

Renewable Energy in the 50 States: Midwestern Region



2013 Edition



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ACORE, a 501(c)(3) non-profit membership organization, is dedicated to building a secure and prosperous America with clean, renewable energy. ACORE seeks to advance renewable energy through finance, policy, technology, and market development and is concentrating its member focus in 2013 on National Defense & Security, Power Generation & Infrastructure, and Transportation. Additional information is available at www.acore.org.

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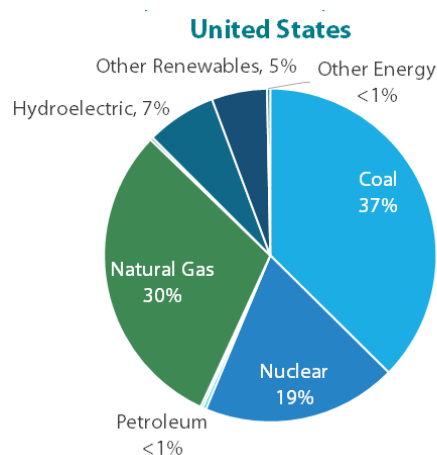
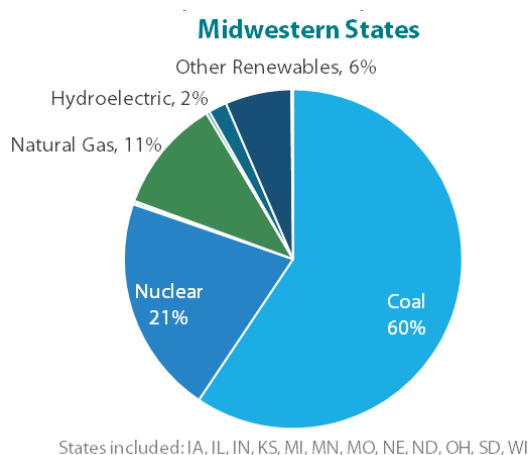
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Executive Summary

The Midwest's remarkable renewable energy resources, vast agricultural land, strong manufacturing base, and leading research institutions have propelled the region to become a hub for renewable energy development. It is home to over a third of U.S. wind power capacity and 80% of U.S. biofuel production capacity. However, uncertainty about federal policy – like the production tax credit (PTC) and renewable fuels standard (RFS) – as well as transmission constraints could hinder Midwestern renewable energy capacity additions in the near term, with 2013 expected to yield only a fraction of the installations seen in previous years. Nevertheless, increasingly affordable project costs and state renewable energy targets will continue to drive market momentum in the region, as indicated by recent, positive signals given by renewable energy companies and utilities.

Electricity Generation by Source, 2012:



Source: EIA

While coal dominates the Midwest's power supply, the states recognize the importance of renewable energy and have set targets for its use and deployment. Out of the 12 states profiled in this report, eight have binding standards for renewable and/or clean energy and three have non-binding goals. A number of the states support these targets through an array of financial incentives for wind power, on-farm energy, biofuels, solar power, and other renewable energy systems.

The cost of building renewable energy projects continues to decline in many Midwestern states, facilitated by the region's nationally recognized wind and bioenergy resources.¹ As a result, two of Michigan's largest utilities recently eliminated a surcharge on their customers' bills originally designed to cover the cost of meeting the state's renewable portfolio standard, indicating that renewable energy projects are costing them less than expected.² In addition, a major investor-owned utility recently chose wind power as its technology of choice because of its "lower costs than other possible resources," in its announcement to build four new power projects in the Midwest. These four projects would add 600 MW of wind energy capacity to the grid and power up to 750,000 homes.³

Home to the Corn Belt and much of the nation's agricultural activity, nine of the top ten biofuel states by production capacity are located in the Midwest. Companies and universities spearhead advanced biofuel

¹ <http://www.awea.org/Resources/Content.aspx?ItemNumber=5547#CostofWindEnergy>

² <http://www.greentechmedia.com/articles/read/in-michigan-renewables-costing-utilities-less-than-expected>

³ <http://thinkprogress.org/climate/2013/08/24/2520551/upper-midwest-windfarm>

research in Midwestern states, with numerous pilot and small-scale facilities that develop cellulosic and algae-sourced fuels, and development is underway on the first facilities that will produce advanced biofuels at commercial scale. Airlines and the U.S. military also see the region as a proving ground for aviation fuels. Major airlines work with biofuel companies and research institutions to grow feedstocks for and produce renewable jet fuel in the Midwest, with plans to launch biofuel-powered planes from Midwestern airports.⁴ In May 2013, the U.S. Department of Defense chose Nebraska to be the location of a biofuel plant that will sustainably power jets and ships by 2016. Nevertheless, the continued growth of and investment in renewable fuels in the Midwest is in question if the federal RFS is scaled back or repealed.

Over a third of U.S. wind capacity is located in the Midwest. Five Midwestern states generate over 10% of their electricity from wind energy, out of only nine states nationally. Last year resulted in a 29% increase in installed generation capacity in the Midwest, adding over 21 GW of new wind power to the grid. However, uncertainty caused by Congressional debate over the PTC, coupled with transmission constraints, have resulted in far fewer wind power facilities to be built to date in 2013.

Wind power and biofuels are far from the only renewable technologies used in the Midwest:

- ▶ Solar power saw a 150% boost in capacity in 2012, with 200 MW now connected to the grid in Midwestern states. Policies that encourage distributed generation, like net metering, also spur the growth of residential and commercial solar energy markets in states such as Wisconsin and Missouri.
- ▶ Many states use their considerable agricultural and other biomass resources, like corn stover, to produce bioenergy. The Midwest's numerous dairy farms, wastewater treatment plants, and other facilities produce biogas for electricity, heat, and fuel, helping to reduce air and water pollution.⁵
- ▶ Waste-to-energy projects in several states convert municipal solid waste into electricity and/or steam for use as an energy source for municipalities and private industry.
- ▶ Renewable heating technologies, like biomass thermal, geothermal heat pumps, and solar thermal, can be used to offset the region's reliance on imported fossil fuels for heating purposes.⁶ Waste heat to power technologies capture heat from industrial processes to produce electricity, and are considered renewable in at least six Midwestern states.⁷
- ▶ Hydropower is an important energy resource in some Midwestern states, responsible for 49% of electricity generation in South Dakota.

Despite the industry's recent growth, electricity transmission inadequacies stifle large-scale development so that many states tap into only a fraction of their available resources.⁸ New transmission line proposals in Illinois, Iowa, Michigan, Missouri, Nebraska, and North Dakota could help to open bottlenecks and encourage continued renewable energy development.

The importance of renewable energy in the Midwest will continue to grow as it becomes an increasingly competitive alternative to fossil fuel generation.

⁴ <http://www.midwestenergynews.com/2013/07/01/midwest-seen-as-proving-ground-for-biofuel-powered-airliners>

⁵ <http://www.qpsid.net/vertical/Sites/%7B1510F0B9-E3E3-419B-AE3B-582B8097D492%7D/uploads/%7B6DEFD5AC-B930-4ED1-AB05-0AD7EB86EA6B%7D.PDF>

⁶ http://heatingthemidwest.org/wp-content/uploads/MidwestVision_Final_04212013.pdf

⁷ <http://www.heatispower.org/wp-content/uploads/2013/06/WHP-Fact-Sheet-6-10-2013.pdf>

⁸ <http://www.bendbulletin.com/apps/pbcs.dll/article?AID=/20130806/NEWS0107/308060335/1254>

MIDWESTERN STATE INSTALLED CAPACITY RANKINGS

	Renewable Power (w/hydro)	Renewable Power (w/o hydro)	Renewable Fuels
1.	Iowa *: 5,280 MW	Iowa *: 5,149 MW	Iowa : 4,153 mGy
2.	Illinois *: 3,799 MW	Illinois *: 3,759 MW	Nebraska : 2,063 mGy
3.	Minnesota *: 3,693 MW	Minnesota *: 3,489 MW	Illinois : 1,586 mGy
4.	Kansas *: 2,728 MW	Kansas *: 2,721 MW	Indiana : 1,254 mGy
5.	South Dakota †: 2,381 MW	North Dakota †: 1,690 MW	Minnesota : 1,213 mGy
6.	North Dakota †: 2,304 MW	Indiana †: 1,611 MW	South Dakota : 1,023 mGy
7.	Michigan *: 1,866 MW	Michigan *: 1,496 MW	Ohio : 670 mGy
8.	Indiana †: 1,702 MW	Wisconsin *: 1,027 MW	Wisconsin : 537 mGy
9.	Wisconsin *: 1,684 MW	South Dakota †: 783 MW	Kansas : 507 mGy
10.	Missouri *: 987 MW	Ohio *: 693 MW	North Dakota : 458 mGy
11.	Ohio *: 822 MW	Missouri *: 488 MW	Missouri : 457 mGy
12.	Nebraska : 803 MW	Nebraska : 471 MW	Michigan : 318 mGy
	Total : 28,049 MW	Total : 23,377 MW	Total : 14,239 mGy

*=State has a renewable portfolio standard

†=State has a non-binding renewable portfolio goal

MW=megawatt; mGy=million gallons per year

Sources: See User's Guide

Renewable Energy in Illinois

Summary

Illinois is one of the top electricity-generating states in the country and a leading net exporter of electricity to other states. Its extensive wind and biomass resources and renewable portfolio standard, which includes carve-outs for solar energy and distributed generation, foster a supportive environment for its citizens and the commercial, industrial, and utility sectors to invest in renewable energy. The state ranks second in the Midwest for installed renewable power capacity and third in the region for biofuels production capacity.

Installed Renewable Energy Capacity, 2012

Wind Power	3,568 MW	Marine Power	0 MW
Solar Photovoltaic	42.9 MW	Biomass & Waste	148.6 MW
Solar Thermal Electric	0 MW	Ethanol	1,412 mGy
Geothermal Power	0 MW	Biodiesel	173.6 mGy
Hydropower	39.7 MW	Totals	3,799 MW; 1,586 mGy

Sources: See User's Guide for details

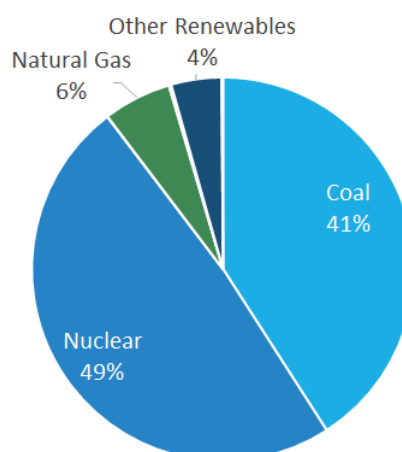
Market Spotlight

- ▶ Illinois is a national leader in the wind energy supply chain, ranking fourth among states for installed wind power capacity. In December 2012, three wind farms commissioned in Vermillion and Champaign, Woodford, and Henry Counties added an additional 500 MW to the grid.
- ▶ The state ranks third in the nation for ethanol production capacity and fourth for biodiesel production capacity. Advanced biofuel facilities in the state produce cellulosic ethanol and biodiesel from woodchips and agricultural residues.
- ▶ A proposed 400 mile, \$1.1 billion transmission line stretching across the state received approval from the Illinois Commerce Commission in summer 2013. Construction is expected to begin in 2014, providing a significant boost to the economy while connecting thousands of residents to clean sources of energy.
- ▶ Phase I of a planned 62 MW solar PV farm in Rockford came online in October 2012. When fully operational, the facility will be one of the largest of its kind in the Midwest.

Economic Development

Employment	2011	
Green Goods & Services Jobs	136,447	
Investment (Grossed-up)	2011	2012
Asset Finance	\$1.45bn	\$817m
Venture Capital & Private Equity	\$50.8m	\$121.5m

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Electricity Generation, 2012 (EIA)

Renewable Energy in Illinois

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 25% by compliance year 2025-2026 ▶ Investor-owned utilities (IOUs) and retail suppliers (covering 89% of state's electric load) ▶ Technology minimums – <i>wind</i>: 75% of annual requirement for IOUs, 60% for alternative retail electric suppliers; <i>PV</i>: 6% of annual requirement in 2015-2016 and after; <i>distributed generation</i>: 1% of annual requirement in 2015-2016 and after for IOUs ▶ Bundled renewable energy credits (RECs) and tradable RECs may be used for compliance ▶ Procurement is limited to "cost-effective" resources
Net Metering	<ul style="list-style-type: none"> ▶ IOUs, alternative retail electric suppliers ▶ System capacity limit – <i>current rules</i>: 40 kW; <i>new rules</i>: 2 MW ▶ Aggregate capacity limit – <i>current</i>: 1% of utility's peak demand in previous year; <i>new rules</i>: 5% of utility's peak demand in previous year ▶ Net excess generation – <i>current</i>: credited to customer's next bill at retail rate, granted to utility at end of 12 months; <i>new rules</i>: only for non-competitive customers; non-hourly customers keep existing rules; hourly customers receive energy credit and delivery service credit based on hourly rate ▶ Customer owns RECs; virtual net metering allowed
Interconnection Standards	<ul style="list-style-type: none"> ▶ IOUs ▶ External connect switch required ▶ Insurance requirements vary by system size/type
Tax Incentives	<p>Sales Tax Exception:</p> <ul style="list-style-type: none"> ▶ For businesses building a new wind power facility in an "Enterprise Zone" ▶ Exemption from the full state sales tax and any additional local state sales taxes for building materials incorporated into the facility ▶ Must involve a minimum investment of \$12m and create 500 full-time jobs
Public Benefit Fund	<ul style="list-style-type: none"> ▶ Supports renewables through grants, loans, and other incentives ▶ Total fund: ~\$100m (1998-2015)
Rebates and Grants	<p>Solar and Wind Energy Rebate Program:</p> <ul style="list-style-type: none"> ▶ Maximum incentive – <i>residential</i>: \$10,000; <i>commercial</i>: \$20,000; <i>nonprofits and government sector</i>: \$30,000 ▶ System size – <i>PV</i>: ≥1 kW; <i>solar thermal</i>: 0.5 therms/day or 60 sq. ft.; <i>wind</i>: 1-100 kW <p>Community Solar and Wind Grant Program:</p> <ul style="list-style-type: none"> ▶ <i>Businesses</i>: up to 30% of project costs for solar thermal and wind and 25% for solar PV; <i>government and nonprofits</i>: 40% of project costs ▶ Maximum incentive of \$250,000 <p>Biofuels Production Facility Grants:</p> <ul style="list-style-type: none"> ▶ Construction or expansion of biodiesel or ethanol facilities ▶ The lesser of 10% of the total construction costs of the facility or \$4m <p>Alternative Fuel Vehicle (AFV) and Alternative Fuel Rebates:</p> <ul style="list-style-type: none"> ▶ Rebate for 80%, up to \$4,000, of the incremental cost of purchasing an AFV ▶ 80%, up to \$4,000, of the cost of converting a vehicle to an AFV, and the incremental cost of purchasing alternative fuels
Bonds	<ul style="list-style-type: none"> ▶ The Illinois Finance Authority issues tax-exempt bonds for eligible renewable energy projects that provide a significant public benefit to the state
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=IL ▶ Illinois Commerce Commission (RPS): www.icc.illinois.gov/electricity/procurementprocess2013.aspx ▶ Illinois Energy Office (Energy): http://www.ildceo.net/dceo/Bureaus/Energy_Recycling ▶ Illinois Finance Authority (Energy): http://www.il-fa.com/programs/energy

Renewable Energy in Indiana

Summary

Like many of its Midwestern neighbors, Indiana is endowed with plentiful wind and biomass resources, ranking fourth in the nation for ethanol production capacity and also a user of wind, wood waste, and other renewable resources for energy. In an effort to diversify its coal-heavy energy portfolio and increase in-state power generation, the state set a goal in 2011 to obtain 10% clean energy by 2025. This commitment to clean energy is expected to further encourage the sector's growth, but perhaps not at the rate of neighboring states that have more aggressive policies and similar renewable resources.

Installed Renewable Energy Capacity, 2012			
Wind Power	1,543 MW	Marine Power	0 MW
Solar Photovoltaic	4.4 MW	Biomass & Waste	62.3 MW
Solar Thermal Electric	0 MW	Ethanol	1,148 mGy
Geothermal Power	0 MW	Biodiesel	106 mGy
Hydropower	92.1 MW	Totals	1,702 MW; 1,254 mGy

Sources: See User's Guide for details

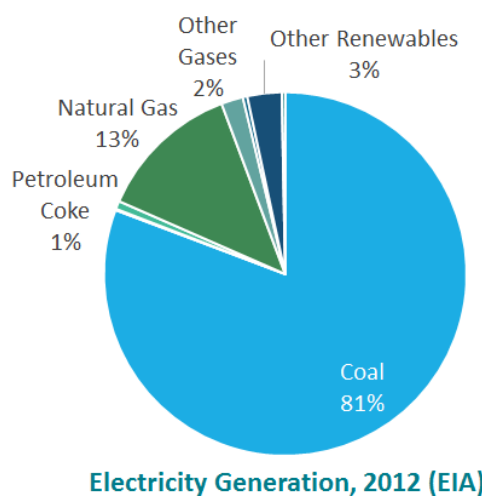
Market Spotlight

- ▶ The 200 MW Wildcat Wind Farm in Tipton and Madison Counties began operations in December 2012, sited on land that also continues to be used for corn, soybean, and tomato farming.
- ▶ The Indianapolis International Airport installed the first phase of the nation's largest airport-sited solar farm in September 2013. Phase II began construction in the same month, and the project will total 25 MW in capacity when complete – to be one of the largest solar power facilities in the region.
- ▶ About 30% of Indiana's installed ethanol capacity was not operational in 2012. In March 2013, commercial operations resumed at a Linden bioethanol plant after idling for about five months. The facility will once again generate 110 million gallons per year of bioethanol and 315,000 tons of dry distillers grains.
- ▶ A new biogas upgrading facility at Fair Oaks Farm became operational in March 2012, which converts biogas from cow manure into the equivalent of nearly 10,000 gallons per day of diesel fuel. This fuels a fleet of 42 milk trucks. The project is expected to reduce greenhouse gas emissions of the fleet by roughly 40,000 tons per year.

Economic Development

Employment		2011	
Green Goods & Services Jobs		70,156	
Investment (Grossed-up)		2011	2012
Asset Finance		\$1.3m	\$280m
Venture Capital & Private Equity		-	-

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Renewable Energy in Indiana

State Policy

Clean Energy Portfolio Goal	<ul style="list-style-type: none"> ▶ 10% by 2025 (voluntary) ▶ Only public utilities may participate ▶ Up to 30% of goal may be met with clean coal, nuclear, CHP, natural gas, and net-metered distributed generation systems ▶ 50% of qualifying energy must come from within the state ▶ Thermal energy used for heating, cooling or mechanical work is also eligible
Net Metering	<ul style="list-style-type: none"> ▶ Investor-owned utilities (IOUs) ▶ System capacity limit: 1 MW ▶ Aggregate capacity limit: 1% of utility's most recent peak summer load ▶ Net excess generation credited to customer's next bill at retail rate, carries over indefinitely
Interconnection Standards	<ul style="list-style-type: none"> ▶ IOUs, regulated municipal utilities, regulated electric cooperatives ▶ No system capacity limit specified
Tax Incentives	<p>Property Tax Incentive:</p> <ul style="list-style-type: none"> ▶ Solar, wind, hydropower and geothermal systems and their affiliated equipment (including storage and distribution equipment) are exempt from property tax ▶ For real property and mobile homes equipped with renewable energy systems <p>Income Tax Deduction: 50% of the cost of materials and installation labor for solar-powered roof fans, up to \$1,000</p> <p>Sales and Use Tax Exemption: Certain wind turbine components are exempt from the state sales and use tax</p> <p>Alternative Fuel Vehicle (AFV) Manufacturer Tax Credit:</p> <ul style="list-style-type: none"> ▶ 15% of qualified investments for the manufacture or assembly of AFVs ▶ Facility must agree to maintain operations for at least 10 years, and employees must be paid 150% of the state's hourly minimum wage <p>Ethanol Production Tax Credit:</p> <ul style="list-style-type: none"> ▶ \$0.125/gallon of ethanol produced, including cellulosic ethanol ▶ Unused credit may be carried forward to the following taxable years ▶ Maximum credits per taxpayer: \$2m for grain ethanol facilities that produce 40-60 mGy; \$3m for grain ethanol facilities that produce at least 60 mGy; and \$20m for cellulosic facilities that produce at least 20 mGy <p>Biodiesel Production Tax Credit:</p> <ul style="list-style-type: none"> ▶ \$1.00/gallon of biodiesel produced and used in biodiesel blends ▶ Single taxpayers may receive no more than \$3m total for all taxable years <p>Biodiesel Blending Tax Credit:</p> <ul style="list-style-type: none"> ▶ \$0.02/gallon of blended biodiesel ▶ Single taxpayers may receive no more than \$3m total for all taxable years
Grants	<p>Community Conservation Challenge</p> <ul style="list-style-type: none"> ▶ \$25,000-\$150,000 for community energy conservation projects ▶ Applies to alternative fuel vehicle fleets, CHP, biomass, energy efficiency, solar, traffic signal retrofits, waste management and recycling, and wind energy projects
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=IN ▶ Office of Energy Development: www.in.gov/oed/2649.htm ▶ Utility Regulatory Commission: www.in.gov/iurc ▶ Fuel and Environmental Tax Forms: www.in.gov/dor/3512.htm

Renewable Energy in Iowa

Summary

Iowa has experienced significant renewable energy growth in recent years, a leading state in the production of renewable energy from wind, ethanol, and biodiesel, and ranking first in the Midwest for renewable power and fuels production capacity. The state's strong manufacturing and agricultural sectors coupled with its early policy support create an attractive environment for companies and individuals interested in producing renewable energy in the state. With the Iowa Utilities Board recently approving over 1 GW of additional wind generation by the end of 2015, the climate for wind energy development in the state is promising.

Installed Renewable Energy Capacity, 2012

Wind Power	5,133 MW	Marine Power	0 MW
Solar Photovoltaic	1.2 MW	Biomass & Waste	14.6 MW
Solar Thermal Electric	0 MW	Ethanol	3,848 mGy
Geothermal Power	0 MW	Biodiesel	304.5 mGy
Hydropower	131.3 MW	Totals	5,280 MW; 4,153 mGy

Sources: See User's Guide for details

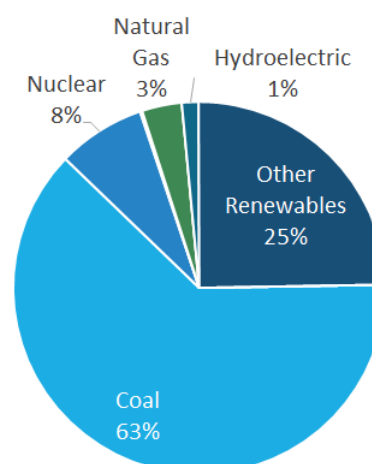
Market Spotlight

- ▶ In 2012, Iowa ranked third in the nation for installed wind power capacity, with 24.5% of total generated electricity coming from wind power, more than any other state. An additional four wind farms came online in December 2012, adding 500 MW of wind generating capacity to the state's power portfolio.
- ▶ The state is home to over a quarter of U.S. ethanol production capacity and is a major producer of U.S. biodiesel. Biodiesel production reached a record high in Q2 2013, when the state's nine plants produced nearly 57 million gallons of biodiesel in three months.
- ▶ Iowa recently phased out non-ethanol unleaded gasoline in place of ethanol-blended 87 octane gas. E15 ethanol blends are expected to become the lowest-cost registered fuel in the state.⁹
- ▶ A \$250 million cellulosic ethanol plant in Emmetsburg is expected to begin production early next year, which will be one of the first sites to turn corn husks and other crop waste into fuel at a commercial volume.
- ▶ Two waste-to-energy facilities are planned in the state that will convert municipal solid waste into feedstocks for the production of compressed biogas and cellulosic ethanol.

Economic Development

Employment	2011	
Green Goods & Services Jobs	43,791	
Investment (Grossed-up)	2011	2012
Asset Finance	\$864.7m	\$1.24bn
Venture Capital & Private Equity	-	-

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Electricity Generation, 2012 (EIA)

⁹ <http://farmprogress.com/story-e15-ethanol-blend-expected-lowest-cost-fuel-iowa-9-101034>

Renewable Energy in Iowa

State Policy

Alternative Energy Law	<ul style="list-style-type: none"> ▶ Investor-owned utilities (IOUs) must own or contract a combined total of 105 MW of renewable generating capacity ▶ Qualifying systems include solar, wind, waste management, resource recovery, refuse-derived fuel, agricultural crops or residues, wood-burning facilities, and small hydropower
Net Metering	<ul style="list-style-type: none"> ▶ IOUs ▶ System capacity limit of 500 kW; no aggregate limit specified ▶ Net excess generation credited to customer's next bill at retail rate, carries over indefinitely
Interconnection Standards	<ul style="list-style-type: none"> ▶ IOUs, Linn County REC ▶ 10 MW limit on system capacity ▶ Insurance requirements vary by system size and/or type
Loans	<p>Alternative Energy Revolving Loan Program:</p> <ul style="list-style-type: none"> ▶ 50% of financed project costs ▶ Maximum incentive of \$1,000,000 for most applicants; \$500,000 for non-rate regulated gas and electric utilities ▶ No interest; maximum term of 20 years <p>IADG Energy Bank Revolving Loan Program:</p> <ul style="list-style-type: none"> ▶ \$50,000-\$500,000 for commercial and industrial renewable energy projects ▶ ≥1% interest rate; loan term of up to 10 years; 1% origination fee <p>Iowa Energy Bank:</p> <ul style="list-style-type: none"> ▶ Renewable energy systems at schools and colleges, hospitals, and governments ▶ ≥1% interest rate; 15-year repayment period; 0.25% servicing fee; 2% origination fee
Tax Incentives	<p>Renewable Energy Production Tax Credits (Personal or Corporate):</p> <ul style="list-style-type: none"> ▶ 1 cent/kWh for energy sold or generated for on-site consumption by eligible wind energy facilities; maximum total eligibility of 50 MW ▶ 1.5 cents/kWh for energy sold by eligible facilities and/or used onsite by facilities 750 kW and larger; maximum total eligibility for wind is 363 MW and for non-wind is 53 MW <p>Solar Energy Systems Tax Credit (Personal or Corporate): 15% credit; maximum incentive \$3,000 for residential and \$15,000 for commercial; budget of \$1,500,000/year</p> <p>Renewable Energy Equipment Exemption: Sales tax exemption for solar, wind, and hydropower equipment</p> <p>Property Tax Exemption: 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</p> <p>Methane Gas Conversion Property Tax Exemption: For the real and personal property for methane gas conversion facilities operated in connection or conjunction with publicly-owned sanitary landfills</p> <p>Geothermal Tax Credit: Tax credit equal to 20% of the federal tax credit for geothermal heat pumps; excess credit may be carried forward 10 years</p> <p>Energy Replacement Generation Tax Exemption: Replacement generation tax of 0.06 cents/kWh in place of a property tax on generation facilities; applies to landfill gas, wind, hydropower, and self-generators</p> <p>Biodiesel Producer Tax Refund: Refund of sales or use taxes paid on purchases, 2 cents/gallon in 2014</p>
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=IA ▶ Iowa Utilities Board: www.state.ia.us/iub ▶ Iowa Economic Development: www.iowaeconomicdevelopment.com/Programs/Energy ▶ Department of Revenue: www.iowa.gov/tax/index.html

Renewable Energy in Kansas

Summary

Kansas has one of the most promising wind resource potentials in the country and more than doubled its wind power generating capacity in 2012, raising its ranking to ninth in the nation for wind power installations. The state ranks within the top ten states nationally for ethanol production capacity. Its 20% renewable portfolio standard (RPS) and financial incentives promote large and small-scale renewable energy generation, and three out of six utility companies have already met their RPS requirements seven years ahead of schedule.¹⁰ However, the shortage of high-voltage power lines to connect remote areas to population centers could slow the future development of renewable energy projects in the state.

Installed Renewable Energy Capacity, 2012

Wind Power	2,713 MW	Marine Power	0 MW
Solar Photovoltaic	0.5 MW	Biomass & Waste	7.2 MW
Solar Thermal Electric	0 MW	Ethanol	503.5 mGy
Geothermal Power	0 MW	Biodiesel	3.9 mGy
Hydropower	7 MW	Totals	2,728 MW; 507 mGy

Sources: See User's Guide for details

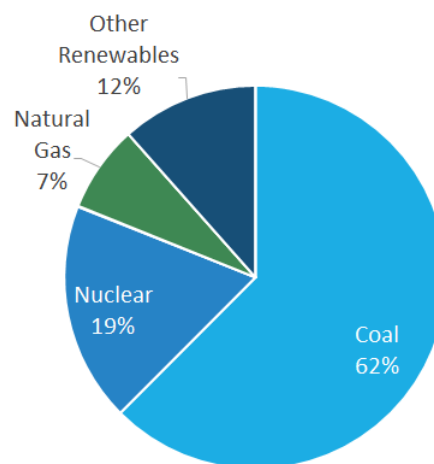
Market Spotlight

- ▶ Kansas was among the country's largest and fastest growing wind energy markets in 2012. Construction on the second phase of the Flat Ridge Wind Farm completed at the end of 2012, adding 419 MW to the grid and creating 30 permanent jobs. In spring 2013, the 250 MW Buffalo Dunes wind farm broke ground and is expected to be commissioned by the end of the year.
- ▶ Development continues in Hugoton on one of the nation's first commercial cellulosic ethanol plants, which will use agricultural waste, non-feed energy crops, and wood waste to produce fuel as well as electricity. The 25 million gallon facility secured a \$132.4 million loan guarantee from the Department of Energy in fall 2011, and developers expect to commence ethanol and power production in early 2014. The plant will create 65 permanent jobs.
- ▶ A 359,000 square foot retail store under construction in Merriam will be heated by the largest geothermal heating-and-cooling system in Kansas.

Economic Development

Employment	2011	
Green Goods & Services Jobs	25,632	
Investment (Grossed-up)	2011	2012
Asset Finance	\$1.48bn	\$2.09bn
Venture Capital & Private Equity	\$2.5m	-

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Electricity Generation, 2012 (EIA)

¹⁰ <http://www.nrdc.org/energy/renewable-portfolio-standards/files/RPS-KS-rebuttal-IB.pdf>

Renewable Energy in Kansas

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 20% by 2020 ▶ Investor-owned utilities (IOUs) and rural electric cooperatives (representing 81.5% of the state's electric load) ▶ Unlike most other RPS policies, target is based on generation capacity rather than retail electric sales ▶ Renewable energy credits (RECs) may only meet a portion of requirements
Net Metering	<ul style="list-style-type: none"> ▶ IOUs ▶ System capacity limit of 200 kW for non-residential and 25 kW for residential ▶ Aggregate capacity limit of 1% of utility's retail peak demand during previous year ▶ Net excess generation credited to the customer's next bill at retail rate; granted to utility at end of the calendar year ▶ Utility owns RECs
Interconnection Standards	<ul style="list-style-type: none"> ▶ IOUs ▶ Net metering required (same system capacity limits as net metering)
Tax Incentives	<p>Biofuel Blending Equipment Tax Exemption: Property tax exemption for equipment used to store or blend petroleum-based fuel with biodiesel, ethanol, or other biofuel</p> <p>Biodiesel Production Facility Tax Exemption:</p> <ul style="list-style-type: none"> ▶ Constructed or expanded biomass-to-energy facilities are exempt from state property taxes for up to 10 years ▶ Includes industrial process plants that use biomass to produce at least 500,000 gallons of cellulosic alcohol fuel, liquid or gaseous fuel, or other sources of energy, with energy content at least equal to that of 500,000 gallons of cellulosic alcohol fuel <p>Property Tax Exemption: Renewable electricity systems are exempt from property taxes</p>
Other Incentives	<p>Solar and Wind Manufacturing Incentive:</p> <ul style="list-style-type: none"> ▶ To support research, development, engineering or manufacturing projects ▶ Must result in at least \$30m in new investment and the hiring of 200 new employees within five years ▶ Manufacturers apply for incentives through the Kansas Department of Commerce, which must request the Kansas Development Finance Authority to issue bonds to finance the project ▶ Maximum incentive of \$5m <p>Ethanol Production Incentive:</p> <ul style="list-style-type: none"> ▶ \$0.035/gallon sold to alcohol blenders ▶ Up to 15 million gallons/year for no more than seven years ▶ Only applies to grain ethanol producers who commenced production prior to July 2001 and who increased production in or after July 2001 by 5 million gallons ▶ Producers who commenced cellulosic ethanol production in or after July 2012 and who sold at least 5 million gallons also qualify ▶ As of July 2012, no new grain-based ethanol producers are eligible for the incentive <p>Biodiesel Production Incentive: \$0.30/gallon of biodiesel sold</p>
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=KS ▶ Department of Commerce (Energy): www.kansascommerce.com/index.aspx?NID=135 ▶ Kansas Corporation Commission (Energy): www.kcc.state.ks.us/energy/index.htm

Renewable Energy in Michigan

Summary

A skilled workforce, supportive policies, and significant renewable energy resources have positioned Michigan to become a hub for clean energy research and production. The state is expected to reach its 10% renewable energy target by 2015, and a new report released in September 2013 suggests it could triple its wind and solar energy production to account for 30% by 2035.¹¹ Renewable energy is steadily becoming more cost effective in the state, and as a result, two of Michigan's largest utilities have eliminated a surcharge on customers' bills originally designed to cover the cost of meeting the state's RPS.

Installed Renewable Energy Capacity, 2012			
Wind Power	988 MW	Marine Power	0 MW
Solar Photovoltaic	19.9 MW	Biomass & Waste	488.4 MW
Solar Thermal Electric	0 MW	Ethanol	268 mGy
Geothermal Power	0 MW	Biodiesel	49.8 mGy
Hydropower	369.6 MW	Totals	1,866 MW; 318 mGy

Sources: See User's Guide for details

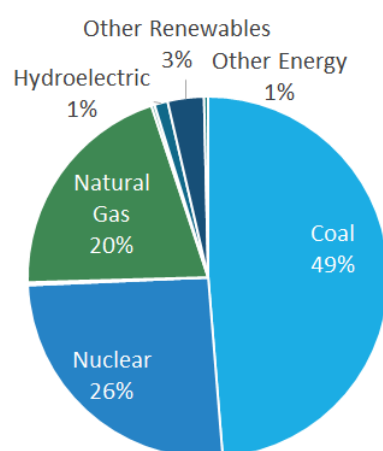
Market Spotlight

- ▶ The 120 MW Tuscola Bay Wind Project became operational in December 2012 and generates enough electricity to power more than 50,000 Michigan homes.
- ▶ An auto manufacturer has partnered with the U.S. Army to test and develop hydrogen fuel cell technology at two new facilities in the state. The partnership is expected to continue for up to five years.
- ▶ Michigan's net metering and solar pilot programs increased 55% from 2011 to 2012, to 9,583 kW of installed systems.¹²
- ▶ A research team at the University of Michigan received a \$2 million federal grant to identify and test naturally diverse groups of green algae that can be used to produce biofuel.
- ▶ A 140-mile-long transmission project is currently underway in Michigan's Thumb. The project is expected to be complete by 2015, and will be capable of supporting 5,000 MW of additional wind capacity.

Economic Development

Employment	2011	
Green Goods & Services Jobs	82,644	
Investment (Grossed-up)	2011	2012
Asset Finance	\$577.4m	\$774m
Venture Capital & Private Equity	\$24.4m	\$1.3m

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Electricity Generation, 2012 (EIA)

¹¹ <http://www.freep.com/article/20130920/NEWS06/309200112/renewable-energy-wind-solar-Michigan-public-service>

¹² <http://www.smartenergyuniverse.com/regulatory/21206-michigan-electric-customers-continue-to-install-solar-and-wind-generation>

Renewable Energy in Michigan

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 10% by 2015 ▶ All utilities; additional obligations for two largest investor-owned utilities: Detroit Edison (600 MW by 2015) and Consumers Energy (500 MW by 2015) ▶ May be met with bundled or unbundled renewable energy credits (RECs) ▶ Extra credits granted toward compliance for electricity from solar power, certain power produced at peak demand times, use of storage technologies, and power produced using equipment manufactured and/or from systems constructed in state
Net Metering	<ul style="list-style-type: none"> ▶ Investor-owned utilities (IOUs), electric cooperatives, alternative electric suppliers ▶ System capacity limit of 150 kW; aggregate capacity limit of 0.75% of utility's peak load during previous year ▶ Net excess generation credited to customer's next bill at the retail rate for systems ≤20 kW or at the power supply component of the retail rate for larger systems; carries over indefinitely ▶ Customer owns RECs
Interconnection Standards	<ul style="list-style-type: none"> ▶ IOUs, electric cooperatives ▶ Insurance requirements vary by system size and/or type
Tax Incentives	<p>Biomass Gasification and Methane Digester Property Tax Exemption: Full exemption from real and personal property taxes for certain energy production-related farm facilities</p> <p>Reduced Biofuels Tax:</p> <ul style="list-style-type: none"> ▶ \$0.07/gallon discount on the gasoline tax for gasoline containing at least 70% ethanol ▶ \$0.03/gallon discount on the diesel tax for diesel fuel containing at least 5% biodiesel <p>Alternative Fuel Development Property Tax Exemption: For industrial property used for high-technology activities (including advanced vehicle technologies) or the creation or synthesis of biodiesel fuel</p>
Loans	<p>Energy Revolving Loan Fund:</p> <ul style="list-style-type: none"> ▶ Farm energy and passive solar: 4% fixed interest rate; interest-only payments for first six months; six year maximum ▶ Public entity renewable energy projects: 3% fixed interest rate; six year maximum ▶ Maximum amounts – <i>farm energy</i>: \$150,000; <i>passive solar</i>: \$15,000; <i>public entities</i>: \$2.5m
Grants	<p>Biomass Energy Program: Supports biomass energy through program reports, partnerships, technical assistance, and education; funding opportunities vary annually</p>
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=MI ▶ Michigan Energy Website: www.michigan.gov/energy ▶ Michigan Energy Office: www.michigan.gov/mdcd/0,4611,7-122-25676---,00.html ▶ Public Service Commission: www.michigan.gov/mpsc/0,1607,7-159-16393---,00.html ▶ RPS Implementation Report: www.michigan.gov/documents/mpsc/implementation_of_PA295_renewable_energy_411615_7.pdf

Renewable Energy in Minnesota

Summary

Minnesota has been diligent in providing financial incentives that help support its ranking as a top five ethanol-producing state and a leading producer of biomass and wind power. Minnesota also strengthened its renewable portfolio standard (RPS) this year by adopting a solar energy carve-out, which requires investor-owned utilities to supply at least 1.5% of their energy sales from solar power by 2020. This carve-out, coupled with new financial incentives for solar energy, is expected to increase the state's installed solar capacity to 450 MW. With continued policy support, the state's wind, solar, and bioenergy markets hold potential for further growth.

Installed Renewable Energy Capacity, 2012			
Wind Power	2,987 MW	Marine Power	0 MW
Solar Photovoltaic	11.3 MW	Biomass & Waste	491 MW
Solar Thermal Electric	0 MW	Ethanol	1,147.1 mGy
Geothermal Power	0 MW	Biodiesel	66 mGy
Hydropower	204 MW	Totals	3,693 MW; 1,213 mGy

Sources: See User's Guide for details

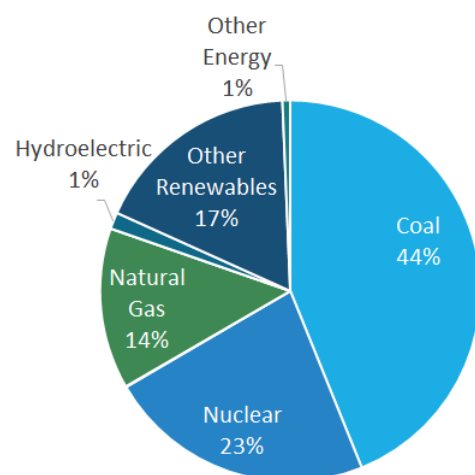
Market Spotlight

- ▶ A bio-based isobutanol facility came back online in June 2013 after being shut down the previous year, which can produce 18 million gallons per year. The isobutanol will be used as a building block to make jet fuel and chemical products.
- ▶ Developers in Minnesota added 267 MW of wind power capacity in 2012. The state currently ranks seventh in the nation for installed wind power capacity. The 200 MW Prairie Rose Wind Farm located in Rock and Pipestone Counties came online in 2012 and produces enough power to provide energy to up to 60,000 homes annually, enough to displace 360,000 tons of carbon dioxide.
- ▶ Minnesota's first community solar project celebrated its grand opening in September 2013, built by the Wright-Hennepin Cooperative Electric Association at its headquarters in Rockford. Co-op members have purchased individual solar panels and will receive credit on their utility bills for the electricity produced.
- ▶ At least nine waste-to-energy facilities produce electricity and steam from municipal solid waste, with a combined capacity of over 126 MW.

Economic Development

Employment	2011	
Green Goods & Services Jobs	75,302	
Investment (Grossed-up)	2011	2012
Asset Finance	\$567.7m	\$427.4m
Venture Capital & Private Equity	\$14m	\$16.7m

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Electricity Generation, 2012 (EIA)

Renewable Energy in Minnesota

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 31.5% by 2020 for Xcel Energy; 26.6% by 2025 for other investor-owned utilities (IOUs); 25% by 2025 for other utilities ▶ For IOUs, 1.5% of total retail sales from solar PV; statewide goal of 10% solar by 2030 <ul style="list-style-type: none"> ○ 10% of the IOU solar PV requirement must come from systems ≤20 kW (incentivized by a \$5m/year fund for the next five years)
Net Metering	<ul style="list-style-type: none"> ▶ All utilities ▶ System capacity limit – <i>current rules</i>: 40 kW; <i>new rules</i>: 1 MW ▶ Net excess generation – <i>current rules and new rules for systems under 40 kW</i>: customer may receive payment or credit on next bill at the retail rate; <i>new rules</i>: customers with systems 40 kW-1 MW may receive credit at the avoided-cost rate or a kWh credit; excess credit reimbursed at end of calendar year at the avoided-cost rate
Interconnection Standards	<ul style="list-style-type: none"> ▶ All utilities; system capacity limit of 10 MW ▶ Insurance requirements vary; external disconnect switch required
Rebates	<p>Made in Minnesota Solar Thermal Rebate:</p> <ul style="list-style-type: none"> ▶ 25% of installed costs for systems with components manufactured in Minnesota ▶ Maximum rebates – <i>single-family residential</i>: \$2,500; <i>multi-family residential</i>: \$5,000; <i>commercial</i>: \$25,000; program budget of \$250,000/year
Tax Incentives	<p>Sales Tax Exemption: Applies to solar energy and wind power systems, and the materials used to manufacture, install, construct, repair or replace wind energy systems</p> <p>Property Tax Exemption: For real property taxes for solar PV and real and personal property taxes for wind; in lieu of property tax, wind projects charged a production tax</p> <p>Investment Tax Credit: For investments in small businesses that use or are involved in the research or development of cellulosic ethanol; 25% of investment, <\$250,000 annually</p>
Production Incentives	<p>Made in Minnesota Solar Energy Production Incentive: Solar systems connected to the grid, less than 40 kW and made in state; 10-year contract; recalculated rates each year</p> <p>Renewable Energy Production Incentive: 1.5%/kWh for on-farm biogas facilities</p> <p>Value of Solar Tariff: Public utilities must offer this tariff or net metering</p>
Loans	<p>Agricultural Improvement Loan Program:</p> <ul style="list-style-type: none"> ▶ Improvements or additions to permanent agricultural facilities, including wind energy (maximum 1 MW), anaerobic digestion, and certain other biomass systems ▶ Loans made by financial institutions; Minnesota Rural Finance Authority (RFA) participation limited to the lesser of 45% of loan principal or \$300,000; 10 year max <p>Methane Digester Loan Program: RFA participation limited to 45% of loan principal or \$250,000; maximum term of 10 years; RFA portion at zero interest</p> <p>Sustainable Infrastructure Revolving Loan Program:</p> <ul style="list-style-type: none"> ▶ On-farm energy production, including solar power, wind, and biomass, that results in improvement of the environment and of the farm's economic viability ▶ Up to \$40,000 per farm family or up to \$160,000 for joint projects; total budget \$1m ▶ Fixed interest rate for up to 7 years (3% currently); 2:1 ratio of collateral to loan amount <p>Fix-up Loan: Home improvement loans for renewable energy and energy efficient technologies; \$2,000-\$50,000; loan repayment 10-20 years</p>
Biofuel Mandates	<ul style="list-style-type: none"> ▶ Gasoline sold or offered for sale must contain 10% ethanol (will raise to 20% in 2015) ▶ Diesel sold or offered for sale must contain at least 5% biodiesel (should raise to 10% by 2014 and 20% in 2015)
Other Policies	<ul style="list-style-type: none"> ▶ Each public utility must file with the Public Utility Commission to create a 20-year power purchase agreement (PPA) for community-owned renewable energy projects
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=MN ▶ Minnesota Department of Commerce (Energy): www.mn.gov/commerce/energy ▶ Minnesota Department of Agriculture (Energy): www.mda.state.mn.us/renewable.aspx

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, particularly well-suited for wind and bioenergy production. The state has enacted 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. However, it did not see significant renewable energy investment activity or utility-scale capacity additions in the 2011-2012 time period, and still relies on coal generation to provide most of its power. In March 2013, the Missouri House voted to allow additional hydroelectric power to be used toward meeting the state's renewable energy requirement.

Installed Renewable Energy Capacity, 2012

Wind Power	459 MW	Marine Power	0 MW
Solar Photovoltaic	18.5 MW	Biomass & Waste	9.8 MW
Solar Thermal Electric	0 MW	Ethanol	271 mGy
Geothermal Power	0 MW	Biodiesel	186 mGy
Hydropower	499.2 MW	Totals	987 MW; 457 mGy

Sources: See User's Guide for details

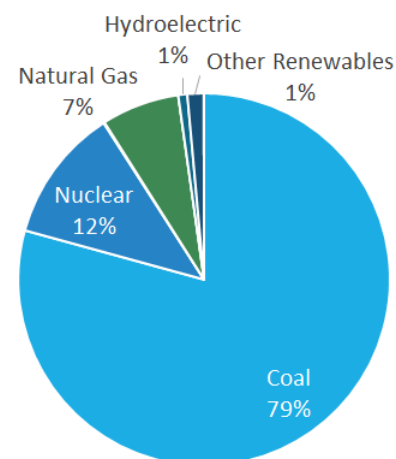
Market Spotlight

- ▶ The state ranks third in biodiesel production capacity nationwide. A developer is constructing a biodiesel plant near St. Louis to produce renewable jet fuel, which is expected to begin operations in 2013.
- ▶ The University of Missouri replaced a coal-fired boiler with a new biomass-fired boiler in July 2013. The new biomass boiler is fueled by more than 100,000 tons of woody biomass annually and will reduce fossil fuel usage on campus by 25%.
- ▶ Developers in Missouri installed more than 16 MW of small-scale solar energy installations in 2012. Kansas City recently signed agreements to install solar PV at 80 municipal buildings to reduce energy costs. Each system could be up to 25 kW in size.
- ▶ After adding a majority of its wind power capacity in the 2009 to 2010 period, Missouri did not install any large wind power projects in 2012.

Economic Development

Employment	2011	
Green Goods & Services Jobs	68,534	
Investment (Grossed-up)	2011	2012
Asset Finance	-	-
Venture Capital & Private Equity	-	-

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Electricity Generation, 2012 (EIA)

Renewable Energy in Missouri

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 15% by 2021 ▶ Investor-owned utilities (IOUs) (representing 70% of the state's electric load) ▶ Solar power must meet 2% of annual requirement, to reach 0.3% of retail sales by 2021 ▶ In-state renewable energy is worth 25% more for compliance purposes ▶ Solar renewable energy credits (SRECs) can be used to comply with the solar target or the overall target ▶ IOUs must offer rebates of at least \$2/watt for customer-sited solar power systems <25 kW, and may offer standard contracts for the purchase of SRECs ▶ Penalties imposed of twice the market value of RECs or SRECs for noncompliance
Net Metering	<ul style="list-style-type: none"> ▶ All utilities ▶ System capacity limit of 100 MW; aggregate capacity limit of 5% of utility's single-hour peak load during previous year ▶ Net excess generation credited to next bill at avoided-cost rate for 12 months
Interconnection Standards	<ul style="list-style-type: none"> ▶ All utilities ▶ Net metering required, other rules vary by utility, system type and/or system size
Tax Incentives	<p>Missouri Works Program: Tax credits or retention of withholding tax for new and existing businesses creating or retaining jobs in state</p> <p>Solar Property Tax: Solar energy systems not held for resale are exempt from state, local, and county property taxes</p>
Loans	<p>Energy Revolving Loan Program:</p> <ul style="list-style-type: none"> ▶ Applies to energy improvements made at schools, public water, and wastewater treatment facilities, public/private not-for-profit hospitals, and local governments, including the installation of renewable energy systems ▶ \$5,000-\$500,000 per applicant; \$5m total available in FY2014
Fuel Production Incentive	<p>Ethanol Production Incentive:</p> <ul style="list-style-type: none"> ▶ Grantee must own at least 51% of production facility and produce ethanol for commercial purposes from Missouri agricultural products or qualified biomass ▶ For over 60 months at rate of \$0.20/gallon for first 12.5 million gallons and \$0.05 for next 12.5 million gallons ▶ Maximum \$3.125m per producer per fiscal year
Renewable Fuel Mandate	<ul style="list-style-type: none"> ▶ All gasoline sold at retail stations must contain 10% ethanol
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=MO ▶ Missouri Division of Energy: www.ded.mo.gov/division-of-energy/funding-opportunity ▶ Public Service Commission (RPS): www.efis.psc.mo.gov/mpsc/Filing_Submission/DocketSheet/docket_sheet.asp?caseno=EX-2010-0169&pagename=case_filing_submission_rst.asp

Renewable Energy in Nebraska

Summary

Nebraska's landscape has diverse and plentiful renewable energy resources. With its array of state tax incentives and loans, it has become a leader in the biofuels industry, but its other renewable energy sectors are less notable. 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 utility financial incentives and operating structures for renewable energy as investor-owned utilities. Coal is responsible for nearly three-quarters of in-state electricity generation, and growth in state's renewable power markets may remain limited without a renewable portfolio standard.

Installed Renewable Energy Capacity, 2012

Wind Power	459 MW	Marine Power	0 MW
Solar Photovoltaic	0.4 MW	Biomass & Waste	10.9 MW
Solar Thermal Electric	0 MW	Ethanol	2,058 mGy
Geothermal Power	0 MW	Biodiesel	5 mGy
Hydropower	332.3 MW	Totals	803 MW; 2,063 mGy

Sources: See User's Guide for details

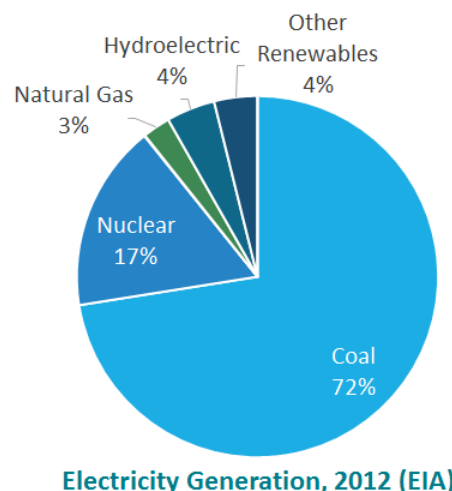
Market Spotlight

- ▶ Nebraska ranks second in the nation in ethanol production capacity. In May 2013, the U.S. Department of Defense chose South Sioux City to be the location of a biofuel plant that will power military jets and ships by 2016, as part of the Defense Production Act's Advanced Drop-In Biofuels Production Project.
- ▶ Although Nebraska ranks fourth in the nation for wind power potential, it only ranks 23rd in the nation for actual installed capacity (American Wind Energy Association).
- ▶ The 200 MW Prairie Breeze wind farm in Antelope, Boone, and Madison Counties is expected to begin commercial operations in 2014. The average annual output could power 60,000 homes.
- ▶ A proposed 220-mile-long transmission line in north-central Nebraska could open the door for the expansion of renewable energy in the state, while creating a means to sell excess energy to other utilities across state lines.

Economic Development

Employment	2011	
Green Goods & Services Jobs	22,392	
Investment (Grossed-up)	2011	2012
Asset Finance	\$60.9m	\$270.2m
Venture Capital & Private Equity	-	\$2m

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Renewable Energy in Nebraska

State Policy

Net Metering

- ▶ All utilities
- ▶ System capacity limit of 25 kW
- ▶ Aggregate capacity limit of 1% utility's average monthly peak demand
- ▶ Net excess generation credited to next bill at avoided-cost rate; carries over indefinitely
- ▶ Customer retains ownership of renewable energy credits (RECs)

Interconnection Standards

- ▶ All utilities
- ▶ Net metering required

Tax Incentives

Sales and Use Tax Exemption for Community Wind Projects:

- ▶ Community wind project owners can include Nebraskan residents, limited liability companies, nonprofit corporations, electric suppliers, and/or tribal councils
- ▶ At least 33% of power purchase agreement payments must be paid to the owners or local community

Sales and Use Tax Exemption for Renewable Energy Property:

- ▶ Equipment investment must meet or exceed \$20m
- ▶ For systems used to produce electricity for sale

Property Tax Exemption for Wind Energy Generation Facilities:

- ▶ Nameplate capacity tax charged in lieu of property tax for wind power projects
- ▶ Both the property tax and nameplate capacity tax are exempt if project is owned by the government, certain electricity suppliers, electricity customers who install a turbine on their side of the meter, and certain other groups

Renewable Energy Tax Credit (Personal or Corporate):

- ▶ Program budget of \$50,000
- ▶ Electricity generated in 2013 or after receives a credit of 0.05 cents/kWh
- ▶ Credits available for a 10-year period

Cellulosic Ethanol Investment Tax Credit:

- ▶ Credit for up to 40% of the amount invested in a cellulosic ethanol-related small businesses, up to \$350,000
- ▶ Up to \$3m available annually through the program

Biodiesel Production Investment Tax Credit:

- ▶ Credit for up to 30% of the amount invested in a biodiesel production facility that produces B100, up to \$250,000

Ethanol and Biodiesel Motor Fuel Tax Exemption:

- ▶ Applies to motor fuels sold to an ethanol or biodiesel production facility and motor fuels manufactured at and sold from an ethanol or biodiesel facility

Loans

Dollar and Energy Savings Loan:

- ▶ Low-interest loans for residential and commercial energy efficiency improvements, including the installation of renewable energy systems
- ▶ Interest rate of 2.5%-5%
- ▶ Payback term of 5-15 years
- ▶ Largest loan offered is \$750,000 for non-residential case-by-case basis loans

More Info

- ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=NE
- ▶ Nebraska Energy Office: www.neo.ne.gov
- ▶ Power Review Board: www.nprb.state.ne.us
- ▶ Department of Revenue: www.revenue.ne.gov/incentiv/incentive_index.html

Renewable Energy in North Dakota

Summary

As one of the top energy consumers per capita, wind energy, hydropower, and other renewable energy generation together constitute nearly a quarter of North Dakota's power portfolio. Coal is the only other notable source of electricity generation in the state, providing over three quarters of the state's power. North Dakota's renewable energy installations have increased significantly over the past five years, but much of its wind resource potential still remains untapped. An array of state tax incentives, loan programs, and other incentives encourage developers to take advantage of the state's outstanding renewable resources; however, historically low energy prices command conventional energy generation.

Installed Renewable Energy Capacity, 2012

Wind Power	1,680 MW	Marine Power	0 MW
Solar Photovoltaic	0.1 MW	Biomass & Waste	9.8 MW
Solar Thermal Electric	0 MW	Ethanol	370 mGy
Geothermal Power	0 MW	Biodiesel	88 mGy
Hydropower	614 MW	Totals	2,304 MW; 458 mGy

Sources: See User's Guide for details

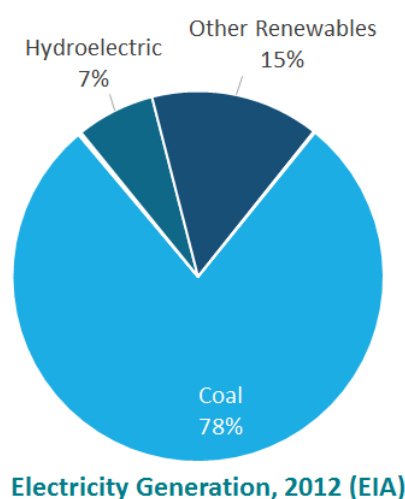
Market Spotlight

- ▶ North Dakota is the 10th largest ethanol producing state in the nation. Plants in Casselton and Hankinson produce more than 230 million gallons of corn ethanol per year.
- ▶ In 2012, North Dakota ranked 11th in the nation for installed wind power capacity. The 292 MW Bison Wind Energy Center in Oliver and Morton Counties marked completion in December 2012, which exports power to Minnesota over a 465-mile direct current transmission line.
- ▶ The Dakota Spirit AgEnergy ethanol plant broke ground in August 2013. The refinery will produce 65 million gallons of ethanol per year and will purchase 23 million bushels of corn annually from area farmers.
- ▶ A three-year research project is currently underway at North Dakota State University, intended to advance development for the state's first facility that will use beets to produce biofuels.

Economic Development

Employment	2011	
Green Goods & Services Jobs	9,481	
Investment (Grossed-up)	2011	2012
Asset Finance	-	\$311.2m
Venture Capital & Private Equity	-	-

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Renewable Energy in North Dakota

State Policy

Renewable and Recycled Energy Objective	<ul style="list-style-type: none"> ▶ 10% by 2015 (voluntary) ▶ All utilities ▶ Eligible resources include most renewable energy systems and certain waste heat, and should be cost effective
Net Metering	<ul style="list-style-type: none"> ▶ Investor-owned utilities (IOUs) ▶ System capacity limit of 100 kW ▶ Net excess generation reconciled monthly at avoided-cost rate
Tax Incentives	<p>Renewable Energy Tax Credit (Corporate):</p> <ul style="list-style-type: none"> ▶ 3% per year for five years (15% total) of the actual cost to acquire and install a renewable energy system ▶ Excess credit from new systems may be carried over for 10 years <p>Geothermal Tax Credit (Personal):</p> <ul style="list-style-type: none"> ▶ 3% per year for five years (15% total) for the cost of acquiring and installing a geothermal energy system on a property owned or leased by the taxpayer ▶ Excess credit may be carried over for 10 years <p>Sales and Use Tax Exemption for Electrical Generating Facilities:</p> <ul style="list-style-type: none"> ▶ Facilities must have a capacity of at least 100 kW ▶ For the purchase of building materials, production equipment, and any other tangible personal property used for constructing or expanding an electrical generation facility <p>Biodiesel Blender Credit:</p> <ul style="list-style-type: none"> ▶ \$0.05/gallon for diesel fuel blended with at least 5% biodiesel or green diesel ▶ May be carried forward five years <p>Large Wind Property Tax Reduction: 70% or 85% reduction in property taxes on centrally-assessed wind turbines ≥100 kW</p> <p>Renewable Energy Property Tax Exemption: For five years for locally-assessed solar, wind or geothermal energy devices serving buildings or structures</p> <p>Sales and Use Tax Exemption for Gas Processing Facilities: For materials, equipment, and other tangible property used to build or expand a landfill gas facility</p> <p>Sales Tax Exemption for Hydrogen Generation Facilities: For the sale of hydrogen used to power an internal combustion engine or fuel cell, or for equipment used to produce and store hydrogen</p> <p>Agriculturally-Based Fuel Production Wage and Salary Tax: New biofuel producers may be eligible for an income tax credit equal to a percentage of wages and salaries paid</p>
Loans	<p>Biofuels Partnership in Assisting Community Expansion (PACE) Loan Program:</p> <ul style="list-style-type: none"> ▶ Interest buy down of up to 5% below the note rate for biodiesel, ethanol or green diesel production facilities and certain support facilities ▶ Up to \$500,000 for the purchase, construction, or expansion of a production facility or for the purchase or installation of equipment at the facility <p>Agriculturally-Derived Fuel Production Facility Loan Guarantees:</p> <ul style="list-style-type: none"> ▶ For the construction of biofuel production facilities that use agricultural feedstocks ▶ May not exceed 30% of the total loan, up to \$2.5m
Other Incentives	<ul style="list-style-type: none"> ▶ Ethanol production incentive based on the wholesale ethanol price and the average state corn price for the preceding quarter; cumulative incentive of \$1.6m ▶ Matching grants and other assistance to support research and development of advanced and sugar-based biofuels
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=ND ▶ Department of Commerce: www.communityservices.nd.gov/energy ▶ State Tax Incentives: www.nd.gov/tax/taxincentives ▶ Public Service Commission: www.psc.nd.gov

Renewable Energy in Ohio

Summary

Ohio is a key player in the Midwest wind supply chain due to its proximity to large wind energy markets, but the state's production of wind energy has not reached the scale of some of its neighbors. The state is one of the nation's top ten ethanol producers and has the largest amount of installed solar energy capacity in the Midwest. With significant renewable energy resources from wind power, solar power, and bioenergy, as well as a multifaceted renewable energy policy portfolio, the state has tremendous potential to expand its emerging renewable energy markets.

Installed Renewable Energy Capacity, 2012

Wind Power	428 MW	Marine Power	0 MW
Solar Photovoltaic	79.9 MW	Biomass & Waste	185.8 MW
Solar Thermal Electric	0 MW	Ethanol	538 mGy
Geothermal Power	0 MW	Biodiesel	132 mGy
Hydropower	128.6 MW	Totals	822 MW; 670 mGy

Sources: See User's Guide for details

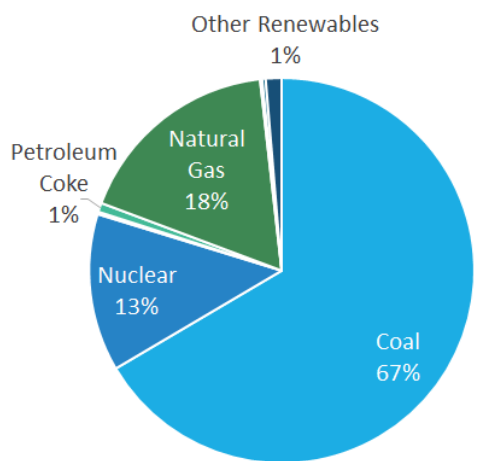
Market Spotlight

- ▶ Solar installations are on the rise in Ohio, with 25 MW of new capacity added in 2012. In April 2013, a 5 MW solar PV plant came online in Mercer County creating 108 construction jobs.
- ▶ A number of biogas plants throughout the state capture methane from landfills to produce energy. A new biogas facility at the Mahoning Landfill came online in 2013, which has a capacity of 4.8 MW.
- ▶ The U.S. Department of Agriculture awarded small rural and agricultural businesses in Ohio more than \$1.1 million in grants in August 2013 to help reduce the use of conventional energy and increase the use of renewable energy.
- ▶ Ohio State University researchers are evaluating the use of flax and camelina for biofuel, to help diversify Ohio farms and boost their sustainability.

Economic Development

Employment	2011	
Green Goods & Services Jobs	137,143	
Investment (Grossed-up)	2011	2012
Asset Finance	\$194.6m	\$71.4m
Venture Capital & Private Equity	\$6.1m	\$14.9m

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Electricity Generation, 2012 (EIA)

Renewable Energy in Ohio

State Policy

Alternative Energy Portfolio Standard

- ▶ 12.5% by 2024 (renewable energy), 12.5% by 2025 (advanced energy)
- ▶ Investor-owned utilities (IOUs) and retail electric suppliers (representing 88.6% of state's electric load)
- ▶ Solar energy must account for 0.5% of the total electricity supply by 2024 (part of overall renewable energy requirement)
- ▶ Renewable energy requirement includes certain cogeneration and waste heat recovery system technologies as well as distributed generation
- ▶ Penalties imposed if standard not met
- ▶ Renewable energy credits (RECs) and solar RECs may be used to meet the standard

Net Metering

- ▶ IOUs
- ▶ Net excess generation credited to customer's next bill at unbundled generation rate; customer may be paid for excess credit at end of 12 months

Interconnection Standards

- ▶ IOUs
- ▶ System capacity limit of 20 MW

Tax Incentives

Energy Conversion and Thermal Efficiency Sales and Use Tax Exemption:

- ▶ For certain tangible personal property used in energy conversion, solid waste energy conversion, or thermal efficiency improvement facilities

Qualified Energy Property Tax Exemption:

- ▶ Qualified energy projects over 250 kW are subject to a payment in lieu of personal property taxes and real property taxes
- ▶ Qualified energy projects 250 kW or less are exempt from public utility tangible personal property taxes and real property taxes and are not subject to an extra payment in lieu of the taxes

Air Improvement Tax Incentives:

- ▶ May include a full tangible personal property tax exemption; real property tax exemption; corporate franchise tax reduction; and/or sales and use exemption
- ▶ Qualifying projects include renewable energy production, including biofuel

Ethanol Production Investment Tax Credit:

- ▶ Equal to 50% of an investment in a certified ethanol production plant against the state corporation franchise tax and income taxes, up to \$5,000 per taxpayer per plant

Loans

Energy Loan Fund:

- ▶ Small businesses, manufacturers, nonprofits, and public entities
- ▶ Interest rate equal to or less than market rate; \$250 application fee; 1% processing and commitment fee; 0.25% annual servicing fee
- ▶ Projects must reduce energy consumption by 15% and result in a return on investment in 15 years or less

Energy Conservation for Ohioans:

- ▶ Reduced rate financing for energy efficiency and renewable energy home upgrades
- ▶ 3% loan rate reduction through participating banks
- ▶ Maximum loan rate reduction of \$50,000 and for seven years of bank loan

More Info

- ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=OH
- ▶ Public Utilities Commission (RPS): www.puco.ohio.gov/puco/index.cfm/industry-information/industry-topics/ohioe28099s-renewable-and-advanced-energy-portfolio-standard
- ▶ Development Services Agency (Energy): www.development.ohio.gov/bs/bs_renewenergy.htm
- ▶ Air Quality Development Authority (Energy): www.ohioairquality.org/energy

Renewable Energy in South Dakota

Summary

Hydropower and wind power account for nearly three-quarters of South Dakota's electricity generation, and the state has a significant opportunity to further develop its renewable energy resources and export sustainable energy to other states. The state is also a leading producer of ethanol. Nevertheless, it has not seen significant renewable energy investment activity or utility-scale capacity additions since the beginning of 2011. And unlike most other states, it does not have net metering standards to encourage the deployment of distributed generation systems, like solar energy.

Installed Renewable Energy Capacity, 2012

Wind Power	783 MW	Marine Power	0 MW
Solar Photovoltaic	0 MW	Biomass & Waste	0 MW
Solar Thermal Electric	0 MW	Ethanol	1,016 mGy
Geothermal Power	0 MW	Biodiesel	7 mGy
Hydropower	1,598.1 MW	Totals	2,381 MW; 1,023 mGy

Sources: See User's Guide for details

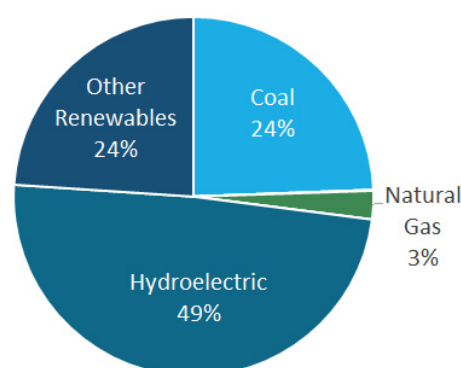
Market Spotlight

- ▶ A cellulosic ethanol pilot plant in the city of Scotland uses cobs from previous corn harvests and corn fiber extracted from an adjacent corn ethanol production facility to produce fuel.
- ▶ South Dakota provided 23.9% of its electricity from wind power in 2012, the second highest percentage of any state (American Wind Energy Association). However, its installed wind power capacity only ranks 16th nationally.
- ▶ The first ever Native American intertribal wind project was announced in August 2013, which plans to unite six South Dakota Tribes to create revenue and energy for the state.
- ▶ At least four recovered energy plants operate in the state that produce energy by using waste heat from natural gas turbines.

Economic Development

Employment	2011	
Green Goods & Services Jobs	10,578	
Investment (Grossed-up)	2011	2012
Asset Finance	-	-
Venture Capital & Private Equity	-	-

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Electricity Generation, 2012 (EIA)

Renewable Energy in South Dakota

State Policy

Renewable, Recycled and Conserved Energy Objective	<ul style="list-style-type: none"> ▶ 10% by 2015 (voluntary) ▶ All utilities (no penalty for non-compliance) ▶ Eligible systems include most renewable energy generation as well as certain waste heat and hydrogen production ▶ Annual reporting required through 2017
Interconnection Standards	<ul style="list-style-type: none"> ▶ Investor-owned utilities (IOUs) ▶ System capacity limit of 10 MW ▶ Insurance requirements vary by system size and/or type
Tax Incentives	<p>Wind Energy Facility Sales and Use Tax Reimbursement:</p> <ul style="list-style-type: none"> ▶ Up to 100% of tax paid on project costs for new or expanded wind power facilities (that cost more than \$20m) or equipment upgrades (that cost more than \$2m) <p>Renewable Energy System Property Tax Incentives:</p> <ul style="list-style-type: none"> ▶ For the greater of \$50,000 or 70% of the assessed value of eligible property <p>Large Commercial Wind Exemption and Alternative Taxes:</p> <ul style="list-style-type: none"> ▶ Alternative taxation in lieu of real and personal property taxes imposed by the state, county, municipality, school district, and other political subdivisions ▶ Calculated as \$3/kW of system capacity and 2% of the gross receipts of the wind farm <p>Biodiesel Blend Tax Credit:</p> <ul style="list-style-type: none"> ▶ Granted on a per gallon basis in the amount that the rate for diesel fuel exceeds the rate for the biodiesel blend
Fuel Production Incentive	<p>Ethanol and Biobutanol Production Incentive:</p> <ul style="list-style-type: none"> ▶ \$0.20/gallon for ethanol and biobutanol fully distilled and produced in state ▶ Ethanol must be denatured, 99% pure, distilled from cereal grains, and blended with gasoline ▶ Annual incentives may not exceed \$1m per facility, or \$4.5m for the overall program in 2014
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=SD ▶ Statewide Energy Management: www.state.sd.us/boa/ose/OSE_Statewide_Energy.htm ▶ Public Utilities Commission: www.puc.sd.gov

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, the state has enacted an array of financial incentives, particularly for biomass, solar, and wind energy.

Installed Renewable Energy Capacity, 2012			
Wind Power	648 MW	Marine Power	0 MW
Solar Photovoltaic	21.1 MW	Biomass & Waste	358.1 MW
Solar Thermal Electric	0 MW	Ethanol	504 mGy
Geothermal Power	0 MW	Biodiesel	32.6 mGy
Hydropower	657.1 MW	Totals	1,684 MW; 537 mGy

Sources: See User's Guide for details

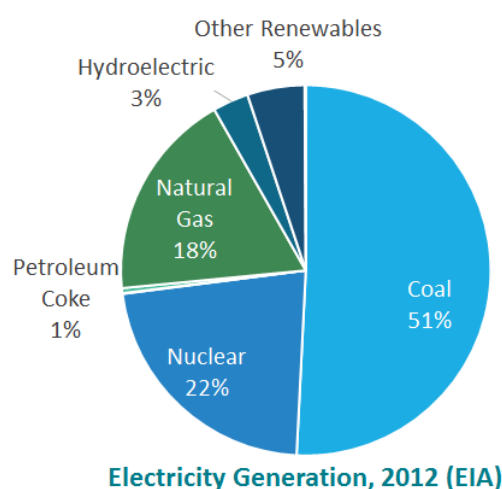
Market Spotlight

- ▶ 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 will have an installed capacity of 18 million gallons of biodiesel per year.
- ▶ Wisconsin is a leader in anaerobic digestion, and biomass facilities in the state also produce electricity through landfill gas power, gasification, anaerobic digestion, and combustion. At least two waste-to-energy facilities produce electricity and steam from municipal solid waste, with a combined capacity of over 28 MW.
- ▶ Testing began in July 2013 on a 50 MW biomass power plant that will burn approximately 500,000 tons of biomass supplied by local sawmills, paper mills, and loggers. The plant is expected to be fully operational before the end of 2013, while generating enough power to supply 32,000 homes.
- ▶ Solar energy capacity doubled in 2012, mostly from residential and commercial solar capacity additions.

Economic Development

Employment	2011	
Green Goods & Services Jobs	69,647	
Investment (Grossed-up)	2011	2012
Asset Finance	\$254.3m	-
Venture Capital & Private Equity	\$1.2m	-

Sources: Bureau of Labor Statistics (BLS); Bloomberg New Energy Finance (BNEF). See User's Guide for details.



Renewable Energy in Wisconsin

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 10% by 2015 (statewide, varies by utility) ▶ All electricity providers ▶ Renewable energy certificates (RECs) and renewable resource credits (RRCs) may be used for compliance
Net Metering	<ul style="list-style-type: none"> ▶ Investor-owned utilities (IOUs), municipal utilities ▶ System capacity limit of 20 kW; for some utilities 100 kW ▶ Net excess generation varies by utility, generally credited to next bill at retail rate
Interconnection Standards	<ul style="list-style-type: none"> ▶ IOUs, municipal utilities ▶ System capacity limit of 15 MW ▶ External disconnect switch generally required; insurance requirements vary by system size and/or type
Public Benefit Fund	<p>Focus on Energy:</p> <ul style="list-style-type: none"> ▶ Funded by state's IOUs and by participating municipal and electric co-ops ▶ Utilities required to spend 1.2% of annual operating revenue on efficiency and renewables; fund for 2014 is \$10m for renewables ▶ Provides financial assistance, information, technical assistance and other services
Rebates and Grants	<p>Residential Renewable Energy Rebates:</p> <ul style="list-style-type: none"> ▶ Rebates for geothermal heat pumps; incentives for solar thermal and PV suspended ▶ Funding available (as of September 2013): \$40,881; maximum rebate \$650 per system <p>Renewable Energy Competitive Incentive Program (RECIP):</p> <ul style="list-style-type: none"> ▶ Competitive request for proposals process for businesses that install qualifying renewable energy systems ▶ Rates may not exceed \$0.50/kWh or \$1.00/Therm produced or offset ▶ Incentives range from \$5,000-\$500,000
Tax Incentives	<p>Sales Tax Exemption:</p> <ul style="list-style-type: none"> ▶ Eligible purchases for solar, landfill gas, wind, biomass, and anaerobic digestion energy systems are exempt from sales and use taxes <p>Property Tax Exemption:</p> <ul style="list-style-type: none"> ▶ The value added by a solar or wind energy system is exempt from property taxes <p>Woody Biomass Harvesting and Processing Tax Credit (Personal or Corporate):</p> <ul style="list-style-type: none"> ▶ 10% of the cost of equipment used to harvest or produce woody biomass for use as a fuel or as a component of fuel ▶ Maximum credit is \$100,000; total credits may not exceed \$900,000 per year ▶ Excess credit in a given year is refunded to taxpayer
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=WI ▶ Focus on Energy: www.focusonenergy.com ▶ Public Service Commission (RPS): www.psc.wi.gov/utilityInfo/electric/renewableResource.htm ▶ State Energy Office: www.energyindependence.wi.gov

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 Spotlight
- ▶ Economic Development
- ▶ Electricity Generation by Source
- ▶ 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 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 *U.S. Wind Industry Fourth Quarter 2012 Market Report*.
- ▶ Solar photovoltaic (PV) data is from IREC's *U.S. Solar Market Trends 2012* 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 *2013 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. Biomass power data includes capacity from biomass facilities that use combustion, anaerobic digestion, gasification, co-firing, landfill gas or pyrolysis to produce electricity.

- ▶ Bioethanol data is from RFA's *2013 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 Spotlight

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, the Bloomberg New Energy Finance (BNEF) desktop, and news articles.

Economic Development

This section provides information 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 grossed-up estimates for completed, BNEF-tracked deals over the past two years. 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>.

Electricity Generation

These pie charts indicate the percentage of power generation from each energy source in 2012. The data is from EIA's *Monthly Energy Review: February 2013*, using the generation totals from January to December 2012.

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 of the most recent update. 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. 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.

Renewable Energy in the 50 States 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 cogeneration, 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

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.

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).