



Green Power



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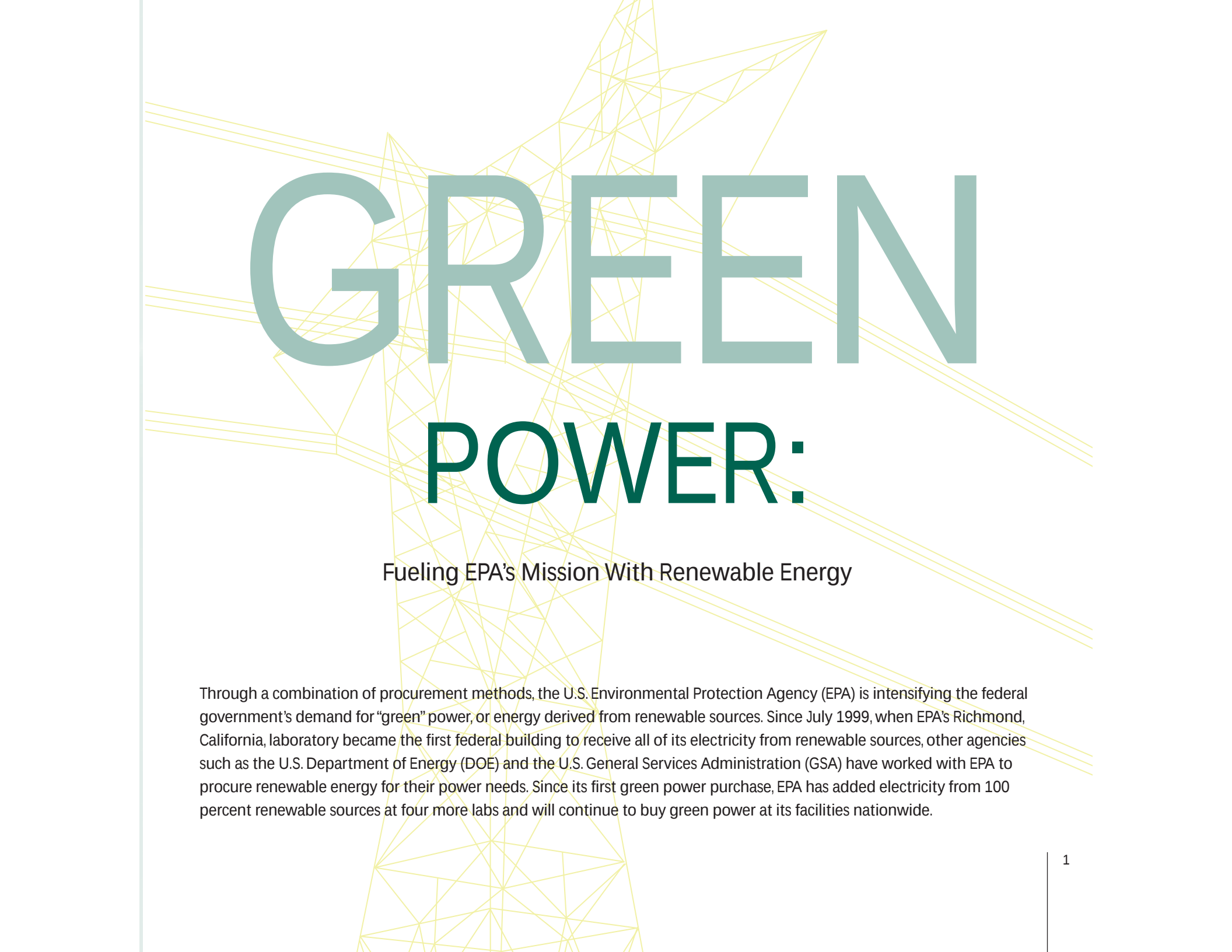
The Bush Administration has asked the government to be the first to conserve energy. These purchases represent a creative and innovative approach to help solve our nation's energy crisis, while achieving tremendous environmental benefits and charting the way for the emerging green power market.

—Christine Todd Whitman, EPA Administrator,
speaking about EPA's most recent green power purchase

United States
Environmental Protection Agency

Administration and Resources
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Sustainable Facilities Practices Branch
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GREEN POWER:

Fueling EPA's Mission With Renewable Energy

Through a combination of procurement methods, the U.S. Environmental Protection Agency (EPA) is intensifying the federal government's demand for "green" power, or energy derived from renewable sources. Since July 1999, when EPA's Richmond, California, laboratory became the first federal building to receive all of its electricity from renewable sources, other agencies such as the U.S. Department of Energy (DOE) and the U.S. General Services Administration (GSA) have worked with EPA to procure renewable energy for their power needs. Since its first green power purchase, EPA has added electricity from 100 percent renewable sources at four more labs and will continue to buy green power at its facilities nationwide.



What is GREEN POWER?

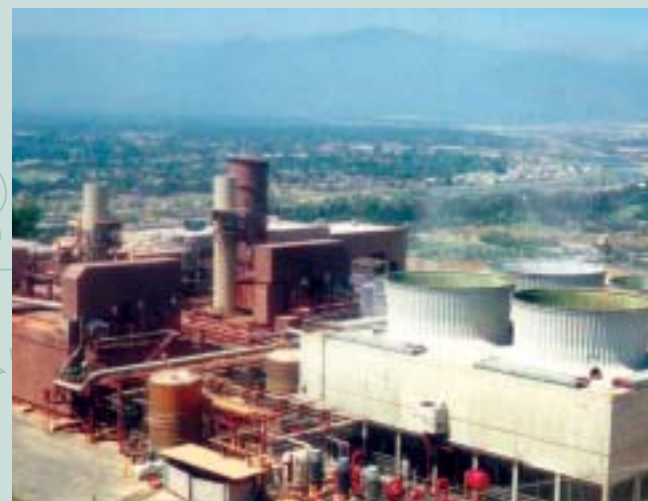
Also known as renewable energy, green power has been used throughout history and encompasses a variety of energy sources that are naturally replenished, including the following:

- **Solar** energy uses the sun to produce electricity either directly (using photovoltaic cells to capture the sun's rays) or indirectly (solar thermal collectors use the sun's heat to generate steam, which drives turbines that make electricity).
- **Wind** generates electricity by moving windmills that drive turbines.
- **Biomass** generates electricity from burning waste wood, other plant material, or landfill gas to create heat and steam, which drives turbines.
- **Geothermal** draws on the heat of the Earth's interior to produce steam that drives electric turbines.
- **Hydro** generates electricity through small installations, which use running or falling water to drive turbines.

Electricity generated using fossil fuels (such as coal, oil, and natural gas) has been a mainstay of our nation's power supply for more than a century. Large hydroelectric dams have been used for many years and have increasingly contributed to our energy supply since the Great Depression, and nuclear reactors have been a source of electricity since the 1950s. All of these have contributed to a stable energy supply nationwide.

As our reliance on electricity has grown, people have become increasingly concerned about the environmental and resource implications of relying solely on non-renewable means to generate power. For example, concerns have been raised about carbon dioxide (CO₂), sulfur dioxide (SO₂), and nitrogen oxide (NO_x)—emissions created from fossil fuel combustion—because of heightened interest in global climate change, acid rain, and smog.

Over the past several years, investments have been made in improving the environmental performance of traditional energy technologies. At the same time, the United States has made significant investments in ways to produce electricity from renewable resources. Fostering renewable energy, combined with the improvements in traditional power generation, benefits the environment while expanding the diversity and capacity of the nation's energy supply.



Renewable Benefits

EPA and Green Power A

Restructuring of the electric utility industry offers the federal government the opportunity to purchase energy from more renewable sources and reduce the environmental impact of its electricity consumption. Since EPA's mission is to protect human health and the environment, the Agency believes it should lead the federal government's charge to purchase renewable energy. And because many of EPA's facilities are laboratories, which are large power consumers, these renewable energy purchases accomplish several related goals:

- **Leading by Example.** EPA's green power purchases are helping to develop a buying process that can be duplicated across the country in other federal agencies and facilities. With each new procurement, EPA is providing information and experience that make future renewable power purchases simpler for other federal agencies.
- **Raising Consumer Awareness.** People are becoming more aware of the options for purchasing power. Green power is increasingly available nationwide through green power marketers, utility green pricing programs, on-site renewable energy generation, and trading in renewable energy certificates, also known as green tags. EPA hopes its efforts can help energy consumers of all sizes make informed decisions about a vital service.
- **Expanding the Renewable Market.** By purchasing green power, EPA helps the renewable energy market develop new renewable resources, lower technology



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Natural Match

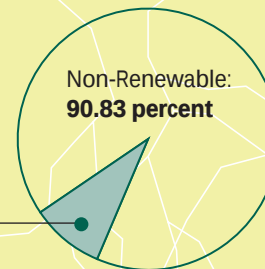
costs, boost utilization, and strengthen the nation's long-term energy security. EPA's green power strategy encourages the use of local or regional sources of renewable energy wherever possible, and *requires* that a percentage of the energy in each purchase come from newly constructed generation sources.

- **Reducing Greenhouse Gases.** EPA's renewable energy purchases advance the principles outlined in Executive Order 13123, "Greening the Government Through Efficient Energy Management," which mandates that federal agencies reduce greenhouse gas emissions 30 percent by 2010 compared to 1990 emissions levels.
- **Partnering for Progress.** EPA is a founding partner in the Green Power Partnership, a voluntary program launched by EPA's Climate Protection Partnerships Division in 2001. Partners in the program commit to procuring a percentage of their electricity from green power sources. In return, EPA provides technical assistance and recognition.

A Growing Preference for Green

EPA's use of green power has been growing since May 1999. The Agency requires more than 259 million kilowatt hours (kWh) of electricity per year for nearly nine million square feet of office and laboratory space. By the end of 2001, the Agency expects to be receiving approximately 23.8 million kWh of energy from renewable sources in five of its laboratories. EPA's use of green power will therefore be more than nine percent of its total electricity consumption.

EPA Facilities - Offices and Laboratories



Ratio of purchased renewable electric energy to total purchased electric energy: **9.17 percent**

- Gross Square Feet: 8,900,000 sq. ft.
- FY2001 electricity consumption (estimated): 259,674,670 kWh
- FY2001 electricity from renewables (estimated): 23,807,204 kWh*

*Assumes 100 percent green power purchases at five EPA laboratories—Richmond, California; Manchester, Washington; Golden, Colorado; Chelmsford, Massachusetts; and Cincinnati, Ohio.

Leveraging Federal Buying Power

The cost of green power can be higher than traditional power. To offset these costs, EPA is implementing a series of energy-efficient and cost-saving measures. EPA views its green power purchases as an investment in the future. Combined with other federal agencies, its efforts can spur demand for renewable energy and help expand the market. This, in turn, will lead to lower technology costs, greater utilization, and long-term diversity of energy sources for the nation as a whole.

In addition, by issuing requests for proposals (RFPs) for green power, EPA encourages suppliers to enter the green power market. Since RFPs include requirements for a percentage of the power purchased to be generated from *new* renewable sources, EPA is further encouraging the expansion of renewable energy capacity.

Green power is delivered over the same wires owned and maintained by the local utilities that deliver standard electric power. In deregulated markets, the utility company typically continues its energy distribution services and maintains the power lines. Since power is still distributed over the same system, switching providers does not affect the quality or reliability of electricity.

Over the past two years, EPA has collaborated with GSA and DOE's National Renewable Energy Laboratory to develop procurement strategies and policies that will benefit other federal agencies, as well as the renewable energy industry. Progress has been made to begin leveraging the federal government's buying power to create demand for green power. In addition, because of the federal government's interest in renewable energy credits—or green tags—federal procurements have become a means of supporting development of innovative new mechanisms for supplying renewable energy into the electrical grid.



Success Stories

Over the past two years, EPA has increased its renewable energy purchasing power with contracts in five facilities. The Agency's use of green power at its laboratories in Richmond, California; Golden, Colorado; Manchester, Washington; Chelmsford, Massachusetts; and Cincinnati, Ohio, will help open up the market for renewable technologies and demonstrate how the federal government's buying power can help reduce pollution.

Richmond, California

Since July 1999, EPA has been purchasing 100 percent green power from the Sacramento Municipal Utility District (SMUD) for its laboratory in Richmond, California. The laboratory uses 1.9 million kWh of electricity annually, enough to power 181 households. To ensure the power for this major purchase was truly from renewable sources, EPA required SMUD to obtain "Green-e" certification. Initially, SMUD provided 40 percent of the energy from landfill gas and 60 percent from geothermal sources, but since fall 1999, 100 percent has come from landfill gas.

kWh: 1,898,362 (FY 2000)

* Emissions calculated using state average factors from E-GRID2000
** A portion of these emissions reductions was achieved through control technologies installed as part of the landfill gas project.

Estimated Emissions Avoided, 2001:*

CO₂: 907,398 lbs.
SO₂: 266 lbs.
NO_x: 702 lbs.**

Certified Green

Wherever the program is available, EPA uses the Green-e Renewable Electricity Certification Program to verify that the power it purchases is from renewable sources. Green-e, operated by the Center for Resource Solutions in San Francisco, is the nation's first voluntary certification and verification program for green electricity products. Through annual audits, Green-e certifies power distributors are providing the correct amount of green power from the appropriate source(s).

Golden, Colorado



EPA Region 8 moved into a GSA-leased, 47,800-square-foot laboratory in Golden, Colorado, in summer 1999 and started purchasing 15 percent renewable electricity that fall from Xcel (formerly Public Service Company of Colorado or PSCO), an investor-owned utility. In October 2000, that was increased to 100 percent green power.

The Golden lab consumes approximately 2 million kWh of electricity annually and purchases “blocks” of wind power from the Xcel WindSource program, which offers consumers the option of purchasing up to 100 percent wind power through its green pricing program. The WindSource Ponnequin Wind Facility on the Colorado-Wyoming border consists of 29 large wind turbines that supply 20 megawatts of power to Colorado residents.

Since Colorado is still a fully regulated market, EPA procured the green power through a GSA area-wide contract. Xcel charges a premium for wind power. EPA makes up a portion of the cost of this premium through a natural gas supply contract with GSA. EPA also plans to install a transpired solar collector on the south wall of the facility’s hazardous materials building, which will conserve energy through a renewable technology.

kWh: 1,985,832 (FY 2000)

* Emissions calculated using state average factors from E-GRID2000.

Estimated Emissions Avoided, 2001:*

CO₂: 4,168,897 lbs.

SO₂: 10,207 lbs.

NO_x: 8,380 lbs.

Manchester, Washington



EPA's Region 10 laboratory, already using power generated by an onsite solar cell array, procured 100 percent renewable wind power in part through a demonstration grant agreement with the Bonneville Environmental Foundation (BEF). Working with the Bonneville Power Administration, BEF is developing a 700-kilowatt wind turbine that will supply the Manchester lab with approxi-

mately 2.1 million kWh per year of electricity. Construction of the turbine is expected to be completed by the end of 2001.

Washington has not deregulated its electric utility industry, so the electricity from the wind turbine will be sold into the power grid as "generic" electricity and will be available to everyone at the going rate on the regional grid. BEF, an independent non-profit organization promoting renewable energy, will purchase "green tags" from BPA. These tags, which represent the environmental benefits of wind power over traditional energy sources, are also known as renewable energy credits.

kWh: 2,128,002 (FY 2000)

* Emissions calculated using regional average factors from E-GRID2000.

Estimated Emissions Avoided, 2001:*

CO₂: 2,130,236 lbs.

SO₂: 4,064 lbs.

NO_x: 3,979 lbs.

Cincinnati, Ohio



Exelon Community Energy Wind Farm at Mill Run

As its latest green power purchase, EPA is negotiating a 100 percent renewable energy credit contract for three of its facilities in Cincinnati, Ohio, with Community Energy, Inc., a renewable energy marketing company. The EPA facilities have committed to purchase more than 15 million kWh of renewable energy credits annually for three years, with a three-year option to renew.

Community Energy will supply 778,000 kWh per year of power from a wind farm in Pennsylvania. Com Ed, a subsidiary of Exelon Corporation, in partnership with Environmental Resources Trust, will supply the remainder of the renewable energy contract with electricity generated from land-fill gas from Illinois.

The 15-megawatt Exelon–Community Energy Wind Farm in Mill Run, Pennsylvania, scheduled to begin delivering electricity to the regional grid on behalf of EPA beginning in fall 2001, will create enough renewable energy to power more than 5,700 homes.

kWh: 15,590,968 (FY 2000)

* Emissions calculated using regional average factors from E-GRID2000.

Estimated Emissions Avoided, 2001:*

CO₂: 24,481,744 lbs.

SO₂: 160,439 lbs.

NO_x: 37,194 lbs.

Chelmsford, Massachusetts



At its New England Regional Laboratory in Chelmsford, Massachusetts, scheduled for completion in 2001, EPA has signed a renewable energy credit contract to meet the facility's estimated 2.2 million kWh annual electric consumption with 100 percent wind power. The wind will come from Green Mountain's Searsburg wind farm in Vermont and from a new wind power source in New York.

kWh: 2,204,040 (Est. 2001)

* Emissions calculated using regional average factors from E-GRID2000.

Estimated Emissions Avoided, 2001:*

CO₂: 2,251,162 lbs.

SO₂: 10,513 lbs.

NO_x: 3,504 lbs.

Resources

American Solar Energy Society
<www.ases.org>

American Wind Energy Association
<www.awea.org>

Bonneville Environmental Foundation
<www.bonenvfdn.org>

E-GRID, a comprehensive source of data on the environmental characteristics of U.S. electrical power generation
<www.epa.gov/airmarkets/egrid>

U.S. Department of Energy Green Power Network
<www.eren.doe.gov/greenpower>

U.S. EPA Green Power Partnership
<www.epa.gov/greenpower>

Green-e
<www.green-e.org>

National Renewable Energy Laboratory
<www.nrel.gov>

Public Service Company of Colorado / Windsource
<www.pscocolorado.com>

Sacramento Municipal Utility District
<www.smud.org/green>



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