible property measure of the state's corporate excise tax.

*Industry Support* – Massachusetts offers personal and corporate income tax deductions for income received from the sale or lease of a renewable energy patent or associated royalty income.

*Cellulosic Biofuel Tax Exemption* – Cellulosic ethanol fuel blends may qualify for an exemption from the \$0.21 per gallon fuel tax.

**Rebates and Grants:** Massachusetts offers rebates of up to \$4 per watt (with a maximum of \$130,000) for the design and construction of customer-sited small wind public projects and \$5.20 per watt (with a maximum of \$100,000) for non-public projects between 1 kW and 99 kW in capacity. Ninety percent of the rebate amount is paid up front and 10% is paid after one year of reporting. The state also provides rebates of \$0.40-\$0.85 per watt, or a maximum of \$4,250 for the installation of grid-tied PV systems. Grants are also made available for waste energy, solar hot water, and hydropower projects.

**Renewable Fuel Mandate:** Massachusetts mandates that all diesel fuel and other fuel used to operate motor vehicle diesel engines must contain 5% renewable diesel fuel by 2013.



# Renewable Energy in Michigan

## Summary

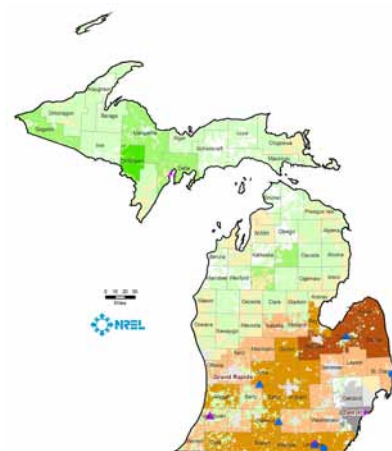
A skilled workforce, supportive policies, and significant renewable energy resource development have positioned Michigan to become an important U.S. hub for clean energy production. Michigan's incentives rank among the most effective in the country for attracting clean energy manufacturing and R&D. According to a study released in early 2012 by the Michigan Public Service Commission, the state's renewable portfolio standard has led to more than 100 MW of added renewable capacity, \$100 million in investments, and has significantly reduced the cost of new, renewable energy since 2008.

| Installed Renewable Energy Capacity, 2011 |        |               |                   |
|-------------------------------------------|--------|---------------|-------------------|
| Wind                                      | 377 MW | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 9 MW   | Biomass Power | 476 MW            |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 268 mGy           |
| Geothermal                                | 0 MW   | Biodiesel     | 50 mGy            |
| Hydropower                                | 383 MW | <b>Totals</b> | 1,245 MW; 318 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Michigan's wind market has grown from 2.6 MW in 2006 to 487 MW in mid-2012. The 213 MW Gratiot County Wind Project became operational in Summer 2012 and generates enough electricity to power more than 50,000 Michigan homes.
- Michigan invests in research and development programs that support growing companies and create high-tech jobs. The state of Michigan and Michigan universities are presently establishing and conducting R&D programs with the state's bioenergy, solar, wind, and other companies, often in collaboration with the U.S. Department of Energy and its National Laboratories.
- At least six anaerobic digestion facilities have been set up at dairy and swine farms in the state, with a joint capacity of 3.7 MW.

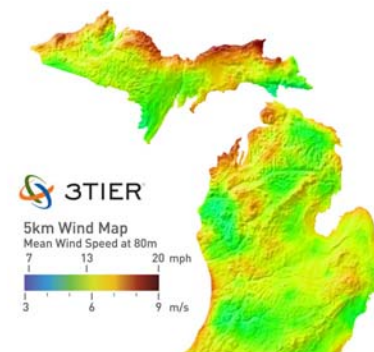


**Biomass Resources-** Dark brown and dark green indicate excellent potential from crop and forestry residue. Michigan's total estimated technical potential for biopower reaches nearly 12,000 GWh.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 79,771              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$304.3m, 2/9 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$27.7m, 4/4 deals  |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$1.7bn             |
| 1603 Cash Grant Program                                             | \$133.4m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources-** Michigan's offshore wind potential is estimated to be 1,739,801 GWh, while its onshore technical potential is 143,908 GWh.

# Michigan

## Policies

**Renewable Portfolio Standard (RPS):** Michigan's RPS requires all electricity providers in the state to provide 10% of their electricity using eligible renewable energy resources by 2015. The state's two largest investor-owned utilities (IOUs) – Detroit Edison and Consumers Energy – have additional capacity requirements of 500 MW and 600 MW for new renewables by 2015, respectively. The RPS allows utilities to use energy efficiency and advanced cleaner energy systems (including gasification, industrial cogeneration and clean coal facilities) to meet a limited portion of their obligations. Compliance can be met by purchasing renewable energy credits (RECs) with or without the associated renewable energy. Bonus credits are given for electricity generated by certain types of energy systems, including solar power systems, systems that generate electricity at peak demand times or store it during off-peak times, and systems that use equipment made in Michigan. Voters will decide whether or not to raise the RPS to 25% by 2025 in the November 2012 general election.

**Net Metering and Interconnection:** Michigan's net metering law applies to IOUs, cooperatives and alternative retail suppliers. All qualifying customer generators up to 20 kW are eligible for "true" net metering and most systems between 20 kW and 150 kW qualify for "modified" net metering. Net metering is available until aggregate capacity reaches 0.75% of a utility's peak load. For true net metering, net excess generation (NEG) during a billing period may be carried forward indefinitely to the next billing period at the power supply component of the retail rate. Modified net metering allows NEG carry-over only for the power supply component of the retail rate. System owners retain RECs associated with onsite production. Michigan's rules for interconnection include provisions for five levels of interconnection, with no limit on system size.

### Tax Incentives:

- Non-refundable business activity credit for businesses engaged in the research, development, or manufacture of alternative energy technologies;
- Refundable payroll tax credit for businesses located in the "NextEnergy Zone" (located in Detroit) engaged in the research, development, or manufacture of alternative energy technologies;
- Refundable tax credit equal to 25% of the capital costs of building a PV manufacturing facility (one credit is provided for up to \$25 million, others are provided up to \$15 million);
- Personal property tax exemption for alternative energy systems of 2 MW or less that use a single technology, or 10 MW or less that use a combination of technologies, and a 100% property tax exemption for biomass gasification and methane digesters at farms;
- Property tax exemption for industrial property used for high tech activity (including the development of advanced vehicle technologies) or the creation or synthesis of biodiesel fuel;
- Property tax exemption for qualified alternative fuel vehicles;
- Reduced gasoline tax of \$0.12 per gallon for gasoline containing at least E70 or B5.

**Renewable Energy Renaissance Zones (RERZ):** Michigan enacted legislation in 2006 allowing for the creation of 15 RERZs, five of which will focus on the production of cellulosic fuels. Renewable energy facilities within these zones – including generation facilities and facilities that focus on research, development or manufacturing – are exempt from the corporate income tax, state education tax, personal and property taxes and local income taxes (where applicable), for a period of up to 15 years.

**Public Benefit Fund:** The Low-Income and Energy Efficiency Fund (LIEEF) issues requests for proposals for prospective projects, which includes renewable energy projects. Total annual funding for the public benefit fund amounts to around \$89 million annually, collected as surcharges on the electric utilities' distribution rates.

**Grants:** The Michigan Biomass Energy Program (MBEP), funded by the U.S. Department of Energy's State Energy Program, provides competitive grant opportunities for state bioenergy and biofuels projects.

**Loans:** The Energy Efficiency and Renewable Energy Revolving Loan Fund provides loans for advanced manufacturing (up to \$2,000,000 for up to six years with a 6% interest rate), nonprofit and agricultural passive solar systems (between \$5,000-\$15,000 for six years at 4%), as well as other technologies.



# Renewable Energy in Minnesota

## Summary

Minnesota has been diligent in providing tax incentives, loans, and grants that help support its ranking as a top five ethanol-producing state. Minnesota has also been successful in developing a mature wind power industry, mandating that most of its 30% renewable portfolio standard be supplied by wind. With continued policy support, the state's wind, solar, and bioenergy markets hold potential for further growth.

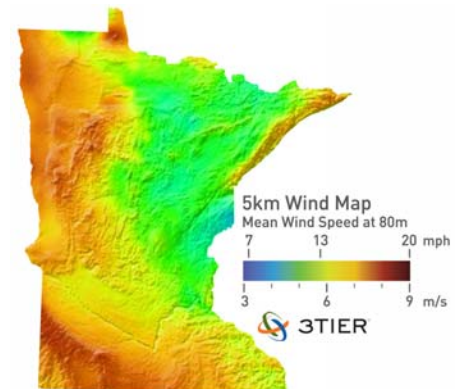
### Installed Renewable Energy Capacity, 2011

|                            |          |               |                           |
|----------------------------|----------|---------------|---------------------------|
| Wind                       | 2,733 MW | Ocean         | 0 MW                      |
| Solar Photovoltaic         | 5 MW     | Biomass Power | 486 MW                    |
| Concentrated Solar Thermal | 0 MW     | Bioethanol    | 1,147 mGy                 |
| Geothermal                 | 0 MW     | Biodiesel     | 66 mGy                    |
| Hydropower                 | 213 MW   | <b>Totals</b> | <b>3,437 MW; 1,213mGy</b> |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- According to a report by the Minnesota Department of Agriculture, the state's 21 ethanol plants generated more than \$5 billion in total economic activity in 2011 and supported more than 12,600 jobs.
- Minnesota added 542 MW of wind power in 2011 and currently ranks fifth in the nation for installed wind capacity. In addition, a number of facilities in the state manufacture components for the wind industry.
- University researchers in Minnesota are engaged in the innovation of wind, solar, bioenergy, geothermal, and energy storage technologies. The Initiative for Renewable Energy and the Environment (IREE) supports innovative renewable energy and environmental research and demonstration projects at the University of Minnesota.

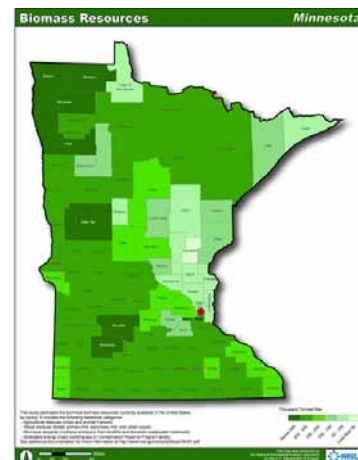


**Wind Resources-** Minnesota has the onshore wind resource to generate 1,428,525 GWh. Offshore, the state has the resource potential to generate an additional 100,455 GWh.

## Economic Development

| <b>Employment</b>                                                          |                      |
|----------------------------------------------------------------------------|----------------------|
| Green Goods and Services Jobs, 2010                                        | 69,736               |
| <b>Private Sector Investment (Disclosed Amount, Disclosed/Total Deals)</b> |                      |
| Asset Finance, 2010-2011                                                   | \$741.5m, 6/17 deals |
| Venture Capital & Private Equity, 2010-2011                                | \$32.7m, 12/12 deals |
| <b>Recovery Act Funding (Total Awarded)</b>                                |                      |
| Energy Contracts, Grants & Loans                                           | \$272.7m             |
| 1603 Cash Grant Program                                                    | \$377.5m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Minnesota has the potential to generate 21,391 GWh from biopower. Darker green indicates a very good resource.

# Minnesota

## Policies

**Renewable Portfolio Standard (RPS):** Minnesota requires Xcel Energy, which covers about half the state's electric load, to generate 30% of retail sales from renewable energy sources by 2020. Of the 30% renewable energy required, at least 25% must be generated by wind or solar energy systems, with solar limited to no more than 1%. Minnesota also requires all other utilities to generate 25% of retail sales from renewable energy by 2025. The Public Utility Commission (PUC) is allowed a wide range of compliance penalties. These include imposing financial penalties and ordering the utility to construct facilities or purchase renewable energy.

**Net Metering and Interconnection:** Minnesota requires all investor-owned utilities (IOUs), municipal utilities, and electric cooperatives to provide net metering for customers with renewable energy systems less than 40 kW in capacity. There is no limit on statewide capacity, and customers have the option to have net excess generation (NEG) credited to their next bill or be compensated at the retail rate. Interconnection standards have been adopted by the PUC that establish an order of standards for utility tariffs for the interconnection and operation of distributed generation facilities up to 10 MW.

**Production Incentive:** Minnesota offers a payment of 1 to 1.5 cents per kWh for electricity generated by biomass and on-farm anaerobic digester facilities. It is funded by a required annual contribution from Xcel Energy until 2020, which is currently \$10.9 million.

**Tax Incentives:** Solar and wind energy systems are exempt from sales tax and property taxes. The land on which the systems are located remains taxable.

In place of a property tax on larger wind facilities, a production tax is in effect, tiered by system size.

Investments in qualified small businesses that use or develop proprietary cellulosic ethanol technology may qualify for a tax credit equal to 25% of the investment, up to \$250,000 annually.

**Loans:** The Minnesota Rural Finance Authority (RFA) provides a variety of loans for the agriculture sector for installations or improvements of renewable energy technology. The Agricultural Improvement Loan Program provides loans for improvements made to permanent structures including wind turbines, anaerobic digestion, and biomass facilities. Livestock producers can receive loans for biomass or anaerobic digestion process systems. Lastly, loans are available to help farmers finance the purchase of stocks in certain cooperatives, limited liability companies, or limited liability partnerships that produce a value added agricultural product. RFA works with individual financial institutions to provide these loans, and purchases up to 45% of the loan principal for each program.

The Sustainable Agriculture Revolving Loan program offers loans in amounts of up to \$40,000 per farm family, or up to \$160,000 available for joint projects, for on-farm energy production. Loans are up to seven years with a 3% fixed interest rate.

The Neighborhood Energy Connection provides low-interest loans of between \$2,000 and \$35,000 for renewable energy improvements at residential properties, with repayment terms varying between one and 20 years at a fixed interest rate of 5.75%.

The Minnesota Housing Finance Agency Fix-Up Fund offers low-interest fixed rate home improvement loans for renewable energy installations and energy efficiency improvements at residential properties. Loans range between \$2,000 and \$35,000.

**Grants:** Cellulosic transportation fuel production facilities may qualify for a grant to cover 50% of the cost of research, technical assistance, or production equipment for the facility, of up to \$500,000.

Fuel retailers that wish to install equipment to dispense E85 to the public may qualify for a grant worth 50% of eligible system costs.

**Renewable Fuel Mandate:** All diesel fuel sold or offered for sale in the state for use in internal combustion engines must contain at least 5% biodiesel, which will raise to 10% in May 2013. All gasoline sold or offered for sale in Minnesota must contain at least 10% ethanol, which will raise to 20% in August 2015.

**Community-Based Energy Development Tariff (C-BED):** Public utilities in Minnesota are required to create a 20-year power purchase agreement (PPA) for community-owned renewable energy projects.





# Renewable Energy in Mississippi

## Summary

Although the state lacks significant policy support for renewable energy development, Mississippi has attracted an array of cutting-edge renewable energy companies with its tax incentives and cheap loans. Mississippi's biomass resources are ranked sixth in the nation, yet remain largely untapped. As such, the state holds great potential for the expanded use of biomass power, combined heat and power, and production from next generation fuels such as cellulosic ethanol.

### Installed Renewable Energy Capacity, 2011

|                            |        |               |                 |
|----------------------------|--------|---------------|-----------------|
| Wind                       | 0 MW   | Ocean         | 0 MW            |
| Solar Photovoltaic         | 0.6 MW | Biomass Power | 244 MW          |
| Concentrated Solar Thermal | 0 MW   | Bioethanol    | 54 mGy          |
| Geothermal                 | 0 MW   | Biodiesel     | 116 mGy         |
| Hydropower                 | 0 MW   | <b>Totals</b> | 245 MW; 170 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

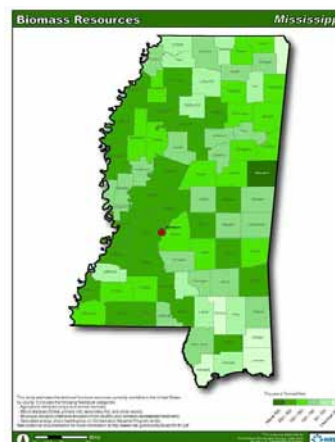
## Market

- Mississippi houses a number of biofuels facilities and is one of the top ten producers of biodiesel in the U.S. An advanced biofuels company chose Mississippi to be the site of its next generation bio-oil facilities, which will use wood waste to produce renewable crude oil.
- Due to the ease of doing business with the state, Mississippi has attracted a number of green tech companies to build manufacturing facilities.
- Two of Mississippi's largest biomass power plants are combined heat and power facilities that are located adjacent to paper and pulp mills. The facilities produce both electricity and heat by processing black liquor and/or wood residues from the mills.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 17,412              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$222.0m, 1/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals   |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$406.7m            |
| 1603 Cash Grant Program                                             | \$0.3m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Dark green indicates an above average resource potential of between 250 and 500 thousand metric tons of biomass per year. In total, Mississippi's biopower resource has the potential to produce 15,287 GWh.



**Solar Resources-** Rural utility-scale photovoltaic installations have an estimated technical potential to generate 4,981,252 GWh in Mississippi.

# Mississippi

## Policies

**Tax Incentives:** Mississippi's Clean Energy Initiative provides 10-year income, franchise, and sales and use tax exemptions. These exemptions apply to companies that manufacture systems or components used to generate renewable or alternative energy, including but not limited to, biomass, solar, wind and hydroelectric generation. In order to qualify, the company must invest at least \$50 million and create 250 full time jobs.

**Loans:** Mississippi's Energy Investment Loan Program offers low-interest loans for commercial and industrial renewable energy systems that reduce a facility's energy costs, ranging from \$15,000 to \$300,000. The program is supported by revolving loan fund of \$7 million, with interest rates of 3% below prime and a seven-year repayment term. The program is funded by oil overcharge restitution funds from the U.S. Department of Energy.

**Production Incentive:** Ethanol and biodiesel producers may qualify for payments of \$0.20 per gallon for up to ten years, capped at 30 million gallons per year per producer (or \$6 million).

# Renewable Energy in Missouri

## Summary

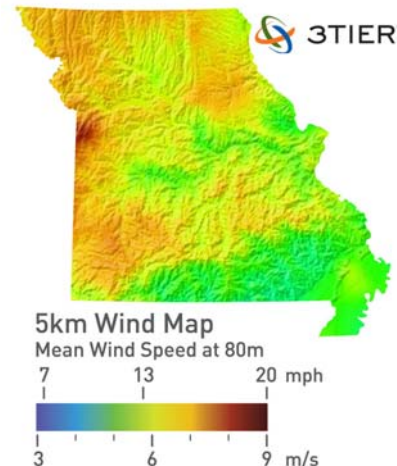
Although Missouri’s renewable energy industry is less developed than some of its neighboring states, it possesses an equally strong renewable energy resource potential. Missouri is particularly well suited for solar, wind, and bioenergy production. The state has enacted technologically diverse policies and tax incentives to help support the renewable energy industry’s advancement, especially through the provisions in its renewable energy portfolio standard and its biofuels incentives.

| Installed Renewable Energy Capacity, 2011 |        |               |                 |
|-------------------------------------------|--------|---------------|-----------------|
| Wind                                      | 459 MW | Ocean         | 0 MW            |
| Solar Photovoltaic                        | 2 MW   | Biomass Power | 8 MW            |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 251 mGy         |
| Geothermal                                | 0 MW   | Biodiesel     | 184 mGy         |
| Hydropower                                | 499 MW | <b>Totals</b> | 969 MW; 435 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- After adding a majority of its wind power capacity in the 2009 to 2010 period, Missouri has installed just 1.5 MW from 2011 to present (American Wind Energy Council).
- A number of facilities in Missouri produce biofuel from corn and vegetable oils. The state ranks third in biodiesel capacity nationwide. A few biodiesel facilities that experienced delayed operations a few years ago finally opened in the 2011-2012 timeframe due to improved economic and financial conditions.
- In 2011, the Optimal Development Solar Index ranked Missouri as the fourth-leading state with respect to the benefits that can potentially be gained by solar energy.

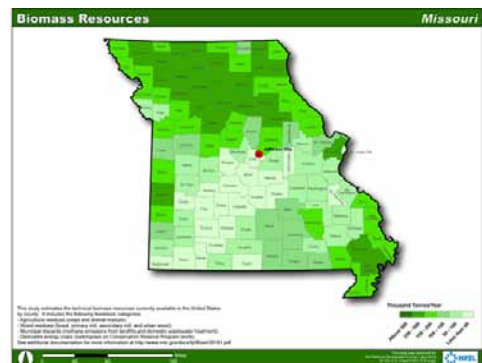


**Wind Resources-** With an estimated 54,871 km<sup>2</sup> of available land, Missouri has the technical potential to generate 689,519 GWh from its wind resource.

## Economic Development

| Employment                                                          |                   |
|---------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                 | 65,205            |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                            | \$0.0m, 0/0 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals |
| Recovery Act Funding (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                    | \$429.6m          |
| 1603 Cash Grant Program                                             | \$203.8m          |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Dark green indicates an above average resource potential of between 250 and 500 thousand metric tons of biomass per year. Missouri could generate as much as 13,986 GWh from biopower.

# Missouri

## Policies

**Renewable Portfolio Standard (RPS):** Missouri requires investor-owned utilities (IOUs), which cover 70% of the state's electric load, to achieve 15% electricity production from renewable sources by 2021, with 0.3% generated from solar. Eligible resources include electricity generated from solar thermal electric, PV, landfill gas, wind, biomass, certain municipal solid waste, anaerobic digestion, small hydroelectric (under 10 MW), and fuel cells using renewable fuels. Renewable energy credits (RECs) and solar renewable energy credits (SRECs) can be used for compliance for up to three years from the generation date. RECs created from in-state generation receive a multiplier of 1.25 compared to out-of-state generation. Utilities that do not comply are subject to penalties of at least twice the market value of RECs or SRECs.

The law also requires IOUs to offer rebates of at least \$2 per watt for customer-sited solar electric systems under 25 kW in capacity. Utilities are allowed to offer standard offer contracts for the purchase of SRECs from customer-owned systems.

**Net Metering and Interconnection:** Missouri requires all electric utilities to offer net metering to customers with eligible renewable energy systems up to 100 kW. Net metering is available until the aggregate generating capacity meets 5% of a utility's single-hour peak load (estimated from the previous year), or once the aggregate capacity for interconnection exceeds 1% of a utility's single-hour peak load for the previous calendar year. Net excess generation (NEG) is credited on a customer's next billing cycle at the utility's avoided-cost rate. At the end of a 12-month period, NEG not used by the customer is granted to the utility.

Investor-owned utilities are required to follow interconnection standards for net metered systems, which include simplified procedures and exempts systems from limited liability insurance.

**Tax Incentives:** The Wood Energy Tax Credit allows individuals or businesses processing Missouri forestry residues into energy a transferable income tax credit of \$5.00 per ton of processed material. The program is in effect until June 2013.

As part of the Enhanced Enterprise Zone program, new, expanded or replacement business facilities can receive a property tax abatement from the applicable local government authority if it is located in a designated "Renewable Energy Generation Zone." A full property tax exemption is available if the facility maintains at least 50 jobs.

**Loans:** The Missouri Energy Revolving Fund Loan Program, administered by the Division of Energy in the Missouri Department of Natural Resources (DNR), offers loans for solar electric and thermal, wind and biomass systems at public schools, universities, colleges, cities and counties. In 2012, loans of up to \$500,000 are available with a 2.5% interest rate and up to ten year repayment period.

**Production Incentive:** The Missouri Ethanol Producer Incentive Fund offers incentives for ethanol produced in the state by facilities that are at least 51% owned by agricultural producers and that use Missouri cereal grains as a feedstock. Incentives are equal to 20 cents per gallon for the first 12.5 million gallons and 5 cents per gallon for the next 12.5 million gallons. The maximum annual grant is \$3.125 million.

**Renewable Fuel Mandate:** Missouri mandates that all gasoline offered for sale at retail stations must contain at least 10% ethanol.

# Renewable Energy in Montana

## Summary

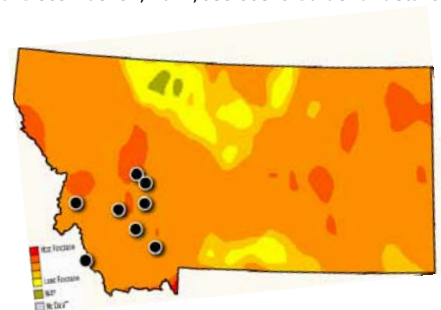
Montana benefits from strong wind speeds, electricity-grade geothermal resources, agricultural feedstocks for biomass, and suitable solar insolation for renewable energy development. A supportive policy portfolio aimed at increasing the state's movement toward a robust renewable energy economy complements its varied resource landscape, with a 15% renewable portfolio standard and an array of personal and corporate tax incentives that support the production of renewable electricity, fuels, and thermal energy. However, its current renewable energy portfolio consists primarily of hydro and wind power, and few of its other resources are being developed for large scale use.

| Installed Renewable Energy Capacity, 2011 |          |               |                 |
|-------------------------------------------|----------|---------------|-----------------|
| Wind                                      | 386 MW   | Ocean         | 0 MW            |
| Solar Photovoltaic                        | 0.70 MW  | Biomass Power | 0 MW            |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 0 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 0 mGy           |
| Hydropower                                | 2,585 MW | <b>Totals</b> | 2,971 MW; 0 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Developers are investing in the renovation and expansion of Montana's older hydropower plants to increase efficiency, improve water flow, and reduce environmental impact. The \$230 million expansion of the Rainbow Dam is expected to be complete by the end of 2012.
- Geothermal development in the state has mostly been limited to low-temperature (less than 100°C) near-surface geothermal resources used to heat buildings, grow plants in greenhouses, or heat water for aquaculture.
- Over one gigawatt of wind power projects are under development, including the 189 MW Rim Rock wind farm, which is expected to be operational by the end of 2012.

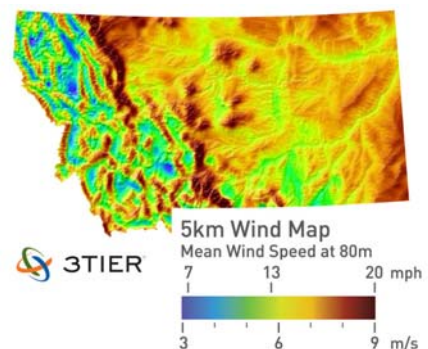


**Geothermal Resources-** Orange and red indicate an excellent and superb geothermal resource. Montana is home to 25,000 square miles of high-potential sites, the greatest of which are located at or northwest of Yellowstone National Park.

## Economic Development

| Employment                                                          |                   |
|---------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                 | 14,545            |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                            | \$0.0m, 0/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals |
| Recovery Act Funding (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                    | \$99.3m           |
| 1603 Cash Grant Program                                             | \$77.3m           |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources-** Montana has 188,801 km<sup>2</sup> of available windy land for small to commercial scale wind turbines, with the potential to produce 2,746,272 GWh.



# Montana

## Policies

**Renewable Portfolio Standard (RPS):** Montana requires investor-owned utilities (IOUs) and competitive electricity suppliers to acquire 15% of their retail electricity sales from renewable energy by 2015. Facilities must have begun operation after January 1, 2005, and must either be located in Montana or in a state that delivers electricity to Montana. Utilities and competitive suppliers can meet the standard by purchasing electricity bundled with renewable energy credits (RECs), purchasing the RECs separately, or a combination of both. To stimulate rural economic development, utilities must purchase the electricity output and RECs from community renewable energy projects under 25 MW, until they total 50 MW in the period 2012-2014 and total 75 MW after 2015.

**Net Metering and Interconnection:** Montana's net metering law requires all customers of IOUs that have renewable energy systems of up to 50 kW in capacity to have access to net metering at no cost to them. Only systems generating electricity that utilize solar, wind or small hydropower resources are eligible. No limit on enrollment or statewide installed capacity is specified. Net excess generation is credited to a customer's next bill at the retail rate, but granted to the utility at end of each 12-month billing cycle. Interconnection rules apply to the customers of utilities under the Montana Public Service Commission with systems up to 10 MW.

**Loans:** The Alternative Energy Revolving Loan Program provides loans for the installation of most renewable energy systems for on-site use. The 2012 fixed interest rate is set at 3.75% annually with a maximum loan term of 10 years, and a maximum loan amount of \$40,000.

**Tax Incentives:** Residential and non-residential structures are exempt from property tax resulting from the installation of a renewable energy system, based on an investment of \$20,000 for single family and \$100,000 for multi-family and non-residential structures, for ten years post-installation.

New electricity generating facilities under 1 MW are exempt from property taxes for five years after the system's installation. New or expanded energy generation facilities over 1 MW are eligible for a 50% property tax reduction for five years. The reduction in taxable value then declines in each year thereafter, until there is no reduction in the tenth year. New production, manufacturing and research and development facilities qualify for a 50% property tax abatement.

Residential taxpayers who install a renewable energy system on their property are eligible for a tax credit equal to the investment and installation cost, up to \$500 per individual or \$1,000 per household. Residents who install a geothermal heating or cooling system can claim a tax credit based on the installation cost of the system for up to \$1,500.

Commercial and net metering alternative energy investments of \$5,000 or more are eligible for a personal or corporate tax credit of up to 35%, against taxes on income generated by the investment. This includes investments in renewable energy equipment, manufacturing plants, and business facilities that supply basic energy needed from alternative energy generators on a direct contract sales basis. Unused credit may be carried over for seven years.

Ethanol producers may qualify for a tax incentive of \$0.20 per gallon of ethanol, produced by in-state agricultural products when available.

Biodiesel producers may qualify for a tax credit of up to 15% of the cost of equipment used for storing or blending biodiesel fuel (produced in the state) with petroleum diesel fuel offered for sale.

Businesses and individuals may qualify for a tax credit of up to 15% of the cost to construct or equip a facility for biodiesel production.

Property tax rate abatements are available for qualified biofuels production facilities.

**Public Benefit Fund:** The Universal System Benefits Program (USBP) supports renewable energy and energy efficiency programs in the state, including research and development programs, market transformation programs, and renewable energy projects and applications. All electric utilities are required to contribute revenue from a surcharge on customers' electricity use. The budget is around \$9 million annually.

**Renewable Fuel Mandate:** After the state is able to produce 40 million gallons of ethanol annually, all gasoline sold in the state for use in motor vehicles operating on public roads must be blended with 10% ethanol.



# Renewable Energy in Nebraska

## Summary

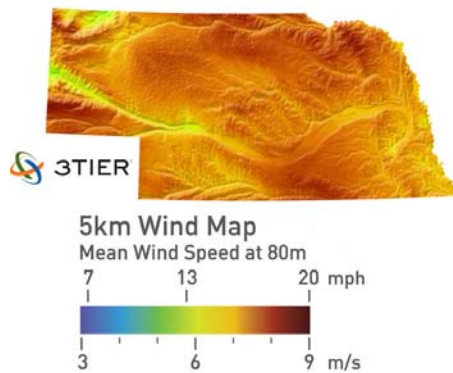
Nebraska’s landscape has diverse and plentiful renewable energy resources, including vast wind and biomass resources as well as moderate solar and geothermal resources. Nebraska is the only state in the nation where electricity is completely supplied by public power utilities, which are generally hindered from using the same financial incentives and operating structures for renewable energy as investor-owned utilities. With its array of state tax incentives and loans, it has become a leader in the biofuels industry and has also attracted wind developers. However, without a renewable portfolio standard, growth in state’s renewable power markets may remain limited.

| Installed Renewable Energy Capacity, 2011 |         |               |                   |
|-------------------------------------------|---------|---------------|-------------------|
| Wind                                      | 337 MW  | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 0.30 MW | Biomass Power | 11 MW             |
| Concentrated Solar Thermal                | 0 MW    | Bioethanol    | 2,108 mGy         |
| Geothermal                                | 0 MW    | Biodiesel     | 5 mGy             |
| Hydropower                                | 332 MW  | <b>Totals</b> | 681 MW; 2,113 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- Nebraska is ranked second in the nation in ethanol production capacity. In May 2012, a Danish company opened one of the largest biofuel-enzyme factories in Blair, Nebraska, which will supply ethanol plants with enzymes for converting sugars and starch into biofuel.
- Although Nebraska is ranked sixth in the nation for wind power potential, it is only ranked 25th in the nation for actual installed capacity (American Wind Energy Association). However, a number of companies in Nebraska manufacture components for the wind industry.
- A new 80 MW wind farm near Broken Bow is expected to generate \$540,000 a year in lease royalties for landowners and \$600,000 a year in property and state income taxes over its 25-year lifespan.

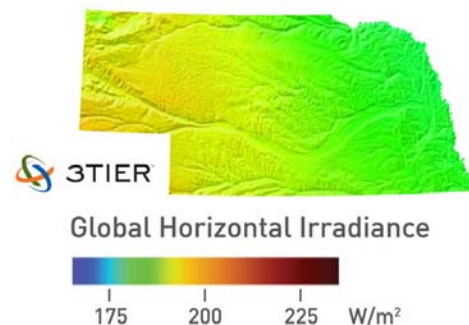


**Wind Resources-** Nebraska has the technical potential to generate 3,011,253 GWh from its substantial wind resource.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 17,703              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$210.3m, 2/5 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals   |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$111.9m            |
| 1603 Cash Grant Program                                             | \$134m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Solar Resources-** Ranking 10<sup>th</sup> among the states, Nebraska has the potential to generate 9,266,757 GWh from rural utility-scale photovoltaic installations.

# Nebraska

## Policies

**Net Metering and Interconnection:** Nebraska requires all utilities in the state to offer net metering to customers that install solar, methane, wind, biomass, hydropower or geothermal energy systems 25 kW and under. Net excess generation (NEG) is credited to the customer's next billing period at the utility's avoided cost rate, with any NEG at the end of an annualized period paid out to the customer. Net metering must be offered until the aggregate generating capacity of all generators equals 1% of the utility's average monthly peak demand. To be eligible for interconnection standards, a facility must meet all applicable standards established by the National Electric Code, be net metered, and be capable of automatically isolating itself from the electrical grid in the event of a power outage. Bi-directional meters are provided to the customer with no additional cost to them.

**Loans:** Nebraska's Dollar and Energy Savings Loan program makes available low-interest loans of up to \$750,000 for residential and non-residential renewable energy systems and energy efficiency improvements. The loans have interest rates that vary between 2.5% and 5%, depending on the technology and the origin of the funds, and payback terms vary between five and 15 years. The program is funded in part by oil overcharge funds and miscellaneous state, public power district and federal funds, and additional funding provided through the American Recovery and Investment Act (ARRA).

**Tax Incentives:** Nebraska allows an exemption from the sales and use tax imposed on the gross receipts from the sale, lease, or rental of personal property for use in community-based wind energy development projects.

To reduce the tax liability of wind farm owners, wind projects are subject to a nameplate capacity tax of \$3,518 per megawatt, which replaces the Nebraska Department of Revenue's central assessment and taxation of the tangible personal property associated with wind energy generation facilities. Projects are exempt from this tax if they are owned by the federal, state or local government; public power districts; electric membership associations; cooperatives; or electricity customers who install wind turbines on their side of the meter.

Nebraska offers 10-year corporate and personal production-based tax credits to producers of electricity generated by wind, solar, geothermal, hydropower, fuel cells or methane gas systems that were placed into service on or after July 14, 2006. The credit is \$0.0005/kWh on or after January 1, 2013. The allowed credit may be used to reduce the producer's Nebraska income tax liability or to obtain a refund of state sales and use taxes paid by the producer. The program budget is \$50,000.

Nebraska offers a tax credit of up to 40% of the amount invested in a small business that is involved in the cellulosic ethanol market, of up to \$1 million. The state also offers a tax credit of 30% of the amount invested in biodiesel production facilities, of up to \$250,000.

# Renewable Energy in Nevada

## Summary

Nevada contains excellent sites for developing renewable energy resources. Its solar and geothermal resources are among the best in the nation, and it is a substantial producer of electricity from each. Nevada's policies have kept it in the forefront of the renewable energy industry, including an aggressive target of 25% renewable energy by 2025 and strong net metering and interconnection policies designed to encourage distributed generation. However, the lack of available transmission capacity has prevented Nevada from taking full advantage of its abundant resources. As a response, the state created a task force to recommend zones with deployable renewable energy resources for the construction of new transmission routes.

| Installed Renewable Energy Capacity, 2011 |          |               |                 |
|-------------------------------------------|----------|---------------|-----------------|
| Wind                                      | 0 MW     | Ocean         | 0 MW            |
| Solar Photovoltaic                        | 124 MW   | Biomass Power | 0 MW            |
| Concentrated Solar Thermal                | 64 MW    | Bioethanol    | 0 mGy           |
| Geothermal                                | 469 MW   | Biodiesel     | 1 mGy           |
| Hydropower                                | 1,052 MW | <b>Totals</b> | 1,709 MW; 1 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Nevada is an attractive location for solar manufacturing. In 2012, a subsidiary of a Chinese power developer has announced plans to develop a 720 MW solar system and a thin-film silicon manufacturing plant in the state. The manufacturing plant and the solar system would both be amongst the largest of their kind worldwide.
- Nevada is home to the world's first geothermal-solar hybrid power plant. Commissioned in 2012, the 59 MW project combines 33 MW of baseload geothermal power with 26 MW of solar generated electricity. Overall, the plant is expected to provide electricity for more than 50,000 homes.
- Nevada's first commercial-scale wind farm, a 152 MW project located in Spring Valley, became operational in August 2012. The project has the capacity to provide power to over 45,000 Nevada homes.

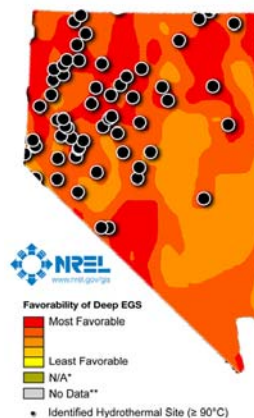


**Solar Resources-** With over 300 days of sunshine per year, Nevada has a technical potential of 8.6 million GWh from solar photovoltaic sources.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 17,254              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$56.4m, 3/15 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$211.2m, 7/7 deals |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$1.1bn             |
| 1603 Cash Grant Program                                             | \$213m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Geothermal Resources-** Nevada has one of the strongest high-temperature geothermal resources in the country. The technical potential for advanced geothermal systems in Nevada totals 1,262,175 GWh.

# Nevada

## Policies

**Renewable Portfolio Standard (RPS):** Nevada's RPS requires investor-owned utilities (IOUs) and retail suppliers, which cover over 88% of the state's electric load, to provide 25% renewable energy from eligible resources by 2025, with interim targets every two years through 2015 and every five years thereafter. Solar power is required to comprise 6% of the target, or 1.25% total, by 2025. Energy efficiency may be used to satisfy a portion of the requirement, which is capped at 25% of the total standard in any particular year.

Nevada authorizes energy providers to buy and sell portfolio energy credits (PECs) in order to meet portfolio requirements. Nevada also created a Temporary Renewable Energy Development (TRED) Program to help facilitate renewable projects, which allows IOUs to collect revenue from electric customers to pay for renewable energy separately from other purchased wholesale power.

**Net Metering and Interconnection:** Nevada offers net metering for IOU customers with renewable energy systems of the lesser of 1 MW or 100% of the customer's annual requirements for electricity. Aggregate system capacity is limited to 2% of the utility's peak capacity. Net excess generation is credited to the customer's next bill at retail rate and carries over indefinitely. Owners of systems over 25 kW in capacity may be required to install a second meter.

Interconnection is available for customers of IOUs with on-site generation up to 20 MW in capacity. Interconnection standards are mostly consistent with IEEE 1547 standards, California's interconnection rule, and the model agreement developed by NARUC.

**Rebates:** The Renewable Generations Rebate Program offers rebates for the installation of wind, PV and small hydroelectric systems sited at schools and at commercial, residential, public, nonprofit and agricultural locations. Incentive levels vary by technology type, customer class and program year. There are no size restrictions for participating systems aside from net metering limits. The program is administered by the utility NV Energy, which takes ownership of the renewable energy credits associated with the system to count toward its goals under the state's RPS. As of September 2012, the program's wind power was on hold.

**Loans:** The Nevada Revolving Loan Program offers loans between \$100,000 and \$1 million with a 3% interest rate and maximum repayment term of 15 years. The program incentivizes the construction or expansion of renewable energy systems, as well as the manufacture of components for these systems.

**Tax Incentives:** New or expanded businesses with renewable energy generation facilities over 10 MW may qualify for a sales and use tax abatement, in which they are only required to pay sales and use taxes at a rate of 2.25%. Businesses may also be eligible for a property tax abatement of up to 55% for up to 20 years for the real and personal property used to generate electricity from renewable energy resources. Job creation and quality requirement must be met to qualify for both incentives.

Businesses and residences that install renewable energy systems may be exempt from the added property taxes resulting from the addition of qualifying renewable energy systems.



# Renewable Energy in New Hampshire

## Summary

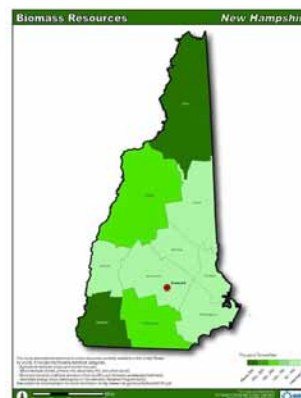
New Hampshire has an active biomass industry and an emerging wind industry, which are poised to meet the state's renewable portfolio standard (RPS) of 24.8% by 2025. With its strong biomass resources, particularly in the forestry sector, New Hampshire has the opportunity to increase its role in the production of bioenergy. It became the first state to require a portion of its RPS to come from thermal energy, which could have a particularly positive impact on the biomass thermal industry.

| Installed Renewable Energy Capacity, 2011 |        |               |               |
|-------------------------------------------|--------|---------------|---------------|
| Wind                                      | 125 MW | Ocean         | 0 MW          |
| Solar Photovoltaic                        | 3 MW   | Biomass Power | 182 MW        |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 0 mGy         |
| Geothermal                                | 0 MW   | Biodiesel     | 6 mGy         |
| Hydropower                                | 446 MW | <b>Totals</b> | 756 MW; 6 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- New Hampshire's biomass facilities produce heat and electricity from wood chips, wood waste, landfill gas, and municipal solid waste. A 75 MW biomass plant at a closed paper mill in Berlin is due to start generating electricity in the fall of 2013. The \$275 million project will maintain 40 permanent jobs and employ former workers from the paper mill.
- New Hampshire's largest wind farm, the 99 MW Granite Reliable wind park in Coos County, became operational at the end of 2011. A 48 MW wind farm in Groton is currently under construction and due for completion in early 2013.

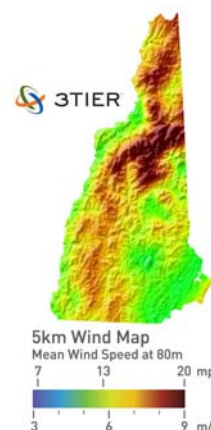


**Biomass Resources-** Dark green indicates an excellent resource of over 500 thousand metric tons of biomass a year. Biopower has the potential to generate 1,343 GWh in New Hampshire.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 11,502              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$650.0m, 3/3 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$15.3m, 3/3 deals  |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$102.5m            |
| 1603 Cash Grant Program                                             | \$54.4m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources-** New Hampshire could generate 5,706 GWh from onshore wind installations and 14,478 GWh from offshore wind installations.

# New Hampshire

## Policies

**Renewable Portfolio Standard (RPS):** New Hampshire's RPS requires electricity suppliers in the state (excluding municipal utilities) to acquire renewable energy certificates (RECs) equivalent to 24.8% of retail electricity sold to customers by 2025. There are mid-term deadlines for certain technologies and types of facilities. Class I resources must account for 15% by 2025, which includes most renewable electricity and "useful thermal energy" systems that began operation in or after 2006. Class II systems must account for 0.3% by 2014 and after, which includes solar energy systems built in or after 2006. Class III technologies must account for 8% by 2015, which includes existing biomass systems up to 25 MW and methane-powered systems. Lastly, Class IV systems are required to account for 1.5% of the requirement by 2015, which includes existing small hydroelectric systems under 5 MW. Utilities that do not comply with the RPS requirements can make payments into a renewable energy fund.

**Net Metering and Interconnection:** New Hampshire requires all of its electric utilities to offer net metering for renewable energy systems up to 1 MW, until the aggregate capacity of net metered systems reaches 50 MW. Net excess generation is carried over indefinitely, although the customer can request to receive a payment for any excess credit at the end of a 12 month period at the utility's avoided cost rate. Interconnection standards are provided for net metered systems. Insurance is not required, and external disconnect switches are not required for inverter-based systems.

**Rebates and Grants:** New Hampshire's renewable energy rebate programs are subsidized by the alternative compliance payment issued under the RPS. Residential solar or wind energy systems up to 5 kW of capacity are eligible for a \$0.75 per watt rebate. The maximum incentive is the lesser of \$3,750 or 50% of system costs. The budget is \$927,964 in 2012.

Residential solar thermal hot water heater and solar space heating systems are eligible for rebates of \$1,500, \$1,700 or \$1,900, depending on rated system output, with a maximum incentive of \$1,900. The program budget is \$1,082,000.

Commercial and industrial solar (thermal and electric) systems under 100 kW are eligible for rebates ranging from \$0.50 to \$0.80 per watt for PV systems and \$0.04 to \$0.12 per rated or modeled kBtu per year for solar thermal systems, with a maximum incentive of the lesser of 25% the total cost or \$50,000. The program budget is \$1.428 million.

Residential bulk-fed, wood pellet central heating boilers or furnaces are eligible for a 30% rebate on their installed cost.

New Hampshire's grant programs have provided incentives of up to \$1 million for renewable energy projects, but programs were on pause as of August 2012.

**Tax Incentives:** New Hampshire allows local governments to exempt residential property taxes in the amount of the assessed value of a renewable energy system used on the property. Eligible technologies include solar energy, wind energy, and wood-fired central heating systems.

**Loans:** The Municipal Energy Reduction Fund provides loans between \$5,000 and \$400,000 for renewable energy systems installed by municipal governments. The program is supported by New Hampshire's Greenhouse Gas Emissions Reduction Fund.

# Renewable Energy in New Jersey

## Summary

By enacting a strong renewable portfolio standard (RPS), net metering and interconnection standards, and the solar renewable energy credit (SREC) financing model, New Jersey has become the second largest market for solar in the country, with over 17,500 industrial, commercial, academic, and residential installations. New Jersey's incentive programs are also designed to take advantage of its wind and biomass resources and to attract renewable energy manufacturers into the state. New Jersey passed legislation in July 2012 to help restabilize its solar market after solar development outpaced its solar incentive program's anticipated demand.

### Installed Renewable Energy Capacity, 2011

|                            |        |               |                |
|----------------------------|--------|---------------|----------------|
| Wind                       | 8 MW   | Ocean         | 0.04 MW        |
| Solar Photovoltaic         | 566 MW | Biomass Power | 245 MW         |
| Concentrated Solar Thermal | 0 MW   | Bioethanol    | 0 mGy          |
| Geothermal                 | 0 MW   | Biodiesel     | 90 mGy         |
| Hydropower                 | 13 MW  | <b>Totals</b> | 832 MW; 90 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- The state's strong solar development continued in the first half of 2012, with an additional 277 MW of capacity installed. Because of state-wide support, manufacturers of solar equipment have been drawn to invest in New Jersey-based facilities.
- A solar farm located in Pilesgrove Township began commercial operations at the end of 2011. The 20 MW facility is among the largest of its kind in the Northeast.
- Although development has suffered setbacks on New Jersey's 350 MW Bluewater offshore wind project, progress continues on a variety of wind farms of the coast of the state. The 20 MW Fishermen's Atlantic City project has achieved final permitting, and developers have chosen the location of its demonstration turbines.



**Wind Resources-** New Jersey has limited onshore wind resources, but estimates put the state's offshore technical potential at 429, 808 GWh.

## Economic Development

| <b>Employment</b>                                                          |                      |
|----------------------------------------------------------------------------|----------------------|
| Green Goods and Services Jobs, 2010                                        | 76,025               |
| <b>Private Sector Investment (Disclosed Amount, Disclosed/Total Deals)</b> |                      |
| Asset Finance, 2010-2011                                                   | \$227.0m, 9/62 deals |
| Venture Capital & Private Equity, 2010-2011                                | \$126.4m, 8/8 deals  |
| <b>Recovery Act Funding (Total Awarded)</b>                                |                      |
| Energy Contracts, Grants & Loans                                           | \$342.1m             |
| 1603 Cash Grant Program                                                    | \$616.9m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Solar Resources-** New Jersey has the estimated potential to produce 15,768 GWh from rooftop photovoltaic installations alone.

# New Jersey

## Policies

**Renewable Portfolio Standard (RPS):** New Jersey's RPS calls for investor-owned utilities (IOUs) and retail electric suppliers to procure 20.38% of the electricity they sell from Class I and Class II renewables by energy year 2020-2021, plus 4.1% from solar energy by 2027-2028. There is also a carve-out of 1,100 MW for offshore wind (which is included in the Class I target). Class II renewables, which includes hydro facilities under 30 MW and resource recovery facilities, are limited to meeting 2.5% of the requirement. Utilities may purchase renewable energy credits (RECs), solar RECs (SRECs) or offshore wind RECs (ORECs) for compliance. Alternative compliance payments (ACPs) are required for noncompliance, for the amount of the REC or SREC that was not submitted.

**Net Metering and Interconnection:** New Jersey's net metering program and interconnection standards apply to all customers of the state's IOUs as well as to certain municipal utilities and electric cooperatives. System size is limited to meeting annual on-site demand. The Board of Public Utilities (BPU) allows utilities to cease offering net metering if capacity exceeds 2.5% of the peak electricity demand. Net metering is available to all customer classes as well as for most renewable energy technologies. After a 12-month cycle, net excess generation is reconciled at the avoided-cost rate. State and local governments, local agencies, and school districts can participate in net metering aggregation of solar facilities. Interconnection rules are divided into three levels, depending on system size and complexity, and apply to all IOUs.

**Public Benefit Fund:** New Jersey's Clean Energy Fund supports investments in energy efficiency and renewable energy. It is funded by a "societal benefits charge," a charge imposed on customers of the state's IOUs. The total fund is \$2.4 billion for the 2001-2012 period.

**Solar Renewable Energy Credits:** The SREC program provides a means for solar renewable energy credits to be created and verified, and allows electric suppliers to buy these certificates from most sectors in order to meet their solar RPS requirements. Average prices range from \$225 to \$390 per MWh in 2012.

**Rebates:** The *Renewable Energy Incentive Program* provides rebates for wind energy systems of up to \$3.20 per kWh for the first 16 MWh and \$0.50 per kWh for the next 984 MWh; for biomass and fuel cell systems without CHP of \$1 to \$2 per watt; for biomass and fuel cell systems with CHP of \$2 to \$3 per watt; and for feasibility studies of up to 50% of the study cost. The program is funded by the state's system's benefit charge, and has \$10 million in available funding in 2012.

New Jersey also provides \$500 rebates for residential geothermal heat pumps under the COOLAdvantage Program and \$1,200 rebates for solar hot water heaters under the WARMAdvantage Program.

**Tax Incentives:** New Jersey offers a full exemption from the state's sales tax for solar energy equipment. The state also offers a full property tax exemption for the value added by renewable energy systems at commercial, industrial, or residential sites.

Businesses that manufacture wind energy equipment, employ at least 300 full-time employees, and make a minimum capital investment of \$50 million can receive a tax credit for 100% of the qualified capital investment of the facility.

**Grants and Loans:** Through the Edison Innovation Clean Energy Manufacturing Fund, grants and up to ten-year, 2% interest loans are available for manufacturers of renewable energy products (primarily "Class I" systems (see RPS description)). There is a maximum incentive of \$300,000 for grants and \$3 million for loans per project. A minimum 50% cash match of total project costs is required to be from non-state derived matching funds. The program is funded by the state's public benefit fund and has a \$2 million budget for 2012.

Through the Edison Innovation Green Growth Fund, loans of \$250,000 to \$2 million are available for for-profit companies that develop Class I renewable energy systems (see RPS description) and meet certain employment requirements. Loans have a fixed five year term and an interest rate of 2%. After five years, the borrower may convert up to half of the loan into a performance grant if it meets certain business milestones. Borrowers must match the amount of the loan with non-state grants, deeply subordinated debt or equity.

# Renewable Energy in New Mexico

## Summary

New Mexico has made significant progress in developing its wind industry over the past decade, and is currently making strides to develop its plentiful solar resources. A broad spectrum of tax incentives encourage industry, businesses, and homeowners to take advantage of the state's renewable resources. The state's natural resources, which include non-arable land, high level of sunlight, non-potable water, and appropriate energy and agricultural infrastructure, are ideal for the development of algae-based biofuel.

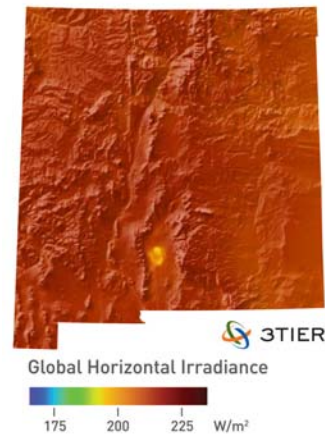
### Installed Renewable Energy Capacity, 2011

|                            |        |               |                  |
|----------------------------|--------|---------------|------------------|
| Wind                       | 750 MW | Ocean         | 0 MW             |
| Solar Photovoltaic         | 166 MW | Biomass Power | 7 MW             |
| Concentrated Solar Thermal | 0 MW   | Bioethanol    | 30 mGy           |
| Geothermal                 | 0 MW   | Biodiesel     | 2 mGy            |
| Hydropower                 | 82 MW  | <b>Totals</b> | 1,004 MW; 32 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Utilities in New Mexico are building their first solar power projects in order to meet the state's solar power requirement. The Cimarron Solar project, which came online in January 2011, is a 30 MW, \$100 million project and among the nation's largest solar PV plants.
- One of the largest concentrating photovoltaic (CPV) plants in the U.S., a 5 MW project located in the city of Hatch, began producing power in August 2011.
- New Mexico is the home to major solar energy manufacturing facilities, including a 50 MW/year CPV facility and other factories that build components for solar installations.
- Recently, a start-up company completed construction on the first portion of a commercial-scale algae farm. The project is intended to process algae into liquid fuel for transportation, and has secured \$144 million from investors.

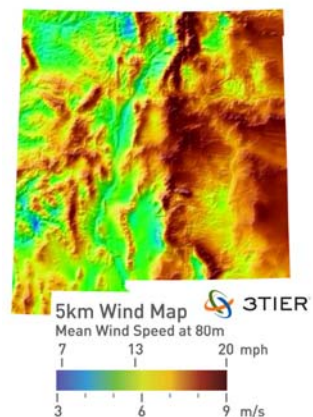


**Solar Resources-** New Mexico has enough solar resources to produce 6.5 kWh to 7 kWh per square meter, totaling 16 million GWh per year from photovoltaics

## Economic Development

| Employment                                                          |                      |
|---------------------------------------------------------------------|----------------------|
| Green Goods and Services Jobs, 2010                                 | 21,267               |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                      |
| Asset Finance, 2010-2011                                            | \$572.7m, 5/13 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$17.9m, 2/2 deals   |
| Recovery Act Funding (Total Awarded)                                |                      |
| Energy Contracts, Grants & Loans                                    | \$586.7m             |
| 1603 Cash Grant Program                                             | \$207.7m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources-** New Mexico has abundant wind power resources, with 98,417 km<sup>2</sup> of windy land area available. This can produce 492 GW of wind power. Dark red indicates the highest potential.



# New Mexico

## Policies

**Renewable Portfolio Standard (RPS):** New Mexico directs investor-owned utilities (IOUs) to generate 20% of total retail electricity sales from renewable energy resources by 2020. Of the total requirement, solar and wind power must each cover a minimum of 20%; biomass, geothermal energy, certain hydro facilities, and other renewables must cover a minimum of 10%; and distributed renewables must cover 3% (starting in 2015). Rural electric cooperatives must also meet a requirement of 10% by 2020. Utilities use renewable energy certificates (RECs) to demonstrate compliance.

**Net Metering and Interconnection:** New Mexico law dictates that electric cooperatives and IOUs must offer net metering and interconnection standards to customers with systems up to 80 MW in capacity. Any net excess generation is credited to customer's next bill or reconciled monthly at the avoided-cost rate. To be eligible for interconnection, systems up to 80 MW must comply with all relevant local and national standards and follow a specific application process, dependent on system size, with four levels of review.

**Tax Incentives:** New Mexico has a broad spectrum of tax incentives for renewable energy:

*Sales Tax Incentives*—Businesses in New Mexico have a gross receipts tax structure instead of a sales tax, for which they are taxed on the gross amount of their business receipts each year before expenses are deducted. Before the gross receipts tax is calculated, businesses are able to deduct from gross receipts the revenue generated by the (1) the sale and installation of solar electric, geothermal electric, energy storage or CHP/ cogeneration facilities above 1 MW for up to \$60 million; (2) the sale of certain wind turbines or solar electric equipment to government entities; and (3) the sale and installation of solar heating or electric systems at residential or commercial properties. In addition, the biomass equipment and materials used for biopower, biofuels, or biobased systems may be deducted when determining the amount of compensating tax due (the state's excise or use tax).

*Property Tax Incentives*—Residential solar thermal and electric systems are exempt from property tax assessments.

*Personal and Corporate Tax Credits*—New Mexico provides a 10% personal income tax credit (up to \$9,000) for residents and businesses that install solar PV or solar heating and cooling. PV systems must be at least 100 watts, solar thermal systems must be at least 15 square feet, and solar water heating systems must heat at least 50% of the total water heating load. There is maximum credit of \$9,000, and the annual program budget is \$3 million for PV and \$2 million for solar thermal.

Personal and corporate production tax credits of 1¢/kWh are available for companies that generate electricity from wind or biomass systems above 1 MW, for the first 400 GWh annually for 10 years. Companies that generate electricity from solar energy systems above 1 MW can receive a tax incentive that varies annually, averaging 2.7¢/kWh, for the first 200 GWh annually for ten years. There is a statewide cap of 2,000 GWh, plus an additional 500 GWh for solar electric systems. Excess credit is refunded to the taxpayer.

Geothermal heat pumps purchased and installed between 2010 and 2020 on the taxpayer's property are eligible for a 30% tax credit (corporate or personal), for up to \$9,000 of the system's cost. Unused credit can be carried forward for up to ten years. The program's budget is \$2 million per year.

The Advanced Energy Tax Credit allows 6% of the cost of solar electric, energy storage and geothermal projects with a minimum project capacity of 1 MW to be credited against personal and corporate income taxes. The credit cap is \$60 million, and any unused credit may be carried forward for up to ten years.

Agricultural biomass from a dairy or feedlot used for energy can receive a personal or corporate tax credit for \$5 per wet ton. The program budget is \$5 million per year. Excess credit can be carried forward for four years.

*Industry Recruitment Tax Credit*—A tax credit is available for companies that manufacture renewable energy products and components. The total amount of the credit may not exceed 5% of the taxpayer's qualified expenditures. Excess credit can be carried forward for five years.

Companies may be eligible for a tax credit for up to 30% of the cost of purchasing or installing equipment used to produce biodiesel blends with at least 2% biodiesel.

**Renewable Fuel Mandate:** All diesel fuel sold to consumers for use in on-road motor vehicles must contain at least 5% biodiesel.



# Renewable Energy in New York

## Summary

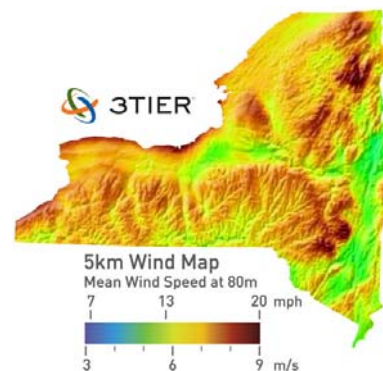
Renewable energy technologies are at the center of New York’s concerted strategy to move to a clean energy economy. The state has a significant amount of installed wind and solar generation capacity and is also one of the nation’s top generators of electricity from hydropower, landfill gas and solid municipal waste. Through its supportive, multifaceted package of incentives and continued workforce development, New York is well positioned to further increase its market share of the renewable energy industry.

| Installed Renewable Energy Capacity, 2011 |          |               |                   |
|-------------------------------------------|----------|---------------|-------------------|
| Wind                                      | 1,403 MW | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 124 MW   | Biomass Power | 512 MW            |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 164 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 25 mGy            |
| Hydropower                                | 4,657 MW | <b>Totals</b> | 6,696 MW; 189 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- New York currently ranks 12th in the nation in installed wind capacity, and the sector is steadily expanding, with 220 MW under construction (American Wind Energy Association).
- Due to favorable incentives, New York consistently ranks within the top ten states for solar PV capacity, with more than 7,400 systems installed (Solar Energy Industries Association).
- New York has four tidal power projects in development. Verdant Power has been testing tidal power technology in the East River since 2006—claimed to be the first grid-connected array of tidal turbines in the world—with plans to build a 7.5 MW project.
- A renewable energy developer and a local university are partnering to develop next generation solar manufacturing equipment. The \$20 million project is expected to create 250 jobs in Ulster County and across Upstate New York.

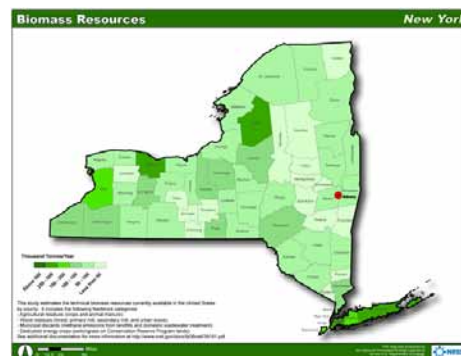


**Wind Resources-** New York has a significant wind resource which can be tapped for large-scale electricity generation both on and offshore. In total, the state has the potential to produce around 675,000 GWh.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 248,526             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$20.0m, 1/7 deals  |
| Venture Capital & Private Equity, 2010-2011                         | \$104.2m, 9/9 deals |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$1.4bn             |
| 1603 Cash Grant Program                                             | \$463m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** New York has an abundant supply of biomass from the forestry, agricultural and other sectors, particularly anaerobic digesters. The state has 6.031 million tons of biomass resources, and potentially has between 1 million and 1.68 million acres of non-forest land that can be used for bioenergy feedstock production. (NYSERDA, Renewable Fuels Roadmap).

# New York

## Policies

**Renewable Portfolio Standard (RPS):** New York requires 29% of the electricity consumed in-state to come from renewable resources by 2015 (including hydroelectric power and cogeneration facilities). Of the target, 20.7% will be derived from existing facilities (built in 2003 or later), 1% will be met through voluntary green power sales, and the remainder will be derived from new, eligible resources centrally procured by the New York State Research and Development Authority (NYSERDA). Eligible new generation falls into two tiers—a Main Tier (roughly 94% of incremental renewables generation) and a Customer-Sited Tier (CST) (roughly 6%). NYSERDA can procure Main Tier resources through auction, requests for proposals, or standard offer contracts. To fund the RPS, NYSERDA manages an RPS fund gathered through a surcharge on each kWh sold by the state's investor-owned utilities (IOUs), which is separate from the state's systems benefit charge (SBC).

**Net Metering and Interconnection:** New York mandates that IOUs offer net metering for solar and wind residential systems up to 25 kW and non-residential systems up to 2 MW; agricultural wind systems up to 500 kW; agricultural biogas systems up to 1 MW; micro-hydroelectric residential systems up to 25 kW and nonresidential systems up to 2 MW; and residential micro-CHP and fuel cells up to 10 kW. Changes in 2011 allow for remote net metering. Rules for net excess generation (NEG) vary by technology, but NEG generally can be credited to the customer's next bill at the retail rate, and excess can be reconciled annually at the avoided cost rate (although for certain systems, NEG can be carried over indefinitely). The aggregate capacity limit is 1% of the utility's 2005 demand for non-wind powered systems and 0.3% for wind powered systems. New York's interconnection rules apply to systems up to 2 MW located in the service areas of the state's IOUs. Systems up to 25 kW and inverter-based systems 2 kW-200 kW are subject to a simplified, six-step application process.

**Systems Benefit Charge (SBC):** Investor-owned utilities collect funds through a surcharge on customers' bills to fund energy efficiency, education and outreach, research and development, and low-income energy assistance programs in the state. The program is set to run through the end of 2016, and has an overall budget of \$2.39 billion.

**Tax Incentives:** New York provides a residential property tax exemption for the installation of residential solar electric or thermal, biomass, wind, or geothermal heat pump systems for the value the system adds to the residence.

New York exempts both the sale and installation of solar heating and electric systems as well as the retail sale of wood used for residential heating from the state's sales tax.

New York offers a personal income tax credit for expenditures on solar heating and PV equipment used on residential property, equal to 25% of the cost of equipment and installation, for up to \$5,000. The credit was amended in August 2012 to include systems installed under lease or power purchase agreements (PPAs) of ten or more years in length.

Refundable personal and corporate tax credits are offered for the residential use of biodiesel for space heating or water heating for 1-20 cents per gallon.

Biofuel producers may qualify for a state tax credit of \$0.15 per gallon of biodiesel or ethanol after the facility has produced 40,000 gallons of biofuel per year. The maximum credit is \$2.5 million.

E85 and hydrogen fuel used to operate motor vehicles are exempt from state sales and use taxes.

**Production Incentives:** Through New York's RPS fund, up to three-year incentive payments are available for up to 50% of the installed costs of customer-sited solar PV or biogas systems over 50 kW. The budget is \$227 million. Through the Fuel Cell Rebate and Performance Incentive, incentives up to \$1 million are also available for fuel cells, with a program budget of \$21 million.

**Industry Recruitment:** NYSERDA offers incentives for companies to research, develop, demonstrate, or commercialize a manufacturing process for clean energy technologies. For most eligible projects, incentives are the lesser of 50% of project costs or \$400,000, but there is a cap of \$100,000 for feasibility studies. A total of \$2.5 million in funding is available.

**Rebates, Grants and Loans:** NYSERDA provides a broad array of incentives for the installation of renewable electric and thermal energy systems and for the development of alternative fuels. For more information, visit NYSERDA's website: <http://www.nysERDA.org/funding>



# Renewable Energy in North Carolina

## Summary

North Carolina was the first state in the southeast to enact a renewable portfolio standard (RPS) and has implemented a variety of initiatives to encourage its citizens, utilities, and commercial entities to increase the use of renewable energy systems. In addition to its suitable solar, biomass, and geothermal resources, North Carolina's coastline is situated at the point where the Labrador Current and the Gulf Stream meet in the Atlantic Ocean, creating significant wind energy potential (which has yet to be developed).

### Installed Renewable Energy Capacity, 2011

|                            |          |               |                  |
|----------------------------|----------|---------------|------------------|
| Wind                       | 0 MW     | Ocean         | 0 MW             |
| Solar Photovoltaic         | 86 MW    | Biomass Power | 593 MW           |
| Concentrated Solar Thermal | 0 MW     | Bioethanol    | 60 mGy           |
| Geothermal                 | 0 MW     | Biodiesel     | 22 mGy           |
| Hydropower                 | 1,856 MW | <b>Totals</b> | 2,534 MW; 82 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

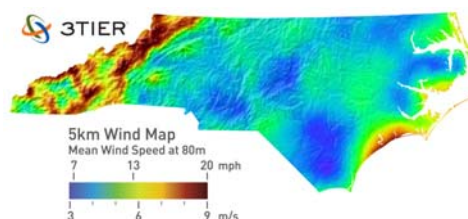
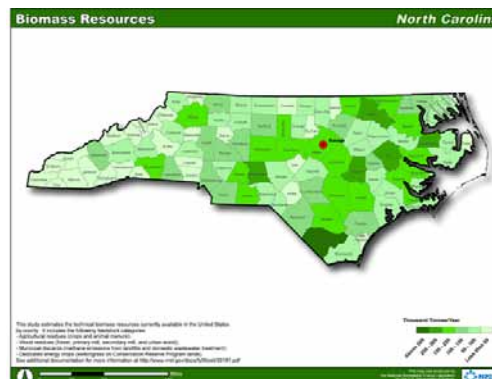
## Market

- North Carolina's utility solar market continues to expand due to a carve-out in the state's renewable energy and energy efficiency portfolio standard for solar. Construction on a 20 MW solar PV facility at a data center began in February 2012. The electricity generated from the plant will be purchased by a utility under a long term power purchase agreement.
- Combined heat and power, biogas, waste energy, and combustion facilities provide both heat and power to North Carolinians from the state's biomass feedstocks, such as milling and logging residues, forestry residues, tire-derived fuel, wood waste, black liquor, and landfill gas.
- Several wind component and solar manufacturing facilities are sited throughout North Carolina. In September 2012, a concentrated photovoltaic solar panel maker chose the state to be the site of its new manufacturing facility, which will eventually employ more than 250 people.

## Economic Development

| Employment                                                          |                      |
|---------------------------------------------------------------------|----------------------|
| Green Goods and Services Jobs, 2010                                 | 77,498               |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                      |
| Asset Finance, 2010-2011                                            | \$47.0m, 4/13 deals  |
| Venture Capital & Private Equity, 2010-2011                         | \$47.7m, 11/11 deals |
| Recovery Act Funding (Total Awarded)                                |                      |
| Energy Contracts, Grants & Loans                                    | \$624.6m             |
| 1603 Cash Grant Program                                             | \$76.3m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources**- North Carolina's greatest wind potential lies offshore and at the foothills of the Appalachian Mountains. Through its offshore wind resource alone, North Carolina could potentially generate 1,269,627 GWh.

# North Carolina

## Policies

**Renewable Energy and Energy Efficiency Portfolio Standard (REPS):** North Carolina requires investor-owned utilities (IOUs) to produce 12.5% of their retail electricity sales from eligible energy sources (including solar electric and thermal, biopower, wind, geothermal electric, landfill gas, combined heat and power (CHP), hydrogen, anaerobic digestion, small hydroelectric and marine energy) by 2021. Up to 25% of the obligations can be achieved through energy-efficiency technologies, including CHP systems fueled by non-renewable sources, until 2021, after which they should account for 40% of the standard. Specific requirements include 0.2% for solar power and 0.2% for swine waste by 2018 as well as 900 GWh generated from poultry waste by 2014. Compliance is achieved through the procurement of Renewable Energy Credits (RECs), with 25% of RECs allowed from unbundled, out-of-state facilities. There are currently no specified enforcement or penalty measures for non-compliance, but the North Carolina Utilities Commission has existing authority to enforce compliance. In addition to the IOU requirement, electric cooperatives and municipal utilities must meet a target of 10% renewable energy by 2018 and meet the solar, swine waste, and poultry waste goals.

**Net Metering and Interconnection:** North Carolina requires IOUs to offer net metering to their customers for systems of up to 1 MW in nameplate capacity, with no aggregate capacity limit. Customers can elect any rate schedule available; however, customers taking payments on anything other than the Time Of Use schedule (TOU) surrender all RECs to the utility. Net excess generation (NEG) is credited to the customer's next billing cycle at the retail rate, until the summer billing season, when utilities gain possession of used NEG credit. Interconnection standards have a three tiered approach to simplify the application process, are modeled after the Federal Energy Regulatory Commission (FERC) standards for small generators, and do not have restricted capacity. Systems do not need to be net metered to qualify.

**Tax Incentives:** North Carolina offers businesses, residences, and farms an 80% property tax abatement for the appraised value of solar photovoltaic and solar thermal electric systems. In addition, solar active heating and cooling systems may not be assessed at a higher value than a conventional system for property tax purposes.

North Carolina offers a personal and corporate tax credit equal to 35% of the cost of new renewable energy property constructed, purchased, or leased. For residential customers, there is a maximum incentive of \$1,400-\$10,500, depending on the technology. Systems used for business purposes can receive a maximum of \$2.5 million per installation. For single family dwellings, excess credit may be carried forward five years. For installations on other property, the credit must be taken in five equal installments. Allowable credit may not exceed 50% of the taxpayer's state tax liability for the year, reduced by the sum of all other state tax credits.

Constructed or retrofitted renewable energy manufacturing facilities are eligible for a tax credit worth 25% of the eligible costs of the facility, which includes construction and equipment costs. The credit must be taken in installments over five years.

Project developers may qualify for a tax credit equal to 35% of the cost of constructing or equipping biodiesel or ethanol (E70-E100) commercial processing facilities. The developer must place into service three or more facilities and invest at least \$400 million to qualify for the credit.

The retail sale, use, storage, and consumption of biofuels is exempt from the state sales and use tax.



# Renewable Energy in North Dakota

## Summary

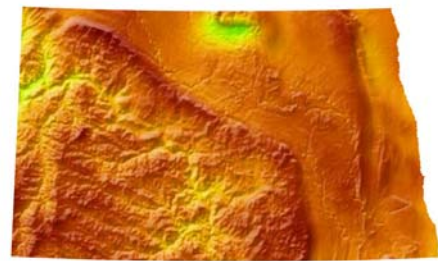
While nearly all of the state's electricity is produced by coal fired-plants, North Dakota's landscape is rich in biomass and wind energy resource potential. A broad array of tax incentives, state loan programs, and other incentives have encouraged developers to tap these renewable energy resources; however, historically low energy prices command conventional energy generation.

| Installed Renewable Energy Capacity, 2011 |          |               |                   |
|-------------------------------------------|----------|---------------|-------------------|
| Wind                                      | 1,445 MW | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 0 MW     | Biomass Power | 10 MW             |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 393 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 88 mGy            |
| Hydropower                                | 614 MW   | <b>Totals</b> | 2,069 MW; 481 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- North Dakota is the 11th largest ethanol producing state in the nation. Plants in Casselton and Hankinson produce more than 230 million gallons of corn ethanol per year.
- In 2011, North Dakota ranked tenth in the nation for installed wind power capacity and third for its percentage of power provided by wind (14.7%) (American Wind Energy Association).
- Four waste heat to power facilities in North Dakota generate electricity from the hot exhaust gases produced from existing natural gas turbines.

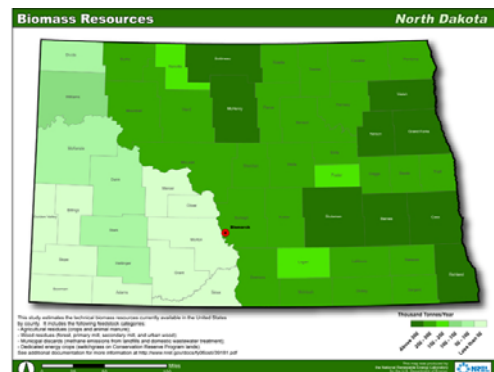


**Wind Resources-** 84% of North Dakota (over 150,000km<sup>2</sup>) is available windy land area. From this land, the state has the potential to generate 2,537,825 GWh.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 8,407               |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$235.0m, 1/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals   |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$69.4m             |
| 1603 Cash Grant Program                                             | \$263.2m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Dark green represents the highest resource measured by NREL. In total, the state has the potential to produce 8,216 GWh from biopower.

# North Dakota

## Policies

**Renewable Portfolio Goal:** North Dakota has established a voluntary objective that 10% of retail electricity sold in the state be obtained from renewable and recycled energy sources by 2015, including solar, wind, landfill gas, biopower, new hydroelectric, geothermal electric, hydrogen, electricity from waste heat and anaerobic digestion. Renewable energy credits may be acquired from both in-state and out-of-state facilities. Retailers and suppliers are required to make an economic assessment determining the cost-effectiveness of renewable and recycled energy before deciding on the best option for meeting their consumers' electricity needs.

**Net Metering:** Investor-owned utilities (IOUs) are required to offer net metering to their customers that own renewable energy and/or combined heat and power (CHP) systems with a nameplate capacity of up to 100 kilowatts (kW). Any net excess generation (NEG) at the end of the month is purchased by the utility at the avoided cost rate, which includes the associated renewable energy credits (RECs). There is no state-wide aggregate capacity limit for net metering systems.

**Tax Incentives:** North Dakota offers IOUs and commercial entities a property tax credit of 70% or 85% for centrally-assessed wind turbines with a nameplate capacity of 100 kW or larger.

Solar, geothermal, and wind systems are exempt from property taxes for five years after installation.

Individuals, estates and trusts can receive a personal income tax credit for the cost of acquiring and installing a geothermal energy system, equal to 3% per year for five years. Excess credit can be carried forward for ten years.

North Dakota offers a corporate income tax credit of 3% per year for five years for the actual cost of acquiring or installing renewable energy systems. Excess credit may be carried over to each of the five succeeding taxable years if the amount exceeds the taxpayer's income tax liability, although there are some exceptions.

The materials used to construct or expand gas processing facilities (including those that process landfill gas) or electrical generating facilities (with at least one unit over 100 kW) are exempt from sales and use taxes.

Licensed fuel suppliers may qualify for an income tax credit of \$0.05 per gallon for blending diesel fuel with at least 5% biodiesel or green diesel.

The state awards an income tax credit to new ethanol, biodiesel, green diesel, and biogas producers equal to the percentage of wages and salaries paid each year (for agricultural products, it is equal to 1% for the first three years and 0.5% for the fourth and fifth years).

**Loans:** North Dakota offers an interest buy down of up to 5% below the note rate for biofuels production facilities and for operations that supply livestock byproducts or grain storage for biofuels production. The maximum award is \$500,000 of interest buy down.

The Bank of North Dakota offers loan guarantees for the construction of facilities using biomass for agriculturally-derived fuel production. The maximum guarantee is 25% of the total loan, up to \$12.5 million.

**Other Incentives:** The state makes quarterly payments to qualified ethanol producers when ethanol prices are unusually low and/or corn prices are unusually high. The program distributes a maximum of \$1.6 million each year.

The state awards grants to support the research and development of advanced and sugar-based biofuels.

# Renewable Energy in Ohio

## Summary

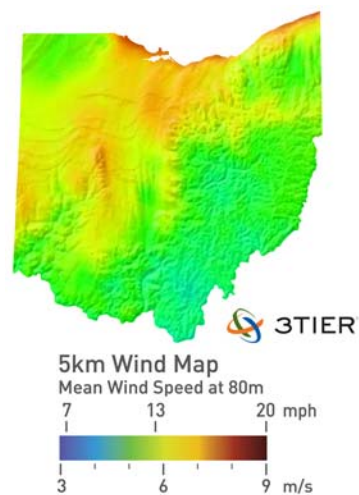
Ohio is becoming nationally recognized for the research and development of solar and wind energy technologies and is a key player in the Midwest wind supply chain due to its proximity to large wind energy markets. The state also has a considerable biofuels market and is the eighth largest ethanol producer in the nation. With significant renewable energy resources from on and offshore wind power, solar power and bioenergy, and a multifaceted renewable energy policy portfolio, the state has tremendous potential to expand its emerging renewable energy markets.

| Installed Renewable Energy Capacity, 2011 |        |               |                 |
|-------------------------------------------|--------|---------------|-----------------|
| Wind                                      | 112 MW | Ocean         | 0 MW            |
| Solar Photovoltaic                        | 32 MW  | Biomass Power | 156 MW          |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 538 mGy         |
| Geothermal                                | 0 MW   | Biodiesel     | 132 mGy         |
| Hydropower                                | 129 MW | <b>Totals</b> | 428 MW; 670 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Ohio is a leading U.S. component supplier for wind turbine original equipment manufacturers. International companies operate research and development centers for wind power in the state.
- New dairy farm anaerobic digesters went online in 2010 and 2011, each with 600 kW of capacity. Ohio was one of four states selected by USDA in 2011 to grow giant miscanthus grass on 19,000 acres under the Biomass Crop Assistance Program.
- In March 2012, construction was completed on a 304 MW wind farm, and the project gradually began commercial operations over the course of the year. The Ohio State University announced it would purchase 50 MW of the project, representing 25% of campus electricity requirements.
- In April 2012, a planned 50 MW solar array in south-eastern Ohio received a Finding of No Significant Impact (FONSI) from the Department of Agriculture. A three-year construction plan was subsequently announced, with project completion expected in 2015.

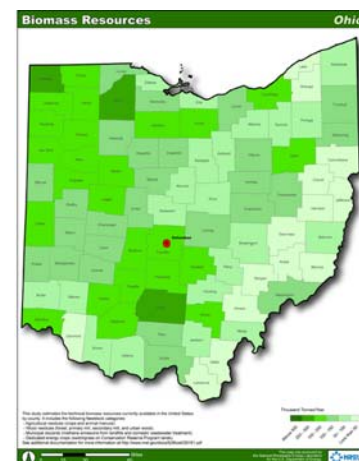


**Wind Resources-** Ohio has the combined onshore and offshore potential to generate nearly 300,00 GWh from its wind resource.

## Economic Development

| Employment                                                          |                   |
|---------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                 | 126,855           |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                            | \$5.0m, 1/9 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$3.2m, 4/5 deals |
| Recovery Act Funding (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                    | \$1.1bn           |
| 1603 Cash Grant Program                                             | \$280.9m          |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Ohio has 8 million dry tons of cellulose biomass and 10.1 million dry tons of total biomass resource.

# Ohio

## Policies

**Advanced Energy Resource Standard:** Ohio mandates that investor-owned utilities (IOUs) and retail electric suppliers must provide 12.5% of their retail electricity supply from renewable energy sources by 2024 (which includes a 0.5% carve-out for solar electric). This is part of a broader standard to source 25% from alternative energy sources by 2025, with the remaining 12.5% of the standard met by clean coal, nuclear power, certain energy efficiency and other “advanced energy” resources. Qualifying renewable energy sources include solar electric, wind, geothermal, biopower, landfill gas, qualified hydroelectric, waste-to-energy, fuel cells and certain storage facilities. Customer-distributed generation is also included. At least 50% must be met by in-state facilities, and the remaining 50% may be from facilities that deliver electricity to the state. Penalties for not meeting these standards include \$45 per MWh for renewable energy deficiencies and \$400 per MWh as solar alternative compliance payments, yet utilities are not required to meet the benchmarks if doing so is expected to increase operating costs by 3% or greater. Only renewable energy credits (RECs) that are generated from facilities online after 2008 may be used for compliance.

**Net Metering and Interconnection:** The net metering policy in Ohio applies to IOUs, and the program has neither a project nor an aggregate capacity limit. However, it does have an implied limit that customers not produce more electricity than they use. Net excess generation (NEG) is credited to the customer’s next bill at the unbundled generation rate, and customers may request refunds of NEG credits after 12 months. Hospitals have different net metering tariffs wherein all electricity generated (used and otherwise) must be credited. IOUs also implement interconnection standards modeled after federal precedents, which include three levels of review for distributed generation systems up to 20 MW in capacity.

**Tax Incentives:** Ohio offers an exemption from public utility tangible personal property taxes and real property taxes for facilities that sell electricity to third parties. Projects over 250 kW in capacity that begin construction from 2009 through 2013 must make a payment in lieu of taxes of \$7,000 per megawatt for solar energy facilities or \$6,000-\$8,000 per megawatt for other qualifying facilities: the exact amount is dependent on in-state job creation. Projects of 250 kW or less are not required to make a payment in lieu of property tax if built in 2010 or after. Eligible energy facilities may also qualify for an exemption from certain property taxes or sales and use taxes.

Small and large businesses that install qualifying “air quality projects” can receive an exemption from the tangible personal property tax, real property tax, a portion of the corporate franchise tax, and/or sales and use tax.

Taxpayers that invest in ethanol production plants may qualify for a tax credit equal to 50% of the investment, up to \$5,000, which is taken against the state corporation franchise tax and income taxes.

**Loans:** Through the ECO-Link program, homeowners who install solar electric or thermal, wind, or geothermal heat pump systems are eligible for a maximum 3% rate reduction on a five-year loan of \$25,000 or on a seven-year loan of between \$25,000 and \$50,000 through participating banks. Terms of these loans vary by lending bank.

Through the energy loan fund, public entities, manufacturers, and small businesses can obtain loans for energy savings projects, which include solar PV, wind, biomass, CHP, and certain other renewable energy systems. The program is funded by the State Energy Program and Advanced Energy Fund.

**Industry Recruitment:** The Ohio Job Stimulus Plan Advanced Energy Program awards funds to renewable energy projects that serve to “attract new investment to Ohio, build upon Ohio’s manufacturing strength, advance energy technology development toward commercialization, and prepare Ohio’s workforce for the future.” Of the program’s budget, \$84 million is reserved for non-coal related projects in three annual appropriations. Bonds range from \$50,000 to \$2 million and may be exempt from certain taxes.

**Public Benefit Fund:** The Advanced Energy Fund provides grants and loans for renewable energy and energy efficiency projects in the state and is funded by a small surcharge on IOU customers’ electricity bills.

# Renewable Energy in Oklahoma

## Summary

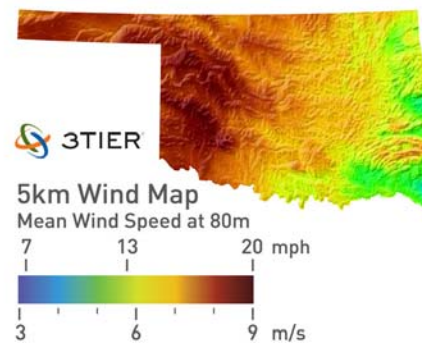
Oklahoma has a large wind industry that continues to expand, with several gigawatts of wind energy projects in the development queue. To better distribute wind energy from resource areas to population centers, the state is building new transmission lines, the largest of which is expected to open up an additional 3.5 GW of wind capacity for export. Oklahoma established a voluntary 15% renewable energy standard to be achieved by 2015, which aims to create jobs and decrease dependence on carbon-intensive fuel sources.

| Installed Renewable Energy Capacity, 2011 |          |               |                  |
|-------------------------------------------|----------|---------------|------------------|
| Wind                                      | 2,007 MW | Ocean         | 0 MW             |
| Solar Photovoltaic                        | 0.20 MW  | Biomass Power | 85 MW            |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 0 mGy            |
| Geothermal                                | 0 MW     | Biodiesel     | 36 mGy           |
| Hydropower                                | 805 MW   | <b>Totals</b> | 2,897 MW; 36 mGy |

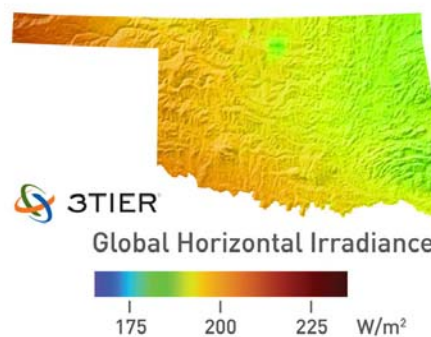
Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Oklahoma saw the installation of an additional 525 MW of wind capacity through the end of 2011, bringing cumulative wind capacity to over 2 GW.
- Oklahoma's largest wind farm is nearing completion. The Canadian Hills project will have a capacity of 300 MW and is scheduled to be online by the end of 2012. Among the more notable large-scale energy purchasers from the project is Google, signing a ten-year, 48 MW agreement to power a local data center.
- The Oklahoma Bioenergy Center (OBC) is a research and economic development collaboration between the University of Oklahoma, Oklahoma State University, and the Samuel Roberts Noble Foundation working to cultivate the growth of Oklahoma's renewable energy industry.



**Wind Resources-** Ranking 8<sup>th</sup> in the nation, Oklahoma has the potential to produce 516,822 MW of wind power.



**Solar Resources-** Oklahoma has the estimated technical potential to produce 1,885 GW from rural utility-scale photovoltaics, and ranks 6<sup>th</sup> nationwide for solar power potential.

## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 22,411             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$1.3bn, 4/8 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals  |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$287.2m           |
| 1603 Cash Grant Program                                             | \$246.9m           |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



# Oklahoma

## Policies

**Renewable Portfolio Goal:** In 2010, Oklahoma established a goal for 15% of its total generation capacity to be derived from renewable energy sources by 2015. Clean energy sources including hydropower, hydrogen, wind, solar, geothermal, biomass, and other renewable energy resources are eligible, and energy efficiency may be used to meet up to 25% of the overall goal. Utilities are not required to use renewable energy credits to demonstrate compliance; instead, each utility must file an annual report with the Oklahoma Corporation Commission to document their renewable energy usage.

**Net Metering:** Oklahoma requires investor-owned utilities (IOUs) and electric cooperatives under the commission's jurisdiction to offer net metering to all customer classes for customer-owned renewable energy systems and combined heat and power facilities of up to 100 kW. Depending on the utility, net excess generation may be credited to the customer's next bill, be refunded to the customer if the utility agrees, or be granted to the utility monthly.

**Tax Incentives:** Zero-emission facilities that generate renewable power for third parties and are over 1 MW in capacity may qualify for a state income tax credit. Facilities placed in operation between 2007 and 2016 may qualify for a \$0.0050/kWh credit, which may be carried forward up to ten years.

Manufacturers of small wind turbines may qualify for an income tax credit for turbines manufactured on July 1, 2012 or after. The amount is \$25 per square foot of the rotor swept area.

Certain wind power generators may qualify for a five year ad valorem property tax exemption if they meet specific investment criteria.

Biodiesel and ethanol production facilities may qualify for a tax credit of \$0.20 per gallon of biofuels produced for up to five years. The credit is capped at \$25 million gallons of biofuel per year per facility. Eligible biodiesel facilities must have produced at least 25% of their original design capacity on or before December 31, 2008. Eligible ethanol facilities must have produced at least 25% of their original design capacity on or before December 31, 2010. Beginning in 2013, new or expanded biofuels facilities may receive a credit of \$0.075 per gallon for up to 36 months for new fuel production.

**Loan Program:** Oklahoma offers loans for public and nonprofit k-12 schools to reduce their energy consumption, which includes the installation of certain renewable energy systems. Loans generally cover 100% of the costs of the system, or up to \$200,000 per eligible school district. There is a 3% interest rate, and loans must be paid back within six years. The program is funded by oil overcharge restitution funds and has a budget of \$1 million.

Oklahoma has also established a loan/lease fund for institutes of higher education to install renewable energy systems, including solar electric, solar heating, and wind energy systems. The loan amount varies, although there is a maximum incentive of \$300,000. Loans must be repaid within one to six years at a 3% interest rate. The program is funded by oil overcharge restitution funds and has a budget of \$1.1 million.

The Oklahoma Department of Commerce operates a revolving loan fund that distributes loans of up to \$150,000 for local governments to install solar electric, solar heating, wind, biomass and certain other renewable energy systems. Loans must be repaid within six years, with a 3% interest rate. The program is funded by oil overcharge restitution funds and has a budget of \$1 million.

The Alternative Fuels Conservation Loan program provides 0% interest loans to government fleets for converting vehicles to operate on alternative fuels, constructing of alternative fuel vehicle fueling infrastructure, and purchasing original equipment manufacturer (OEM) alternative fuel vehicles. Loans must be repaid in seven years. The maximum award is \$10,000 per alternative fuel vehicle and up to \$300,000 for the development of alternative fueling infrastructure. The state also offers a 3% interest loan to companies and nonprofits that operate three or more alternative fuel vehicles, for converting vehicles and for purchasing original equipment manufacturer (OEM) alternative fuel vehicles.

# Renewable Energy in Oregon

## Summary

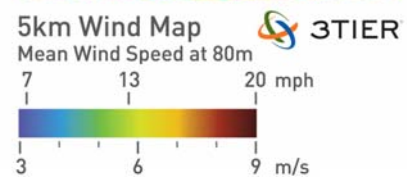
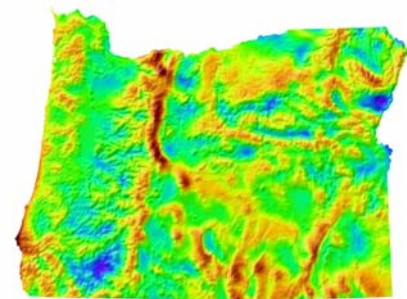
Oregon is on the leading edge of renewable energy production. It is one of the few states in the country undertaking wave power development and is home to the second largest land-based wind farm ever built. Oregon's tax credits for renewable energy have attracted many clean energy companies, particularly those involved in solar energy manufacturing. Recent technological and legislative developments across the board in wind, solar, biomass and waste, wave energy, geothermal and biofuels promise to provide Oregon with sustainable and diverse sources of energy for the future.

| Installed Renewable Energy Capacity, 2011 |          |               |                    |
|-------------------------------------------|----------|---------------|--------------------|
| Wind                                      | 2,513 MW | Ocean         | 0 MW               |
| Solar Photovoltaic                        | 36 MW    | Biomass Power | 361 MW             |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 149 mGy            |
| Geothermal                                | 0.28 MW  | Biodiesel     | 18 mGy             |
| Hydropower                                | 8,241 MW | <b>Totals</b> | 11,151 MW; 167 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- The Shepherds Flat wind farm became fully operational in September of 2012, and its 845 MW capacity makes it the second largest wind farm in the U.S.
- Oregon's central coast will be the site of the first U.S. commercial wave farm. Up to ten generators will be placed about two and a half miles off the coast of Reedsport, and they are expected to provide power for about 1,000 homes. The wave farm is expected to be commissioned by May 2013.
- Solar manufacturers in Oregon continue to benefit from the state's expertise in silicon, a skilled workforce, a network of suppliers, active solar development, and subsidies. In September 2012, a 225,000-square-foot manufacturing facility opened in Portland.
- An advanced geothermal pilot project is underway the Newberry Volcano, about 100 miles west of Eugene. The project will use dry rock to vaporize water, and, depending on the results, the developer ultimately aims to build a commercial-scale geothermal plant at the site.

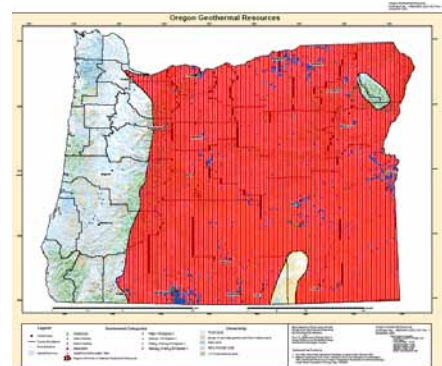


**Wind Resources**– Oregon has strong wind resources, especially offshore. Up to 27 GW of potential exists on land, while over 200 GW of potential exists off the coast.

## Economic Development

| Employment                                                          |                       |
|---------------------------------------------------------------------|-----------------------|
| Green Goods and Services Jobs, 2010                                 | 54,953                |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                       |
| Asset Finance, 2010-2011                                            | \$2.6bn, 5/11 deals   |
| Venture Capital & Private Equity, 2010-2011                         | \$166.0m, 12/12 deals |
| Recovery Act Funding (Total Awarded)                                |                       |
| Energy Contracts, Grants & Loans                                    | \$316m                |
| 1603 Cash Grant Program                                             | \$832.7m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Geothermal Resources**– The U.S. Interior Department identifies seven sites in Oregon as among the 35 "highest potential" geothermal regions in the country. Enhanced geothermal systems have the technical potential to generate 914,105 GWh in Oregon.

# Oregon

## Policies

**Renewable Portfolio Standard (RPS):** Oregon's RPS requires large utilities to procure 25% of their electricity sales from qualifying renewable energy sources by 2025 (which includes a limited number of hydropower facilities operational before 1995, as well as less than 11 MW of municipal solid waste each year). Smaller utilities are required to meet reduced targets (5% or 10% renewable energy by 2025), depending on their size. Investor-owned utilities (IOUs) must together develop 20 MW of solar PV by 2020. Oregon caps the amount of unbundled renewable energy credits (RECs) that large utilities can use at 20%, and large consumer-owned utilities can use at 50%, to meet RPS obligations. IOUs are allowed to raise electric rates to recover the costs associated with RPS compliance.

**Net Metering and Interconnection:** Oregon has separate net metering programs for the state's primary investor-owned utilities (IOUs) and for its municipal utilities and electric cooperatives. For IOUs, the system capacity limit is 2 MW for non-residential systems and 25 kW for residential systems. For non-IOUs, the limit is 25 kW. Net excess generation (NEG) is credited to IOU customers' next bill at the utility's retail rate, while treatment of NEG varies for non-IOUs. The program has no aggregate capacity limit. Interconnection standards apply to customers of IOUs with systems up to 20 MW for large generators, 10 MW for small generators, 25 kW for residential net metered systems, and 2 MW for non-residential net metered systems. There are three levels of review for IOU customers and special rules for the interconnection of small, non-net metered generator facilities of 10 MW and under and for large generator facilities over 20 MW. Non-IOUs follow interconnection guidelines developed by the Oregon Building Codes Division.

**Production Incentive:** The Oregon Public Utilities Commission determines the rules and rates for Oregon's Pilot Solar Volumetric Incentive and Payments Program, and the state's three IOUs are responsible for its operation. The pilot program is limited to an aggregate capacity of 25 MW of solar PV, with a maximum system size cap of 500 kW. The incentive rate is set at the time of enrollment and depends on system size and geographic zone. Unlike the German feed-in tariff model, the power produced onsite offsets the owner's electric costs. Payment to the producer is made for the kilowatt-hours generated over a period of 15 years.

**Tax Incentives:** Personal tax credits for residential renewable energy systems vary by technology type. PV systems and fuel cells are eligible for the highest credit at \$2.10 per peak watt with a maximum limit of \$6,000, or up to 50% of the installed cost.

The added value from the installation of a qualifying renewable energy system may not be included in the assessment of the property's value for property tax purposes.

Agricultural producers and collectors of biomass used for power or fuel may qualify for a corporate tax credit. The amount varies by feedstock type.

The tax credit for facilities that manufacture renewable energy resource equipment equals 50% of the construction costs. Manufacturers are awarded 10% of the credit each year for five years.

Residents may qualify for an income tax credit of \$0.50 per gallon of gasoline blended with at least E85 or B99.

**Rebates and Grants:** The Energy Trust of Oregon, an independent nonprofit association, manages several state-wide rebate and grant programs that provide a broad array of incentives for renewable energy installations, including rebates for solar water heating, solar PV, geothermal heat pumps, community wind projects of up to 20 MW in capacity, and small wind projects of up to 100 kW in capacity. Visit the website for more information: <http://energytrust.org/residential/incentives>

**Loan Program:** The Oregon Small-Scale Energy Loan Program (SELP) offers low-interest loans for renewable energy. There is no maximum loan amount; however, loans generally range from \$20,000 to \$20 million and must be paid back within five to 15 years.

**Public Benefit Fund (PBF):** The Energy Trust of Oregon administers Oregon's PBF to fund financial incentives for both small and utility scale renewable energy projects in the state. The fund will generate \$14.2 million for renewables in 2012 by requiring Pacific Power and Portland General Electric to collect a public-purpose charge from their customers.

**Renewable Fuel Mandate:** Oregon mandates that all gasoline sold in the state must contain 10% ethanol and all diesel sold in the state must contain 5% biodiesel.



# Renewable Energy in Pennsylvania

## Summary

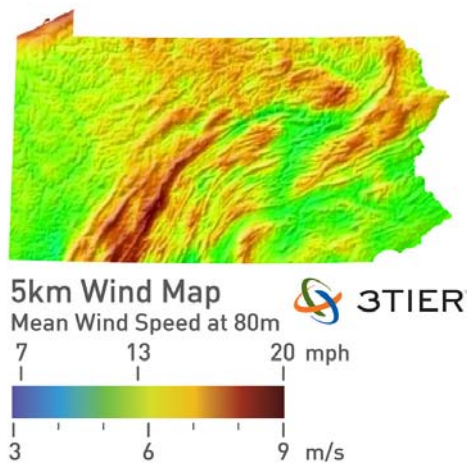
Pennsylvania is home to developing wind, solar, and biomass energy markets that hold significant opportunity for expansion. The state has been particularly successful in attracting wind and solar manufacturers to locate their facilities in state. However, Pennsylvania’s alternative energy portfolio standard requires a greater percentage of generation from alternative energy sources, such as waste coal and coal gasification, than from renewable energy sources. In addition, the state recently cut funding for existing renewable energy programs in favor of increased natural gas development. This could slow deployment of renewable energy systems in the foreseeable future.

| Installed Renewable Energy Capacity, 2011 |        |               |                   |
|-------------------------------------------|--------|---------------|-------------------|
| Wind                                      | 789 MW | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 133 MW | Biomass Power | 598 MW            |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 110 mGy           |
| Geothermal                                | 0 MW   | Biodiesel     | 111 mGy           |
| Hydropower                                | 778 MW | <b>Totals</b> | 2,298 MW; 221 mGy |

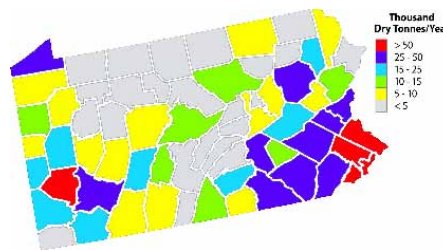
Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- A \$250 million, 141 MW wind farm located in Wyoming County is set to be operational by January 2013. Developers are also exploring the option to add solar panels to the wind farm at a later date.
- Pennsylvania boasts a strong manufacturing base in both the solar PV and wind sectors. The combination of pipeline efficiency and favorable local resources has allowed for an additional 500 MW of wind and solar PV capacity to be added between January and September of 2012.
- Pennsylvania school districts are demonstrating a continuing interest in renewable energy. Both solar PV installations and wind turbines are currently deployed to power schools as well as educate students about renewable energy.



**Wind Resources-** Pennsylvania contains 661 km<sup>2</sup> of windy land, with wind speeds reaching 9 m/s. The state could potentially produce up to 3 GW from its wind resource.



**Biomass (Forest Residue) Resources-** Red represents the best resource area while blue and purple indicate excellent to superb areas. Pennsylvania ranks 2nd in secondary mill resources with 127 thousand metric tons per year and 7th in urban wood waste with 1,238 thousand metric tons per year. In total, the state has 6.569 million tons of biomass resources.

## Economic Development

| Employment                                                          |                      |
|---------------------------------------------------------------------|----------------------|
| Green Goods and Services Jobs, 2010                                 | 182,193              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                      |
| Asset Finance, 2010-2011                                            | \$181.7m, 7/15 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$4.1m, 2/2 deals    |
| Recovery Act Funding (Total Awarded)                                |                      |
| Energy Contracts, Grants & Loans                                    | \$896.1m             |
| 1603 Cash Grant Program                                             | \$432.1m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



# Pennsylvania

## Policies

**Alternative Energy Portfolio Standard:** Pennsylvania law requires each electric distribution company (EDC) and electric generation supplier (EGS) to supply 18% of their electricity using alternative energy sources by 2020. This includes 8% from “Tier I” resources, including both new and existing solar PV, solar thermal, wind, low-impact hydro, geothermal, biomass, biologically-derived methane gas, coal-mine methane, and fuel cell energy systems; and 10% from “Tier II” resources, including both new and existing distributed generation systems, large-scale hydro, municipal solid waste, wood-pulping and manufacturing by-products, demand-side management, waste coal, and integrated gasification combined cycle coal technology systems. The standard also includes an alternative compliance payment (ACP) provision of \$45 per MWh. For the solar carve-out provision, EDCs and EGSs must pay two times the sum of the market value of solar alternative energy credits (AEC) and the fair value of up-front rebates received by sellers of solar AECs. AECs are allowed to be used as long as their production is verified by metered data on systems of 15 kW or more.

**Net Metering and Interconnection:** Pennsylvania requires investor-owned utilities (IOUs) to offer net metering to residential customers with systems up to 50 kW in capacity, nonresidential customers with systems up to 3 MW, and emergency and micro-grid systems between 3 MW and 5 MW. Net excess generation (NEG) is credited to the customer's next bill at the full retail rate. Customers are compensated for remaining NEG after the 12 month billing cycle and retain ownership to all AECs created. Virtual meter aggregation is allowed for properties the customer owns or leases within two miles of their property and within the same utility's service territory. The program allows use of third-party ownership models in conjunction with net metering as long as the systems do not produce more than 110% of on-site electricity needs. Pennsylvania provides interconnection standards for net metered systems up to 5 MW, with four levels of review depending on system size and type.

**Solar Renewable Energy Credits:** Pennsylvania offers incentives for solar production to help electricity suppliers meet their compliance obligations under the state RPS. There are no system size limitations, and prices vary on market conditions but can range from \$0.12 - \$0.17 per kWh.

**Tax Incentives:** Pennsylvania allows the value added to a property by wind turbines and related equipment (including towers and foundations) to be exempt from property tax, but also provides an alternative valuation method.

**Grants, Loans and Rebates:** The state offers programs for a range of residential and commercial renewable energy systems for varying grants, rebates, loans and industry recruitment incentives. Many programs were not open for funding at the time of this report's publication, due to an ongoing review and update of their guidelines. Visit these state websites for more information:

[http://www.portal.state.pa.us/portal/server.pt/community/grants\\_loans\\_tax\\_credits/10395](http://www.portal.state.pa.us/portal/server.pt/community/grants_loans_tax_credits/10395);

<http://www.newpa.com/find-and-apply-for-funding>

**Public Benefits Programs:** Pennsylvania has four sustainable energy funds created and overseen by the state's five major utilities. The funds aim to promote the development and use of renewable energy and advanced clean energy technologies, energy conservation and efficiency, and sustainable-energy businesses. The programs have collected \$99 million in revenue through 2012.

**Renewable Fuels Mandate:** Pennsylvania mandates that all gasoline sold in the state must contain 10% cellulosic ethanol, one year after in-state production has reached 350 million gallons of cellulosic ethanol for a minimum three month period. All diesel sold in the state must contain 2% biodiesel, one year after the state has produced 40 million gallons of biodiesel, which will ramp up to 20% biodiesel once the state produces 400 million gallons of biodiesel.



# Renewable Energy in Rhode Island

## Summary

With some of the highest electricity prices in the nation and a strong dependence on imported electricity, Rhode Island has implemented a number of policy measures designed to diversify its in-state energy fuel sources and decrease energy price volatility. If plans proceed according to expectation, offshore wind will become a primary source of renewable power in the state. In fact, a state authored report notes that nearly 98% of the potential wind capacity needed to satisfy its renewable goals is located offshore (Rhode Island Office of Energy Resources). In addition, the state implemented a feed-in tariff program in mid-2011 that will ramp up the state's renewable energy production, with the target of procuring 40 MW of new, renewable energy by 2014.

| Installed Renewable Energy Capacity, 2011 |      |               |              |
|-------------------------------------------|------|---------------|--------------|
| Wind                                      | 2 MW | Ocean         | 0 MW         |
| Solar Photovoltaic                        | 1 MW | Biomass Power | 26 MW        |
| Concentrated Solar Thermal                | 0 MW | Bioethanol    | 0 mGy        |
| Geothermal                                | 0 MW | Biodiesel     | 2 mGy        |
| Hydropower                                | 3 MW | <b>Totals</b> | 32 MW; 2 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Development continues on the state's offshore wind facilities. A major project includes a \$250 million, 30 MW demonstration facility near Block Island, as well as a \$5 billion, 1,000 MW regional offshore wind hub. The project and its associated undersea transmission network received a favorable regulatory decision in August 2012, and construction is expected to begin as early as mid-2013.
- The U.S. Navy is currently assessing the construction of a 9 MW wind farm at the historic Naval Station Newport. The project aligns with the Navy's decision to purchase 1 GW of renewable energy by the end of this decade.



**Wind Resources-** Rhode Island has limited opportunity for onshore wind generation, but its offshore technical potential exceeds 20 GW.



**Biomass Resources-** Light green indicates moderate biomass potential. The state has about 174 thousand metric tons a year of biomass resources; of which wood waste accounts for about one third.

## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 11,924             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$80.5m, 2/3 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals  |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$76.5m            |
| 1603 Cash Grant Program                                             | \$1.1m             |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.

# Rhode Island

## Policies

**Renewable Portfolio Standard (RPS):** Rhode Island requires the state's investor-owned utilities (IOUs) and retail electric suppliers to supply 16% of their retail electricity sales from renewable energy technologies by the end of 2019. Eligible technologies include solar electric, landfill gas, wind, biomass, hydroelectric facilities 30 MW and under, geothermal electric, anaerobic digestion, ocean energy, biodiesel, and fuel cells using renewable fuels. Electricity providers must purchase New England Power Pool Generation Information System (NEPOOL-GIS) certificates or make an alternative compliance payment of \$64.02 per MWh to the state's Renewable Energy Development Fund to comply. A separate standard, the Long Term Contracting Standard for Renewable Energy, requires electric distribution companies to solicit proposals and enter into long-term contracts for new, in-state renewable energy facilities. Of this requirement, 90 MW must be contracted by 2014, with at least 3 MW from in-state solar facilities.

**Net Metering:** Rhode Island requires investor-owned utilities (IOUs) to offer net metering to customers who install systems that generate electricity using solar, wind, ocean-thermal, geothermal, small hydropower, or biogas. The individual system capacity limit for net metering is 5 MW. IOUs must offer net metering until aggregated system capacity reaches 3% of a utility's peak load (2 MW is reserved for systems under 50 kW). The customer has the option to roll net excess generation credit over to their next electric bill or sell it back to the utility at the avoided cost rate. Rhode Island's interconnection standards are not as comprehensive as standards in other states and apply only to customers of IOUs.

**Tax Incentives:** Rhode Island offers a corporate tax credit for the installation of solar electric, solar heating, wind, and geothermal heat pump systems on residences. The tax credit is equal to 25% of the system costs and is only available to the business that pays for the system. There is a maximum system cost of \$15,000 for PV, active solar space heating, and wind systems and \$7,000 for solar hot water and geothermal systems. Unused credits in the year of installation may not be carried over to subsequent tax years.

Solar heating, solar electric, wind, and geothermal heat pump systems are exempt from the state's sales and use tax.

Rhode Island law states that residentially installed solar PV, solar hot water, and active solar space heating systems are to be assessed for municipal property tax purposes at no more than the value of a conventional energy system.

**Feed-in Tariff:** The Distributed Generation Standard Contracts program requires electric distribution companies to enter into standard contracts with new distributed renewable energy generators of 5 MW and under until they reach an aggregate capacity of at least 40 MW by the end of 2014. The standard contracts include a fixed payment rate and a 15-year term. Eligible technologies include solar, wind, landfill gas, ocean thermal, geothermal, small hydropower, certain biomass, and fuel cell systems that use renewable resources.

**Grants and Loans:** The Rhode Island Economic Development Corporation (RIEDC) provides financial assistance for renewable energy projects. The programs are funded through the Rhode Island Renewable Energy Fund (RIREF), which is supported by a surcharge on electric customer's bills of \$0.0003/kWh. There are four program areas:

The *Nonprofit Affordable Housing Investment Program* provides up to two \$100,000 awards per year to non-profit affordable housing developers and agencies.

The *Municipal Renewable Energy Investment Program* provides \$500,000 per award per year (with a \$1 million program cap) for municipalities.

The *Pre-Development Consultant and Technical Feasibility Program* provides incentives of up to \$100,000 per award (totaling up to \$200,000 per year) for business, nonprofit, municipality, civic and educational institution renewable energy projects.

The *Renewable Energy Development Program* provides incentives of up to \$250,000 per award (totaling up to \$750,000 per year) for business, nonprofit, municipality, civic and educational institution projects.

# Renewable Energy in South Carolina

## Summary

South Carolina has significant renewable energy development potential from its offshore wind and biomass resources. The state provides substantial tax incentives that offer support for renewable energy's expansion, but the lack of a renewable portfolio standard has resulted in slow growth. As the offshore wind industry matures, South Carolina will be poised to become a leader in wind energy generation.

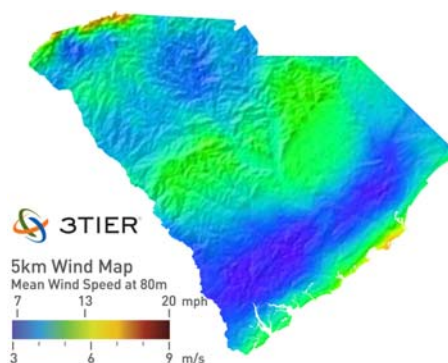
### Installed Renewable Energy Capacity, 2011

|                            |          |               |                  |
|----------------------------|----------|---------------|------------------|
| Wind                       | 0 MW     | Ocean         | 0 MW             |
| Solar Photovoltaic         | 4 MW     | Biomass Power | 321 MW           |
| Concentrated Solar Thermal | 0 MW     | Bioethanol    | 0 mGy            |
| Geothermal                 | 0 MW     | Biodiesel     | 90 mGy           |
| Hydropower                 | 1,363 MW | <b>Totals</b> | 1,688 MW; 90 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- The Clemson University Wind Turbine Drivetrain Testing Facility in North Charleston is scheduled to begin operations by early 2013. When completed, the facility will allow for advanced testing of turbine drivetrain systems as large as 15 MW.
- After a change in ownership, construction is underway on biomass plants in Dorchester and Allendale Counties. Combined, these plants will generate 36 MW, and they are expected to be fully operational by the end of 2013.
- South Carolina's first combined heat and power facility commenced operations in March 2012. The facility uses forestry residues to create 240,000 pounds of steam per hour.



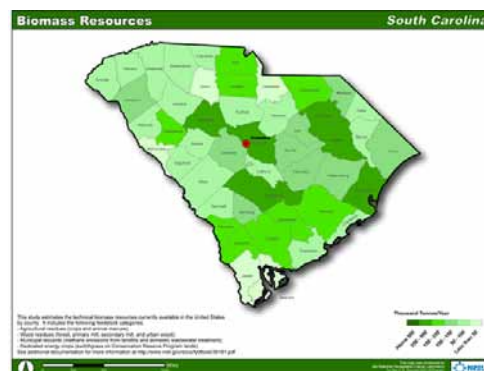
**Wind Resources-** South Carolina's wind resources are located almost exclusively offshore, and have the technical potential to generate 133 GW.

## Economic Development

### Employment

|                                                                            |                   |
|----------------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                        | 35,100            |
| <b>Private Sector Investment</b> (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                                   | \$0.0m, 0/1 deals |
| Venture Capital & Private Equity, 2010-2011                                | \$0.0m, 0/0 deals |
| <b>Recovery Act Funding</b> (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                           | \$1.8bn           |
| 1603 Cash Grant Program                                                    | \$14.4m           |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** South Carolina has about 6,315,000 metric tons per year of biomass resources. Primary mill waste accounts for about one fourth of all biomass resources at 2,468,000 metric tons per year. The state has the potential to generate over 8,000 GWh from biopower.

# South Carolina

## Policies

**Interconnection Standards:** The South Carolina Public Service Commission (PSC) provides interconnection guidelines for renewable energy systems, including standards for non-residential systems up to 100 kW and simplified procedures for residential systems up to 20 kW. There is a \$100 application fee for residential systems and a \$250 application fee for non-residential systems. The guidelines apply to the state's four investor-owned utilities. An external disconnect switch is required.

**Tax Incentives:** A personal or corporate tax credit is provided for 25% of the eligible costs of purchasing and installing of solar electric, solar heating and cooling, or small hydropower systems. The credit may not exceed the lesser of \$3,500 per year or 50% of the taxpayer's tax liability for that taxable year. Excess credit may be carried forward up to ten years.

A personal or corporate tax credit is provided for up to 25% of the eligible costs of a biomass energy system. The credit may not exceed the lesser of \$650,000 per year or 50% of the tax liability for that taxable year. Excess credit may be carried forward for 15 years.

The state offers a sales tax exemption for fuel cell and hydrogen energy systems.

Commercial biofuel production facilities may qualify for a tax credit of 25% of the cost of constructing or renovating a building and equipping a facility. The credit must be taken in seven equal annual installments.

**Loans:** The state provides loans ranging from \$25,000 to \$500,000 to nonprofit, public, and institutional entities who install solar PV, biomass, geothermal heat pumps, and certain other renewable energy systems.

**Production Incentives:** Through the Energy Freedom and Rural Development Act, the state provides an incentive of \$0.01 per kilowatt-hour (kWh) for the electricity generated and \$0.30 per therm for the energy produced from biomass, landfill gas, CHP, and anaerobic digester systems. There is a maximum incentive of \$100,000 per fiscal year per taxpayer, and \$2.1 million per fiscal year for all taxpayers.

# Renewable Energy in South Dakota

## Summary

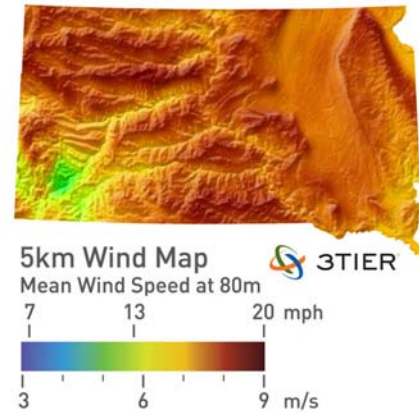
Non-hydropower renewable energy accounted for more than 20% of South Dakota's total in-state electricity generation in 2011, up from 1% in 2001, and the state has a significant opportunity to further develop its switchgrass, wind, and crop residue resources. The state has implemented a 10% renewable portfolio goal, which opens the door for more aggressive policies. Its tax credit for wind energy supports many of the development costs for building wind farms.

| Installed Renewable Energy Capacity, 2011 |          |               |                     |
|-------------------------------------------|----------|---------------|---------------------|
| Wind                                      | 784 MW   | Ocean         | 0 MW                |
| Solar Photovoltaic                        | 0 MW     | Biomass Power | 0 MW                |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 1,009 mGy           |
| Geothermal                                | 0 MW     | Biodiesel     | 7 mGy               |
| Hydropower                                | 1,598 MW | <b>Totals</b> | 2,382 MW; 1,016 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- As of April 2012, South Dakota ranks sixth among all other states for ethanol production, most of which is derived from corn.
- The state hosts a cellulosic ethanol pilot facility that uses cobs from previous corn harvests and corn fiber extracted from an adjacent corn ethanol production facility to produce fuel.
- South Dakota provided 22.3% of its electricity from wind power in 2011, the highest percentage of any state (American Wind Energy Association).
- A joint study conducted by the USDA Economic Research Service, the National Renewable Energy Laboratory, and the Lawrence Berkeley National Laboratory has determined that every megawatt of installed capacity in South Dakota led to an additional \$11,000 in personal income and 0.5 jobs per county during the time period studied.

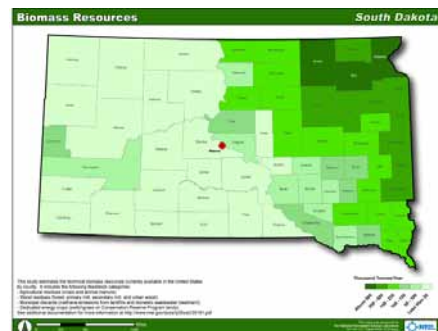


**Wind Resources-** South Dakota has several regions with excellent wind resource classifications. With windy land area comprising nearly 90% of the state, South Dakota has the potential to generate 882 GW from its wind resource.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 11,239              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$363.0m, 1/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals   |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$78.3m             |
| 1603 Cash Grant Program                                             | \$257.2m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** South Dakota has about 10,342 thousand metric tons per year of biomass resources. Crop residue and switchgrass on Conservation Reserve Program (CRP) lands each account for about half of its total biomass resources.



# South Dakota

## Policies

**Renewable Portfolio Goal:** South Dakota set a voluntary objective that 10% of all retail electricity sales in the state be obtained from renewable and recycled energy by 2015. Retail providers must submit a report to the public utilities commission each year on their progress, but there are no penalties for non-compliance.

**Interconnection Standards:** South Dakota's interconnection standards for distributed generation apply to customers of investor-owned utilities. There are four levels of review for systems up to 10 MW in capacity. Utilities are authorized to require the use of an external disconnect switch.

**Tax Incentives:** South Dakota provides a refund for the sales and use tax and the excise tax for applicable wind energy facilities, electric transmission lines and associated facilities, and business facilities that manufacture or distribute wind or transmission components. The tax refund schedule is determined by a percentage of the taxes paid. Eligible projects that cost between \$10 million and \$40 million receive a 45% refund of the taxes paid, and projects that cost over \$40 million receive a 55% refund of taxes paid.

For wind farms of more than 5 MW or greater in capacity, South Dakota has an alternative tax assessment method in lieu of all real and personal property taxes that allows a reduced tax equal to \$3 per kW of the project's capacity and 2% of the gross receipts of the wind farm. Partial rebates are available for the transmission line and collector system equipment that serves an eligible facility.

The first \$50,000 or 70% of the assessed value of all real property used or constructed for renewable energy systems of up to 5 MW is exempt from the real property tax.

The state awards tax credits to entities that blend biodiesel with special fuel (including diesel), which are granted on a per gallon basis for the amount that the rate for special fuel exceeds the rate for the biodiesel blend.

**Production Incentives:** Ethanol and biobutanol producers that fully distill and produce their product in state may qualify for a \$0.20 per gallon production incentive. Ethanol producers must have begun operation before the end of 2006. The maximum annual incentive is \$1 million, and cumulative installations may not exceed \$4 million (which increases to \$7 million after 2016).

# Renewable Energy in Tennessee

## Summary

Through tax incentives, grants and other supportive policies, Tennessee has created an environment to spur economic growth and employment in the renewable energy industry. The industry is still young, and there is significant potential to develop the state's vast biomass and wind resources to support its continued growth, particularly through the addition of a renewable portfolio standard. Until further commitment is made, the development of these resources may remain slow.

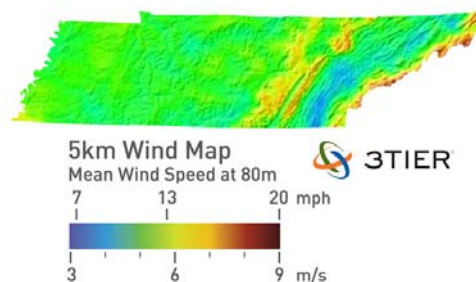
### Installed Renewable Energy Capacity, 2011

|                            |          |               |                   |
|----------------------------|----------|---------------|-------------------|
| Wind                       | 29 MW    | Ocean         | 0 MW              |
| Solar Photovoltaic         | 22 MW    | Biomass Power | 194 MW            |
| Concentrated Solar Thermal | 0 MW     | Bioethanol    | 225 mGy           |
| Geothermal                 | 0 MW     | Biodiesel     | 53 mGy            |
| Hydropower                 | 2,499 MW | <b>Totals</b> | 2,745 MW; 278 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- An innovative new downdraft gasification project in western Tennessee will generate electricity by using woody biomass and biosludge as feedstock.
- Because of the scope and variety of its biomass resource, Tennessee is home to groups engaged in the research and development of bioenergy, including the Oak Ridge National Laboratory.
- A demonstration plant in Vonore is successfully producing cellulosic ethanol from switchgrass and corn stover. The facility is one of the first of its kind in the nation, and is currently scaling up its process.
- The largest solar installation in Tennessee is currently under construction in Chattanooga. The \$30 million facility secured financing in August 2012 and will have a nameplate capacity of 10 MW.



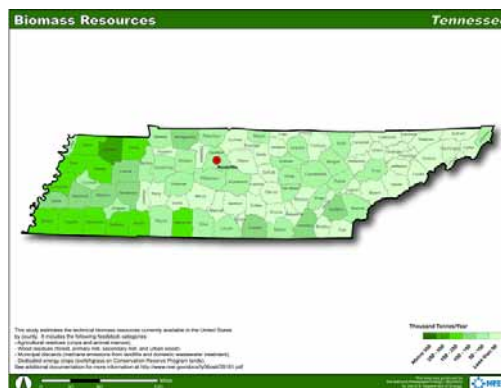
**Wind Resources-** With speeds averaging 6.5-7 m/s along the Tennessee-North Carolina border, the state has the potential to generate around 800 GWh of wind power.

## Economic Development

### Employment

|                                                                            |                    |
|----------------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                        | 62,004             |
| <b>Private Sector Investment (Disclosed Amount, Disclosed/Total Deals)</b> |                    |
| Asset Finance, 2010-2011                                                   | \$35.3m, 2/4 deals |
| Venture Capital & Private Equity, 2010-2011                                | \$0.0m, 0/1 deals  |
| <b>Recovery Act Funding (Total Awarded)</b>                                |                    |
| Energy Contracts, Grants & Loans                                           | \$1.3bn            |
| 1603 Cash Grant Program                                                    | \$30.8m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Tennessee has about 6,745,000 metric tons per year of biomass resources, and biopower alone has the potential to provide an estimated 8,080 GWh of energy in the state.

# Tennessee

## Policies

**Tax Incentives:** Wind energy systems operated by public utilities, businesses, or industrial facilities may not be taxed at more than one-third of their total installed cost.

Manufacturers of clean energy technologies may their have sales and use tax reduced to 0.5%. Qualifying manufacturers must make a minimum \$100 million investment, create and maintain 50 full-time jobs for ten years that pay 150% above the Tennessee occupational average wage, and must be subject to the franchise and excise taxes.

Tennessee provides a tax credit of up to \$1.5 million, applied to a company's franchise and excise tax liability, to industries in the green supply chain that invest more than \$250 million into the state within three years.

Taxpayers can receive a tax credit, receive a tax refund for taxes paid, or make tax-exempt purchases for systems that produce electricity in a certified green energy production facility. Certified green energy production facilities may also qualify for a special ad valorem property tax assessment.

**Production Incentives:** Biodiesel producers may qualify to receive payments for biodiesel fuel produced and sold to Tennessee distributors, for up to 10 million gallons produced annually.

**Grants:** The Biofuel Green Island Corridor Grant Project awards competitive grants to establish biofuel stations that distribute E85 and B20 within 100 miles of each other along the state's interstate system and major highways. There were no open grant solicitations at the time of this report's publication.

# Renewable Energy in Texas

## Summary

Texas boasts massive resource potential in multiple renewable energy sectors, giving it a diverse fuel mix as the demand for clean energy grows. Texas leads the nation in wind power generation, with more than twice the installed capacity as the next closest state. In addition, Texas has more biodiesel capacity than any other state in the nation. Other technologies, including electricity from biomass, solar photovoltaics, and geothermal sources show huge promise and will likely be further developed in coming years.

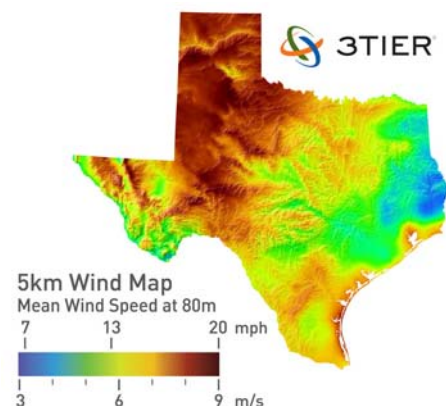
### Installed Renewable Energy Capacity, 2011

|                            |           |               |                    |
|----------------------------|-----------|---------------|--------------------|
| Wind                       | 10,377 MW | Ocean         | 0 MW               |
| Solar Photovoltaic         | 86 MW     | Biomass Power | 350 MW             |
| Concentrated Solar Thermal | 0 MW      | Bioethanol    | 355 mGy            |
| Geothermal                 | 0 MW      | Biodiesel     | 577 mGy            |
| Hydropower                 | 698 MW    | <b>Totals</b> | 11,511 MW; 933 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Texas continues to be the national leader in wind power, and the state is currently home to some of the largest wind farms in the world. As of mid-2012, Texas has 1,573 MW wind capacity under construction, to add to an established capacity totaling roughly 11,000 MW.
- In early 2012, a five-phase, 400 MW solar PV installation was announced for the San Antonio area. Developed via a public-private partnership, it would be one of the largest solar projects in the nation once complete.
- Transmission lines tailored to renewable energy sources continue to be an area of focus in Texas. Investment in the state's Competitive Renewable Energy Zones (CREZ) has grown to \$7 billion in 2012, and will allow an even greater amount of electricity to flow from rural wind generation sites to high-demand urban sites.



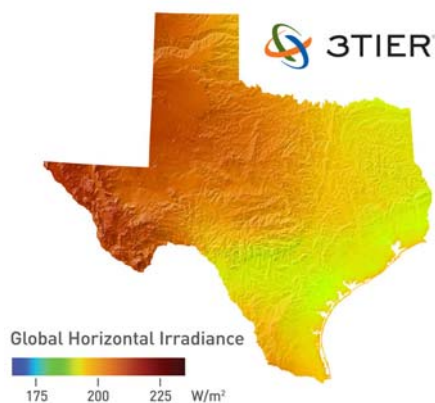
**Wind Resources-** With significant wind power potential in the Great Plains, the Gulf Coast and specific areas in the Trans-Pecos region. Texas has a total technical potential capacity of 2,173 GW from onshore and offshore wind installations.

## Economic Development

### Employment

|                                                                            |                       |
|----------------------------------------------------------------------------|-----------------------|
| Green Goods and Services Jobs, 2010                                        | 229,685               |
| <b>Private Sector Investment (Disclosed Amount, Disclosed/Total Deals)</b> |                       |
| Asset Finance, 2010-2011                                                   | \$608.3m, 5/23 deals  |
| Venture Capital & Private Equity, 2010-2011                                | \$402.3m, 25/26 deals |
| <b>Recovery Act Funding (Total Awarded)</b>                                |                       |
| Energy Contracts, Grants & Loans                                           | \$1.2bn               |
| 1603 Cash Grant Program                                                    | \$1.8bn               |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Solar Resources-** Texas has the total technical potential to generate nearly 40 million GWh from solar photovoltaics. West Texas has 75% more direct solar radiation than East Texas, and is an ideal location for utility scale CSP projects.

# Texas

## Policies

**Renewable Portfolio Standard (RPS):** Texas was one of the first states to adopt rules for a renewable energy mandate, establishing a Renewable Portfolio Standard (RPS), a Renewable Energy Credit (REC) trading program, and renewable energy purchase requirements for competitive retailers in the state. The RPS requires 5,880 MW to be generated from eligible renewable energy technologies by 2015, with a target of 500 MW generated from non-wind technologies. Furthermore, the mandate established a goal of 10,000 MW of renewable energy capacity by 2025. Compliance for retail providers under the RPS is calculated using a capacity conversion factor (CCF), of 32.2% for 2012 and 2013, in order to translate MW goals into MWh requirements. A “compliance premium” is offered for each non-wind REC generated after December 31, 2007, doubling the compliance value of renewable resources other than wind.

In 2009, Texas reached its goal of having 10,000 MW of renewable energy capacity, 16 years ahead of schedule, with 97% coming from wind. This was the second time that Texas had reached its RPS target ahead of schedule, passing its original mandate from 1999 three years early, in 2006.

**Interconnection Standards:** Interconnection rules apply to customers of investor-owned utilities who install renewable energy systems up to 10 MW. Conditions vary based on system size, and there are no pre-connection fees for systems less than 500 kW. Texas utilities are authorized but not required to offer net metering.

**Revolving Loan Program:** The LoanSTAR Program offers low-interest loans of up to \$5 million to all public entities for the installation of solar electric, solar heating, wind, and geothermal heat pump systems. Loans are repaid through energy cost savings over ten years or less, and interest rates vary by project. The program budget is \$190 million, including funds from the Petroleum Violation Escrow Funds and the American Recovery and Reinvestment Act.

**Grants:** The Texas Department of Rural Affairs (TDRA) offers grants to qualified local, non-entitlement governments (of under 50,000 residents) and qualifying counties (of under than 200,000 residents) for the installation of renewable energy systems. The program budget for 2012 is \$500,000, funded by the Federal Community Development Block Grant (CDBG).

**Tax Incentives:** Texas offers a franchise tax exemption to companies that have a primary business of manufacturing, selling, or installing devices that store or produce solar or wind energy for onsite usage. The franchise tax is the Texas equivalency to the corporate state tax. Texas also allows a franchise tax deduction of 10% of the amortized cost of a wind or solar system from the company’s apportioned margin.

Texas offers a property tax exemption for the value added by the installation or construction of renewable energy systems at commercial, industrial or residential buildings.



# Renewable Energy in Utah

## Summary

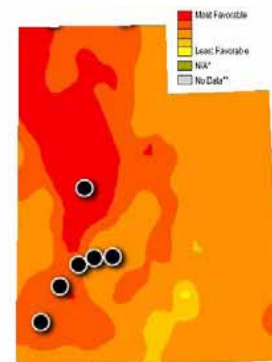
Utah has a vast and uniquely diverse renewable energy resource potential that rivals that of most of its neighboring states. However, unlike many other states in the region, Utah does not have a mandatory renewable portfolio standard. In order to encourage renewable energy development, the state provides an array of tax incentives and programs to help residents, commercial, and industrial entities provide clean energy to the state's grid.

| Installed Renewable Energy Capacity, 2011 |        |               |                |
|-------------------------------------------|--------|---------------|----------------|
| Wind                                      | 325 MW | Ocean         | 0 MW           |
| Solar Photovoltaic                        | 4 MW   | Biomass Power | 10 MW          |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 0 mGy          |
| Geothermal                                | 42 MW  | Biodiesel     | 10 mGy         |
| Hydropower                                | 262 MW | <b>Totals</b> | 643 MW; 10 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Utah saw the addition of 91 MW of geothermal capacity through the first quarter of 2012, and the state currently has 11 geothermal projects currently in various stages of development.
- The Milford Wind Corridor project is the largest wind project in the state. Phase II of the project was commissioned in mid-2011, adding an additional 102 MW and bringing total capacity to 305.5 MW.
- The Calvin L. Rampton Salt Palace Convention Center saw the commissioning of Utah's largest solar array in early 2012. The rooftop installation has a capacity of 1.6 MW, and is expected to offset 17% of the electricity consumed by the building.

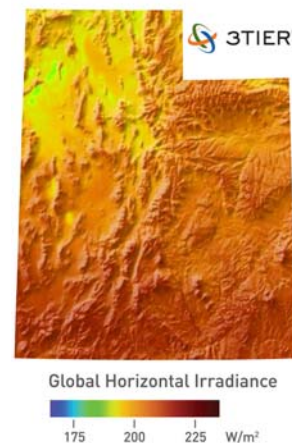


**Geothermal Resources-** Utah has a technical potential of 12,982 GWh from conventional geothermal sources.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 27,948              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$318.8m, 2/2 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.0m, 0/0 deals   |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$367.8m            |
| 1603 Cash Grant Program                                             | \$238.8m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Solar Resources-** Utah ranks 8<sup>th</sup> among the states in solar resources with a photovoltaic potential of 5.2 million GWh.

# Utah

## Policies

**Renewable Portfolio Goal:** Utah established a goal for municipal utilities, investor-owned utilities (IOUs) and rural electric cooperatives to produce or buy 20% renewable energy of their adjusted retail electric sales by 2025, to the extent that is cost-effective to do so. Eligible technologies include: solar electric and thermal (thermal technologies may be counted by how much fossil fuel energy consumption they displace), wind, biomass (under certain conditions), hydroelectric (under certain conditions), marine, geothermal, waste gas, waste heat, landfill gas, coal mine methane, certain energy storage, and anaerobic digestion. Utilities must file progress reports every five years, but there are no interim targets. Utilities may purchase renewable energy certificates (RECs) produced within the Western Electricity Coordinating Council (WECC) territory to meet their target. As an incentive for solar energy systems, each kilowatt-hour (kWh) produced using solar energy is recorded as 2.4 kWh for compliance purposes.

**Net Metering and Interconnection:** Utah requires its IOU and most electric cooperatives to offer net metering for systems 25 kW and under for residential customers and 2 MW and under for non-residential customers. Treatment of net excess generation (NEG) varies. For residential and small business customers of the state's IOU, NEG is credited to the customer's next bill, and at the end of the 12 month billing period is granted to the utility. For large commercial and industrial customers of the IOU, NEG is valued at an avoided cost based rate or at an alternative rate based on utility revenue and sales. For co-op customers, it is credited at the avoided cost rate. The IOU may offer net metering until 20% of its 2007 peak demand is met, and co-ops may offer net metering until their 0.1% of their 2007 peak demand is met. Utah's interconnection rules are based on the Federal Energy Regulatory Commission's (FERC) interconnection standards for small generators and provide for three levels of interconnection for systems up to 20 MW, based on system size.

**Tax Incentives:** Utah provides a 25% personal or corporate tax credit for most conventional renewable energy residential systems, with up to a maximum credit of \$2,000 per residential unit. The residential credit is nonrefundable, but can be carried forward for the next four years. Commercial wind, geothermal electric or biomass systems over 660 kW may qualify for a refundable production tax credit of 0.35¢/kWh for four years. Other commercial systems are allowed a 10% refundable investment tax credit, with a maximum credit of up to \$50,000. The credits for commercial systems may not be carried forward or backward. The credit may be used for up to seven years from the initiation of the lease.

Utah allows commercial, utility, and industrial entities to be exempt from sales tax resulting in the purchase or lease of equipment for new renewable power systems of 2 MW or greater.

The Alternative Energy Development Incentive (AEDI) is a post-performance refundable tax credit for up to 100% of new state tax revenues (including corporate, sales and withholding taxes) over the life of a manufacturing project. It is meant to encourage renewable energy producers and manufacturers to locate their projects in Utah.

# Renewable Energy in Vermont

## Summary

Hydroelectric power is the backbone of Vermont’s renewable energy portfolio, accounting for 20% of the state’s total electricity use. With its strong and diverse renewable resources, the state also holds great potential to source greater portions of its energy portfolio from biomass, solar, wind and other renewable energy technologies. In particular, with almost 78% of the state covered in forests, Vermont is well positioned to expand its wood-based energy sector to heat and power homes, businesses, and industrial facilities. It became the first state to enact a state-wide “feed-in tariff”-style legislation for renewable energy in 2009, with the goal of increasing new renewable energy to 20% of total statewide electric retail sales by 2017.

| Installed Renewable Energy Capacity, 2011 |        |               |               |
|-------------------------------------------|--------|---------------|---------------|
| Wind                                      | 46 MW  | Ocean         | 0 MW          |
| Solar Photovoltaic                        | 12 MW  | Biomass Power | 88 MW         |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 0 mGy         |
| Geothermal                                | 0 MW   | Biodiesel     | 0 mGy         |
| Hydropower                                | 315 MW | <b>Totals</b> | 461 MW; 0 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- Developers began constructing Vermont’s largest wind farm in 2012, a 63 MW facility in Lowell. When complete, the project will be capable of supplying power to about 20,000 homes.
- Vermont is undergoing a modernization of its electric grid to improve grid reliability and security, through industry partnerships and utility programs to deploy smart meters and improve demand response.
- Vermont is a leader in the research, development, and commercialization of wood energy. The McNeil Generating Station was the world’s largest wood-burning facility at the time of its construction in 1984 and has become a laboratory for the vast majority of biomass plants that have followed.
- Several of Vermont’s schools are heated with biomass. Green Mountain College uses a \$5.8 million combined heat and power (CHP) wood chip heating system to heat 155 acres of campus buildings.

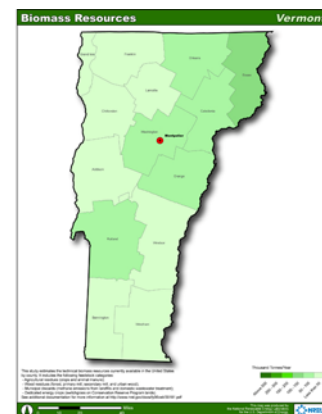


**Wind Resources-** With 590 km<sup>2</sup> of land suitable for wind generation, Vermont has resources consistent with utility scale production.

## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 12,884             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$12.0m, 1/3 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$41.0m, 5/5 deals |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$152.5m           |
| 1603 Cash Grant Program                                             | \$51.8m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** The forests of Vermont cover 78% of the state. The state can produce 701,000 metric tons of biomass resources, 496,000 tons of which would be from forest residues.

# Vermont

## Policies

**Production Incentive:** Vermont was the first state to enact “feed-in tariff”-style legislation in May 2009. The state requires all retail electricity providers to purchase electricity generated by eligible renewable energy facilities through the Sustainably Priced Energy Enterprise Development (SPEED) Program, via long term contracts with fixed standard offer rates. Eligible facilities must be under 2.2 MW, and include solar, landfill gas, wind, biomass, hydroelectric, and farm methane facilities. The overall program cap is 127.5 MW. The long-term contracts are 10 to 25 years for solar and 10 to 20 years for all other technologies. Vermont will establish a standard offer contract and pricing for existing hydroelectric facilities in 2013, but existing hydro capacity will not count toward the 127.5 MW program cap. Current final standard offer rates paid per MWh range from \$90 for landfill gas to \$271 for solar.

**Renewable Portfolio Standard:** Vermont’s SPEED Program itself is not a renewable portfolio goal or standard. If the Vermont Public Service Board determines that the established minimum obligations of the SPEED program are not met – specifically that 20% of total statewide electric retail sales be generated by new SPEED resources by 2017 – the state’s utilities will be required to meet a binding RPS. Under the SPEED program, utilities are expected to develop their own SPEED projects or enter into a long-term power purchase agreement (PPA) with generators certified as SPEED projects. In addition, Vermont has a separate target of producing 25% of the energy consumed within the state through the use of renewable energy sources by 2025, with an emphasis on farms and forests.

**Net Metering and Interconnection:** Net metering is available for most renewable energy systems up to 500 kW, micro-CHP systems up to 20 kW, and military systems up to 2.2 MW. The total capacity eligible for net metering is 4% of a utility’s peak demand. Net excess generation is carried over to the customer’s next bill at retail rate and is granted to the utility after 12 months. Group net metering is also available. Interconnection standards are offered with different rules for (1) net metered systems of 150 kW or less and (2) net metered systems above 150 kW and distributed generation systems up to 50 MW. Certain distributed generation systems are eligible for a “fast track” interconnection process.

**Rebates:** The Small Scale Renewable Energy Incentive Program provides rebates for new solar water heating, solar PV, and wind energy installations. Incentives vary by technology and sector, and for solar PV range from \$0.50/W to \$2.10/W, with incentives of up to \$77,000.

**Public Benefit Fund:** The Clean Energy Development Fund (CEDF) is a state funding source for programs and projects promoting the development and deployment of renewable energy, CHP, and emerging energy-efficient technologies in Vermont. It is managed by the Vermont Department of Public Service.

**Tax Incentives:** Vermont offers a 24% investment tax credit for the “Vermont-property portion” of the federal business energy tax credit for the installation of renewable energy systems on business properties from 2011 to 2016. The state-level credit is 2.4% or 7.2%, depending on technology.

Solar PV systems up to 10 kW are eligible for a 100% property tax exemption, and systems greater than 10 kW are assessed at a uniform \$4 per kilowatt for property tax purposes (which applies to the equipment and not the land).

Vermont offers a sales tax exemption for the purchase of renewable energy systems up to 250 kW. The state’s sales tax rate is 6%.

High tech businesses that design, develop, and manufacture alternative fuel vehicles, hybrid electric vehicles, all-electric vehicles, or energy technology involving other fuel alternatives to fossil fuels may be eligible for a 1) payroll income tax credit; 2) qualified research and development tax credit; 3) export tax credit; 4) small business tax credit; and 5) high-tech growth tax credit. Businesses may not take more than three of the credits.

# Renewable Energy in Virginia

## Summary

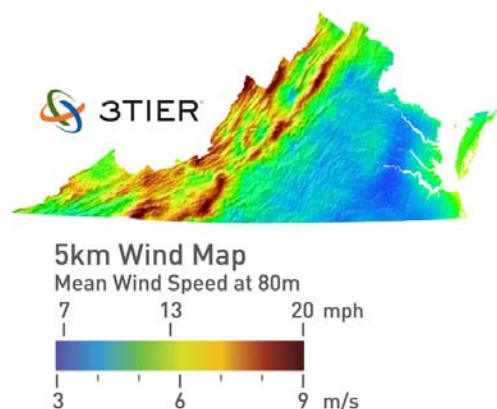
Virginia has strong biomass and wind resources and an adequate solar resource. While not a leader in renewable energy development, Virginia has established a voluntary renewable portfolio standard that encourages renewable power production from these resources. The state is also assessing how to take advantage of the immense potential of its offshore wind resources. Virginia has done well to provide a diverse group of incentives that target employment, commercial and residential priorities, and finance. However, while the state is making progress in diversifying its energy supply, there is much room for the growth of renewables in the mix.

| Installed Renewable Energy Capacity, 2011 |        |               |                  |
|-------------------------------------------|--------|---------------|------------------|
| Wind                                      | 0 MW   | Ocean         | 0 MW             |
| Solar Photovoltaic                        | 5 MW   | Biomass Power | 717 MW           |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 65 mGy           |
| Geothermal                                | 0 MW   | Biodiesel     | 16 mGy           |
| Hydropower                                | 832 MW | <b>Totals</b> | 1,554 MW; 81 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- A 30 MW, \$111 million distributed solar project has been proposed by a Virginia power producer. The company-owned photovoltaic installations would be spread over as many as 50 leased commercial and industrial rooftop locations. The company seeks to construct and operate the first portion of the installations by the end of 2013.
- Conventional coal-fired power stations in Altavista, Southampton, and Hopewell are in the process of being converted to run on biomass. The \$165 million conversion project is expected to be completed by 2013, and the plants in Hopewell and Southampton will have a nameplate capacity of 51 MW each.
- Northern Tazewell County is currently being evaluated for the potential construction of Virginia's first wind farm, which would have 120 MW of capacity.

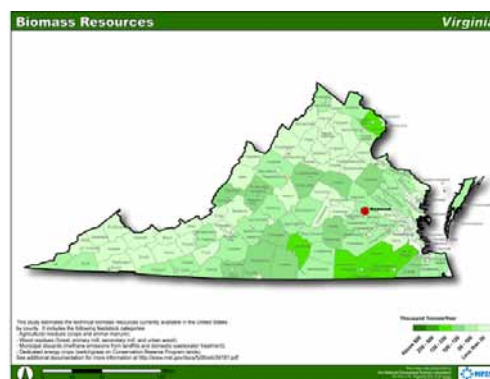


**Wind Resources-** Virginia has a total potential wind resource of about 90 GW, with the vast majority located offshore.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 91,871              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$180.0m, 1/1 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$38.2m, 5/6 deals  |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$333.3m            |
| 1603 Cash Grant Program                                             | \$9.3m              |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Bright green indicates a moderate resource of between 150 and 250 thousand metric tons per year. Virginia ranks eighth in the nation of forest residue resources, and has the potential to produce 13,295 GWh of biopower.



# Virginia

## Policies

**Renewable Portfolio Goal:** Virginia established a voluntary renewable portfolio goal for investor-owned utilities (IOUs) to procure 15% of the power sold in Virginia from eligible renewable energy sources by 2025. The program allows participating IOUs to recover the costs of new systems, and provides an increased profit incentive for each of the timeline goals that IOUs meet. Eligible resources include new and existing solar, wind, geothermal, hydropower (excluding pumped storage), ocean, and biomass energy. Of these resources, onshore wind and solar power receive double credit toward RPS goals, and offshore wind receives triple credit. The state limits the amount of wood derived from trees that would be otherwise used by Virginia lumber and pulp manufacturers at 1.5 million tons annually.

**Net Metering and Interconnection:** Virginia requires IOUs and electric cooperatives to offer net metering to residential customers with renewable energy systems up to 20 kW in capacity and to non-residential customers with systems up to 500 kW. Residential customers with systems over 10 KW must pay a monthly standby charge. Utilities must offer net metering until aggregate capacity achieves 1% of the utility's adjusted peak-load from the previous year. Net excess generation (NEG) is credited on the customer's next billing cycle at the retail rate. At the end of each 12-month period, customers may elect to carry forward NEG indefinitely or receive payment at the avoided cost rate. In addition, customers retain title to renewable energy credits (RECs) created from their generators, and have an upfront, one-time option to enter into an agreement to sell all RECs to the utility.

Virginia has separate interconnection standards for net metered and non-net metered systems, for systems up to 20 MW. Rules for non-net metered systems follow the Federal Energy Regulatory Commission (FERC) small generator interconnection procedure, with three levels of review, depending on system complexity. Rules for net metered systems have one level of review.

**Public Benefits Fund:** Administered by Virginia's Department of Mines, Minerals and Energy, the Voluntary Solar Resource Development Fund is used to provide loans for residential, commercial, or nonprofit solar energy projects and is funded by voluntary contributions from utility customers.

**Loans:** The Virginia Resources Authority offers loans to local governments for renewable energy projects. Financing options include the Virginia Pooled Financing Program, Revolving Loan Funds, and Term Financing.

**Grants:** The Solar Manufacturing Incentive Grant (SMIG) Program offers grants of up to \$4.5 million per year to encourage the production of photovoltaic panels in Virginia. Grants are awarded at a rate of \$0.25-\$0.75/W for panels sold in a calendar year for a period of six years. The program will be phased out in 2013.

The Biofuels Production Incentive Grant Program offers grants of \$0.125/gallon for the production of advanced biofuels and \$0.10/gallon for non-advanced biofuels.

The Clean Energy Manufacturing Incentive Grant Program was created in April 2011 to replace the SMIG and the Biofuels Production Incentive Grant Program, which will be phased out by 2013 and 2017, respectively. The program budget is \$36 million. A clean energy manufacturer can receive a grant for up to six years if it meets certain requisite investment, job creation and other criteria.

**Tax Incentives:** Virginia's Green Jobs Tax Credit allows companies that manufacture or operate renewable energy systems to earn a \$500 income tax credit for every green job created with a yearly salary of \$50,000 or more, for five years. The maximum credit is \$175,000.

Biodiesel and green diesel producers that generate up to two million gallons of biodiesel per year may qualify for a tax credit of \$0.01 per gallon. The maximum credit per year is \$5,000.

Businesses that produce advanced biofuels, support advanced fuel vehicle and component manufacturing, and engage in related activities may qualify for a job creation tax credit of up to \$700 per full-time employee, for three years.

# Renewable Energy in Washington

## Summary

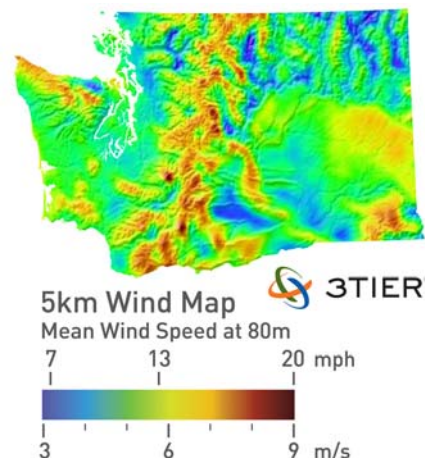
Hydropower supplies more than 60% of Washington's electricity. Now that many of the geographic opportunities for large-scale hydropower have been developed, Washington is exploring opportunities to diversify its energy portfolio, in part by harvesting its vast other renewable energy resources. Washington ranks tenth among the 50 states and the District of Columbia in clean energy jobs (Brookings Institution), which is due in part to the state's supportive incentives for manufacturers and utilities producing renewable energy products and energy. Washington still has great room to expand its abundant wave, ocean, and geothermal resources, and employs tax incentives, production incentives, a renewable portfolio standard, and other policies to encourage their development.

| Installed Renewable Energy Capacity, 2011 |           |               |                    |
|-------------------------------------------|-----------|---------------|--------------------|
| Wind                                      | 2,573 MW  | Ocean         | 0 MW               |
| Solar Photovoltaic                        | 12 MW     | Biomass Power | 464 MW             |
| Concentrated Solar Thermal                | 0 MW      | Bioethanol    | 0 mGy              |
| Geothermal                                | 0 MW      | Biodiesel     | 113 mGy            |
| Hydropower                                | 20,864 MW | <b>Totals</b> | 23,914 MW; 113 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- In the southeastern corner of Washington, a 343 MW wind farm commenced commercial operations in early 2012. The wind farm employs 15 full time workers, and is phase one of a planned 1,430 MW project.
- Developers have chosen Washington to be the site of three of the few tidal energy projects in the country. The Admiralty Inlet tidal pilot project should begin construction in 2013.
- In addition to its numerous large hydropower facilities, the state also operates smaller, run of river projects, which rely on the natural flow of waterways to produce electricity.
- When it was commissioned in 2011, the 7.5 MW Youngs Creek small hydro plant became the first hydropower facility to be built in the state in nearly 20 years. The facility provides power to more than 2,000 homes.

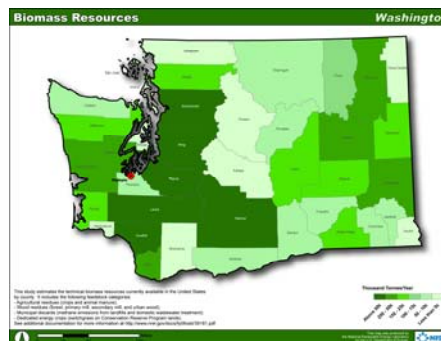


**Wind Resources-** Ranking 24<sup>th</sup> in potential wind resources, Washington has technical offshore estimates of 317,755 GWh and onshore estimates of 47,250 GWh.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 91,906              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$946.3m, 2/7 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$60.1m, 7/7 deals  |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$2.5bn             |
| 1603 Cash Grant Program                                             | \$573.1m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources-** Dark green indicates the highest measured resource of 500 thousand metric tons per year or greater. Statewide, Washington has 9,426,000 tons of biomass resources.

# Washington

## Policies

**Renewable Portfolio Standard (RPS):** Washington's RPS requires all utilities that serve over 25,000 customers (representing 84% of Washington's load) to acquire 15% of their electricity from qualifying renewable resources by 2020 and to meet biennial energy efficiency targets. Qualifying resources include solar, wind, biomass, hydroelectric, geothermal electric, landfill gas, ocean, anaerobic digestion, and biodiesel fuel. In certain cases, distributed generation under 5 MW may be counted as double the facility's electrical output. In general, if utilities fail to meet targets on time, they must pay the state \$50 for each MWh below the target.

**Net Metering and Interconnection:** Washington's net metering program applies to renewable energy systems up to 100 kW. All customer classes are eligible, and all utilities must offer net metering. There is an aggregate capacity limit of 0.25% of the utility's peak demand achieved in 1996, which will increase to 0.5% in 2014. Net excess generation (NEG) may be credited to the customer's next bill at the retail rate and is granted to the utility at the end of a 12-month billing period. Meter aggregation for multiple properties is available at the customer's request and is limited to 100 kW per customer. Interconnection procedures apply to distributed generation systems up to 20 MW, with two levels of review depending on system capacity. The standards only apply to investor-owned utilities.

**Tax Incentives:** Effective until June 30, 2013, Washington State offers a 75% exemption from sales taxes from the sale of equipment used to generate electricity from qualifying renewable resources with a generating capacity of at least 1 kW. Solar PV systems that are 10 kW or less are 100% exempt from sales and use tax.

Manufacturers and wholesale marketers of wholesale solar-electric modules or components qualify for a 43% reduction of the state's business and occupation tax rate.

Washington offers a property tax and leasehold excise exemption for the buildings, equipment, and land used to manufacture biofuels, produce biodiesel feedstocks, or operate anaerobic digestors. The exemption is valid for six years.

Businesses that sell or distribute biodiesel or E85 motor fuel may qualify for a business and occupation tax deduction.

**Production Incentives:** Washington offers production incentives from \$0.12 to \$0.54 per kWh to residences, businesses, non-profits, and local governments that generate electricity from solar power, wind power or anaerobic digesters. The state also offers incentives of \$0.30 per kWh to \$1.08 per kWh for community solar projects with a capacity of up to 75 kW. Utilities also receive a tax credit for paying out the incentives, which cannot exceed the greater of \$100,000 or 0.5% of a utility's taxable power sales.

**Grants and Loans:** The Energy Freedom Loan Program provides competitive grants and low-interest loans for bioenergy production, research, and market development. The program is set to expire after June 30, 2016.

**Renewable Fuel Standard:** Washington mandates that all diesel fuel sold in the state must contain at least 2% biodiesel or renewable diesel, which will increase to 5% after in-state feedstocks meet a minimum production capacity requirement.

All gasoline sold in the state must contain at least 2% denatured ethanol, which may be increased when the state can support the production of higher ethanol blends.

# Renewable Energy in West Virginia

## Summary

West Virginia’s energy plan is designed to allow the state attain energy independence from foreign oil imports by 2030. Much of this plan is reflected in the state’s alternative portfolio standard, which gives favor to renewable energy systems. Despite the fact that West Virginia is the second largest coal producer in the nation, the state offers tax incentives, net metering, and interconnection standards to help support the growth of the renewable energy industry.

| Installed Renewable Energy Capacity, 2011 |         |               |                |
|-------------------------------------------|---------|---------------|----------------|
| Wind                                      | 564 MW  | Ocean         | 0 MW           |
| Solar Photovoltaic                        | 0.60 MW | Biomass Power | 2 MW           |
| Concentrated Solar Thermal                | 0 MW    | Bioethanol    | 0 mGy          |
| Geothermal                                | 0 MW    | Biodiesel     | 33 mGy         |
| Hydropower                                | 325 MW  | <b>Totals</b> | 891 MW; 33 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- Randolph and Barbour counties saw a 97.6 MW wind farm commissioned in October 2011. The facility is also home to an integrated 32 MW battery storage system, the largest of its kind.
- Construction commenced in July 2011 on a 35 MW run-of-the-river hydro facility on the Ohio River, which will divert water from an existing nearby dam.
- January 2012 saw the commissioning of a 55.2 MW wind farm on Green Mountain, south-west of Keyser. The farm has 20-year power purchase agreements with the University of Maryland and the Department of General Services.

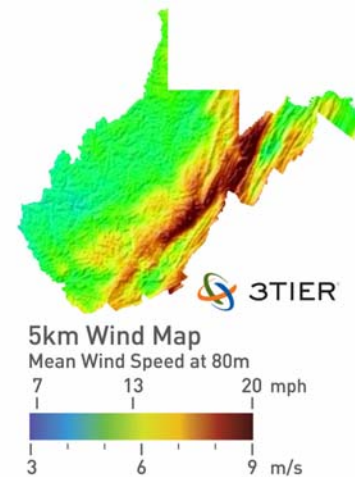


**Biomass Resources**– West Virginia has about 2,445 thousand metric tons per year of biomass resources, and a total technical potential for biopower estimated at 2,688 GWh.

## Economic Development

| Employment                                                          |                     |
|---------------------------------------------------------------------|---------------------|
| Green Goods and Services Jobs, 2010                                 | 14,533              |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                     |
| Asset Finance, 2010-2011                                            | \$250.0m, 1/3 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$2.0m, 1/1 deals   |
| Recovery Act Funding (Total Awarded)                                |                     |
| Energy Contracts, Grants & Loans                                    | \$130.2m            |
| 1603 Cash Grant Program                                             | \$196.7m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Wind Resources**- Wind resources lie along the foothills of the Appalachian mountains on the northeastern part of the state. The state’s total technical potential for wind power is estimated to be nearly 5,000 GWh.

# West Virginia

## Policies

**Renewable Portfolio Standard (RPS):** West Virginia requires investor-owned utilities (IOUs) with more than 30,000 residential customers to supply 25% of retail electric sales from eligible alternative and renewable energy resources by 2025. West Virginia's standard does not require a minimum of the standard to be supplied from renewable energy resources nor does it specify a maximum of the standard that can be supplied from alternative energy resources. The West Virginia law provides the definition for alternative energy resources to include renewable energy as well as coal technology, coal bed methane, natural gas, fuel produced by a coal gasification or liquefaction facility, synthetic gas, integrated gasification combined cycle technologies, waste coal, tire-derived fuel, and pumped storage hydroelectric projects. Compliance is met by attaining alternative energy credits (AECs). In most cases one megawatt-hour (MWh) of energy produced by an alternative energy system is equal to one AEC. Renewable energy systems receive two AECs per MWh of energy produced, except if produced from a renewable system built on a reclaimed mine in West Virginia, in which 1 MWh is equal to three AECs. Credits for energy conservation and/or carbon dioxide reduction by approved projects may also count toward RPS compliance.

**Net Metering and Interconnection:** West Virginia requires its electric utilities to offer net metering to all residential and commercial customers for eligible renewable and alternative energy systems up to 25 kilowatts (kW). Net excess generation (NEG) is carried over to the customer-generator's next electricity bill indefinitely. The program allows physical or virtual meter aggregation as long as the meters are located within two miles of the point of generation. Utilities will offer net metering until aggregate capacity reaches 3% of peak demand during the previous year. The West Virginia Public Service Commission (PSC) has not addressed the issue of AEC ownership.

Interconnection standards include two levels of review: (1) one for inverter-based systems 25 kW or less, with a maximum application fee of \$30; and (2) one for systems 2 MW or less that do not meet level one criteria, with a maximum application fee of \$50 plus \$1 per kW of capacity.

**Tax Incentives:** Business and operation tax for wind turbines is calculated at about 30% of the effective tax rate of most other types of newly constructed generating units.

Solar energy systems installed at residences may qualify for a 30% tax credit for the cost to purchase and install the system, with a maximum credit of \$2,000. If the credit exceeds the taxpayer's tax liability, it may be rolled over for up to four years.

For property tax purposes, utility-owned wind projects are assessed at a value equal to their salvage value. As a result, the provisions lower the tax rate down to 24.95% of fair market value.



# Renewable Energy in Wisconsin

## Summary

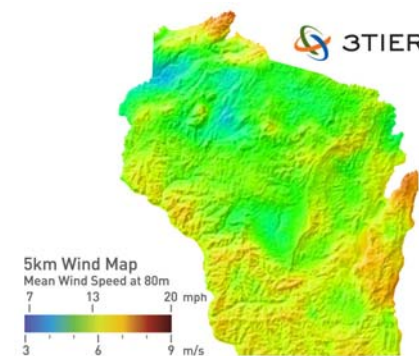
With its vast natural resources, Wisconsin has the opportunity to develop its renewable energy market to meet or exceed its 10% renewable portfolio standard (RPS). Wisconsin’s high corn production makes it one of the nation’s leading producers of ethanol. It also provides an attractive location for solar and wind manufacturing facilities due to its proximity to clean energy supply chains and favorable incentives for manufacturers. In order to support the continued scale-up of clean technologies in Wisconsin, the state has enacted a number of financial incentives, particularly for biomass, biogas, solar, and wind energy.

| Installed Renewable Energy Capacity, 2011 |        |               |                   |
|-------------------------------------------|--------|---------------|-------------------|
| Wind                                      | 631 MW | Ocean         | 0 MW              |
| Solar Photovoltaic                        | 13 MW  | Biomass Power | 356 MW            |
| Concentrated Solar Thermal                | 0 MW   | Bioethanol    | 504 mGy           |
| Geothermal                                | 0 MW   | Biodiesel     | 2.6 mGy           |
| Hydropower                                | 528 MW | <b>Totals</b> | 1,528 MW; 507 mGy |

Estimated capacity as of December 31, 2011; see User’s Guide for details.

## Market

- A next generation biodiesel facility located in Park Falls became operational in May 2012. Processing 1,000 dry tons of forest waste per day, the plant is expected to produce 18 million gallons of biodiesel per year.
- A number of biomass facilities located in Wisconsin produce electricity through landfill gas power, gasification, anaerobic digestion, and incineration. They use municipal solid waste, forestry residue, manure, organic waste and other feedstocks for power.
- In December 2011, a 162 MW wind farm installation came online in Columbia County.

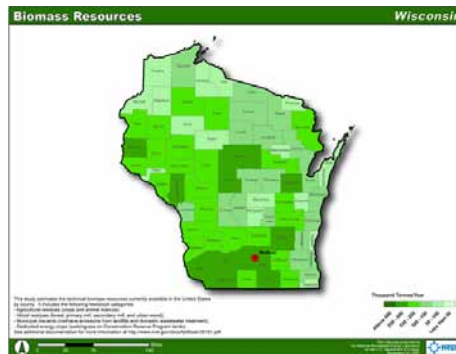


**Wind Resources**– With strong resources located around and on the great lakes, Wisconsin has a technical potential for wind power reaching 104 GW onshore and 81 GW offshore.

## Economic Development

| Employment                                                          |                    |
|---------------------------------------------------------------------|--------------------|
| Green Goods and Services Jobs, 2010                                 | 59,463             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                    |
| Asset Finance, 2010-2011                                            | \$0.0m, 0/4 deals  |
| Venture Capital & Private Equity, 2010-2011                         | \$48.2m, 4/4 deals |
| Recovery Act Funding (Total Awarded)                                |                    |
| Energy Contracts, Grants & Loans                                    | \$642.1m           |
| 1603 Cash Grant Program                                             | \$39.4m            |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). “Employment” includes all jobs in the green goods and services industry, as defined by BLS. “Private Sector Investment” figures include new build/new investment transactions for all completed, disclosed renewable energy deals. “Recovery Act Funding” includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



**Biomass Resources**– Dark green indicates an above average resource of 250 to 500 thousand metric tons per year. Wisconsin could produce as much as 13,295 GWh from biopower alone.

# Wisconsin

## Policies

**Renewable Portfolio Standard (RPS):** Wisconsin has a statewide renewable energy goal to procure 10% by the end of 2015. Eligible technologies include solar (power and heat), landfill gas, wind, biomass (power and heat), small hydroelectric, geothermal (power and heat), municipal solid waste, anaerobic digestion, marine energy, and fuel cells using renewable fuels, which deliver energy to Wisconsin customers (even if generated out of state). Electric providers, wholesale suppliers and customers of electric providers may petition for a one-year extension of a compliance deadline. If the goal is not achieved by 2016, the PSC must indicate why it was not and determine how it may be met. Utilities may use renewable energy certificates (RECs) or renewable resource credits (RRCs) for RPS compliance. RRCs are either RECs that are generated in excess of a utility's RPS requirements in a given year or certificates that represent one MWh of displaced conventional electricity, and may be used for up to four subsequent years after they are generated. RECs may only be used for compliance in the year they are created.

**Net Metering and Interconnection:** Wisconsin requires all investor-owned and municipal utilities to file tariffs allowing net metering to customers that generate electricity from distributed generation systems up to 20 kW in capacity (with some exceptions). There is no limit on total enrollment. The state has not adopted administrative rules for net metering, and utility programs vary. Wisconsin's interconnection standards apply to customers of investor-owned and municipal utilities with distributed generation systems up to 15 MW. There are four levels of review, with simplified rules for smaller systems.

**Tax Incentives:** Wisconsin offers a 10% personal or corporate tax credit from income or franchise taxes for the cost of the equipment used to harvest or process woody biomass for use as a fuel. The maximum credit is \$100,000 per claimant. Total credits granted may not exceed \$900,000 per year. Excess credit in a given year is refunded to the taxpayer.

Wisconsin offers a state sales and use tax exemption for certain biomass, wind, solar, and anaerobic digester systems.

The value added by a solar or wind energy system is exempt from general property taxes.

**Public Benefit Fund:** The Wisconsin Focus on Energy program provides financial assistance in the form of rebates and grants, among other services, to residents, schools, businesses, and the government. Utilities create and fund the programs through contracts with private program administrators. The program requires all utilities to spend 1.2% of their annual operating revenue to fund renewable energy and energy efficiency. In 2012, \$10 million of the fund is allocated for renewable energy.

**Rebates and Grants:** The Focus on Energy Program offers competitive grants for biogas, biomass, geothermal, solar PV, solar thermal and wind systems located in participating electric and gas utility service territories. Grants are between \$25,000 and \$250,000. The program budget is \$1.5 million in 2012.

The Focus on Energy program also offers rebates for residential renewable energy systems based on system capacity. The maximum incentive for solar PV and solar hot water is \$1,200 and for geothermal heat pumps is \$650. The program budget in 2012 is \$700,000.

# Renewable Energy in Wyoming

## Summary

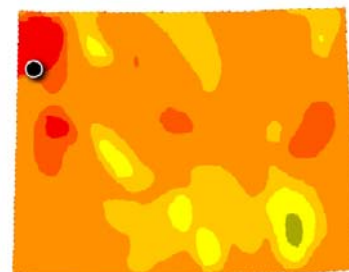
Wyoming is rich in traditional energy sources and has significant production potential from renewable energy, particularly from its strong wind, solar, and geothermal resources. Wyoming exports its wind power to Colorado, Utah and Oregon and has much room to further develop these resources. The state enacted a net metering law and interconnection standards to support distributed generation, but it does not offer significant financial incentives to ramp up renewable energy production like many other states. Without long-term policy signals like a renewable portfolio standard, Wyoming's future in the renewable energy industry is unclear.

| Installed Renewable Energy Capacity, 2011 |          |               |                  |
|-------------------------------------------|----------|---------------|------------------|
| Wind                                      | 1,412 MW | Ocean         | 0 MW             |
| Solar Photovoltaic                        | 0.20 MW  | Biomass Power | 0 MW             |
| Concentrated Solar Thermal                | 0 MW     | Bioethanol    | 12 mGy           |
| Geothermal                                | 0.25 MW  | Biodiesel     | 0 mGy            |
| Hydropower                                | 303 MW   | <b>Totals</b> | 1,716 MW; 12 mGy |

Estimated capacity as of December 31, 2011; see User's Guide for details.

## Market

- Carbon County is the planned home of North America's largest wind farm. The project received a go-ahead from federal regulators in July 2012, and construction of the massive 1,000 turbine, 3,500 MW wind farm is expected to begin before the end of 2013.
- Wyoming is home to a cellulosic ethanol demonstration plant that uses forestry residues as feedstock. The plant is working in conjunction with several Brazilian ethanol producers to research the process of turning crushed cane stalks into biofuel.
- The city of Cheyenne has approved a 30-year lease for a 150-turbine wind farm. The expected \$750 million project is slated to begin commercial operations by 2016.



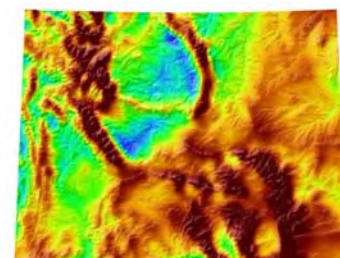
Favorability of Deep EGS  
 Most Favorable  
 Least Favorable  
 N/A\*  
 No Data\*\*  
 \* Identified Hydrothermal Site (> 90°C)  
 \*\*

**Geothermal Resources-** Wyoming's total estimated technical potential for enhanced geothermal systems exceeds 1,000,000 GWh. Dark orange and red represent the strongest resource areas.

## Economic Development

| Employment                                                          |                   |
|---------------------------------------------------------------------|-------------------|
| Green Goods and Services Jobs, 2010                                 | 8,031             |
| Private Sector Investment (Disclosed Amount, Disclosed/Total Deals) |                   |
| Asset Finance, 2010-2011                                            | \$0.0m, 0/2 deals |
| Venture Capital & Private Equity, 2010-2011                         | \$0.4m, 1/1 deals |
| Recovery Act Funding (Total Awarded)                                |                   |
| Energy Contracts, Grants & Loans                                    | \$59.3m           |
| 1603 Cash Grant Program                                             | \$110.8m          |

Sources: Bureau of Labor Statistics (BLS) (Employment), Bloomberg New Energy Finance (Private Sector Investment), and Recovery.gov (Recovery Act Funding). "Employment" includes all jobs in the green goods and services industry, as defined by BLS. "Private Sector Investment" figures include new build/new investment transactions for all completed, disclosed renewable energy deals. "Recovery Act Funding" includes federal funding awarded to present through the American Recovery and Reinvestment Act of 2009 for energy-related contracts, grants, loans, and entitlements.



5km Wind Map  
 Mean Wind Speed at 80m  
 7 13 20 mph  
 3 6 9 m/s  
 3TIER

**Wind Resources-** Wyoming has 110,415 km<sup>2</sup> of windy land available for development with the potential to generate over 1.6 million GWh.

# Wyoming

## Policies

**Net Metering and Interconnection:** Wyoming requires its investor-owned utilities (IOUs), electric cooperatives, and irrigation districts to provide net metering to customers that own photovoltaic, wind, biomass, and hydroelectric systems up to 25 kW. Net excess generation (NEG) is credited to the customer's next bill at the retail rate. After a 12-month billing cycle, utilities must purchase unused NEG at the utility's avoided-cost rate.

Interconnection standards apply to net metered systems. The Wyoming Public Service Commission (PSC) has not established separate interconnection rules and does not limit overall enrollment. Customers must purchase and install an external disconnect switch.