Renewable Energy in the 50 States:
Southeastern Region

ACORE
American Council On Renewable Energy

2013 Edition

About ACORE

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 2014 on National Defense & Security, Power Generation & Infrastructure, and Transportation. Additional information is available at www.acore.org.

Acknowledgements

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Special Thanks:

Bloomberg New Energy Finance
Database of State Incentives for Renewables & Efficiency
Energy Information Administration

Published by:

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Cover images: National Renewable Energy Laboratory (NREL) and Shutterstock

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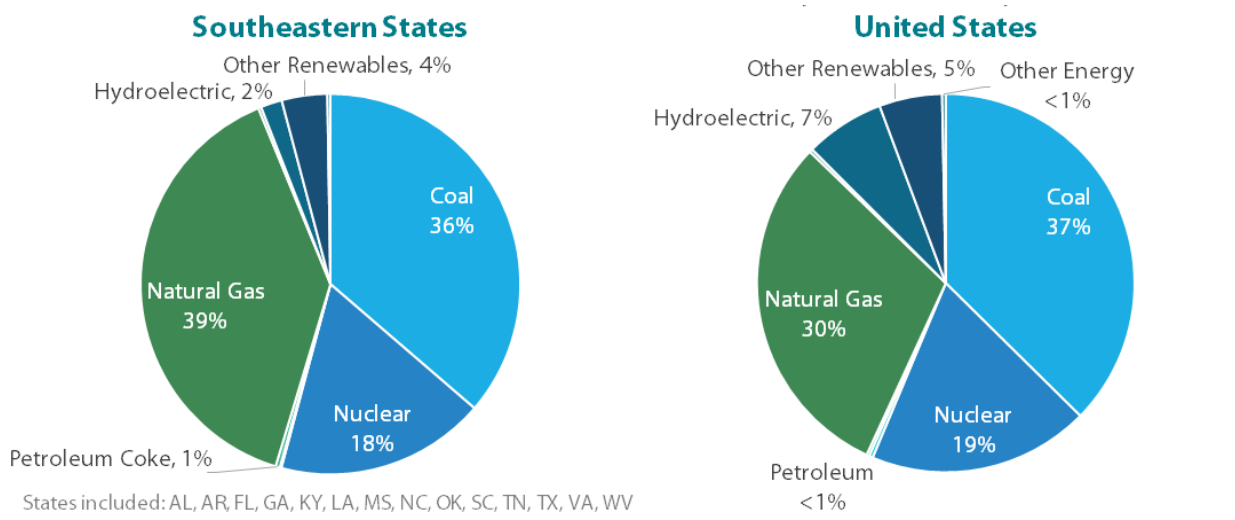
Executive Summary

Renewable energy has a vital role to play in the Southeast's energy sector as a means to satisfy high per-capita electricity consumption, provide an alternative to imported coal, meet the demands of a growing population, and revitalize aging energy infrastructure. However, Southeastern states have often been reluctant to create market signals attractive to renewable energy developers and investors – including appropriate incentives and government initiatives – despite having suitable renewable energy resources. Excluding Texas, the nation's largest producer of wind power, the Southeast only attracted about 10% of the national asset finance, venture capital, and private equity raised for renewable energy in 2012 (and only about 5% in the first nine months of 2013).[1] However, a few states have managed to break from this pattern, like North Carolina, Georgia, Oklahoma, Texas, and others, and are experiencing growth in the solar, wind, biofuels, and biomass sectors.

Electricity Generation By Source, 2012



Source: EIA

In total, renewable energy accounted for about 6% of the Southeast's total electricity generation in 2012, compared to 12% nationally. Only two states in the Southeast contributed more than 10% of their power supply from renewable energy sources. More than half of the Southeast's total renewable power capacity was concentrated in three states: Texas, Alabama, and Oklahoma. Excluding hydropower, Oklahoma and Texas together accounted for nearly 70% of renewable electricity capacity in the Southeast region, leaving Florida and North Carolina far behind as the next largest contributors. Texas alone accounted for 77% of the total Southeast wind power capacity and 45% of the region's biofuels capacity. North Carolina was the leading contributor to solar power capacity in the Southeast, accounting for 36% of the total.

Just three states of the 14 profiled in this report (North Carolina, Texas, and West Virginia) have binding renewable portfolio standards (RPSs); roughly half the states in the U.S. without RPS policies are in the Southeast. Two states, Virginia and Oklahoma, have renewable energy goals that are not binding. Three states, Alabama, Mississippi, and Tennessee, have no RPS, net metering policy, or interconnection standards (the only three such states in the nation), and their renewable energy markets are generally less developed than other states. In contrast, Texas surpassed its target of installing 10 GW of renewable energy capacity by 2025, a full 16 years ahead of schedule.

Biomass is a dominant source of renewable power in the Southeast, with capacity present in every state profiled. However, much of this capacity was built more than a decade ago, and new plants are generally built

[1] Bloomberg New Energy Finance

infrequently. Nevertheless, robust availability of residual wood and the presence of a well-developed harvesting and logistical infrastructure have led the Southeast to become an emerging hub for the production of woody biomass feedstocks used internationally for power and heat. Wood pellet export volumes are expected to grow substantially over the next few years as pellet plants are built or expanded to sell into the demand-rich European renewable energy market.[2] Additionally, the Southeast increasingly uses wood chips in biomass power plants to meet state renewable energy targets. Bioenergy facilities across the region also use agricultural residues, animal waste, municipal solid waste, and other biomass feedstocks, which are often locally produced.[3]

While ten of the 14 states in Southeast Region have no installed wind power capacity, two of the outliers are nationally recognized hubs for wind development: Texas and Oklahoma.[4] To support the growth of the nation's largest wind power market, Texas is building a $7 billion transmission system designed to facilitate the transmission of about 18.5 GW of wind power from turbines located in West Texas to the population centers farther east in the state. Additionally, the Public Service Company of Oklahoma signed 20-year contracts in October 2013 to buy 600 MW of wind power from developing wind farms in Oklahoma, citing competitively low prices.[5] The first wind farms will soon come online in a few other states with no existing capacity, and coastal states are in the early stages of exploring offshore wind.

A few Southeastern states have begun building out their solar energy markets. Aided by financial incentives, states like Louisiana have developed emerging distributed generation markets, and Georgia, North Carolina, Texas, and Florida are home to larger-scale development. Georgia Power plans to have nearly 800 MW of solar power connected to the grid or under contract with developers by 2016.[6] A 38.6 MW facility located near Atlanta came online in December 2013, several months ahead of schedule. Additionally, North Carolina has recently become one of the largest developing solar markets in the nation, ranking second in new solar capacity in 2013.[7]

The deployment of other renewable energy technologies continues across the region. Alabama and Tennessee are two of the top ten states for hydroelectric power production, and modernization has begun on older hydropower facilities to improve their efficiency. A number of states financially incentivize renewable fuels production, and developers continue to bring new ethanol, biodiesel, and advanced biofuel facilities online.

While the region, as a whole, lags behind national development trends, a few Southeastern states have emerged as hotspots for growth. As they attract investment and new renewable generation, their neighbors should see little reason not to follow suit.

[2] http://www.gsabusiness.com/news/48238-s-c-sees-emerging-woody-biomass-industry
[3] http://www.cleanenergy.org/wp-content/uploads/SE_Woody_Bioenergy_Inventory_2013.pdf
[4] http://www.windpoweringamerica.gov/images/windmaps/installed_capacity_current.jpg
[5] http://stateimpact.npr.org/oklahoma/2013/10/11/public-service-company-of-oklahoma-makes-big-move-toward-wind-power
[6] http://www.eenews.net/energywire/stories/1059993450
[7] http://www.pv-tech.org/news/north_carolina_and_texas_shine_in_record_2013_for_us_solar

SOUTHEASTERN STATE INSTALLED CAPACITY RANKINGS

	Renewable Power (w/hydro)	Renewable Power (w/o hydro)	Renewable Fuels
1.	**Texas***: 13,515 MW	**Texas***: 12,817 MW	**Texas**: 947 mGy
2.	**Oklahoma**†**: 4,024 MW	**Oklahoma**†**: 3,219 MW	**Tennessee**: 273 mGy
3.	**Alabama**: 4,001 MW	**Florida**: 1,400 MW	**Mississippi**: 170 mGy
4.	**Tennessee**: 2,770 MW	**North Carolina***: 816 MW	**Georgia**: 146 mGy
5.	**North Carolina***: 2,679 MW	**Virginia**†**: 737 MW	**Arkansas**: 119 mGy
6.	**Georgia**: 2,650 MW	**Georgia**: 723 MW	**Kentucky**: 98 mGy
7.	**South Carolina**: 1,800 MW	**Alabama**: 721 MW	**South Carolina**: 90 mGy
8.	**Arkansas**: 1,722 MW	**West Virginia***: 587 MW	**North Carolina**: 82 mGy
9.	**Virginia**†**: 1,569 MW	**Louisiana**: 463 MW	**Virginia**: 81 mGy
10.	**Florida**: 1,456 MW	**South Carolina**: 437 MW	**Florida**: 41 mGy
11.	**West Virginia***: 1,239 MW	**Arkansas**: 401 MW	**Oklahoma**: 36 mGy
12.	**Kentucky**: 919 MW	**Tennessee**: 271 MW	**Louisiana**: 21 mGy
13.	**Louisiana**: 655 MW	**Mississippi**: 247 MW	**Alabama**: 13 mGy
14.	**Mississippi**: 247 MW	**Kentucky**: 115 MW	**West Virginia**: 3 mGy
	Total: 39,243 MW	**Total**: 22,951 MW	**Total**: 2,119 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 Alabama

Summary

As the leading generator of hydropower in the Southeast, Alabama is in the process of upgrading its aging hydroelectric facilities to increase their efficiency and reduce their environmental impact. Unlike most other states, Alabama does not have a renewable portfolio standard, net metering, or interconnection standards. Besides hydropower, the state's renewable energy production comes almost exclusively from older bioenergy facilities. In 2013, the state's energy office surveyed industry stakeholders for ideas regarding state energy goals, policies, and programs, thus beginning a multi-year effort to develop a comprehensive energy plan.[8]

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	1.1 MW	Biomass & Waste	720 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	0 MW	Biodiesel	13 mGy
Hydropower	3,280 MW	**Totals**	4,001 MW; 13 mGy

Sources: See User's Guide for details

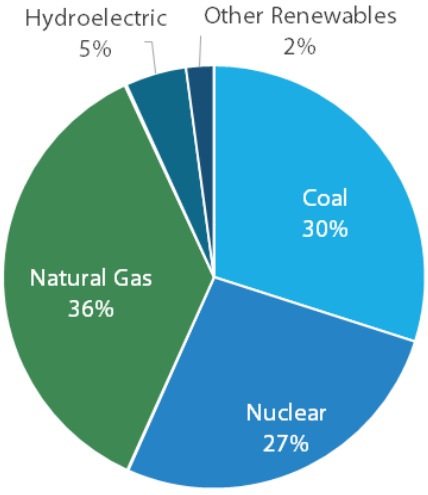
Market Spotlight

- Construction began on a wood pellet fuel facility in Selma in summer 2013. The plant will create 55 permanent positions and 120 supporting jobs.
- An 18.4 MW wind farm under construction in Leesburg, to be one of the first wind farms in the state, qualified for the federal production tax credit in December 2013. It is slated to be commissioned in 2015.
- In September 2013, construction began on a materials recovery facility in Montgomery that will eliminate up to 85% of the city's landfill waste. Expected to be completed by June 2014, the facility will convert the sorted organic waste into compressed natural gas.

Economic Development

Employment	2011	
Green Goods & Services Jobs	54,077	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$85.5m	-
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)

[8] http://www.adeca.alabama.gov/Divisions/energy/Pages/StateEnergyProgram.aspx

Renewable Energy in Alabama

State Policy

Tax Incentives	**Wood-Burning Heating System Deduction:** ▸ Equal to the cost of purchase and installation of a wood-burning heating system ▸ For the conversion of existing gas or electric heating systems, not for new systems **Biofuel Production Facility Tax Credit:** ▸ Up to 5% of project costs per year for 20 years ▸ Can be claimed against the state income tax or the financial institution tax liability that the project generates ▸ Capital costs of the production facility must be at least $2m if not in a favored area, or $500,000 if in a favored area
Loans	**AlabamaSaves:** ▸ For businesses that purchase and install equipment for renewable energy or energy efficiency systems ▸ Loans range $50,000-$4m ▸ Interest rates as low as 1% (maximum buy down of 5%); 2% program origination fee ▸ For retrofits of existing properties and not for the construction of new buildings ▸ Projects must have a simple payback of 10 years or less ▸ Funded through the American Recovery and Reinvestment Act **Local Government Energy Loan Program:** ▸ Low-cost revolving loans for renewable energy or energy efficiency projects undertaken by local governments, K-12 public schools, and public colleges and universities ▸ Systems should help pay for themselves through lower utility bills ▸ 0% interest rate for a term of up to ten years ▸ Maximum loan of $350,000 per campus or $500,000 per school system
Grants	**Biodiesel Fuel Storage Grants:** ▸ Up to $2,500 to cover the cost of cleaning existing fuel tanks to store biodiesel blends of at least 20% ▸ For use in public school, state college and university, and local government fleets
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=AL ▸ Alabama Department of Economic and Community Affairs (Energy Division): www.adeca.alabama.gov/Divisions/energy ▸ Alabama Public Service Commission: www.psc.state.al.us ▸ AlabamaSaves: www.alabamasaves.com

Renewable Energy in Arkansas

Summary

Arkansas relies on coal imported from other states to meet about half of its electricity demand. Although non-hydro renewable energy contributes very little to the state's overall energy portfolio, Arkansas has attracted manufacturers of wind turbine components to build facilities in the state. Nevertheless, few state incentives currently exist to help the industry's growth, resulting in no recent utility-scale development.

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	1.5 MW	Biomass & Waste	399 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	0 MW	Biodiesel	119 mGy
Hydropower	1,321 MW	**Totals**	1,722 MW; 119 mGy

Sources: See User's Guide for details

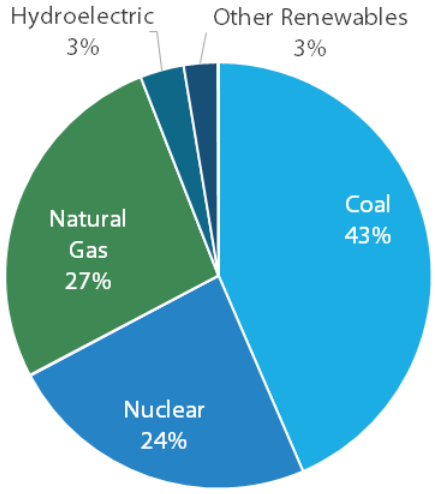
Market Spotlight

- In July 2013, an agreement was reached to sell 150 MW of wind power from two new wind farms in Oklahoma to an electric cooperative in Arkansas. The turbines are scheduled to enter into operation by the end of 2014.
- In January 2013, an agreement was reached with the Flat Ridge 2 Wind Farm in Kansas to sell 51 MW of wind energy to an electric cooperative in Arkansas.
- Arkansas's first community-based biodiesel production facility came online in October 2013. One million gallons of biodiesel from locally grown camelina and vegetable waste oil will be produced per year.
- The state's first E15 station opened in December 2013, joining about 60 stations in 11 other states registered to offer the blend.

Economic Development

Employment	2011	
Green Goods & Services Jobs	33,420	
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 Arkansas

State Policy

Net Metering	▸ Investor-owned utilities (IOUs) and electric cooperatives ▸ System capacity limit of 300 kW for non-residential and 25 kW for residential systems ▸ No aggregate capacity limit specified ▸ Net excess generation credited to customer's next bill at retail; at the end of 12 months, up to four times the amount of a month's average electricity usage may be carried forward to the next annual billing cycle ▸ Customer retains ownership of renewable energy credits (RECs) ▸ Meter aggregation allowed
Interconnection Guidelines	▸ All utilities ▸ Only applies to net metered systems
Tax Incentives	**Wind Energy Manufacturing Tax Abatement:** ▸ Partial income tax abatement for manufacturers of wind turbine blades or components ▸ Must meet investment and job creation thresholds
Loans	**Arkansas Energy Technology Loan Fund (AETL):** ▸ For renewable energy installations, waste heat recovery system installations, and energy efficiency retrofits at businesses ▸ Allows borrowers to repay loans through cost savings realized by project ▸ Maximum term of ten years; interest rates below market rate
Grants and Rebates	**Alternative Fuel Grants and Rebates:** ▸ $0.20/gallon of alternative fuels produced, up to $2m ▸ $3m or 50% of project costs for feedstock processing ▸ $300,000 or 50% of project costs for distribution and storage of alternative fuels at distribution facilities
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=AR ▸ Arkansas Energy Office: www.arkansasenergy.org ▸ Arkansas Alternative Energy Commission: www.aaec.arkansas.gov ▸ Green Arkansas: www.green.arkansas.gov ▸ Public Service Commission: www.apscservices.info/electric.asp

Renewable Energy in Florida

Summary

Florida is among the leading states in biomass power capacity and, until recently, was a leader in solar power development. This growth was in part the result of strong local initiatives, such as the country's first municipal feed-in tariff in Gainesville, and the state's robust available renewable resources. Plans are now underway for a few new solar, biofuels, and biomass power plants to come online. Nevertheless, without a statewide renewable energy target, and by only allowing fully regulated utilities to sell electricity directly to customers, the future of Florida's renewable energy industry is uncertain.

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	116.9 MW	Biomass & Waste	1,208 MW
Solar Thermal Electric	75 MW	Ethanol	0 mGy
Geothermal Power	0 MW	Biodiesel	41 mGy
Hydropower	56 MW	**Totals**	1,456 MW; 41 mGy

Sources: See User's Guide for details

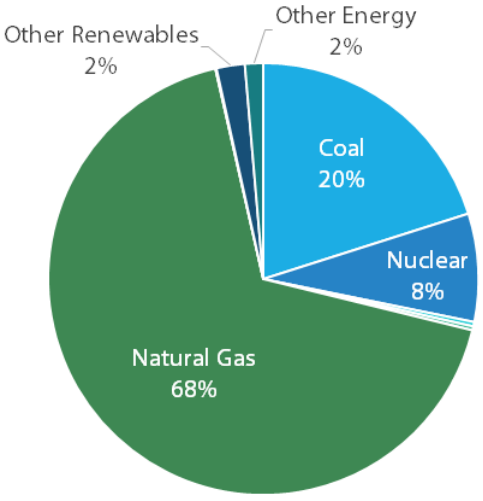
Market Spotlight

- A $130 million co-generation facility in Veros Beach began operating in July 2013, capable of producing 8 million gallons of cellulosic ethanol per year, while producing 6 MW of electricity by utilizing waste biomass material. The plant has 65 full-time employees and provides $4 million of annual payroll to the community.
- A $7 million wind service training facility opened in September 2013 in Orlando, creating 50 new jobs. The new center will host more than 2,400 trainees annually and provide them with the skills necessary to conduct service and long-term maintenance on turbines.
- South Florida will receive its largest rooftop solar array when 1.18 MW of panels are installed on a large furniture retailer's rooftop in summer 2014. The 178,000-square-foot array will annually produce about 1.7 GWh of electricity for the new store.
- Energy Smart Florida was completed in 2013, an $800 million smart grid project partially funded by a grant from the U.S. Department of Energy. The project involved the installation of 4.5 million smart meters and more than 10,000 new intelligent devices across the utility FPL's territory.
- A 100 MW wood-fired biomass power plant began commercial operations in Gainesville in December 2013. The facility is spending $30 million annually for locally produced wood chips, while providing 45 permanent positions at the plant.

Economic Development

Employment	**2011**	
Green Goods & Services Jobs	117,433	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$676.2m	$538.9m
Venture Capital & Private Equity	$1.3m	$98m

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Florida

State Policy

Net Metering	▸ Investor-owned utilities (IOUs) ▸ System capacity limit of 2 MW; no aggregate capacity limit specified ▸ Net excess generation credited to customer's next bill at retail rate; at end of 12 months, paid out to customer at avoided cost rate ▸ Customer retains ownership of renewable energy credits (RECs)
Interconnection Standards	▸ IOUs ▸ Only applies to net metered systems
Tax Incentives	**Sales Tax Refund:** ▸ On materials used in the distribution of biodiesel, ethanol, and other renewable fuels, including fueling infrastructure, transportation, and storage ▸ Limited to $1m in state sales tax each state fiscal year for all taxpayers **Investment Tax Credit:** ▸ Annual corporate tax credit for 75% of all capital costs in connection with an investment in the production, storage, and distribution of biodiesel and ethanol blends with 10%-100% biofuel ▸ Eligible costs may not exceed $1m per year per taxpayer; overall limit of $10m per year **Production Tax Credit:** ▸ Annual corporate tax credit equal to $0.01/kWh of renewable electricity produced and sold by the taxpayer to an unrelated party ▸ Combined total of tax credits limited to $10m per year **Sales and Use Tax Exemption:** ▸ For solar power and thermal systems **Property Tax Exclusion for Residential Renewable Energy Property:** ▸ For residential PV systems, wind energy systems, solar water heaters, and geothermal heat pumps
Grants	**Research and Development Bioenergy Grant Program:** ▸ Matching grants for research, development, and commercialization relating to bioenergy technologies and innovative technologies that reduce fossil fuel consumption for transportation and/or electric generation ▸ Program budget of $3.9m
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=FL ▸ Florida Department of Agriculture and Consumer Services (Energy): www.freshfromflorida.com/Divisions-Offices/Energy ▸ Florida Public Service Commission: www.psc.state.fl.us/utilities/electricgas

Renewable Energy in Georgia

Summary

Georgia relies on imported coal, natural gas, and petroleum for nearly all its energy needs. However, change could be imminent. In July 2013, the Georgia Public Service Commission announced that it will require Georgia Power to construct 525 MW of solar power projects by 2016 – an initiative that has received bipartisan support as a way to diversify the state's energy mix and develop in-state resources.[9] Additionally, biomass companies have tapped into Georgia's considerable agricultural and forestry sectors to bring the state to the forefront of the biomass energy market, and the state's hydropower market is among the largest in the Southeast.

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	21.4 MW	Biomass & Waste	702 MW
Solar Thermal Electric	0 MW	Ethanol	100 mGy
Geothermal Power	0 MW	Biodiesel	46 mGy
Hydropower	1,927 MW	**Totals**	2,650 MW; 146 mGy

Sources: See User's Guide for details

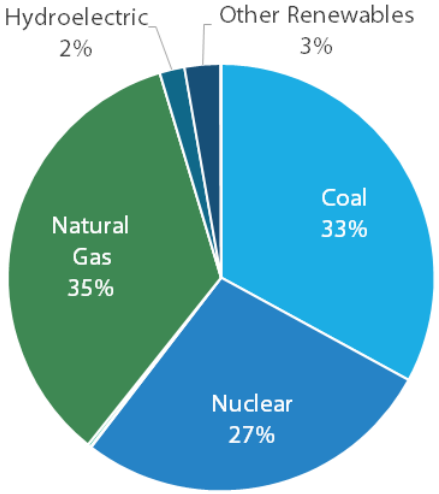
Market Spotlight

- Georgia Power plans to have 800 MW of solar energy connected to the grid or contracted with developers by 2016.[10] Of note, the 38.6 MW Simon Solar Farm near Atlanta began operation in December 2013, several months earlier than expected. Construction also began in October 2013 on two solar power plants in Mitchell and Meriwether Counties, totaling 19 MW.
- A 53.5 MW biomass plant, powered by urban woods waste, mill, and logging residues was commissioned in Barnesville in April 2013. Power from the plant will be sold to Georgia Power under a 20-year power purchase agreement.
- A 100 million gallon-per-year ethanol facility in Camilla reopened in June 2013 after market conditions forced it to shut down in October 2012. Additionally, a 1.14 million gallon-per-year cellulosic ethanol plant in Thomaston opened in May 2013, which uses forestry residues as a feedstock.
- In April 2013, Georgia Power announced that it plans to buy 250 MW of energy from a wind farm in Oklahoma, enough to power more than 50,000 homes.

Economic Development

Employment	2011	
Green Goods & Services Jobs	84,356	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$51m	$11m
Venture Capital & Private Equity	$94.4m	$50.1m

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



Electricity Generation, 2012 (EIA)

[9] http://www.bizjournals.com/atlanta/news/2013/07/11/georgia-psc-orders-more-solar-power.html
[10] http://www.eenews.net/energywire/stories/1059993450

Renewable Energy in Georgia

State Policy

Solar Mandate	▸ Georgia Power must add 525 MW of solar power to its energy mix by 2016
Net Metering	▸ All utilities ▸ System capacity limit of 100 kW for non-residential and 10 kW for residential systems ▸ Aggregate capacity limit of 0.2% of utility's peak demand during previous year ▸ Net excess generation credited to customer's next bill at predetermined rate
Interconnection Standards	▸ All utilities ▸ Only applies to net metered systems
Tax Incentives	**Biomass Sales and Use Tax Exemption:** ▸ For biomass materials used to produce electricity and/or steam that is sold ▸ Pellets and fuels derived from biomass materials are generally eligible **Alternative Fuel and Advanced Vehicle Job Creation Credit:** ▸ For businesses that manufacture alternative energy products for use in battery, biofuel, and electric vehicle enterprises ▸ Annual tax credit for five years, based on the number of eligible new full-time jobs
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=GA ▸ Georgia Environmental Finance Authority: www.gefa.org ▸ Georgia Energy Challenge: www.georgiaenergychallenge.org

Renewable Energy in Kentucky

Summary

As the third largest producer of coal in the nation, Kentucky's coal-fired power plants provide most of its energy needs. To diversify its power supply as its older plants retire and fossil fuel prices increase, the state offers tax incentives that encourage renewable energy production, aiding the development of new distributed generation projects and continued biofuel plant operations. However, the absence of a renewable portfolio standard has discouraged developers from building new utility-scale projects, leaving many of the state's available renewable energy resources untapped.

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	4.8 MW	Biomass & Waste	110 MW
Solar Thermal Electric	0 MW	Ethanol	35 mGy
Geothermal Power	0 MW	Biodiesel	63 mGy
Hydropower	804 MW	**Totals**	919 MW; 98 mGy

Sources: See User's Guide for details

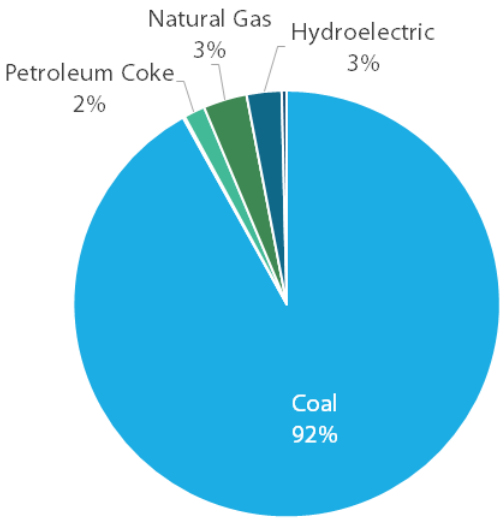
Market Spotlight

- Work continues on retrofitting three dams with hydropower facilities along the Ohio River, totaling 261 MW. Scheduled to be completed in 2014 or 2015, the projects have provided substantial employment opportunities to workers in the region.
- State regulators approved a 20-year contract that allows Kentucky Power Co. to purchase up to 58 MW of electricity from a biomass-fueled plant near Hazard. Approval was also granted for the utility to include 100 MW of wind energy in its upcoming planning process.

Economic Development

Employment	**2011**	
Green Goods & Services Jobs	43,027	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$12.5m	-
Venture Capital & Private Equity	$1.5m	-

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Kentucky

State Policy

Net Metering

- Investor-owned utilities (IOUs), electric cooperatives (except TVA distribution utilities)
- System capacity limit of 30 kW; aggregate capacity limit of 1% of utility's single-hour peak load during previous year
- Net excess generation credited to customer's next bill at retail rate, indefinitely
- Customer retains ownership of renewable energy credits (RECs)

Interconnection Standards

- IOUs, electric cooperatives (except TVA distribution utilities)
- Only applies to net metered systems

Tax Incentives

Renewable Energy Tax Credit *(Personal or Corporate)***:**

- PV: $3/W DC; other systems: 30% of eligible costs
- Maximum incentive of $1,000 per taxpayer for installations on multi-family residences or commercial property; $500 for installations on single family homes
- Excess credit may be carried forward for one year

Tax Credits for Renewable Energy Facilities *(Corporate)***:**

- For companies that make a $1m minimum capital investment to build or renovate a renewable energy facility (power and/or fuels)
- Solar power facilities must generate at least 50 kW; other energy facilities must generate at least 1 MW
- May include: 100% of the corporate income tax; 100% of the limited liability entity tax; and/or 4% of gross wages of each employee; 100% of sales and use taxes
- All tax credits combined may not exceed 50% of the capital investment

Biodiesel Production and Blending Tax Credit:

- Corporate income tax credit or limited liability entity tax credit of $1/gallon of biodiesel B100 or renewable diesel produced or used in the blending process
- Annual cap of $10m

Ethanol Production Tax Credit:

- Corporate income tax credit of $1/gallon of corn or cellulosic-based ethanol
- Maximum credit of $5m for each fuel type in a taxable year

More Info

- DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=KY
- Energy and Environment Cabinet: www.energy.ky.gov
- Think Kentucky Incentives: www.thinkkentucky.com/kyedc/kybizince.aspx
- Governor's Office of Agricultural Policy: http://agpolicy.ky.gov/energy
- Green Bank: http://finance.ky.gov/initiatives/greenbank

Renewable Energy in Louisiana

Summary

As a major producer and consumer of energy, Louisiana relies on an abundance of fossil fuels to power its large industrial sector. However, state policies, like net metering, interconnection standards, and a generous residential solar tax credit, have encouraged the fast expansion of solar energy in its residential sector. Additionally, biofuels are becoming more important to the state's transportation sector, making way for a few large facilities to be commissioned in recent years. Outside of the residential solar and biofuel sectors, recent renewable energy development in the state has been sparse.

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	18.2 MW	Biomass & Waste	445 MW
Solar Thermal Electric	0 MW	Ethanol	2 mGy
Geothermal Power	0 MW	Biodiesel	19 mGy
Hydropower	192 MW	**Totals**	655 MW; 21 mGy

Sources: See User's Guide for details

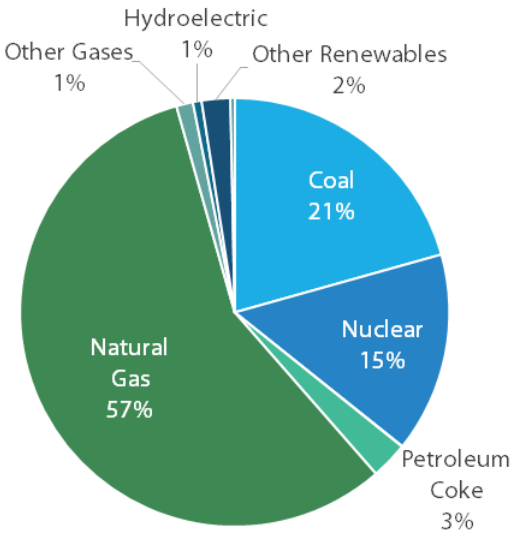
Market Spotlight

- A 137 million gallon-per-year renewable diesel facility in Norco began producing fuel in June 2013. The facility uses recycled animal fat, cooking oil, and corn in its conversion process.
- Three new biorefineries with a capital investment of $168 million were announced in August 2013. If built as planned, the three facilities would create 72 new direct jobs, while providing 750 construction jobs. Construction and completion of the three sites is expected to take place between 2014 and 2016 in Alexandria, Natchitoches, and a yet-to-be-named site.

Economic Development

Employment	2011	
Green Goods & Services Jobs	44,373	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$409m	$6m
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 Louisiana

State Policy

Net Metering	▸ All utilities ▸ System capacity limit of 300 kW for commercial and agricultural systems and 25 kW for residential systems ▸ Aggregate capacity limit of 0.5% of utility's retail peak load ▸ Net excess generation credited to customer's next bill at retail rate, indefinitely ▸ No renewable energy credit (REC) program has been established in the state, thus ownership of RECs for net-metered systems remains unaddressed
Interconnection Standards	▸ All utilities ▸ Only applies to net-metered systems
Tax Incentives	**Residential Solar Tax Credit** *(Personal or Corporate)***:** ▸ For the purchase and installation of residential solar energy systems ▸ Resident-owned systems: equal to 50% of the first $25,000 of the cost of the system ▸ Leased systems installed after 2013: equal to 38% of the first $25,000 ▸ Unused credit will be refunded within one year **Green Jobs Tax Credit:** ▸ Corporate or income tax credit for qualified capital green infrastructure projects ▸ For 10% to 25% of the project costs, up to $1m ▸ Additional 10% payroll tax credit for residents employed for construction of project **Residential Solar Energy Property Tax Exemption:** Solar energy equipment attached to owner-occupied buildings or swimming pools is exempt from ad valorem taxation **Biodiesel Equipment and Fuel Tax Exemption:** For certain property and equipment used to manufacture, produce, or extract unblended biodiesel
Loans	**Home Energy Loan Program:** ▸ Low-interest, five-year loan for energy efficiency improvements, including some renewable energy installations ▸ 50% subsidized by LA Department of Natural Resources, up to $6,000 **Louisiana Revolving Loan Fund Program:** ▸ Low-interest loans for eligible projects at public, private, commercial, and industrial facilities (excluding the residential sector) ▸ Projects must start producing energy no later than February 15, 2014
Other Policies	**Renewable Energy Pilot Program:** ▸ Goal to determine whether a renewable portfolio standard is suitable for the state ▸ Each investor-owned utility (IOU) must build or contract for a minimum of three projects operational before the end of 2013 ○ Tariffs under standard offer option must be $30/MWh, plus an avoided cost payment, for a maximum of five years ▸ IOUs and cooperative utilities must issue requests for proposals (RFPs) for new, long-term renewable resources that will come online between 2011-2014 ○ Program must procure 350 MW total; 10-20 year contracts ○ Systems must deliver at least 2 MW to IOUs or 1 MW to co-ops
Renewable Fuel Standard	▸ Within six months of when monthly denatured ethanol production reaches 50 million gallons, at least 2% of the total gasoline sold by volume must be denatured ethanol ▸ Within six months of when monthly biodiesel production reaches 10 million gallons, at least 2% of total diesel sold by volume must be domestically-grown biodiesel ▸ Requirements may also be met through an alternate renewable fuel
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=LA ▸ State Energy Office: www.dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=35&ngid=2 ▸ Public Service Commission: http://lpscstar.louisiana.gov/star/portal/default/portal.aspx

Renewable Energy in Mississippi

Summary

As one of the three states in the nation without a renewable energy standard, net metering, or interconnection standards, Mississippi is the smallest producer of renewable energy in the Southeast. Although the Mississippi River has vast hydropower potential, the state's waterways do not contain significant hydropower capacity. While new biofuel production and wood pellet facilities are planned in the state, no utility-scale renewable power projects have been installed in more than five years.

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	0.7 MW	Biomass & Waste	246 MW
Solar Thermal Electric	0 MW	Ethanol	54 mGy
Geothermal Power	0 MW	Biodiesel	116 mGy
Hydropower	0 MW	**Totals**	247 MW; 170 mGy

Sources: See User's Guide for details

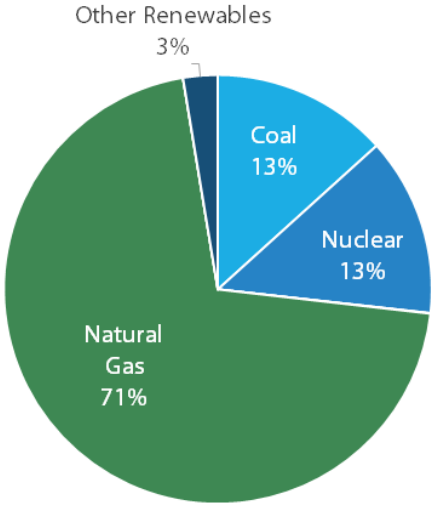
Market Spotlight

- A bio-oil facility in Columbus began shipping renewable gasoline and diesel blendstocks, derived from wood waste, in early 2013. The facility has a production capacity of over 13 million gallons per year, enough to fuel 25,000 cars. The site was chosen for its proximity to local biomass feedstocks and access to shipping infrastructure. The company that operates the plant intends to build an add-on facility adjacent to it.
- As of October 2013, bioenergy facility was under construction in Fulton that will produce 400,000 tons per year of wood pellets and 9 million gallons per year of ethanol when complete. Pellets produced at the facility will be sold into the European-mandated renewable energy market.
- Researchers at Mississippi State University received a $6.5 million grant from the U.S. Department of Agriculture in January 2013 to develop a process to convert methane gases produced from leftover plant materials into renewable liquid fuels. The three-year project will help scientists understand which biomass products are most effective at producing fuel.

Economic Development

Employment	2011	
Green Goods & Services Jobs	21,933	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$222m	-
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 Mississippi

State Policy

Tax Incentives	**Clean Energy Initiative:** ▸ 10-year exemption from income, franchise, and sales and use taxes ▸ For companies that manufacture systems or components used to generate renewable energy ▸ Must invest at least $50m and create 250 full-time jobs
Loans	**Energy Investment Loan Fund:** ▸ For certain renewable energy systems installed at commercial or industrial facilities ▸ Loans range $15,000-$500,000 ▸ 2% below prime rate; loan term of ten years ▸ Funded by revolving loan fund of $7m **Biofuels Production Incentive:** ▸ For ethanol and biodiesel producers ▸ $0.20/gallon for up to 30 mGy for ten years ▸ Funding up to $6m is available annually **Alternative Fuel Vehicle Revolving Loan Program:** ▸ Low-interest loans for public school districts and municipalities ▸ To purchase alternative fuel school buses and other motor vehicles, convert school buses and other motor vehicles to use alternative fuels, purchase alternative fuel equipment, or install fueling stations
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=MS ▸ Mississippi Development Authority's Energy and Natural Resources Division: www.mississippi.org/energy ▸ Energy Works: www.mississippi.org/energy/energy-works-mississippis-energy-roadmap

Renewable Energy in North Carolina

Summary

North Carolina is one of the few states in the Southeast to have a renewable portfolio standard, and successfully defeated efforts to have it repealed in 2013. However, with energy efficiency and energy demand reduction eligible to count toward RPS compliance, the push for utilities to develop renewable energy projects is not as strong as in some other states with renewable targets. Recent renewable energy development in North Carolina has almost exclusively occurred in the solar energy sector – growing to become the largest solar market in the Southeast – coupled with a handful of newer biogas and waste energy installations. In-state wood pellet production for bioenergy has also taken off in recent years, but much of this product is shipped internationally.

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	207.9 MW	Biomass & Waste	608 MW
Solar Thermal Electric	0 MW	Ethanol	60 mGy
Geothermal Power	0 MW	Biodiesel	22 mGy
Hydropower	1,863 MW	**Totals**	2,679 MW; 82 mGy

Sources: See User's Guide for details

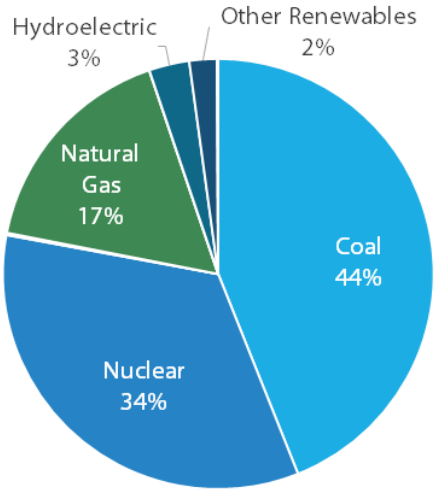
Market Spotlight

- According to a report issued in October 2013, North Carolina has more than 800 MW of solar in development or under construction, the third most in the country behind California and Nevada.[11] In December 2013, construction began on three utility-scale solar projects totaling 30 MW in Halifax, Bertie, and Pitt Counties. The projects will supply enough electricity to power 6,000 homes.
- A wood pellet production facility in Northampton County opened in May 2013, which produces up to 500,000 metric tons of pellets per year from sustainably harvested and untreated raw wood, waste wood, and residuals. The pellets are shipped overseas to the European renewable energy market, while providing 79 direct jobs to the local economy. To support the exports of this and other biomass pellet plants in the region, a $25 million wood pellet export facility is under construction in Carteret County, which will create at least 150 direct and indirect jobs.
- A 5.2 MW biogas facility is under development in Charlotte that will generate electricity from food waste.

Economic Development

Employment	**2011**	
Green Goods & Services Jobs	108,094	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$138.2m	$385.9m
Venture Capital & Private Equity	$37.2m	$10.7m

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



Electricity Generation, 2012 (EIA)

[11] http://www.snl.com/InteractiveX/Article.aspx?cdid=A-25354226-13358

Renewable Energy in North Carolina

State Policy

Renewable Energy and Energy Efficiency Portfolio Standard (REPS)	▸ 12.5% by 2021 for investor-owned utilities (IOUs); 10% by 2018 for electric cooperatives and municipal utilities ▸ Technology minimums – *solar*: 0.2% by 2018; *swine waste*: 0.2% by 2018; *poultry waste*: 900,000 GWh by 2015 ▸ "Energy efficiency technologies" may be used to meet up to 25% of target ▸ "Electricity demand reduction" may be used to meet up to 100% of target ▸ Unbundled renewable energy credits (RECs) generated out of state may be used to meet up to 25% of target ▸ RECs generated from biomass facilities located at "cleanfields renewable energy demonstration parks" may receive triple credit for compliance purposes
Net Metering	▸ IOUs ▸ System capacity limit of 1 MW; no aggregate limit specified ▸ Net excess generation credited to customer's next bill at retail rate; granted to utility at end of billing session ▸ Utility owns RECs, with certain exceptions
Interconnection Standards	▸ IOUs ▸ No system capacity limit specified ▸ Insurance requirements and external disconnect switch requirement varies by system size and/or type
Tax Incentives	**Renewable Energy Tax Credit** *(Personal or Corporate)***:** ▸ Equal to 35% of the cost of purchasing, leasing, or constructing eligible renewable energy property; may be taken against the franchise tax, corporate tax, income tax, or gross premiums tax ▸ Maximum incentive of $2.5m per business installation or $1,400-$10,500 per residential installation (varying by technology) ▸ May not exceed 50% of a taxpayer's state tax liability for the year; excess credit may be carried over for five years **Renewable Energy Equipment Manufacturer Tax Credit:** ▸ Equal to 25% of the eligible construction and equipment costs associated with the manufacture of eligible equipment ▸ Credit taken in installments over five years **Property Tax Abatement for Solar Electric Systems:** 80% of the appraised value of a solar PV system is exempt from property tax **Alternative Fuel Sales and Use Tax Exemption:** For the retail sale, use, storage, and consumption of alternative fuels **Biodiesel Production Excise Tax Exemption:** A credit equal to the per gallon excise tax the producer paid in accordance with the motor fuel excise tax rate for the production of at least 100,000 gallons of biodiesel during the taxable year **Biofuel Production Facility Tax Credit:** For the processing of biodiesel, ethanol, or gasoline blends containing at least 70% ethanol, equal to 25% of the cost of constructing and equipping the processing facility **Renewable Fuel Production Facility Tax Credit:** For 35% of the cost to construct and place into service at least three commercial facilities that process biodiesel, ethanol, or gasoline blends of at least 70% ethanol, with a capital investment of at least $400m
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=NC ▸ Utilities Commission (REPS): www.ncuc.commerce.state.nc.us/reps/reps.htm ▸ Department of Environment and Natural Resources (Energy): www.energync.net

Renewable Energy in Oklahoma

Summary

Oklahoma is a prominent producer and user of energy – particularly its industrial sector – with lower than average electricity prices. Wind power is a competitive energy option in the state, and the sector has grown to become the sixth largest in the country in terms of installed capacity. The state experienced a record year for wind power installations in 2012, followed by number of project announcements in 2013, making its renewable energy goal of 15% by 2015 very achievable. Oklahoma also hosts biomass, biodiesel, and hydropower facilities, but development of these sectors has been less heated.

Installed Renewable Energy Capacity, 2012			
Wind Power	3,134 MW	Marine Power	0 MW
Solar Photovoltaic	0.3 MW	Biomass & Waste	85 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	0 MW	Biodiesel	36 mGy
Hydropower	805 MW	**Totals**	4,024 MW; 36 mGy

Sources: See User's Guide for details

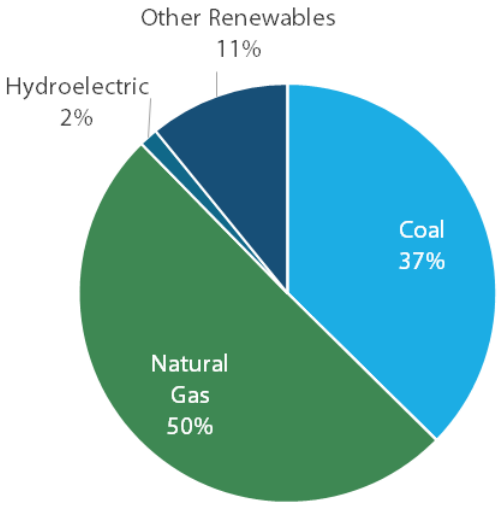
Market Spotlight

- Construction began on the 150 MW Origin wind energy project in the counties of Murray and Carter in November 2013. The project is expected to be completed by the end of 2014 and will supply electricity to an electric cooperative in Arkansas. In December 2013, construction also began on the Chilocco Wind Farms I and II, together 153 MW, co-developed by the Cherokee Nation.
- In October 2013, the University of Oklahoma received a $3 million grant from the U.S. Department of Energy to develop a commercially-viable bio-oil that is non-corrosive and can be refined in the U.S.
- The Public Service Company of Oklahoma signed 20-year contracts in October 2013 to buy 600 MW of wind power from developing wind farms in the state. Originally seeking only 200 MW of new wind, the utility decided to contract for an additional 400 MW because of low prices.[12]

Economic Development

Employment	2011	
Green Goods & Services Jobs	29,035	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$856.6	$1.3bn
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)

[12] http://stateimpact.npr.org/oklahoma/2013/10/11/public-service-company-of-oklahoma-makes-big-move-toward-wind-power

Renewable Energy in Oklahoma

State Policy

Renewable Energy Goal	▸ 15% by 2015 ▸ No interim targets; goal does not extend past 2015 ▸ Eligible technologies include wind, solar, hydropower, hydrogen, geothermal, biomass, and other approved renewable energy sources ▸ Energy efficiency can be used to meet up to 25% of the overall goal ▸ Utilities not required to purchase and retire renewable energy credits (RECs), but must file an annual report documenting all generation facilities
Net Metering	▸ Investor-owned utilities (IOUs), regulated electric cooperatives ▸ System capacity limit of the lesser of 100 kW or 25,000 kWh/year; no aggregate capacity limit specified ▸ Net excess generation credited to customer's next bill or granted to utility monthly
Tax Incentives	**Zero-Emission Facilities Production Tax Credit:** ▸ For the construction of commercial renewable energy systems 1 MW or greater ▸ State income tax credit of $0.0025/kWh-$0.0075/kWh for 10 years ▸ Excess credit may be carried forward for up to 10 years (after 2013, credits can be reimbursed to taxpayer at 85% of value, or can be allocated to other entities) **Property Tax Exemption for Wind Generators:** ▸ Five-year ad valorem property tax exemption for certain wind energy systems ▸ Minimum investment of $250,000 required, and an additional $250,000 in annual payroll in counties with a population of 75,000 or less or $1m in larger counties **Biodiesel Production Tax Credit:** ▸ $0.075/gallon of biodiesel for up to 36 consecutive months for new fuel production ▸ Capped at 10mGy of biodiesel per facility ▸ Excess credit may be carried forward five years **Ethanol Production Tax Credit:** ▸ $0.075/gallon of ethanol, before denaturing, for new production for up to 36 consecutive months ▸ Capped at 10mGy of ethanol per facility, and 30mGy for entire program
Loans	**Energy Loan Fund for Schools:** ▸ Loan/lease fund for public and non-profit K-12 schools that install renewable energy systems and/or make energy efficiency improvements, which have a positive return on investment and reduce energy consumption ▸ Maximum incentive: $200,000 per school district ▸ 3% interest rate for up to six years ▸ Program budget of $1m **Higher Education Loan Fund:** ▸ Loan/lease fund for higher education institutions that install renewable energy systems and/or make energy efficiency improvements, which have a positive return on investment and reduce energy consumption ▸ 3% interest rate for up to six years ▸ Maximum incentive: $300,000 ▸ Program budget of $1.1m
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=OK ▸ Oklahoma Corporation Commission: www.occeweb.com/pu/puregelectric.htm ▸ State Energy Office: www.okcommerce.gov/state-energy-office ▸ Secretary of Energy & Environment: www.ok.gov/energy

Renewable Energy in South Carolina

Summary

Coal imports from Kentucky and in-state nuclear power plants contribute largely to South Carolina's power portfolio. Although the state does not have a renewable portfolio standard or goal, it uses tax credits to incentivize the use of renewable power, heat, and fuels, and offers one of the only production incentives for biomass thermal energy in the country. However, within recent years, renewable energy development has almost exclusively occurred within the biomass energy sector, with only minor capacity additions from solar energy and no notable wind power development.

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	4.6 MW	Biomass & Waste	432 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	0 MW	Biodiesel	90 mGy
Hydropower	1,363 MW	**Totals**	1,800 MW; 90 mGy

Sources: See User's Guide for details

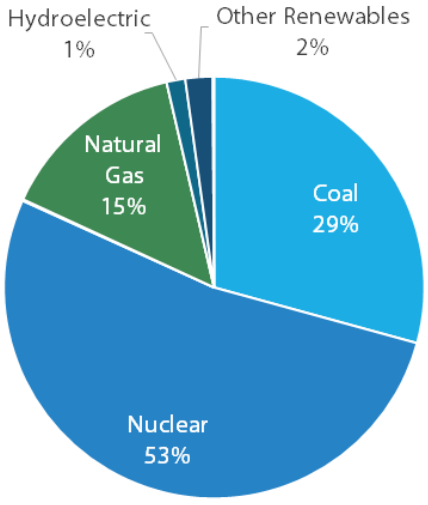
Market Spotlight

- The nation's largest wind drive-train testing facility opened in November 2013 at the Clemson University Restoration Facility on the former Charleston Navy base. The facility, intended to research potential offshore wind installations, can accommodate up to 7.5 MW and 15 MW wind turbine drivetrains while simulating 20 years' worth of wear and tear on drivetrains in a few months.
- Two 17.8 MW woody biomass facilities in Allendale and Dorchester Counties were commissioned in November 2013. The facilities have created over 250 construction jobs and 38 full-time positions.
- South Carolina's first solar farm, with a nameplate capacity of 3 MW, came online in December 2013 in Walterboro, only a few months after the project was announced.

Economic Development

Employment	**2011**	
Green Goods & Services Jobs	44,210	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$22.4m	$100m
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 Carolina

State Policy

Net Metering	▸ Investor-owned utilities (IOUs) ▸ System capacity limit of 100 kW for non-residential and 20 kW for residential systems ▸ Aggregate capacity limit of 0.2% of utility's jurisdictional retail peak demand for previous calendar year ▸ Net excess generation credited to customer's next bill at applicable time-of-use rate; granted to utility annually ▸ Customer owns renewable energy credits (RECs) until a REC market is put in place
Interconnection Guidelines	▸ IOUs ▸ System capacity limit of 100 kW for non-residential and 20 kW for residential systems ▸ External disconnect switch required; additional insurance may be required
Tax Incentives	**Biomass Energy Tax Credit** *(Personal or Corporate)***:** ▸ Equal to 25% of eligible costs of a biomass energy system ▸ Maximum incentive of $650,000 per year ▸ Credit may not exceed 50% of tax liability; excess credit can be carried forward 15 years **Solar Energy and Small Hydropower Tax Credit** *(Personal or Corporate)***:** ▸ Equal to 25% of eligible costs of purchasing and installing a solar energy or small hydropower system for thermal energy use or electricity ▸ Maximum incentive of $3,500 per year ▸ Credit may not exceed 50% of tax liability; excess credit can be carried forward ten years **Renewable Energy Manufacturing Tax Credit:** ▸ 10% income tax credit to manufacturers of renewable energy equipment ▸ Requires a minimum $500m investment the year the tax credit is claimed and a job creation threshold ▸ Maximum incentive of $500,000/year; maximum total of $5m for all years ▸ Unused credit may be carried forward 15 years **Biofuels Production Facility Tax Credit:** ▸ Up to 25% of the cost of constructing, renovating, or equipping a commercial facility that produces biofuel ▸ Must be taken in seven equal annual installments
Production Incentive	**Biomass Energy Production Incentive:** ▸ $0.01/kWh for power and/or $0.30/therm for thermal energy produced ▸ Maximum incentive of $100,000/fiscal year per taxpayer; $2.1m/year for full program ▸ Payments made for five years or until program cutoff in 2018
Loans	**ConserFund Loan Fund:** ▸ Up to 100% of eligible project costs for energy efficiency improvements (including renewable energy installations) made to state and local government buildings, public colleges and universities, school districts, and non-profits ▸ Loans of $25,000-$500,000; low-interest rate for a ten year term
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=SC ▸ State Energy Office: www.energy.sc.gov ▸ Public Service Commission: www.psc.sc.gov

Renewable Energy in Tennessee

Summary

Tennessee is one of the only states in the nation without a renewable energy standard, net metering, or interconnection standards. The Tennessee River, Cumberland River, and other waterways in the state host several hydropower dams, responsible for enough power generation to place the state among the top ten hydropower players nationally. It is the third largest generator of solar power in the Southeast, having doubled its solar installations in 2012. Additionally, biofuels derived from vegetable oil, soybeans, corn, and other grains support alternatively fueled transportation in the state. However, without more leadership and guidance from the state government, the continued development of renewable energy is uncertain.

Installed Renewable Energy Capacity, 2012			
Wind Power	29 MW	Marine Power	0 MW
Solar Photovoltaic	45 MW	Biomass & Waste	197 MW
Solar Thermal Electric	0 MW	Ethanol	225 mGy
Geothermal Power	0 MW	Biodiesel	48 mGy
Hydropower	2,499 MW	**Totals**	2,770 MW; 273 mGy

Sources: See User's Guide for details

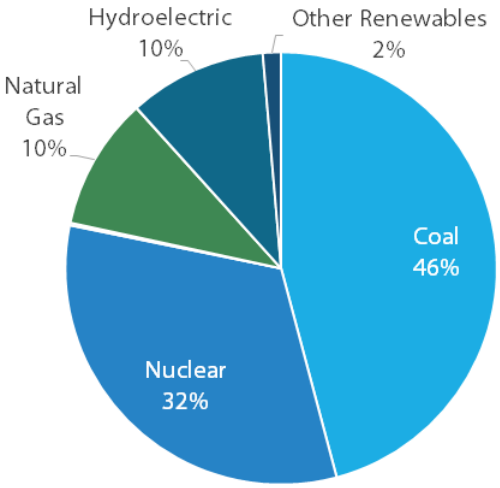
Market Spotlight

- The Tennessee Valley Authority (TVA) completed its final environmental assessment for two proposed solar farms near Selmer in November 2013. With a total combined capacity of 40 MW, the solar farms would be the largest in the state.
- The state's largest operational solar PV facility came online in January 2013, located in Chattanooga, with a nameplate capacity of 9.5 MW. The electricity produced by the panels will be used by a nearby auto manufacturer.
- As of September 2013, the University of Tennessee ranks 10th amongst all U.S. universities for its use of renewable energy, as scored by the Environmental Protection Agency. The campus utilizes biogas, small-scale hydropower, solar, and wind resources to help satisfy its energy demand.

Economic Development

Employment	2011	
Green Goods & Services Jobs	71,111	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$59m	$39m
Venture Capital & Private Equity	$5.7m	$1m

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Tennessee

State Policy

Tax Incentives	**Green Energy Tax Credit:** ▸ Up to $1.5m/tax year to green energy supply chain manufacturers for $250m capital investment into the state ▸ Applied to franchise and excise tax liability **Sales and Use Tax Credit for Emerging Clean Energy Industry:** ▸ Sales and use tax reduced to 0.5% for clean energy technology manufacturers ▸ Requires a minimum $100m investment and job creation thresholds **Property Tax Incentive:** ▸ Wind energy systems operated by public utilities, businesses, or industrial facilities shall not be taxed at more than one-third their total installed cost **Green Energy Property Tax Incentive:** ▸ Special ad valorem property tax assessment for certain renewable energy facilities **Sales Tax Credit for Clean Energy Technology:** ▸ Tax credit, tax refund, or option to make tax-exempt purchases of machinery and equipment used to produce energy in a solar PV, wind, biomass, or geothermal power production facility
Loans	**Commercial Energy Efficiency Loan Program:** ▸ Ten-year loans for commercial renewable energy projects with 5% interest ▸ $50m program for renewable and energy efficiency loans
Grants	**Clean Tennessee Energy Grant Program:** ▸ To purchase, install, and construct biomass, geothermal, solar, or wind energy projects ▸ Financial assistance to municipal government, county government, utility districts, and other entities created by statute
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=TN ▸ Office of Energy Programs: www.tn.gov/environment/energy.shtml ▸ Tennessee Regulatory Authority: www.state.tn.us/tra

Renewable Energy in Texas

Summary

A major player in the energy industry, Texas is the country's largest producer of energy and is the only state with its own power grid. It also leads the nation in wind power generation, with more than twice the installed capacity of the second best state for wind power, California. In recent years, Texas has begun updating its power grid to facilitate more renewable energy generation, by adding new high-voltage power lines and applying smart grid and microgrid technologies. The state exceeded its renewable generation requirement 16 years ahead of schedule, but has not met its goal of installing 500 MW of new, non-wind renewable energy facilities. In particular, the state has a nationally notable solar resource potential, but with few financial incentives to support installations, the pace of development may remain behind other solar leaders.

Installed Renewable Energy Capacity, 2012			
Wind Power	12,214 MW	Marine Power	0 MW
Solar Photovoltaic	140.3 MW	Biomass & Waste	463 MW
Solar Thermal Electric	0 MW	Ethanol	355 mGy
Geothermal Power	0 MW	Biodiesel	592 mGy
Hydropower	698 MW	**Totals**	13,515 MW; 947 mGy

Sources: See User's Guide for details

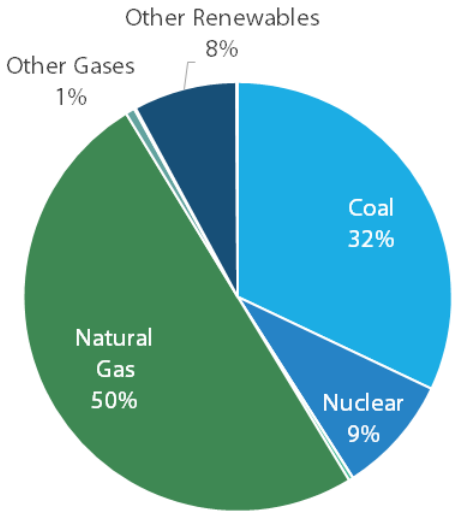
Market Spotlight

- The Fort Bliss Army Base unveiled the Army's first microgrid in May 2013, which integrates renewable energy, local power, energy storage, and load management to provide uninterrupted, continuous power to the base. Additionally, plans have begun to build a 20 MW solar PV project on the base, which is expected to be complete by 2015.
- A massive $7 billion transmission line project, totaling over 3,500 miles of transmission lines, was expected to be completed at the end of 2013. The transmission lines are designed to carry about 18.5 GW of wind power from wind turbines located in West Texas to population centers in the east of the state.
- A 41 MW solar PV project was commissioned in July 2013 near Alamo. The project is the first phase of the larger 400 MW Alamo Solar Project, which is slated for completion in 2016.
- In June 2013, a biodiesel plant in New Boston opened with a production capacity of 15 million gallons per year, which uses poultry fat from local processors to create biofuel.
- Texas continues to set new records for wind power use. On November 10, 2013 at 10:21 a.m., wind power output provided nearly 26% of the state electric grid's (ERCOT's) system load, breaking a previous record set in June 2012.[13]

Economic Development

Employment	2011	
Green Goods & Services Jobs	227,532	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$1.09bn	$2.27bn
Venture Capital & Private Equity	$217.7m	$65.8m

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



Electricity Generation, 2012 (EIA)

[13] http://www.ercot.com/news/press_releases/show/26342

Renewable Energy in Texas

State Policy

Renewable Generation Requirement	▸ 5,880 MW by 2015; goal of 10,000 MW by 2025 (reached 2025 goal 16 years ahead of schedule) ▸ Investor-owned utilities (IOUs), retail electric suppliers are eligible; municipal utilities and co-ops may opt-in ▸ Non-wind goal of 500 MW (compliance value doubled for non-wind renewable energy) ▸ Capacity must be located in state
Interconnection Standards	▸ IOUs ▸ System capacity limit of 10 MW ▸ External disconnect switch required; additional insurance required for certain systems
Loans	**LoanSTAR Revolving Loan Program:** ▸ Low-interest loans for energy-related, cost-reduction retrofits at state, public school district, public college district, and tax-district supported public hospital facilities ▸ Applicants repay loans through energy cost savings realized from project ▸ Maximum incentive of $7.5m; project must have composite payback of ten years or less ▸ Program budget of $190m
Tax Incentives	**Property Tax Exemption:** ▸ For the appraised property value from the installation or construction of a wind, solar, or biomass energy device **Solar and Wind Energy Business Franchise Tax Exemption:** ▸ For companies that exclusively manufacture, sell, or install solar or wind energy devices ▸ No ceiling on exemption **Solar and Wind Energy Device Franchise Tax Deduction:** ▸ Cost of a solar energy device may be deducted from franchise tax (10% of amortized cost of the system from a corporation's appropriated margin) **Diesel Fuel Blend Tax Exemption:** ▸ Biodiesel or ethanol portion of blended fuel containing taxable diesel exempt from the diesel fuel tax
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=TX ▸ Public Utility Commission (RPS): www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.173/25.173ei.aspx ▸ State Energy Conservation Office: www.seco.cpa.state.tx.us ▸ Governor's Energy Page: www.governor.state.tx.us/priorities/infrastructure/energy ▸ ERCOT: www.ercot.com

Renewable Energy in Virginia

Summary

Virginia has taken an "all-of-the-above" approach to energy policy, supporting the generation of electricity from nuclear, natural gas, coal, and renewable energy. Virginia's renewable portfolio goal aims to increase the state's use of renewable energy to 15% by 2025, but unlike renewable targets in many other states, the goal is not binding and allows existing facilities to count toward compliance. Developers and regulators are now directing attention to Virginia's Outer Continental Shelf for the development of offshore wind projects, which could substantially increase the role of renewable energy in the state and power close to one million homes.[14]

Installed Renewable Energy Capacity, 2012			
Wind Power	0 MW	Marine Power	0 MW
Solar Photovoltaic	10.5 MW	Biomass & Waste	726 MW
Solar Thermal Electric	0 MW	Ethanol	65 mGy
Geothermal Power	0 MW	Biodiesel	16 mGy
Hydropower	832 MW	**Totals**	1,569 MW; 81 mGy

Sources: See User's Guide for details

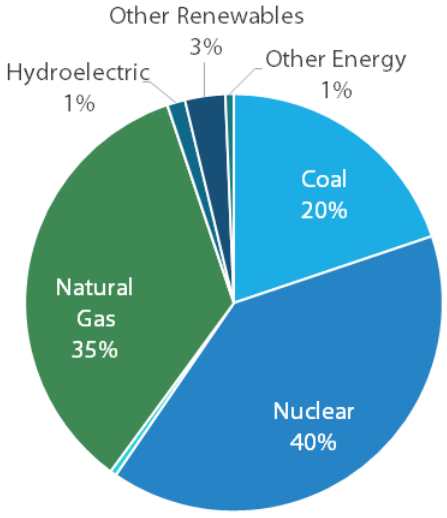
Market Spotlight

- An existing coal-powered facility in Altavista was successfully converted into a 51 MW 100% biomass-powered plant in July 2013. The plant uses waste wood from nearby timber operations as feedstock. A 50 MW biomass project in South Boston was also brought online in 2013. The project is cooled in a closed loop system using water reclaimed from a nearby wastewater treatment facility.
- In September 2013, a Virginian utility won the U.S. Department of the Interior's second competitive lease sale for renewable energy in federal waters. The area auctioned – more than 23 miles off Virginia Beach – could support 2 GW of offshore wind. The project needs to obtain a number of federal approvals before it can begin construction.
- The Virginia Department of Mines, Minerals, and Energy plans to build a grid-connected, 12 MW offshore wind test facility off the state's coast. In December 2013, the U.S. Bureau of Ocean Energy Management determined that there is no other competing interest in the area where the project would be built, but it still needs to approve the installation.
- The Norfolk Navy Base is the site of a ten acre, 2 MW solar power facility that can power up to 200 homes. When it was installed in late 2012, the project was the largest PV facility in Virginia.

Economic Development

Employment	**2011**	
Green Goods & Services Jobs	107,773	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$235m	$16.5m
Venture Capital & Private Equity	$23.2m	$3.8m

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



Electricity Generation, 2012 (EIA)

[14] http://www.doi.gov/news/pressreleases/interior-holds-first-ever-com waters.cfm

Renewable Energy in Virginia

State Policy

Renewable Portfolio Goal	▸ 15% of base year (2007) sales by 2025 (voluntary) ▸ Investor-owned utilities (IOUs) ▸ Includes existing and new solar, wind, geothermal, hydropower, ocean, waste, and biomass power ▸ Up to 25% of goal may be met through research and development activity expenses ▸ Electricity must be generated in state or in interconnection region of the regional transmission utility ▸ Onshore wind and solar receive double credit; offshore wind receives triple credit
Net Metering	▸ IOUs, electric cooperatives ▸ System capacity limit of 500 kW for non-residential and 20 kW for residential (residential systems greater than 10 kW must pay monthly standby charge) ▸ Aggregate capacity limit of 1% of utility's adjusted state peak-load for previous year ▸ Net excess generation credited to customer's next bill at retail rate; customer may opt to continue rolling it over or receive payment at avoided cost rate after 12 months ▸ Customer owns renewable energy credits (RECs)
Interconnection Standards	▸ All utilities ▸ System capacity limit of 20 MW ▸ Rules differ for net metered and non-net metered systems and by size
Tax Incentives	**Green Jobs Tax Credit:** ▸ $500 income tax credit for every green job created with an annual salary of at least $50,000/year, for five years ▸ Maximum incentive of $175,000 **Personal Tax Credit for Home Improvements:** For 10%-30% of the cost of energy efficiency improvements, including the installation of renewable energy systems **Biodiesel Production Tax Credit:** ▸ Equal to $0.01/gallon of biodiesel or green diesel fuels produced; to not exceed $5,000 ▸ For producers that generate up to 2 mGy **Alternative Fuel Job Creation Tax Credit:** ▸ Job creation tax credit of up to $700/full-time employee for alternative fuel related jobs
Loans and Grants	**Voluntary Solar Resource Development Fund:** ▸ Revolving loan fund fueled by donations from customers of IOUs ▸ Loans made available for eligible solar energy projects **Energy Project and Equipment Financing:** ▸ Loans to counties, cities, towns, and authorities for renewable energy installations ▸ Low-interest loans or credit enhancement **Clean Energy Manufacturing Incentive Grants:** ▸ Up to $0.75/watt for the production of renewable energy equipment sold in a year ▸ Manufacturer must meet investment and job creation thresholds **Biofuels Production Grants:** ▸ $0.125/gallon of neat advanced biofuel sold ▸ $0.10/gallon of non-advanced neat biofuels sold in state **Agriculture and Forestry Biofuel Production Grants:** ▸ For the construction of biofuel production facilities ▸ Individual grants may not exceed $250,000 or 25% of qualified capital expenditures
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=VA ▸ Division of Energy: www.dmme.virginia.gov/DE/DeLandingPage.shtml ▸ State Corporation Commission (RPS): www.scc.virginia.gov/pue/renew.aspx

Renewable Energy in West Virginia

Summary

As a top coal producing state, accounting for over one-tenth of total U.S. coal production, West Virginia relies on fossil fuel to provide nearly all of its energy needs. However, a substantial amount of this capacity is set to be retired over the next few years, making room for the addition of new renewable energy facilities. The state has set an alternative and renewable portfolio standard to procure 25% non-fossil energy by 2025, but with no minimum requirement for cleaner, renewable technologies, it is uncertain whether this standard will drive substantial renewable energy development. The state has also enacted net metering policy and interconnection standards to encourage the development of distributed generation.

Installed Renewable Energy Capacity, 2012			
Wind Power	583 MW	Marine Power	0 MW
Solar Photovoltaic	1.7 MW	Biomass & Waste	2 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	0 MW	Biodiesel	3 mGy
Hydropower	652 MW	**Totals**	1,239 MW; 3 mGy

Sources: See User's Guide for details

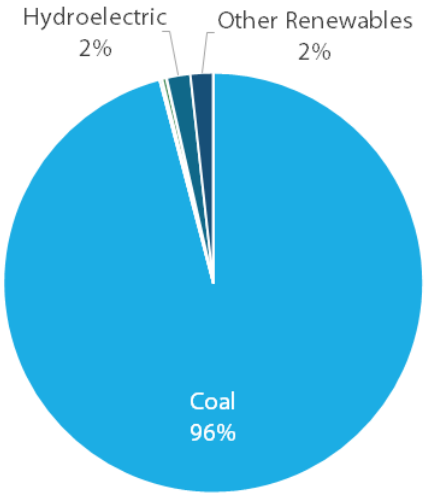
Market Spotlight

- When it is complete in 2015, the 35 MW Willow Island Hydroelectric Project will be one of the state's few recently-built facilities to generate power from the movement of water. Development is also underway on a few micro-hydro projects in the state, including one owned by Marshall University that will use mine water discharge as its water source.
- In late 2012, the U.S. Department of Agriculture awarded researchers at West Virginia University a $350,000 grant to fund a three-year project exploring the economic and environmental impacts of liquid biofuel derived from woody biomass.
- The Beech Ridge Wind Farm in Greenbrier County received permits in 2013 to add 33 additional wind turbines, bringing the total amount of installed turbines to over 100. The project will also take extra precautions to protect endangered bat populations.

Economic Development

Employment	2011	
Green Goods & Services Jobs	16,221	
Investment (Grossed-up)	**2011**	**2012**
Asset Finance	$164.8m	-
Venture Capital & Private Equity	$2m	$14.1m

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



Electricity Generation, 2012 (EIA)

Renewable Energy in West Virginia

State Policy

Alternative and Renewable Energy Portfolio Standard	▸ 25% by 2025 (alternative energy and renewable energy sources, and energy efficiency) ▸ Investor-owned utilities (IOUs) and retail suppliers with more than 30,000 residential customers ▸ At least 90% of target must come from resources other than natural gas ▸ No minimum contribution required for renewable energy, but renewables receive double credit for compliance purposes, and renewable energy systems located at reclaimed surface mines receive triple credit
Net Metering	▸ All utilities ▸ System capacity limit varies by utility and system size/type, ranging from 25 kW-2 MW ▸ Aggregate capacity limit of 3% of peak demand during the previous year ▸ Net excess generation credited to customer's next bill at retail rate indefinitely ▸ Renewable energy credit ownership is not addressed ▸ Meter aggregation is allowed within two miles of the point of generation
Interconnection Standards	▸ All utilities ▸ System capacity limit of 2 MW ▸ External disconnect switch requirement and additional insurance requirements vary by system size/type and utility
Tax Incentives	**Special Assessment for Wind Energy Systems:** ▸ Utility-owned wind projects generally have a value equal to their salvage value for property tax assessment purposes ▸ Reduces effective property tax rate on wind turbines to a minimum of 24.95% of the tax rate on most other newly constructed power facilities **Corporate Tax Exemption for Wind Energy Generation:** ▸ Business and operating tax on wind turbines is multiplied by 12% of the nameplate capacity rating ▸ Equates to about 30% of the effective tax rate on most other newly constructed power facilities
More Info	▸ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=WV ▸ State Energy Office: www.wvcommerce.org/energy ▸ Public Service Commission: www.psc.state.wv.us

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 non-profit 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 and waste data are derived from the Energy Information Agency's Form EIA-860. Biomass and waste 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. Information was derived from the websites of state energy departments, public utility commissions, public benefits funds, the Database of State Incentives for Renewables & Efficiency (DSIRE), and the U.S. Department of Energy's Alternative Fuels Data Center.

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

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

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Renewable Energy in 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.

Polyitaconic Acid: A water soluble polymer with a two 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, which expired at the end of 2013. The PTC can be made for sales in the first ten 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 ten 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).*