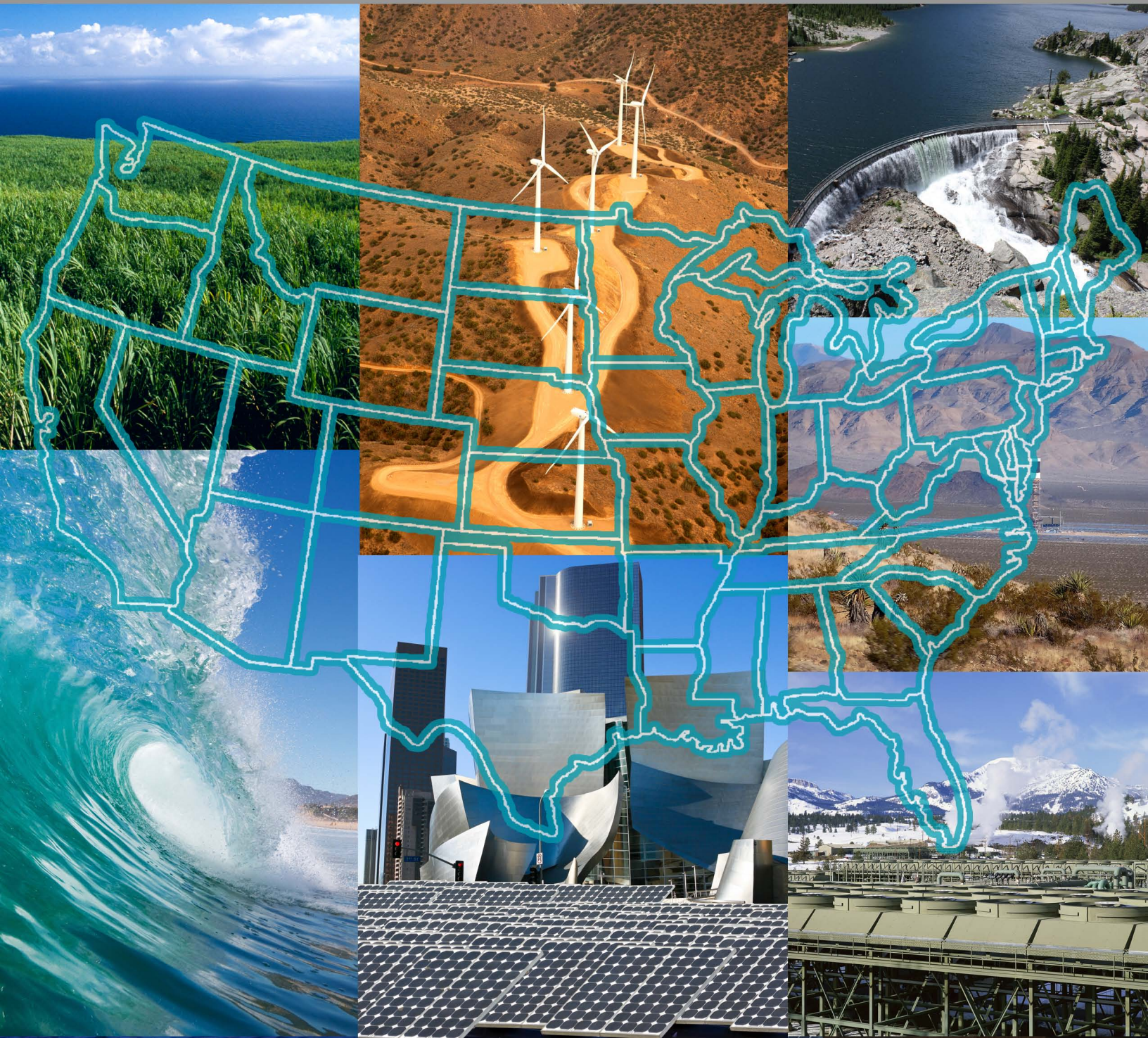


Renewable Energy in the 50 States: Western Region



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 2013 on National Defense & Security, Power Generation & Infrastructure, and Transportation. Additional information is available at www.acore.org.

Acknowledgements

Lead Author:

Lesley Hunter

Researchers:

David Westlake
James Griffith

Special Thanks:

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

2013 American Council On Renewable Energy (ACORE)

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Published by:

American Council On Renewable Energy (ACORE)
1600 K St. NW, Suite 650
Washington, DC 20006
202.393.0001

Questions or Comments: hunter@acore.org



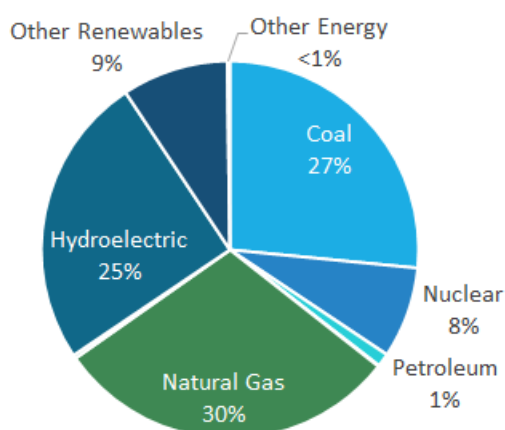
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Executive Summary

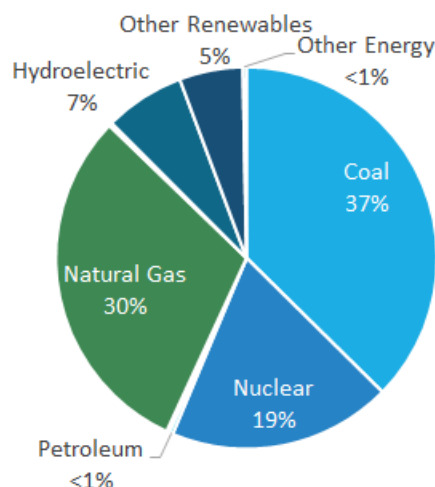
The western United States' remarkable renewable energy resource availability, supportive policies, and well-developed supply chains have transformed western states into national leaders in renewable energy development. In 2012, the region attracted about half of the country's combined venture capital, private equity and asset finance investment in the renewable energy sector, and produced approximately 31% of its total energy generation from renewable energy sources – compared to roughly 12% nationally (sources: Bloomberg New Energy Finance (BNEF) and Energy Information Administration (EIA)).

**Electricity Generation by Source, 2012:
Western States**



States included: AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, WY

**Electricity Generation by Source, 2012:
United States**



Source: EIA

Well-designed state policies have been instrumental in attracting renewable energy companies from around the world to deploy renewable energy in the region for power, heating and transportation. Nine of the 13 western states profiled in this report have binding mandates for renewable energy production, many with minimums for certain distributed generation technologies and/or solar energy. Nearly all of the western states have also enacted net metering rules and interconnection standards to encourage distributed generation and help feed renewable power into the electric grid. An array of state financial incentives – like tax incentives, rebates, production incentives, and low-interest loans – pair with these rules and regulations to mitigate the cost of renewable energy systems for homeowners, businesses, local governments, and other entities, as well as to encourage companies to locate projects and manufacturing facilities in-state. Many states continue to express political support for increased renewable energy development, like in Nevada, where the state government recently passed legislation that would close its remaining coal-fired plants and increase renewable energy production in the state. A number of states also defeated legislation over the past several months that would have weakened or repealed their renewable portfolio standards (RPSs).

Nearly all available renewable energy technologies are well suited for deployment in the West, including solar, wind, hydro, biomass, geothermal, marine, and waste energy, as well as biofuels.

- ▶ The region benefits from some of the best solar resources in the country, responsible for roughly 65% of the nation's solar photovoltaic capacity and 86% of the nation's solar thermal electric capacity.
- ▶ With the country's strongest geothermal resources in western states, the country's utility-scale geothermal power projects currently operate in this region exclusively.
- ▶ The western region is responsible for about 63% of the nation's installed hydropower capacity, and hydropower accounts for about 25% of the region's electricity generation.

- ▶ California and Oregon rank within the top five states for wind power capacity. Wind power projects have been built in every western state.
- ▶ A number of biomass facilities produce energy from municipal solid waste, wood waste, agricultural residues, and other organic feedstocks. Waste-to-energy and biogas systems produce energy from landfills throughout the region, which also helps reduce their size and capture hazardous methane emissions. Biomass energy is also produced at farms, paper mills, and stand-alone biomass facilities in many western states.
- ▶ Companies have begun producing advanced biofuels at a number of facilities and produce ethanol and biodiesel commercially to fuel the region's many alternative-fueled vehicles.
- ▶ Developers have chosen western states to be the site of groundbreaking, innovative renewable energy projects, like ocean thermal energy conversion (OTEC) and wave energy experiments in Hawaii and Oregon, an enhanced geothermal project in Nevada, an algae fuel production facility in New Mexico, and microgrid projects in several states (see state descriptions for more details).
- ▶ Waste heat can be converted into electricity at a number of industrial facilities, like steel mills, paper plants, refineries, chemical plants, oil and gas pipelines, as well as renewable and non-renewable power plants.
- ▶ Residences, businesses, and government buildings use renewable resources for heating and cooling purposes throughout the region, from solar thermal, biomass thermal, and geothermal direct-use systems.

Investors feed billions of dollars to renewable energy projects, technologies, and companies in the western United States each year, spurring the creation of thousands of jobs and stimulating local economies. In 2012, the region was responsible for nearly half – 47% – of the nation's new build asset finance for renewable energy (\$11.3 billion), and an impressive 70% of the nation's new venture capital and private equity investment raised by pure play renewable energy companies (\$1.8 billion) (source: BNEF). The cost of building renewable energy projects in the west continues to drop. In certain states, the availability of resources and/or high conventional energy prices make new renewable energy projects very attractive. In fact, a solar energy power purchase agreement was recently approved in New Mexico at 5.7 cents per kWh – close to the price of energy at an existing coal plant in the state. In addition, the cost to produce biofuels continues to drop, and the first commercial advanced biofuels facilities are coming online.

Recent federal government actions have created new opportunities for renewable energy development. For example, the U.S. Department of Interior expedites the approval of certain renewable energy projects located on federal lands, particularly abundant in the west, and has established “renewable energy zones” to encourage utility-scale development in a number of western states. The U.S. Department of Defense has chosen many western military bases to be the site of renewable energy projects that will help achieve its aggressive clean energy goals, including solar, biomass, and ocean energy systems. National Labs operated by the U.S. Department of Energy also lead the research and development of renewable energy technologies in Colorado, California, New Mexico and elsewhere.

Certain challenges remain. The future of the renewable energy development in states without RPS policies – like Alaska, Wyoming, Idaho, Utah (which has a non-binding renewable portfolio goal) and Wyoming – is less clear than in states with renewable mandates. In Wyoming, with the lack of an RPS or financial incentives and with the country's only imposed tax on wind power generation, developers built no utility-scale renewable energy projects in 2012, nor are any expected this year. Also, without renewable energy mandates and incentives, the cheap price of natural gas may discourage states from building renewable energy projects. In addition to the absence of state policy support, the availability of transmission also poses certain barriers to the effective use of renewable energy, especially when transporting power from projects located in rural areas (like federal lands), where resources are especially plentiful, to demand centers. Certain states strategically plan new transmission lines to be built along with new renewable energy projects, but many experience delays due to permitting issues and cost barriers.

Despite these challenges, the long-term outlook for renewable energy in most western states is positive, with their unmatched resources and strong public and political support.

Western State Installed Capacity Rankings

	Renewable Power (w/hydro)	Renewable Power (w/o hydro)	Renewable Fuels
1.	Washington* : 24,133 MW	California* : 12,646 MW	California : 301 mGy
2.	California* : 22,699 MW	Oregon* : 3,645 MW	Oregon : 167 mGy
3.	Oregon* : 11,887 MW	Washington* : 3,231 MW	Colorado : 125 mGy
4.	Arizona* : 4,107 MW	Colorado* : 2,623 MW	Washington : 117 mGy
5.	Idaho : 3,674 MW	Wyoming : 1,411 MW	Arizona : 103 mGy
6.	Colorado* : 3,273 MW	Arizona* : 1,389 MW	Idaho : 56 mGy
7.	Montana* : 3,250 MW	Idaho : 1,138 MW	New Mexico : 32 mGy
8.	Nevada* : 2,139 MW	Nevada* : 1,086 MW	Wyoming : 12 mGy
9.	Wyoming : 1,714 MW	New Mexico* : 988 MW	Utah : 10 mGy
10.	New Mexico* : 1,070 MW	Hawaii* : 672 MW	Hawaii : 8 mGy
11.	Hawaii* : 699 MW	Montana* : 647 MW	Nevada : 5 mGy
12.	Utah : 652 MW	Utah : 390 MW	Alaska : 0.3 mGy
13.	Alaska : 489 MW	Alaska : 69 MW	Montana : 0.3 mGy

*=State has a renewable portfolio standard

MW=megawatt; mGy=million gallons per year

Sources: See User's Guide

Renewable Energy in Alaska

Summary

With some of the highest electricity and gasoline prices in the nation, Alaska has the opportunity to economically deploy a variety of renewable energy projects throughout its diverse geographic regions. The state's renewable capacity accounts for over a fifth of electricity generation, predominantly via an extensive hydroelectric system, and growing installations of wind turbines. State initiatives have traditionally supported small-scale projects, which feed into larger transmission grids and the 150 remote, stand-alone grids serving rural villages. However, the development of Alaska's renewable energy industry may continue to be subject to "fits and starts" until a more aggressive strategy is set in place.

Installed Renewable Energy Capacity, 2012

Wind Power	59 MW	Marine Power	0 MW
Solar Photovoltaic	0 MW	Biomass Power	9.2 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	0.7 MW	Biodiesel	0.3 mGy
Hydropower	420.3 MW	Totals	489 MW; 0.3 mGy

Sources: See User's Guide for details

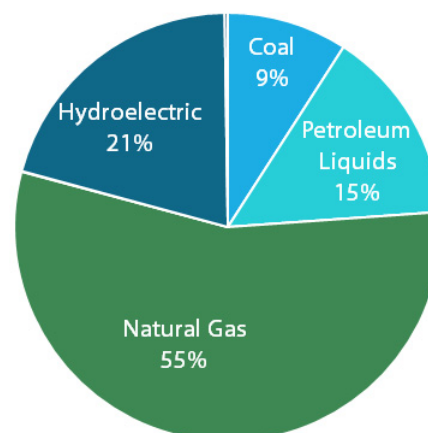
Market Spotlight

- ▶ Over 20 communities in Alaska generate electricity from wind power. Alaska's first commercial-scale wind power project was commissioned in October 2012 on Fire Island, to serve the city of Anchorage. The project has 17.6 MW of capacity—enough to power 6,000 homes.
- ▶ Wood is used for heating statewide, generating both heat and electricity at community-level biomass thermal facilities in at least ten communities.
- ▶ In the summer of 2012, the Joint Base Elmendorf-Richardson commissioned a landfill gas-to-energy facility, which converts the methane produced from a local landfill into electricity. At 6.5 MW, the facility can meet about half of the base's electricity demand.
- ▶ Some isolated, small towns like Kotzebue are deploying heat-to-power systems to increase the energy efficiency and extend the fuel supply of the diesel engines that supply them power.
- ▶ Through the U.S. Department of Energy and the Denali Commission, five Alaska Native communities will receive technical expertise through the Strategic Technical Assistance Response Team (START) program, to be used for community-based energy planning, energy awareness and training programs, and clean energy deployment and financing opportunities.

Economic Development

Employment		2011	
Green Goods & Services Jobs		12,119	
Investment (Grossed-up)		2011	2012
Asset Finance		\$83.1m	-
Venture Capital & Private Equity		-	\$0.6m

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Alaska

State Policy

Net Metering	<ul style="list-style-type: none"> ▶ Utilities with annual retail sales of 5 GWh or more ▶ System cap: 25 kW; aggregate cap: 1.5% of utility's average retail demand ▶ Net excess generation credited to customer's next bill at non-firm power rate; carries over indefinitely
Interconnection Standards	<ul style="list-style-type: none"> ▶ Net metering required ▶ Other requirements vary by utility
Tax Incentives	<ul style="list-style-type: none"> ▶ Local Option: Municipalities may pass ordinances that exempt residential renewable energy systems from property taxation
Grants	<p>Renewable Energy Fund:</p> <ul style="list-style-type: none"> ▶ Assists utilities, independent power producers, local governments, and tribal governments ▶ For feasibility studies, reconnaissance studies, energy resource monitoring, and work related to the design and construction of eligible facilities ▶ Funded by state appropriation; grant amounts vary ▶ Intention of providing \$50m/year until 2023; program has already provided \$227m in funding since it began in 2008 ▶ Administered by the Alaska Energy Authority (AEA) <p>Emerging Energy Technology Fund:</p> <ul style="list-style-type: none"> ▶ Assists utilities, independent power producers, local governments, tribal governments, Alaskan businesses, and nonprofits ▶ For demonstration projects of technologies that have a reasonable expectation to be commercially viable within five years ▶ Maximum project funding of \$750,000 ▶ Administered by AEA
Power Project Loan Fund	<ul style="list-style-type: none"> ▶ Assists electric utilities, regional electric utilities, municipalities, regional and village corporations, village councils, and independent power producers ▶ For the development or upgrade of small-scale power production facilities under 10 MW, conservation facilities, and bulk fuel storage facilities ▶ Term related to life of project ▶ Interest rates the lesser of the average weekly yield of municipal bonds for 12 months preceding the date of the loan, or at a rate the AEA determines would make the project financially feasible
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=AK ▶ Alaska Energy Authority: www.akenergyauthority.org ▶ Regulatory Commission of Alaska: www.rca.alaska.gov ▶ Alaska Renewable Energy Project: www.alaskarenewableenergy.org

Renewable Energy in Arizona

Summary

With Arizona's ideal combination of land area and resource potential for solar power, the state now has the second highest solar photovoltaic capacity of any state, as well as the most PV installed per capita. Research institutions and companies in Arizona are conducting research in algae-based biofuel, which is well suited for development in the state's arid climate. Arizona's modest renewable energy standard of 15% by 2025 and industry recruitment measures have been successful in attracting renewable energy companies to the state, although the future of certain state incentives is uncertain.

Installed Renewable Energy Capacity, 2012

Wind Power	238 MW	Marine Power	0 MW
Solar Photovoltaic	1,106.4 MW	Biomass Power	41.2 MW
Solar Thermal Electric	3.5 MW	Ethanol	55 mGy
Geothermal Power	0 MW	Biodiesel	48 mGy
Hydropower	2,718 MW	Totals	4,107 MW; 103 mGy

Sources: See User's Guide for details

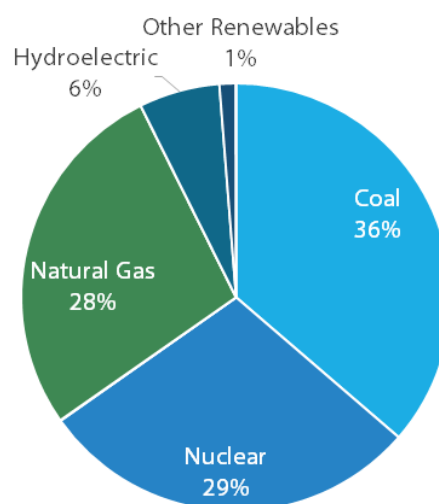
Market Spotlight

- ▶ The Solar Energy Industries Association (SEIA) estimates that the state's net metering program will produce \$34m in net benefits annually by 2015.¹
- ▶ Solar installations in Arizona fell 9% from Q4 2012 to Q1 2013, despite the U.S. hitting a solar installation record during this timeframe, blamed by industry advocates as the result of reduced state incentives.
- ▶ Construction on the 16 MW solar PV plant located at the Davis-Monthan Air Force Base in Tucson is expected to complete at the end of 2013. The plant will supply 50% of the energy needed to power the base during its first year of operation. The base will purchase the energy produced through a 25-year power purchase agreement, and the system will be owned and operated by a third party.
- ▶ In summer 2013, the U.S. Department of the Interior approved both the 500 MW Mohave County Wind Farm and the 100 MW Quartzite Solar Energy Project to be built on federal land in Arizona, which are expected to create hundreds of jobs and inject millions of dollars in investment into the state.

Economic Development

Employment	2011	
Green Goods & Services Jobs	48,851	
Investment (Grossed-up)	2011	2012
Asset Finance	\$5.8bn	\$511.2m
Venture Capital & Private Equity	\$5.5m	\$15.9m

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



Electricity Generation, 2012 (EIA)

¹ <http://www.seia.org/sites/default/files/resources/AZ-Distributed-Generation.pdf>

Renewable Energy in Arizona

State Policy

Renewable Energy Standard (RES)	<ul style="list-style-type: none"> ▶ 15% by 2025 ▶ Investor-owned utilities (IOUs) and electric co-ops (representing 58.6% of state's electric load) ▶ 30% of target to come from distributed generation technologies <ul style="list-style-type: none"> ○ Half from residential applications ○ Half from non-residential, non-utility applications ▶ Bundled renewable energy credits (RECs) acquired in any year can be used to meet existing requirements ▶ Extra credit multipliers of up to 2x per REC awarded for in-state solar installations and projects using in-state manufactured content ▶ Surcharge applied to electric utility bills to allow utilities to recover RES costs
Net Metering	<ul style="list-style-type: none"> ▶ IOUs, electric cooperatives ▶ Net excess generation (NEG) credited to customer's next bill at retail rate; reconciled annually at the avoided-cost rate ▶ No capacity limit or aggregate limit specified ▶ Customer owns RECs
Interconnection Standards	<ul style="list-style-type: none"> ▶ IOUs, Salt River Project ▶ Other rules vary by utility
Tax Incentives	<p>Production Tax Credits (Personal or Corporate):</p> <ul style="list-style-type: none"> ▶ Wind, biomass, or solar power systems over 5 MW ▶ Paid for 10 years ▶ Individual cap: \$2m/year; program cap: \$20m/year <p>Business Tax Incentives:</p> <ul style="list-style-type: none"> ▶ Property tax incentives and an up to 10% income tax credit available ▶ For businesses that establish or expand manufacturing facilities or corporate headquarters in state ▶ Must pay employees above certain income level and/or invest at least \$25m in facilities, equipment, land and infrastructure <p>Residential Tax Credits for Wind and Solar (Personal):</p> <ul style="list-style-type: none"> ▶ For 25% the cost of a solar or wind energy device ▶ \$1,000 maximum allowable limit ▶ Unused portion carried forward up to five years <p>Non-Residential Tax Credits for Wind and Solar (Personal or Corporate):</p> <ul style="list-style-type: none"> ▶ For 10% the cost of a solar or wind energy device (includes tax-exempt entities) ▶ \$25,000 maximum limit for one building in the same year, and \$50,000 per business in total credits in any year ▶ Unused portion carried forward up to five years <p>Property Tax Incentive: Utility-owned renewable energy equipment assessed at 20% its depreciated cost</p> <p>Personal Deduction: The cost of converting an existing wood fireplace to a qualifying wood stove is tax deductible, up to \$500</p>
Grants More Info	<ul style="list-style-type: none"> ▶ Up to \$75,000 to encourage use of biofuels and promote fueling infrastructure ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=AZ ▶ Corporation Commission: www.azcc.gov/divisions/utilities/electric/environmental.asp ▶ Arizona Commerce Authority incentives: www.azcommerce.com/incentives ▶ Renewable Energy Mapping Project: http://renewablemap.az.gov/portal

Renewable Energy in California

Summary

With a population of over 38 million people and the largest economy in the nation, California has faced many challenges and opportunities for its renewable energy economy. To support the growth of the sector, the state has enacted ambitious policies, like its 33% renewable portfolio standard. California leads the nation in generation capacity from geothermal, biomass, solar PV, and solar thermal electric projects, while placing second in wind and hydropower generation capacity. California's rich resource base and its early, sustained support for the renewable energy industry has been successful in attracting and incubating leading renewable energy companies which, in turn, has created many high-quality jobs.

Installed Renewable Energy Capacity, 2012			
Wind Power	5,544 MW	Marine Power	0 MW
Solar Photovoltaic	2,559.3 MW	Biomass Power	1,416.8 MW
Solar Thermal Electric	393.2 MW	Ethanol	223 mGy
Geothermal Power	2,732.2 MW	Biodiesel	78 mGy
Hydropower	10,053.6 MW	Totals	22,699 MW; 301 mGy

Sources: See User's Guide for details

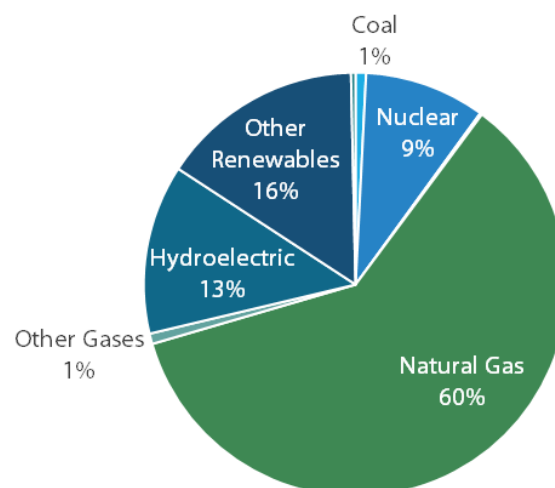
Market Spotlight

- ▶ California is a global hub for renewable energy research and development, with a strong innovation to commercialization track record and an attractive environment for start-ups. The Lawrence Berkeley National Laboratory is located in California and is on the forefront of cleantech research and development.
- ▶ California has the largest market for solar photovoltaic applications in the nation, with over 983 MW of grid-tied PV installed in 2012 alone. Many companies have located manufacturing plants and headquarters in the state and its neighbors for proximity to California's market.
- ▶ Over 875 MW of solar thermal electric projects are under construction, including the Ivanpah Solar Electric Generating System, a 392 MW project on 3,500 acres of federal land expected to be online before the end of 2013.
- ▶ Over 80% of U.S. geothermal power capacity is located in California.
- ▶ The 44 MW Mt. Poso Cogeneration coal-fired power plant near Bakersfield was converted to run entirely on biomass feedstocks, like tree trimmings and agricultural residue, in 2012.
- ▶ The Navy is creating a secure, centrally-managed microgrid in San Diego that will connect three separate military installations equipped with solar generation technology, energy storage and grid controls.

Economic Development

Employment		2011	
Green Goods & Services Jobs		360,245	
Investment (Grossed-up)		2011	2012
Asset Finance		\$16.1bn	\$8.5bn
Venture Capital & Private Equity		\$1.4bn	\$1.6bn

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



Electricity Generation, 2012 (EIA)

Renewable Energy in California

State Policy

Renewable Portfolio Standard Net Metering	<ul style="list-style-type: none"> ▶ 33% by 2020 (targets of 20% by 2013 and 25% by 2016); all electric utilities ▶ Tradable renewable energy credits (TRECs) eligible for 25% of requirement for 2013 and 10% for 2017 ▶ All utilities except LADWP ▶ Available for systems up to 1 MW, until utility meets 5% of its customer peak demand, or systems up to 5 MW for those owned by universities or local governments ▶ Net excess generation (NEG) credited to customer's next bill at retail rate; at end of 12-months, may be rolled over indefinitely or purchased by utility ▶ Customers own RECs for system, but not RECs for NEG purchased by utility ▶ Virtual net metering allowed for multi-tenant properties, and meter aggregation allowed for governments
Interconnection Standards Go Solar California! Campaign	<ul style="list-style-type: none"> ▶ Investor-owned utilities (IOUs) ▶ No limit specified, net metering not required ▶ Goal to install 3,000 MW of solar power capacity by end of 2016 and 585 million therms of solar hot water systems by end of 2017; state-wide budget of \$3.6bn ▶ For IOU service territories
	<p>California Solar Initiative (CSI):</p> <ul style="list-style-type: none"> ▶ For existing residential homes and existing and new commercial, industrial, and agricultural properties ▶ PV and solar thermal electric rebates; solar hot water rebates; single and multi-family affordable homes rebates; solar research, development and deployment grants ▶ PV incentive offered as a one-time payment based on expected performance or as a monthly payment based on production ▶ Operated by California Public Utilities Commission ▶ As of August 2013, the program had installed over 1.5 GW of solar PV <p>New Solar Homes Partnership (NSHP):</p> <ul style="list-style-type: none"> ▶ Offers incentives for solar PV on new homes to support home builders ▶ Operated by California Energy Commission
Other Incentives	<p>Renewable Energy Auction Mechanism (RAM):</p> <ul style="list-style-type: none"> ▶ State's three IOUs required to purchase electricity from distributed renewable energy systems 3-20 MW in capacity ▶ Each utility responsible for procuring share of 1.3 GW program total ▶ Five competitive auctions are being held from 2011-2014 <p>Self-Generation Incentive Program:</p> <ul style="list-style-type: none"> ▶ For systems 30 kW or larger: 50% incentive received upfront and 50% received based on kWh production over first five years ▶ For systems under 30 kW, 100% paid upfront ▶ Maximum rebate: lesser of \$5m or 60% of eligible project costs ▶ For wind, waste heat, energy storage, biogas, CHP, and fuel cell systems <p>Renewable Market Adjusting Tariff (ReMAT):</p> <ul style="list-style-type: none"> ▶ Replaced state's existing feed-in tariff in July 2013 ▶ Project size cap of 3 MW; statewide program cap of 750 MW ▶ Pricing adjusts based on demand <p><i>California also offers other renewable energy incentives; see links below for more details.</i></p>
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=CA ▶ California Energy Commission: www.energy.ca.gov/renewables ▶ California Public Utilities Commission (CPUC): cpuc.ca.gov/PUC/energy/Renewables ▶ California Solar Initiative: www.californiasolarstatistics.org ▶ PACE Financing: www.californiafirst.org

Renewable Energy in Colorado

Summary

Colorado has an abundance of renewable energy resources, including wind, solar, biomass, and geothermal. With one of the most ambitious renewable portfolio standards in the nation, a substantial rebate program, a strong net metering policy, and a host of other market incentives, Colorado has the fifth largest solar photovoltaic market and the 10th largest wind market in the U.S. The state is also home to the National Renewable Energy Laboratory, one of the leading research, development and deployment facilities of the U.S. Department of Energy focused on renewable energy and energy efficiency.

Installed Renewable Energy Capacity, 2012			
Wind Power	2,301 MW	Marine Power	0 MW
Solar Photovoltaic	299.6 MW	Biomass Power	18.2 MW
Solar Thermal Electric	4 MW	Ethanol	125 mGy
Geothermal Power	0 MW	Biodiesel	0 mGy
Hydropower	649.9 MW	Totals	3,273 MW; 125 mGy

Sources: See User's Guide for details

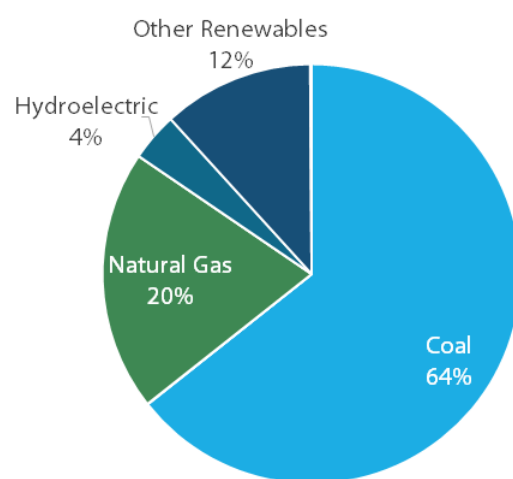
Market Spotlight

- ▶ Colorado added over 100 MW of solar PV in 2012, a 52% growth rate. Additionally, Colorado is home to one of the world's largest concentrating photovoltaic facilities, the 30 MW Alamosa CPV plant.
- ▶ Wind power accounted for 11.3% of Colorado's electricity generation in 2012. Over the course of 2012, it added over 500 MW of wind to reach a total installed capacity of 2.3 GW, tenth in the nation.
- ▶ In October 2013, the Bureau of Land Management plans to hold the first competitive auction for public lands in two Solar Energy Zones (SEZ) in Colorado, which together cover 3,705 acres.
- ▶ The state's wind industry has attracted major original equipment manufacturers (OEMs) to locate manufacturing hubs in the state.
- ▶ The U.S. Forest Service partnered with the Gypsum biomass power plant in November 2012 to use dead timber (collected mostly from the White River National Forest) for biomass power production, to help clean the forest and mitigate wildfires. The plant will burn about 250 tons of wood a day.

Economic Development

Employment	2011	
Green Goods & Services Jobs	72,629	
Investment (Grossed-up)	2011	2012
Asset Finance	\$728.4m	\$145.8m
Venture Capital & Private Equity	\$295.4m	\$89.4m

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Colorado

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 30% by 2020 for investor-owned utilities (IOUs) <ul style="list-style-type: none"> ○ Distributed generation must account for 3% of retail sales ▶ 10% by 2020 for electric co-ops serving <100,000 meters and municipal utilities <ul style="list-style-type: none"> ○ Distributed generation must account for 0.75% of retail sales ▶ 20% by 2020 for electric cooperatives serving ≥100,000 meters <ul style="list-style-type: none"> ○ Distributed generation must account for 1% of retail sales ▶ Tradable renewable energy credits (TRECs) may be used to satisfy standard ▶ Renewable energy generated in-state receives 125% credit for RPS compliance ▶ Credit multipliers for projects installed in service areas of co-ops and eligible municipal utilities: 150% credit for community-based projects; 300% credit for solar electricity installed before mid-2015; 200% credit for projects up to 30 MW connected to electrical transmission and distribution lines, installed before 2015
Net Metering	<ul style="list-style-type: none"> ▶ All utilities, excluding some small municipal utilities ▶ Limits – IOU customers: 120% of customer's average annual consumption; muni and co-op customers: 25 kW for non-residential and 10 kW for residential ▶ Net excess generation credited to next bill at retail rate; at end of 12 months, may be rolled over indefinitely or be purchased by utility ▶ Customer retains ownership of RECs ▶ Virtual net metering offered to IOU customers
Interconnection Standards	<ul style="list-style-type: none"> ▶ All utilities, excluding some small municipal utilities ▶ 10 MW system limit
Tax Incentives	<p>Property Tax Assessment:</p> <ul style="list-style-type: none"> ▶ Commercial PV and wind facilities of 2 MW or less, as well as hydropower, geothermal, and biomass facilities of 2 MW or less that were placed into service prior to 2010, are assessed locally for property taxes ▶ Renewable energy systems of greater than 2 MW are assessed by the state for property taxes and valued as non-renewable energy facilities <p>Property Tax Exemption: Residential renewable energy personal property is exempt from property taxes</p> <p>Sales and Use Tax Exemption: The sale, storage, and/or use of renewable energy components is exempt from the state's sales and use tax until mid-2017</p>
Grants	<p>Biofuels Research Grants:</p> <ul style="list-style-type: none"> ▶ To research institutions to promote biofuels production from agricultural products, algae, and waste grease, as well as biofuel quality testing
Loans	<p>Direct Lending Revolving Loan Program:</p> <ul style="list-style-type: none"> ▶ Loans of over \$100,000 for solar water heat, PV, wind, and other distributed generation technologies ▶ For early-stage companies and commercial projects utilizing innovative energy technologies that cannot receive capital from traditional sources ▶ Funded by the American Recovery and Reinvestment Act of 2009
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=CO ▶ Energy Office: www.colorado.gov/cs/Satellite/GovEnergyOffice/CBON/1251599939024 ▶ Public Utilities Commission: http://cdn.colorado.gov/cs/Satellite/DORA-PUC/CBON/DORA/1251614750747

Renewable Energy in Hawaii

Summary

Hawaii has one of the most diverse renewable energy generation opportunities of any state, but the transmission of electricity across the archipelago remains a challenge. The state has excellent wind, solar, geothermal, biomass, hydropower, and ocean energy resources, and is a leader in ocean thermal energy research. In particular, it is a center for the deployment of distributed generation technology, prompted by both state policy and very high electricity rates of more than double the national average. Hawaii aims to decrease its reliance on imported oil, which is nearly 90% of its primary energy supply. Its Clean Energy Initiative pairs a renewable portfolio standard, which aims for 40% renewable energy, with a 30% energy efficiency requirement, for a total goal of 70% clean energy by 2030.

Installed Renewable Energy Capacity, 2012

Wind Power	206 MW	Marine Power	0.04 MW
Solar Photovoltaic	199.5 MW	Biomass Power	226.8 MW
Solar Thermal Electric	2 MW	Ethanol	0 mGy
Geothermal Power	38 MW	Biodiesel	8 mGy
Hydropower	26.2 MW	Totals	699 MW; 8 mGy

Sources: See User's Guide for details

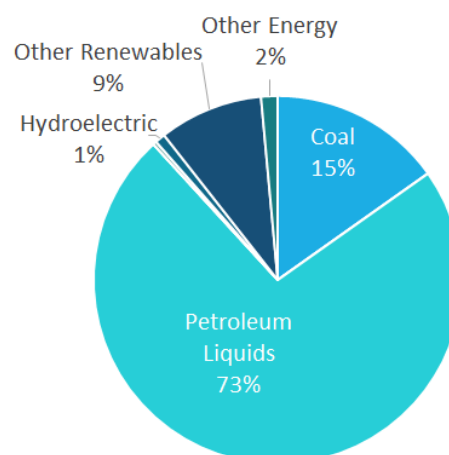
Market Spotlight

- ▶ Hawaii's installed solar power more than doubled in 2012 to 200 MW, the majority of which came from commercial and residential systems. This nearly matches the state's wind and biomass installations. According to Environment America, the state now ranks third in per capita solar installations.
- ▶ Alaska Airlines will partner with a consortium of three of Hawaii's largest landowners and three venture capital firms to purchase sustainable biofuel from locally-grown feedstocks, which the airline will begin using to fuel its aircraft as soon as fall 2018.
- ▶ Almost all of the major U.S. ocean thermal energy conversion (OTEC) experiments are located in Hawaii, as are several wave energy experiments including a commissioned 40 kW demonstration project off of Oahu. The Natural Energy Laboratory of Hawaii Authority (NELHA) has been recognized as a leading laboratory and test facility for OTEC and OTEC-related research.
- ▶ Renewable energy will be used at a number of military installations in Hawaii. A major third-party solar leasing company plans to install 12.8 MW of rooftop solar on military housing in the state, which will provide power to up to 7,500 homes. In addition, the U.S. Air Force and Hawaii signed a memorandum of understanding in June 2012 to use and evaluate clean energy fuel technologies, including hydrogen production and power, at the Joint Base Pearl Harbor Hickam.

Economic Development

Employment	2011	
Green Goods & Services Jobs	17,596	
Investment (Grossed-up)	2011	2012
Asset Finance	\$206.9m	\$451.4m
Venture Capital & Private Equity	\$12.7m	\$1.4m

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



Electricity Generation, 2012 (EIA)

Updated September 2013

Renewable Energy in Hawaii

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 40% by 2030; all electric utilities ▶ The energy savings from the use of energy efficiency technologies or renewables to displace or offset electricity demand can be used toward annual compliance until 2015 ▶ Existing renewables may be used toward compliance ▶ The Public Utilities Commission (PUC) can establish standards for each utility that identify what portion of the RPS should be met by specific technologies
Net Metering	<ul style="list-style-type: none"> ▶ All utilities ▶ Net excess generation credited to customer's next bill at retail rate, granted to utility at end of 12-month billing cycle ▶ 100 kW system capacity limit; aggregate capacity limit of 15% per circuit distribution threshold for distributed generation
Interconnection Standards	<ul style="list-style-type: none"> ▶ Investor-owned utilities ▶ No system capacity limit specified; net metering not required ▶ External disconnect switch required
Tax Incentives	<p>Solar and Wind Energy Credit (<i>Personal or Corporate</i>):</p> <ul style="list-style-type: none"> ▶ 20% of the cost of equipment and installation of a wind system ▶ 35% of the cost of equipment and installation of a solar energy system ▶ Maximum rebate varies by technology and property type ▶ If reduced amount exceeds customer's tax liability, taxpayer may reduce eligible credit amount by 30% and be refunded excess credit <p>Ethanol Production Incentive: For 30% of a production facility's nameplate capacity</p>
Feed-in Tariff	<ul style="list-style-type: none"> ▶ Solar PV, CSP, onshore wind, and in-line hydropower are eligible ▶ Qualified projects receive a fixed rate over a 20-year contract ▶ Three tiers for rates, differentiated by technology and system size ▶ Offered by three investor-owned utilities: HECO, MECO, and HELCO
Public Benefits Fund	<ul style="list-style-type: none"> ▶ All utilities, excluding KIUC, collect surcharge on customers' utility bills ▶ July 2013-June 2014 budget: \$21.9m in direct incentives
Green Infrastructure Bonds	<ul style="list-style-type: none"> ▶ The Department of Business, Economic Development, and Tourism can issue bonds to secure low-cost financing for clean energy measures ▶ Proceeds used to fund the on-bill financing program, and bondholders to be repaid with funds collected through the public benefits fund
Loans	<p>Farm and Aquaculture Alternative Energy Loan</p> <ul style="list-style-type: none"> ▶ For farmers and aquaculturists, to provide up to 85% of PV, hydro, wind, biogas, or biofuel project costs (max of \$1.5m), for a loan term of up to 40 years ▶ 3% interest rate for agriculture, 5% for aquaculture
Rebates	<p>Solar Water Heater (SWH) Rebate</p> <ul style="list-style-type: none"> ▶ Residential customers eligible for a one-time rebate of \$750 ▶ Residential utility customers in certain counties can choose between a direct, upfront rebate of \$1,000 or a \$1,000 interest-rate buydown ▶ Commercial customers may receive custom incentives ▶ Has supported the installation of more than 50,000 residential SWHs
Renewable Fuel Standard	<ul style="list-style-type: none"> ▶ 85% of gasoline sold or supplied to retailers must contain 10% ethanol
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=HI ▶ State Energy Office: http://energy.hawaii.gov/renewable-energy; http://energy.hawaii.gov/developer-investor ▶ Public Utilities Commission: http://puc.hawaii.gov/energy ▶ Public Benefit Fund: www.hawaiienergy.com ▶ Hawaii Clean Energy Initiative: www.hawaiicleanenergyinitiative.org

Renewable Energy in Idaho

Summary

Idaho's rivers offer some of the best hydroelectric power resources in the nation. Consequently, hydropower supplies about three quarters of the state's electricity, making electricity rates among the lowest in the country. Idaho's geothermal resource is also one of the nation's best. The state's wind power generation is also notable for a state without an official target for renewable energy, in part due to past tax incentives and other supportive policies. However, without a renewable portfolio standard to drive development, the future of renewable energy in the state is unclear.

Installed Renewable Energy Capacity, 2012

Wind Power	973 MW	Marine Power	0 MW
Solar Photovoltaic	1 MW	Biomass Power	148.1 MW
Solar Thermal Electric	0 MW	Ethanol	50 mGy
Geothermal Power	15.8 MW	Biodiesel	6 mGy
Hydropower	2,536.2 MW	Totals	3,674 MW; 56 mGy

Sources: See User's Guide for details

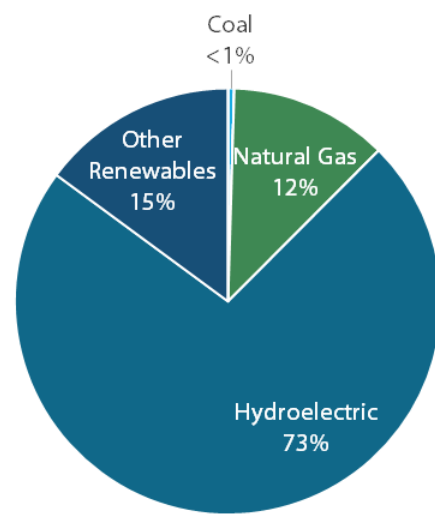
Market Spotlight

- ▶ Idaho and Taiwan signed a memorandum of understanding in April 2013 to cooperate on clean energy development and technology exchange, with an initial focus on geothermal.
- ▶ Through a \$1.94 million contract from the U.S. Army Corps of Engineers, the 402 MW Dworshak dam and hydroelectric project will receive an upgrade to its dam safety monitoring system.
- ▶ Idaho's wind power industry has flourished in the past few years, developing into an export market and generating over 11% of the state's electricity. However, very few wind projects are currently under development.
- ▶ Idaho is consistently among the leading timber and dairy producers in the nation and is home to over 148 MW of biomass plants and anaerobic digesters.
- ▶ In 1892, the nation's first geothermal district heating system was established in Boise and is still in use today. District heating systems continue to heat residences and businesses in the state, including the state capitol. The state is also one of the few with geothermal power, with 16 MW of generating capacity.

Economic Development

Employment	2011	
Green Goods & Services Jobs	24,250	
Investment (Grossed-up)	2011	2012
Asset Finance	\$715.7m	\$232.3m
Venture Capital & Private Equity	-	\$2.2m

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Idaho

State Policy

Net Metering	<ul style="list-style-type: none"> ▶ No statewide net metering policy ▶ State's three investor-owned utilities have net metering tariffs on file with the Idaho Public Utilities Commission, with the following stipulations: <ul style="list-style-type: none"> ○ For solar, wind, hydropower, biomass, and fuel cell systems ○ System capacity limited to 100 kW; residential and smaller systems limited to 25 kW by Idaho Power and Rocky Mountain Power ○ Aggregate capacity limited to 0.1% of peak demand in a baseline year ○ Restricts any single customer from generating more than 20% of such peak production
Tax Incentives	<p>Residential Alternative Energy Tax Deduction:</p> <ul style="list-style-type: none"> ▶ For solar thermal, solar PV, wind, biomass pellet stoves or EPA-certified wood stoves, and geothermal heat pump systems ▶ Income tax deduction of 40% in first year; 20% per year for next three years ▶ Maximum incentive of \$5,000 per year; \$20,000 total deduction per project <p>Property Tax Exemption:</p> <ul style="list-style-type: none"> ▶ For commercial wind and geothermal electric systems ▶ Property tax replaced by tax of 3% on gross energy earnings
Loans	<ul style="list-style-type: none"> ▶ Low-interest loans to make building improvements that conserve energy, which includes the installation of certain renewable energy systems ▶ 4% interest with five-year term ▶ Maximum incentive: \$15,000 for residential, \$100,000 for others ▶ Loan applicants charged a credit analysis fee
Bonds	<ul style="list-style-type: none"> ▶ Independent power producers may request financing from the Idaho Energy Resources Authority for the development of renewable energy projects
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=ID ▶ Governor's Office of Energy Resources: www.energy.idaho.gov ▶ Public Utilities Commission: www.puc.idaho.gov/electric/electric.htm

Renewable Energy in Montana

Summary

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

Installed Renewable Energy Capacity, 2012			
Wind Power	645 MW	Marine Power	0 MW
Solar Photovoltaic	2.2 MW	Biomass Power	0 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	0 MW	Biodiesel	0.3 mGy
Hydropower	2,603.6 MW	Totals	3,251 MW; 0.3 mGy

Sources: See User's Guide for details

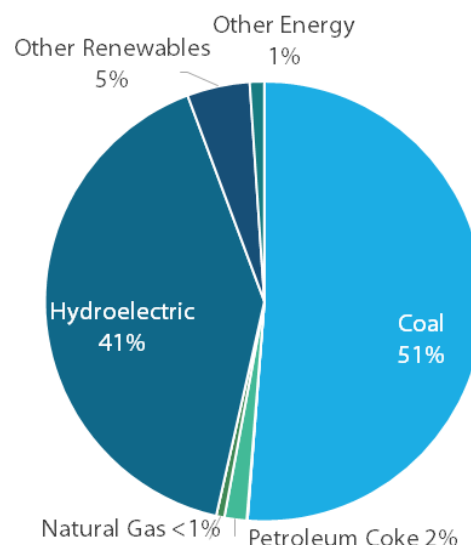
Market Spotlight

- ▶ Developers are investing in the renovation and expansion of Montana's older hydropower plants to increase efficiency, improve water flow, and reduce environmental impact. The \$245 million expansion of the Rainbow Dam was completed in July 2013, expanding the facility's capacity to 60 MW, a 76% improvement.
- ▶ Geothermal development in the state has mostly been limited to low-temperature (less than 100°C), near-surface geothermal resources, and systems are used to heat buildings, grow plants in greenhouses, or heat water for aquaculture.
- ▶ Over 250 MW of wind power projects were installed in 2012, including the 189 MW Rim Rock wind farm.
- ▶ While still small, Montana's residential and commercial solar sectors experienced growth in 2012, expanding the state's installed PV capacity to 2.2 MW.

Economic Development

Employment	2011	
Green Goods & Services Jobs	14,306	
Investment (Grossed-up)	2011	2012
Asset Finance	\$13.4m	\$689m
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 Montana

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 15% by 2015; investor-owned utilities and competitive electricity suppliers (representing 64.4% of state's electric load) ▶ Includes eligible renewable energy facilities that began operation after January 1, 2005 ▶ Utilities may purchase renewable energy credits (RECs) that are not bundled with electricity for compliance ▶ Can be from states that deliver electricity to Montana ▶ Public utilities must purchase both the RECs and electricity for community renewable energy projects under 25 MW, until projects meet 50 MW in capacity in the period 2012-2014 and 75 MW in 2015 and each following year ▶ Penalty of \$10/MWh for noncompliance
Net Metering	<ul style="list-style-type: none"> ▶ Investor-owned utilities ▶ 50 kW system capacity limit; no aggregate limit specified ▶ Net excess generation credited to customer's next bill at retail rate; granted to utility at end of 12-month period
Interconnection Standards	<ul style="list-style-type: none"> ▶ Investor-owned utilities and electric cooperatives ▶ 10 MW system cap ▶ External disconnect switch required
Tax Incentives	<p>Property Tax Incentives:</p> <ul style="list-style-type: none"> ▶ Certain renewable energy production facilities, manufacturing facilities, and renewable energy research and development equipment are assessed for property tax at 50% of their taxable value for up to 19 years ▶ Renewable energy systems, which cost up to \$20,000 at single-family residences and up to \$100,000 at other structures, are exempt from property taxes for 10 years post-installation ▶ New renewable electricity generating facilities of up to 1 MW are exempt from property taxes for five years after operation begins ▶ An eligible renewable electricity generating facility of 1 MW or more can be taxed at 50% of its taxable value in the first five years after the construction permit is issued ▶ Equipment used to produce ethanol from grain is exempt from property tax <p>Alternative Energy Investment Tax Credit (Personal or Corporate): 35% credit on income generated by commercial and "net metering" alternative energy investments of \$5,000 or more, for renewable energy equipment, manufacturing plants, and certain business facilities; unused credit may be carried forward seven years</p> <p>Residential Alternative Energy System Tax Credit (Personal): Up to \$500 per individual taxpayer and \$1,000 per household</p> <p>Biofuels credits: <i>ethanol production:</i> \$0.20 per gallon; <i>biodiesel:</i> up to 15% of the cost of blending equipment, and/or of production facility construction</p>
Public Benefits Fund	<ul style="list-style-type: none"> ▶ All utilities; funds come from surcharge on customer electricity bills, based on 2.4% of utilities' 1995 revenue ▶ Total fund: about \$9m annually
Revolving Loan Program	<ul style="list-style-type: none"> ▶ Maximum incentive of \$40,000 ▶ Loan term of up to 10 years; 3.75% interest rate for 2013
Renewable Fuel Mandate	<ul style="list-style-type: none"> ▶ Once state is able to produce 40 million gallons of ethanol annually, all gasoline sold for use in vehicles operating on public roads must contain 10% ethanol
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=MT ▶ Department of Environmental Quality: www.deq.mt.gov/energy/Renewable/default.mcp ▶ Public Service Commission: http://psc.mt.gov/energy

Renewable Energy in Nevada

Summary

Nevada contains excellent sites for developing a wide array of renewable energy resources. Its solar and geothermal energy resources are among the best in the nation, and it is a substantial producer of electricity from each of them, as well as wind and hydropower. Nevada's policies have helped to sustain the growth of its renewable energy industry, including a target of 25% renewable energy by 2025 with a solar energy carve-out, as well as strong net metering and interconnection policies designed to encourage distributed generation. In June 2013, Nevada made another commitment to renewable energy by passing legislation that would close its remaining coal-fired plants and increase renewable energy production in the state.

Installed Renewable Energy Capacity, 2012			
Wind Power	152 MW	Marine Power	0 MW
Solar Photovoltaic	349.7 MW	Biomass Power	3.2 MW
Solar Thermal Electric	64 MW	Ethanol	0 mGy
Geothermal Power	517 MW	Biodiesel	5 mGy
Hydropower	1,052.2 MW	Totals	2,138 MW; 5 mGy

Sources: See User's Guide for details

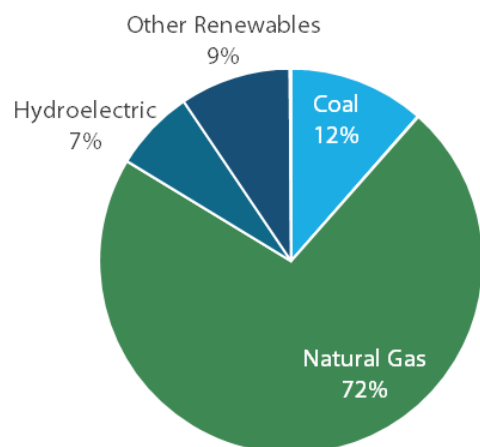
Market Spotlight

- ▶ Nevada is an attractive location for solar installations, and the state's installed solar capacity grew 182% in 2012 to 350 MW. The state now ranks second in per capita solar PV installations.
- ▶ Construction began in August 2013 on what will be the largest polycrystalline solar project in the world, the 250 MW Copper Mountain 3 solar plant. The project is the third phase of the Cooper Mountain Solar complex, one of the largest PV plants in the U.S., and is slated for completion in 2015.
- ▶ In June 2013, the U.S. Department of Interior approved the 35 MW Midland Solar project and the 70 MW New York Canyon Geothermal Project to be constructed on public lands in Nevada.
- ▶ The Moapa Band of Paiute Indians plans to build as much as 1.5 GW of renewable energy projects on its land in Nevada. Excess electricity will be sold to utilities throughout the U.S. Southwest.
- ▶ The first commercial enhanced geothermal system (EGS) project to supply electricity to the grid was deployed in Nevada in April 2013, and has increased power output of a nearby operating geothermal field by nearly 38%.

Economic Development

Employment	2011	
Green Goods & Services Jobs	21,861	
Investment (Grossed-up)	2011	2012
Asset Finance	\$2.3bn	\$295.3m
Venture Capital & Private Equity	\$102.2m	\$4.1m

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Nevada

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ 25% by 2025 ▶ Investor-owned utilities (IOUs) and retail suppliers (representing 88.2% of state's electric load) ▶ Solar energy minimum: 5% of annual portfolio requirement; raises to 6% in 2016 ▶ Energy efficiency may be used to satisfy a share of the requirement before 2025 ▶ Portfolio energy credits (PECs), which represent the electricity generated by portfolio energy systems, are used to satisfy requirements <ul style="list-style-type: none"> ◦ Electricity generated from PV can receive a 2.4 multiplier until 2016 ▶ NV Energy must also purchase, construct, or acquire 350 MW of power from renewables by 2021, separate from the 25% RPS requirement <ul style="list-style-type: none"> ◦ PECs from these projects can be used to comply with the RPS ▶ The Temporary Renewable Energy Development (TRED) allows IOUs to collect revenue from electric customers to pay for renewable energy separately from other wholesale power purchased by the electric utilities, which can be used to pay for renewable energy projects
Net Metering	<ul style="list-style-type: none"> ▶ Investor-owned utilities ▶ System capacity limit of 1 MW or 100% of the customer's annual requirements ▶ Aggregate capacity limit of 3% of total peak capacity of all utilities in state ▶ Net excess generation credited to customer's next bill at the retail rate ▶ Customer owns renewable energy credits (RECs) (unless subsidized by utility) ▶ Meter aggregation allowed for some hydro and wind installations
Interconnection Standards	<ul style="list-style-type: none"> ▶ Investor-owned utilities ▶ 20 MW system cap, net metering not required
Tax Incentives	<p>Property Tax Abatement for Large-Scale Renewables:</p> <ul style="list-style-type: none"> ▶ For new or expanded businesses that build renewable energy projects of 10 MW or more, make a specified minimum capital investment in the state, and employ a certain number of full-time employees during construction, who are paid higher than the average statewide hourly wage and provided health insurance ▶ 55% property tax abatement for 20 years <p>Sales and Use Tax Abatement:</p> <ul style="list-style-type: none"> ▶ New or expanded companies may have their sales and use taxes reduced to 2.25%, if they meet the job creation and job quality requirements noted under the "Property Tax Abatement" ▶ For the property used to generate renewable electricity from systems of 10 MW or more <p>Property Tax Exemption:</p> <ul style="list-style-type: none"> ▶ Renewable energy systems that serve a residential, commercial, industrial building or irrigation system are exempt from property taxes ▶ Applies for all years following the installation
Revolving Loan Program	<ul style="list-style-type: none"> ▶ Short-term, low-cost loans for renewable energy project developers and renewable energy component manufacturers, as well as for certain energy efficiency improvements ▶ Loan amount: \$100,000-\$1,000,000 ▶ Loan term to not exceed 15 years; interest rate of 3%
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=NV ▶ Governor's Office of Energy: http://energy.nv.gov ▶ Renewable Energy Portfolio Credit Standard Information: www.nvtrec.com ▶ Public Utilities Commission: http://puc.nv.gov/Renewable_Energy/Renewable_Energy

Renewable Energy in New Mexico

Summary

New Mexico has made significant progress in developing its wind and solar power capacity over the past decade. A broad spectrum of tax incentives encourage industry, businesses, and homeowners to take advantage of the state's renewable resources. The state's non-arable land, high level of sunlight, non-potable water, and appropriate energy and agricultural infrastructure have also proved ideal for the development of algae-based biofuel.

Installed Renewable Energy Capacity, 2012

Wind Power	778 MW	Marine Power	0 MW
Solar Photovoltaic	203.4 MW	Biomass Power	6.6 MW
Solar Thermal Electric	0 MW	Ethanol	30 mGy
Geothermal Power	0 MW	Biodiesel	2 mGy
Hydropower	81.7 MW	Totals	1,070 MW; 32 mGy

Sources: See User's Guide for details

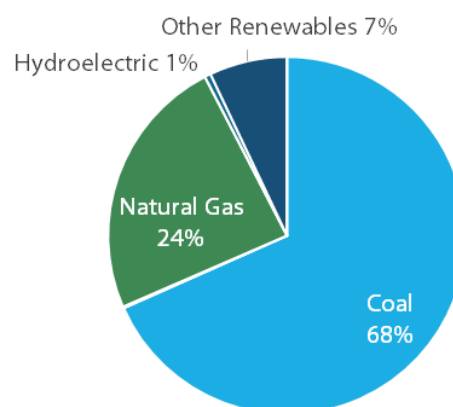
Market Spotlight

- ▶ Utilities in New Mexico are expanding their solar portfolios in order to meet the state's solar power requirement. The state now ranks eighth among all states in installed capacity, and fifth in per capita capacity.
- ▶ In June 2013, the New Mexico Public Regulatory Commission approved a power purchase agreement for the 50 MW Macho Springs solar project, which will be the state's largest solar plant and spread across 500 acres of land leased from the New Mexico State Land Office in Deming. The power will be sold for 5.7 cents per kWh, which is close to the price of an existing coal plant.
- ▶ A biofuels company recently paid off its entire \$54.5 million loan guarantee from the U.S. Department of Agriculture, which it received in 2009 for its algae-to-crude oil commercial demonstration facility in Columbus, New Mexico. The facility is now producing the world's first renewable crude oil.
- ▶ Clovis, NM is the site of the Tres Amigas grid interconnection project, currently under construction and scheduled to be complete in 2014, tying together North America's three major grid interconnections and allowing for renewable electricity to be more widely available across the continent.

Economic Development

Employment	2011	
Green Goods & Services Jobs	24,337	
Investment (Grossed-up)	2011	2012
Asset Finance	\$602.3m	\$55m
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 New Mexico

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ Investor-owned utilities (IOUs): 20% by 2020 (representing 67.7% of state's electric load) <ul style="list-style-type: none"> ○ Technology minimums – <i>solar</i>: 20%; <i>wind</i>: 30%; <i>biomass, geothermal, certain hydropower, and other “green sources”</i>: 5%; <i>distributed generation</i>: 1.5% (3% in 2015) ○ IOUs must spend 3% of total annual revenue on procuring renewables ▶ Rural electric cooperatives: 10% by 2020 (representing 20.8% of state's electric load) <ul style="list-style-type: none"> ○ Co-ops must spend 5% of total annual revenue on procuring renewables in and after 2015
Net Metering	<ul style="list-style-type: none"> ▶ Investor-owned utilities, electric cooperatives ▶ 80 MW system cap; utility owns renewable energy credits (RECs) ▶ Net excess generation credited to customer's next bill at the avoided-cost rate or reconciled monthly at the avoided-cost rate
Interconnection Standards	<ul style="list-style-type: none"> ▶ Investor-owned utilities, electric cooperatives ▶ 80 MW system capacity limit ▶ Insurance required for certain systems above 250 kW; external disconnect switch required for certain systems above 10 kW
Tax Incentives	<p>Advanced Energy Tax Credit (<i>Personal or Corporate</i>):</p> <ul style="list-style-type: none"> ▶ Tax credit for 6% of the cost of a solar electric, energy storage, or geothermal project that is 1 MW or larger, against gross receipts, compensating, or withholding taxes ▶ Maximum credit \$60m; any unused credit can be carried forward 10 years <p>Agricultural Biomass Income Tax Credit (<i>Personal or Corporate</i>):</p> <ul style="list-style-type: none"> ▶ Agricultural biomass from a dairy or feedlot used for energy ▶ \$5/wet ton; excess credit may be carried forward four years ▶ Statewide annual limit of \$5m in total credits <p>Renewable Energy Production Tax Credit (<i>Personal or Corporate</i>):</p> <ul style="list-style-type: none"> ▶ Income tax credit for companies that generate electricity from solar, wind or biomass systems above 1 MW, for 10 years ▶ Credit varies by technology and year; excess credit refunded to taxpayer <p>Solar Market Development Tax Credit (<i>Personal</i>):</p> <ul style="list-style-type: none"> ▶ 10% income tax credit for residential or commercial solar PV or thermal ▶ Up to \$9,000 per project; excess credit may be carried forward for 10 years ▶ Aggregate levels capped yearly at \$2m for solar thermal and \$3m for PV <p>Alternative Energy Product Manufacturers Tax Credit:</p> <ul style="list-style-type: none"> ▶ Tax credit for companies that manufacture renewable energy products or components; may not exceed 5% of the taxpayer's qualified expenditures ▶ Excess credit may be carried forward five years <p>Biofuels Credits: <i>biofuel production</i>: For the cost of purchasing qualified biomass feedstocks and the associated equipment to create biofuels, deducted from the compensating tax; <i>biodiesel blending</i>: up to 30% of the cost of purchasing or installing blending equipment</p> <p>Geothermal Heat Pumps (<i>Personal or Corporate</i>): 30% credit for up to \$9,000</p> <p>Property Tax Exemption: For residential solar thermal and PV systems</p> <p>Gross Receipts and Other Tax Incentives: <i>see “More Info”</i></p>
Biodiesel Blend Mandate	<ul style="list-style-type: none"> ▶ All diesel fuel sold to customers for use in on-road motor vehicles must contain at least 5% biodiesel; set to expire in October 2013
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=NM ▶ Energy Conservation and Management Division: www.emnrd.state.nm.us/ECMD ▶ Public Utilities Commission: www.nmprc.state.nm.us/utilities/renewable-energy.html ▶ Renewable Energy Transmission Authority: http://nmreta.com

Renewable Energy in Oregon

Summary

Oregon is on the leading edge of renewable energy production. It is one of the few states in the country undertaking wave power development and is home to the second largest wind farm ever built in the United States. Oregon's tax credits for renewable energy have attracted many clean energy companies, and the state legislature recently defeated a measure designed to curtail the state's ambitious renewable portfolio standard of 25% by 2025. Recent technological and legislative developments across the board in wind, solar, biomass and waste, wave, and geothermal energy as well as biofuels promise to provide Oregon with sustainable and diverse sources of energy for the future.

Installed Renewable Energy Capacity, 2012

Wind Power	3,153 MW	Marine Power	0 MW
Solar Photovoltaic	56.4 MW	Biomass Power	402.6 MW
Solar Thermal Electric	0 MW	Ethanol	149 mGy
Geothermal Power	33.3 MW	Biodiesel	18 mGy
Hydropower	8,241.4 MW	Totals	11,887 MW; 167 mGy

Sources: See User's Guide for details

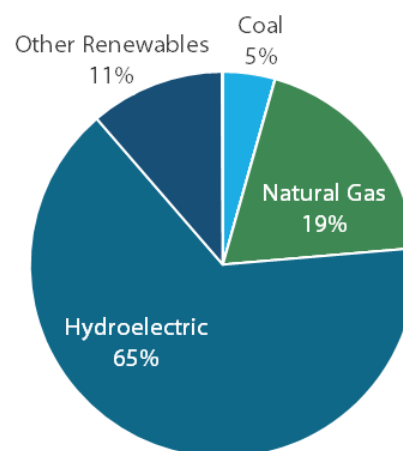
Market Spotlight

- ▶ The Shepherds Flat wind farm became fully operational in September 2012, and its 845 MW capacity makes it the second largest wind farm in the U.S.
- ▶ The Pacific Marine Energy Center, funded by the U.S. Department of Energy (DOE) to conduct research, outreach and education for marine energy, has chosen Newport, Oregon to be the site of the first utility-scale, grid-connected wave energy test site in the U.S.
- ▶ A 22 MW geothermal power facility was brought online in Malheur County in summer 2013, which will sell electricity to Idaho Power Company under a 25-year power purchase agreement. It was the first geothermal project to obtain a loan guarantee under the U.S. DOE's Title XVII loan guarantee program.
- ▶ As part of the Pacific Northwest Smart Grid Demonstration Project, a 5 MW lithium-ion energy storage system in South Salem, Oregon was commissioned in 2013 to store excess electricity produced by renewable energy sources and is integrated with a local microgrid.
- ▶ A report published by the Oregon Solar Energy Industries Association states that the cost of producing solar electricity from large-scale power plants is now less than the regulated avoided costs of the two largest electric utilities in the state.²

Economic Development

Employment	2011	
Green Goods & Services Jobs	68,709	
Investment (Grossed-up)	2011	2012
Asset Finance	\$234.6m	\$414.8m
Venture Capital & Private Equity	\$100.5m	\$42.6m

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



Electricity Generation, 2012 (EIA)

² http://www.oseia.org/Resources/Documents/VISOR%202013_04.pdf

Renewable Energy in Oregon

State Policy

Renewable Portfolio Standard	<ul style="list-style-type: none"> ▶ By 2025 – <i>large utilities</i>: 25%; <i>small utilities</i>: 10%; <i>smallest utilities</i>: 5% ▶ All utilities ▶ Solar PV minimum: 20 MW by 2020 (projects sized 500 kW-5 MW) <ul style="list-style-type: none"> ○ PV systems operating prior to 2016 credited 2 kWh for each kWh generated ▶ Unbundled renewable energy credits (RECs) may be used by large utilities to meet up to 20% of their RPS obligations, and by large consumer-owned utilities to meet up to 50% of their obligations ▶ Only 11 MW of municipal solid waste can count toward the RPS each year ▶ In lieu of procuring renewable energy, utilities can pay an alternative compliance payment
Net Metering	<ul style="list-style-type: none"> ▶ All utilities (except Idaho Power) ▶ System cap: 2 MW for non-residential Portland General Electric and PacifiCorp customers; 25 kW for muni, co-op and public utility district (PUD) customers ▶ Aggregate cap: 0.5% of utility's historic single-hour peak load for munis, co-ops, PUDs ▶ Net excess generation credited to customer's next bill at retail rate for investor-owned utility (IOU) customers; varies for muni, co-op, and PUD customers ▶ Customer owns RECs; meter aggregation allowed
Interconnection Standards	<ul style="list-style-type: none"> ▶ Investor-owned utilities (except Idaho Power) ▶ System capacity limits: >20 MW for large generators; ≤10 MW for small generators; ≤25 kW for residential net metered; 2 MW for non-residential net metered
Tax Incentives	<ul style="list-style-type: none"> ▶ Biomass Producer or Collector Tax Credit (<i>Corporate</i>): For the production, collection and transportation of biomass that is used for energy production, using material sourced within the state ▶ Tax Credit for Renewable Equipment Manufacturers: 50% credit equal to the eligible construction and/or improvement costs for a renewable energy manufacturing facility (10%/year for five years), max incentive of \$20m ▶ Energy Conservation Tax Credit (<i>Personal or Corporate</i>): For 35% of qualifying renewable thermal energy project costs; project's first year energy savings must yield a simple payback period of >3 years ▶ Residential Energy Tax Credit (<i>Personal</i>): Credits vary by technology type ▶ Property Tax Incentive: The added value to a property from the installation of a qualifying renewable energy system may not be included in the assessment of the property's value for property tax purposes
Production Incentive	<p>Solar Volumetric Incentive and Payments Program:</p> <ul style="list-style-type: none"> ▶ PV systems paid for kWhs generated over 15 years, at a rate set at the time the system was initially enrolled in the program ▶ Aggregate program capacity limited to 27.5 MW (system cap 500 kW) ▶ Administered by state's three IOUs; program costs recoverable in utility rates
Loans	<ul style="list-style-type: none"> ▶ Low-interest loans for small-scale, local energy projects ▶ Typically \$20,000-\$20m; terms vary; loans range 5-15 years
Renewable Fuels Mandate	<ul style="list-style-type: none"> ▶ All gasoline sold in the state must be blended with 10% ethanol (with certain exceptions); all diesel fuel sold in the state must be blended with 5% biodiesel
Public Benefits Fund	<ul style="list-style-type: none"> ▶ The Energy Trust of Oregon manages several state-wide programs that provide rebates and grants for renewable energy installations (www.energytrust.org)
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=OR ▶ Renewable Portfolio Standard: www.oregon-rps.org ▶ Oregon Department of Energy: www.oregon.gov/energy/renew ▶ Public Utilities Commission: www.puc.state.or.us

Renewable Energy in Utah

Summary

Utah has a vast and uniquely diverse renewable energy resource potential that rivals that of most of its neighboring states. However, unlike many other states in the region, Utah does not have a mandatory renewable portfolio standard, instead having a voluntary renewable portfolio goal of 20% by 2025. In order to encourage renewable energy development, the state provides an array of tax incentives and programs to help residents, commercial, and industrial entities provide clean energy to the state's grid.

Installed Renewable Energy Capacity, 2012			
Wind Power	325 MW	Marine Power	0 MW
Solar Photovoltaic	10 MW	Biomass Power	12.8 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	42 MW	Biodiesel	15.2 mGy
Hydropower	262.2 MW	Totals	652 MW; 10 mGy

Sources: See User's Guide for details

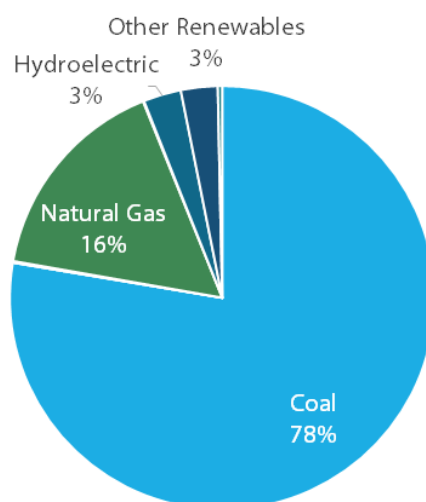
Market Spotlight

- ▶ A geothermal project will be constructed in Cove Fort with an installed capacity of up to 65 MW, to be completed in phases. The first phase is expected to begin generating power by the end of 2013.
- ▶ The Milford Wind Corridor project is the largest wind power project in the state. Phase II of the project was commissioned in mid-2011, adding an additional 102 MW and bringing total capacity to 305.5 MW.
- ▶ Utah saw its solar capacity grow by over 127% in 2012, though from a small starting point, bringing cumulative installed capacity to 10 MW. More is on the way, including the state's first solar thermal energy generation project, a 1.5 MW installation under construction at the Tooele Army Depot.

Economic Development

Employment	2011	
Green Goods & Services Jobs	27,864	
Investment (Grossed-up)	2011	2012
Asset Finance	\$13.4m	\$3m
Venture Capital & Private Equity	\$17.9m	\$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 Utah

State Policy

Renewable Portfolio Goal	<ul style="list-style-type: none"> ▶ 20% by 2025 (goal); all electric utilities (to the extent that it is cost effective) ▶ Utilities must file progress reports every five years, but no interim targets ▶ No in-state system to track use of renewable energy certificates (RECs) ▶ RECs produced within the geographic boundary of the Western Electricity Coordinating Council may be used for compliance ▶ Each kWh produced using solar energy is recorded as 2.4 kWh ▶ Some clean energy and energy efficiency technologies are eligible
Net Metering	<ul style="list-style-type: none"> ▶ Investor-owned utilities and electric cooperatives ▶ System capacity limit of 2 MW for non-residential and 25 kW for residential ▶ Aggregate capacity limit: (of 2007 peak demand) 20% for IOU, 0.1% for co-ops ▶ Treatment of net excess generation (NEG) <ul style="list-style-type: none"> ○ Residential and small business IOU customers: credited to next bill at the retail rate and granted to utility at end of 12 months ○ Large commercial and industrial IOU customers with demand charges: choice to credit NEG to next bill at an avoided-cost-based rate or at an alternative rate based on utility revenue and sales ○ Co-op customers: NEG credited to next bill at the avoided-cost rate
Interconnection Standards	<ul style="list-style-type: none"> ▶ Investor-owned utilities and electric cooperatives ▶ System cap of 20 MW ▶ External disconnect switch required except inverter-based systems of ≤ 10 kW ▶ Additional liability insurance may be required for systems > 2 MW
Tax Incentives	<p>Sales Tax Exemption:</p> <ul style="list-style-type: none"> ▶ The equipment used to generate electricity at a renewable energy production facility is exempt from sales tax ▶ New facilities must be ≥ 2 MW; existing facilities must be expanded by ≥ 1 MW <p>Renewable Energy Systems Tax Credit (Personal or Corporate):</p> <ul style="list-style-type: none"> ▶ Residential systems: income tax credit for 25% of installed costs <ul style="list-style-type: none"> ○ Maximum credit of \$2,000 per residential unit ○ Unused credit may be carried forward for four years ▶ Commercial systems: refundable credit <ul style="list-style-type: none"> ○ Investment tax credit: for 10% of installed costs, up to \$50,000 for wind, geothermal, biomass systems of < 660 kW and other eligible systems of any size ○ Production tax credit: 0.35¢/kWh for four years for commercial wind, geothermal, and biomass systems of ≥ 660 kW <p>Alternative Energy Development Incentive (Personal or Corporate):</p> <ul style="list-style-type: none"> ▶ For installation of renewable electricity generation facilities ≥ 2 MW ▶ Post-performance, non-refundable tax credit for 75% of new state tax revenues over life of project or 20 years (whichever is less) ▶ Must generate new state revenue and new jobs <p>Alternative Energy Manufacturing Credit:</p> <ul style="list-style-type: none"> ▶ For the manufacture of equipment for renewable electricity generation ▶ Post-performance, non-refundable tax credit for up to 100% of new state tax revenues over life of project or 20 years (whichever is less) ▶ Must generate new state revenue and new jobs
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=UT ▶ Office of Energy Development: www.energy.utah.gov/renewable_energy ▶ Governor's Office of Economic Development: http://business.utah.gov/targeted-industries/energy ▶ Public Utilities Commission: www.psc.utah.gov/utilities/electric/index.html

Renewable Energy in Washington

Summary

Hydropower accounts for the largest percentage of Washington's electricity generation. Now that many of the geographic opportunities for large-scale hydropower have been developed, Washington is exploring opportunities to diversify its energy portfolio, in part by harvesting its other vast renewable energy resources. Contributing to this goal are the state's supportive policy environment for manufacturers and utilities producing renewable energy products and energy including tax incentives, production incentives, and a renewable portfolio standard. Washington still has great room to expand its abundant wave, ocean, geothermal, and other renewable energy resources, and is home to some of the nation's pioneering grid-scale storage projects.

Installed Renewable Energy Capacity, 2012

Wind Power	2,808 MW	Marine Power	0 MW
Solar Photovoltaic	19.5 MW	Biomass Power	403.3 MW
Solar Thermal Electric	0 MW	Ethanol	0 mGy
Geothermal Power	0 MW	Biodiesel	117 mGy
Hydropower	20,902.5 MW	Totals	24,133 MW; 117 mGy

Sources: See User's Guide for details

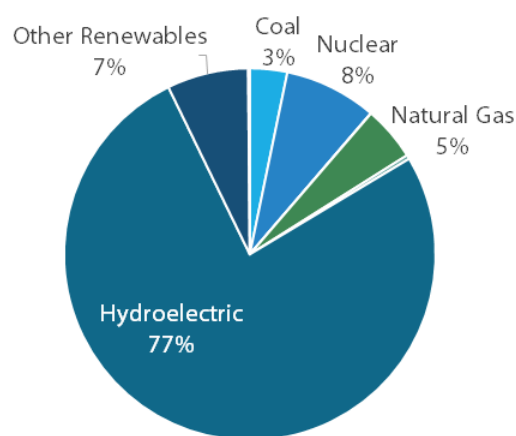
Market Spotlight

- ▶ In 2012, wind power capacity in Washington grew by 235 MW to over 2,800 MW of total installed capacity. This capacity in turn generated almost 6% of Washington's electricity needs.
- ▶ Developers have chosen Washington to be the site of three of the few tidal energy projects in the country. The Admiralty Inlet tidal pilot project is scheduled to be complete in 2014.
- ▶ In addition to its numerous large hydropower facilities, the state also operates smaller, run-of-river projects, which rely on the natural flow of waterways to produce electricity.
- ▶ Washington ranked eighth in the nation in biodiesel capacity nationally with over 113 million gallons per year of available production in 2012.
- ▶ Washington is home to a number of biomass facilities that produce energy from municipal solid waste, wood waste, and other organic feedstocks. It is also the site of a few biomass pellet plants, which produce pellets to serve heating needs.

Economic Development

Employment	2011	
Green Goods & Services Jobs	101,593	
Investment (Grossed-up)	2011	2012
Asset Finance	\$228.8m	-
Venture Capital & Private Equity	\$9.5m	\$24.9m

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Washington

State Policy

Renewable Portfolio Goal	<ul style="list-style-type: none"> ▶ 15% by 2020, and utilities must also undertake cost-effective conservation ▶ All electric utilities serving more than 25,000 customers (representing 84.7% of state's electric load) ▶ Distributed generation from systems under 5 MW may be counted as double for compliance purposes ▶ Utilities must pay \$50/MWh for each MWh below the target ▶ Facilities must be located in the "Pacific Northwest" or electricity from the facility must be delivered into Washington on a real-time basis
Net Metering	<ul style="list-style-type: none"> ▶ All utilities ▶ System capacity limit of 100 kW; aggregate capacity limit of 0.25% of utility's 1996 peak demand (increases to 0.5% in 2014) ▶ Net excess generation credited to customer's next bill at retail rate; granted to utility at end of 12 months ▶ Customer owns renewable energy credits (RECs) ▶ Meter aggregation allowed
Interconnection Standards	<ul style="list-style-type: none"> ▶ Investor-owned utilities ▶ System cap of 20 MW ▶ External disconnect switch generally required for systems up to 300 kW
Tax Incentives	<p>Sales and Use Tax Exemption:</p> <ul style="list-style-type: none"> ▶ 100% exemption for solar PV systems 1-10 kW and solar thermal systems ▶ 75% exemption for other qualifying residential and commercial systems >1 kW ▶ Applies to the labor and services related to installation and to the sale of equipment and machinery <p>Tax Abatement for Solar Manufacturers:</p> <ul style="list-style-type: none"> ▶ 43% reduction of state's business and occupation (B&O) tax ▶ For manufacturers of PV modules, stirring convertors, solar grade silicon, silicon solar wafers, silicon solar cells, thin film devices, or compound semiconductor solar wafers <p>Property Tax and Leasehold Excise Exemption: For buildings, equipment, and land used to manufacture biofuels or produce biodiesel feedstocks (for six years)</p> <p>Biofuels B&O Tax Deduction: For the sale or distribution of biodiesel or E85</p>
Production Incentive	<ul style="list-style-type: none"> ▶ Incentives of \$0.12/kWh - \$1.08/kWh (max \$5,000/year per project) ▶ For electricity produced from solar power, anaerobic digestors, or wind power systems (with special rates for systems using equipment manufactured in state) ▶ Customer-generator retains ownership of RECs ▶ State's utilities pay incentives and earn a tax credit equal to the cost of those payments ▶ Certain community solar projects may also receive production incentives (<75 kW)
Grants and Loans	<ul style="list-style-type: none"> ▶ Competitive grants and low-interest loans for bioenergy production, research, and market development
Renewable Fuel Standard	<ul style="list-style-type: none"> ▶ At least 2% of all diesel fuel sold in state must be biodiesel or renewable diesel ▶ At least 2% of total gasoline sold in state must be denatured ethanol ▶ Targets may be increased if certain requirements met
More Info	<ul style="list-style-type: none"> ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=WA ▶ Utilities and Transportation Commission: www.utc.wa.gov/regulatedIndustries/utilities/energy ▶ Department of Commerce: www.commerce.wa.gov/Programs/Energy ▶ Department of Revenue: http://dor.wa.gov/content/FindTaxesAndRates/TaxIncentives/IncentivePrograms.aspx

Renewable Energy in Wyoming

Summary

Wyoming is rich in conventional energy sources and has significant production potential from renewable energy, particularly from its strong wind, solar, and geothermal resources. Wyoming exports its wind power to Colorado, Utah and Oregon and has much room to further develop its wind power sector. The state enacted a net metering law and interconnection standards to support distributed generation, but it does not offer significant financial incentives to ramp up renewable energy production like many other states – and it is home to the only wind production tax in the nation. Without long-term policy signals like a renewable portfolio standard, Wyoming's future in the renewable energy industry is unclear.

Installed Renewable Energy Capacity, 2012

Wind Power	1,410 MW	Marine Power	0 MW
Solar Photovoltaic	0.6 MW	Biomass Power	0 MW
Solar Thermal Electric	0 MW	Ethanol	11.5 mGy
Geothermal Power	0.3 MW	Biodiesel	0 mGy
Hydropower	303.4 MW	Totals	1,714 MW; 11.5 mGy

Sources: See User's Guide for details

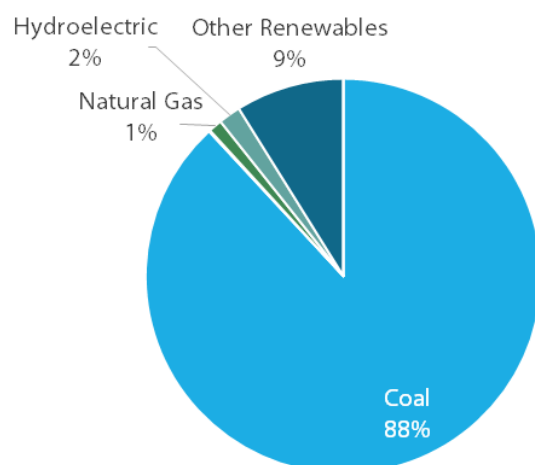
Market Spotlight

- While featuring some of the best wind resources in the nation, Wyoming has allowed its wind industry to stagnate, adding no substantial capacity during the U.S. wind industry's best year to date, 2012. Its existing capacity is still sufficient to rank Wyoming 14th in the nation, but the industry faces stiff obstacles in the form of minimal load centers, insufficient interstate transmission capacity, and a lack of support from Cheyenne.
- Despite these challenges, Wyoming is the planned home of what could be North America's largest wind farm. The project was authorized by the U.S. Department of Interior for 1,500 acres of public land in Carbon County, and construction of the massive 1,000 turbine, 3,000 MW wind farm could begin in 2014. The project would more than triple the state's installed capacity, and at the peak of construction account for 1,000 jobs, in a county that is home to fewer than 16,000 people.

Economic Development

Employment	2011	
Green Goods & Services Jobs	10,369	
Investment (Grossed-up)	2011	2012
Asset Finance	\$155.4m	-
Venture Capital & Private Equity	\$0.4m	-

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



Electricity Generation, 2012 (EIA)

Renewable Energy in Wyoming

State Policy

Net Metering

- ▶ For solar PV, wind, biomass, and hydroelectric systems
- ▶ Investor-owned utilities, electric cooperatives, irrigation districts
- ▶ 25 kW system capacity limit; no aggregate capacity limit specified
- ▶ Net excess generation credited to customer's next bill at retail rate; excess reconciled annually at seasonal avoided-cost rate

Interconnection

Standards

- ▶ Net metering required
- ▶ External disconnect switch required

More Info

- ▶ DSIRE Database: www.dsireusa.org/incentives/index.cfm?state=WY
- ▶ Public Service Commission: <http://psc.state.wy.us/pscdocs/electric.html>

User's Guide

Overview

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

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

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

Each state summary is divided into the following sections:

- ▶ Summary
- ▶ Capacity Chart
- ▶ Market Spotlight
- ▶ Economic Development
- ▶ Electricity Generation by Source
- ▶ Policies

Capacity Chart

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

- ▶ Wind data reflects utility-scale wind power installations and is from AWEA's *U.S. Wind Industry Fourth Quarter 2012 Market Report*.
- ▶ Solar photovoltaic (PV) data is from IREC's *U.S. Solar Market Trends 2012* report. The report's data was obtained from state agencies; organizations administering state incentive programs; utility companies that manage incentive programs and/or interconnection agreements; and nonprofit organizations (through surveys).
- ▶ Geothermal power data is from GEA's *2013 Annual US Geothermal Power Production and Development Update*, released in April 2012. Information is provided by developers or public sources, and is not independently verified by GEA.
- ▶ Ocean power data and concentrating solar power data are derived from the BNEF project database. Ocean power data includes tidal, wave, and ocean thermal energy conversion (OTEC) technologies.
- ▶ Hydropower data and biomass power data are derived from the Energy Information Agency's Form EIA-860. Biomass power data includes capacity from biomass facilities that use combustion, anaerobic digestion, gasification, co-firing, landfill gas or pyrolysis to produce electricity.

- ▶ Bioethanol data is from RFA's *2013 Ethanol Industry Outlook* and represents nameplate capacity in million gallons per year (mGy).
- ▶ Biodiesel data is from the Biodiesel Magazine USA plants list and represents nameplate capacity in million gallons per year (mGy).

Market Spotlight

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

Economic Development

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

Bloomberg New Energy Finance (BNEF), a world leader in industry information and analysis, provided information on renewable energy venture capital, private equity and asset finance transactions. The report's Economic Development section indicates the grossed-up estimates for completed, BNEF-tracked deals over the past two years. Venture capital and private equity transactions reflect new investment in renewable energy technology and early stage companies. Asset finance transactions reflect the funds committed for newly-built renewable energy projects, including debt and equity finance and funding from internal company balance sheets.

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

Electricity Generation

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

Policies

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

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

state-level policies. These terms are defined in the glossary.

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

Renewable Energy in the 50 States was crafted to illustrate a snapshot of renewable energy of each state, highlighting the state's progress in utilizing its available resources to increase renewable energy's share in its existing energy mix. This report does not attempt to be fully comprehensive, forecast success or failure, or compare one state against another. Instead, it is intended to educate the reader about what each state is actively doing to tap into its renewable energy resources.

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

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

Glossary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Capacity: The load that a power generation unit or other electrical apparatus or heating unit is rated by the manufacture to be able to meet or supply. Installed generator nameplate capacity is commonly expressed in megawatts (MW) and is usually indicated on a nameplate physically attached to the generator (referred to as “nameplate capacity”).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

mGy: Million gallons per year.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Property-Assessed Renewable Energy (PACE) Financing: A Property Assessed Clean Energy loan program provides residential and commercial property owners with a loan for energy efficiency and renewable energy measures which is subsequently paid back over a certain number of years via an annual charge on their property tax bill.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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