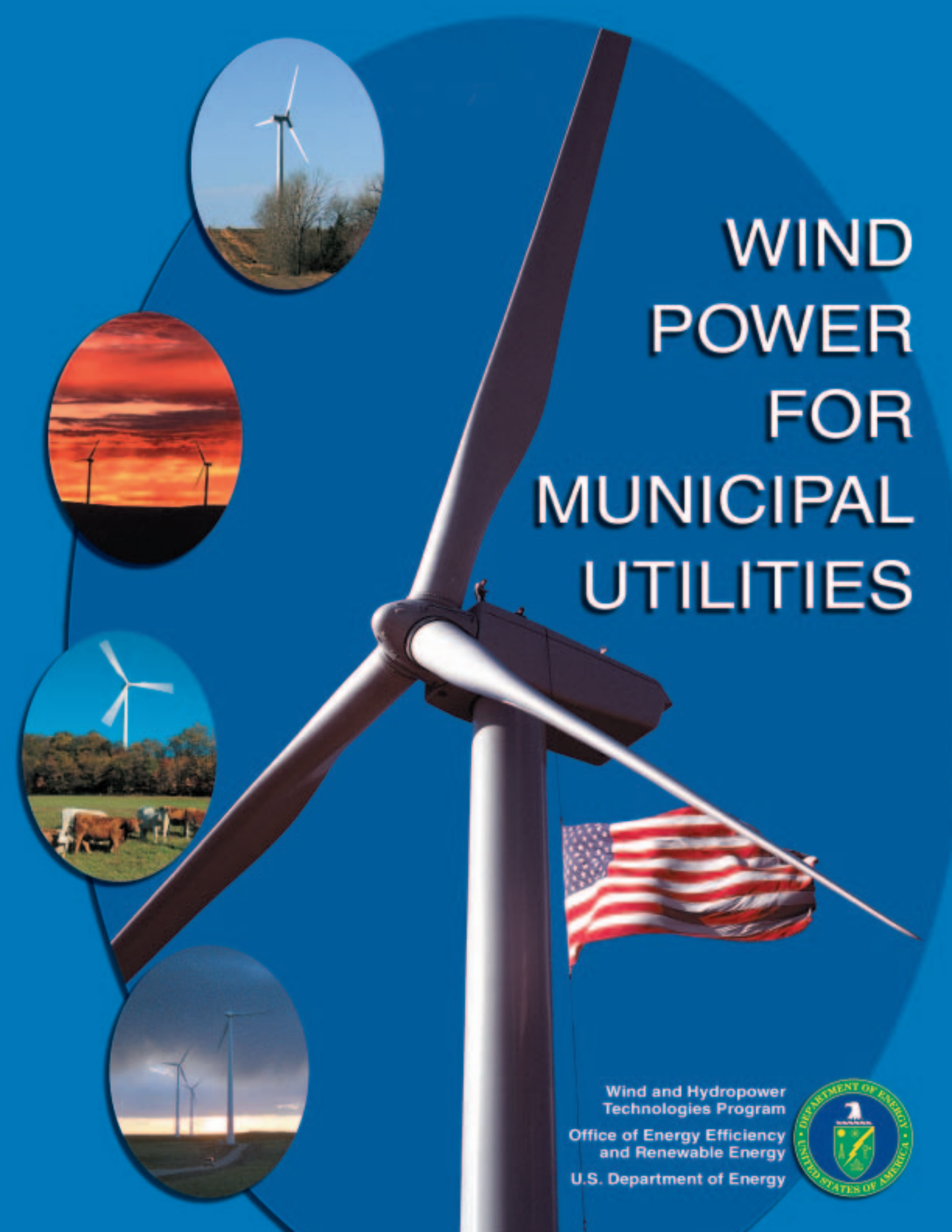


WIND POWER FOR MUNICIPAL UTILITIES

Wind and Hydropower Technologies Program

Office of Energy Efficiency and Renewable Energy

U.S. Department of Energy

FROM COAST TO COAST, WIND POWER IS A BREEZE

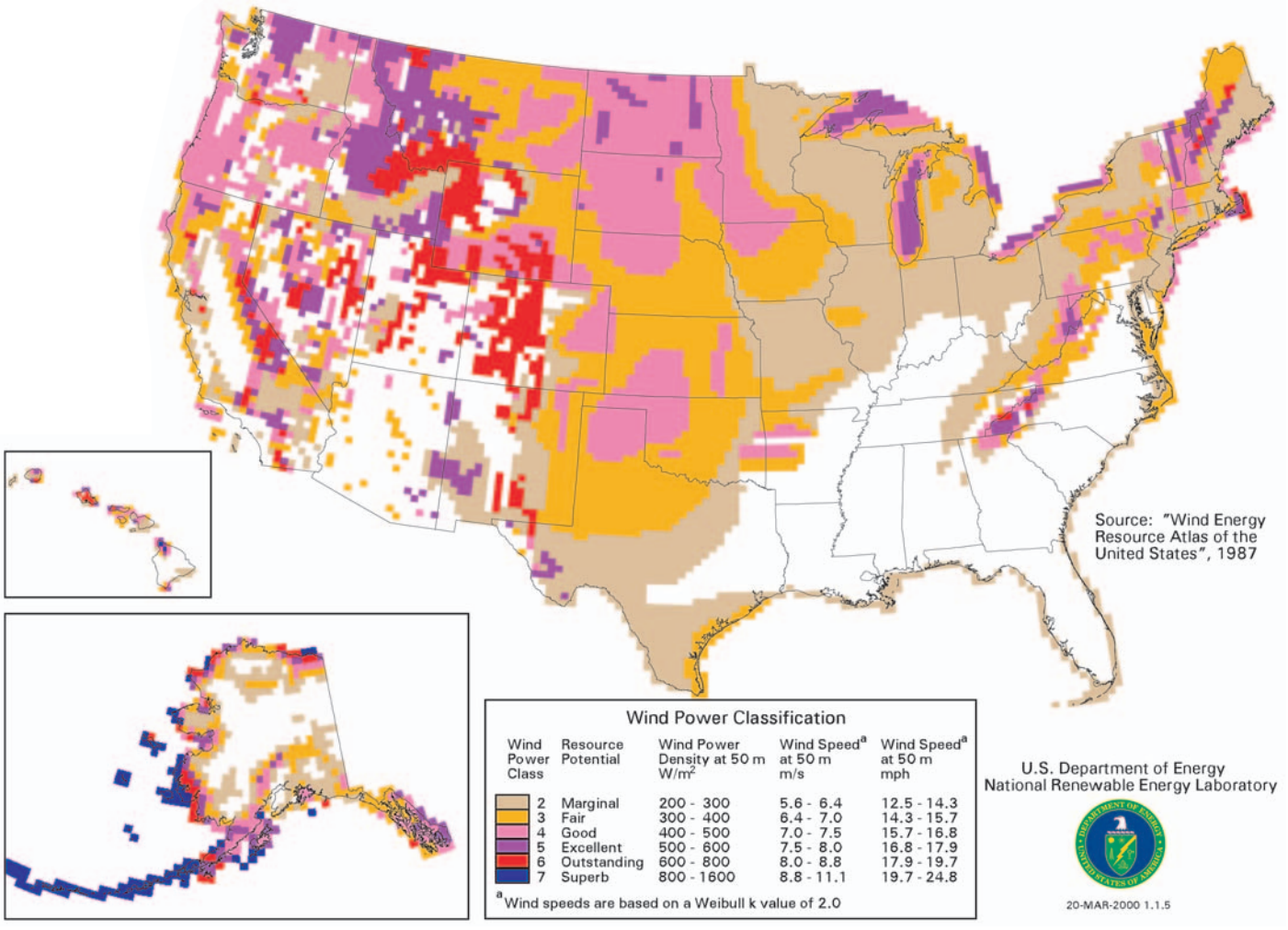
Clean energy has a bright future. Today a growing number of public utilities are harvesting a new source of homegrown energy. From Massachusetts to California, more than two dozen municipal utilities have wind power in their energy mix. Wind energy is attractive for many reasons:

- Wind energy is clean and renewable.
- Wind energy is economically competitive.
- Wind energy reduces energy price risks. Unlike coal, natural gas, or oil, the "fuel" for a wind turbine will always be free.
- Wind energy is popular with the public.

A RECORD YEAR — Wind power is booming. Worldwide, a record 3,800 megawatts (MW) were installed in 2001. These sleek, impressive wind turbines have closed the cost gap with conventional power plants. Depending on size and location, wind farms produce electricity for 3–6 cents per kilowatt-hour (kWh). The nation's investment to advance wind technology will lead to even more competitive wind generated power.

OLD AND NEW — Wind power is one of mankind's oldest energy sources. The American experience with wind technology began during Colonial times. During the 1930s, half a million windmills pumped water on the Great Plains. Today's modern wind turbine is a far cry from the old water pumpers. Incorporating the latest engineering, these sleek, impressive machines produce affordable and reliable electricity.

WIND RESOURCE POTENTIAL — Our nation is blessed with an abundance of world-class wind resources. Harnessing the strong winds that sweep across America offers an excellent business opportunity for the nation's public utilities.



MUNICIPAL WIND POWER PIONEERS

From Oregon to Maine, municipal utilities are beginning to harness the wind. Six of the early pioneers, ranging in size from small to large, tell their story below.

Austin Energy — Austin Energy purchases the wind power produced by 61 Bonus 1.3-MW wind turbines. The turbines are part of the King Mountain wind farm that began full-scale commercial operation in September 2001. Located in Upton County, 70 miles south of Odessa, Texas, the wind farm has a total capacity rating of 79.3 megawatts. The farm was developed by Cielo Windpower of Austin, Texas, and is owned and operated by FPL Energy.

Eugene Water and Electric Board — In keeping with a 90-plus-year history of renewable, sustainable resource development, Eugene Water & Electric Board (EWEB) Eugene, Oregon, pursued the development of wind energy as an integral part of the utility's 1992 Energy Resource Plan. In 1999, the utility introduced the EWEB Wind Power Program, enabling its customers to purchase wind energy generated by a 69-turbine project located in southeastern Wyoming. Since that initial investment in wind power, EWEB has purchased wind power from various other wind projects throughout the region.

Hull Municipal Lighting Plant — The Hull Municipal Lighting Plant (HMLP) installed its first wind turbine—a Vestas 660-kW V-47 machine—in December 2001. Located at the end of the peninsula in Hull, Massachusetts, the turbine is estimated to produce 1.5 million kilowatt-hours of electricity each year. One-third of the output provides electricity for Hull's streetlights and traffic signals. The remainder is fed back into the utility grid. Public reception to the installation has been strong and positive. The majority of citizens want HMLP to install more units.

Moorhead Public Service — Moorhead Public Service (MPS) in Minnesota began offering wind power to its customers through its Capture the Wind Program in 1999 with the installation of its first 750-kW turbine. In 2001, MPS installed its second 750-kW turbine. Output from the first turbine sold out to 427 customers in just two-and-one-half weeks. Output from the second turbine sold out to more than 400 customers in less than four weeks. MPS now provides 1% of Moorhead's electricity needs with wind power.

Municipal Energy Agency of Nebraska — The Municipal Energy Agency of Nebraska (MEAN) recently constructed a 10.5-megawatt wind project consisting of seven turbines, three miles northwest of Kimball, Nebraska. The wind project is expected to generate about 2% to 3% of MEAN's total energy requirements. Each turbine will generate up to 1,500 kilowatts and the project cost about $14 million to construct. The annual output of the project will provide energy for nearly 4,000 homes.

Waverly Light and Power — Waverly Light and Power is a municipally owned utility serving 4,300 customers in northeast Iowa. Waverly began its search for wind energy in 1991 with strong community support. Today, Waverly owns and operates three turbines (two 750-kW Zond turbines and one 900-kW NEG Micon) that provide 5% of the utility's annual system energy requirements. The utility's goal is to provide for 10% of its energy requirements using renewable energy. Waverly conducts a green pricing program through the sale of Iowa Energy Tags™ on the Internet.

ECONOMICS AT A GLANCE

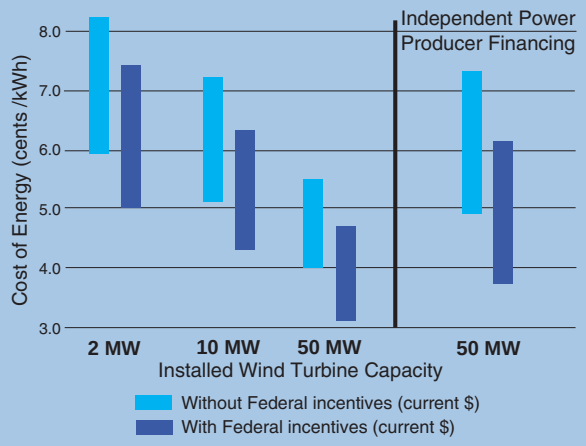
Most municipal utilities start by installing one or two wind machines. The Turbine Cost table shows typical costs and income for a single turbine installation.

A 750-kW wind turbine costs about $800,000 installed. Each year it produces electricity worth $80,000 to $100,000. Public power utilities also receive federal renewable energy production incentives worth approximately $350,000, payable over 10 years.

Turbine Cost

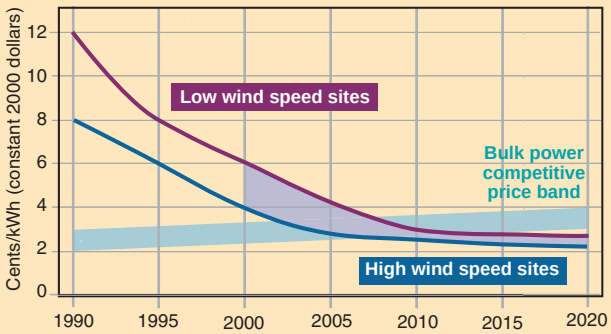
Annual Electricity Sales	$80,000 to $100,000
Annual Renewable Energy Production Incentive	$35,000
Gross Income in First 10 Years	$1,150,000 to $1,350,000

Municipal Financing



Because of the low-cost financing available to municipal utilities, moderate-sized wind projects can compete effectively with larger, privately financed projects.

Cost of Wind Energy



The cost of wind energy has plummeted since 1980. Today wind power is one of the most competitive sources of new electricity.

The development of wind energy by Waverly Light and Power has been an important, environmentally correct step for our community, and continues to provide leadership for expansion of wind energy generation in the Midwest. We strongly believe that public power can play a significant role in the global reduction of greenhouse gasses by expanding and promoting wind energy and using programs like Iowa Energy Tags.

Glenn Cannon, General Manager, Waverly Light and Power

We at Austin Energy found that large wind energy projects are the least expensive new electric generation source. Not only is the price lower than other renewable sources, it's even lower than the fuel cost of our natural-gas-fired units. We're learning how to handle the non-dispatchable and somewhat unpredictable nature of wind energy.

Mark Kapner, Manager, Conservation and Renewable Energy, Austin Energy

Moorhead Public Service is a municipal utility owned and governed by our customers. When our customers expressed interest in a utility wind program, we felt it was our job to find a way to deliver it.

Christopher Reed, Moorhead Public Service, Moorhead, Minnesota

After the old high school wind turbine went out of service, the Citizens for Alternative Renewable Energy approached us about installing a state-of-the-art wind turbine. Once Hull Light got involved, the project became a reality within a relatively short time span.

John MacLeod, Operations Manager, Hull Municipal Light Plant

The governing bodies of our municipal members should be commended for making the commitment to provide their communities with an environmentally clean form of energy. The MEAN Wind Project at Kimball will be a great benefit to the environment and will be a cost-effective source of renewable energy for these communities and their ratepayers.

Richard Duxbury, Executive Director, NMPP Energy

The Eugene community, through EWEB's elected commissioners, holds a very high standard when it comes to environmental issues. Clearly, wind power is a significant component in creating a sustainable energy future. We pursue renewable energy resources, such as EWEB Windpower, and energy conservation in an effort to limit the impact of less environmentally friendly generation sources, both locally and globally.

Randy Berggren, General Manager, Eugene Water and Electric Board

INFORMATION RESOURCES

U.S. Department of Energy
Wind and Hydropower Technologies Program
Forrestal Building
1000 Independence Ave., SW
Washington, DC 20585
(202) 586-5348
www.eren.doe.gov/wind

National Renewable Energy Laboratory
National Wind Technology Center
1617 Cole Boulevard
Golden, Colorado 80401
(303) 384-6979
www.nrel.gov/wind

American Wind Energy Association
122 C Street, NW, 4th Floor
Washington, DC 20001
(202) 383-2500
www.awea.org

American Public Power Association
2301 M Street, NW
Washington, DC 20037-1484
(202) 467-2900
www.appanet.org

Utility Wind Interest Group
2111 Wilson Boulevard, Suite 323
Arlington, VA 22201-3001
(703) 351-4492 ext. 121
www.uwig.org

Western Area Power Administration
12155 W. Alameda Parkway
Lakewood, CO 80228-8213
(720) 962-7000
www.wapa.gov

National Wind Coordinating Committee
1255 23rd Street NW, Suite 275
Washington, D.C. 20037
(202) 965-6398
www.nationalwind.org

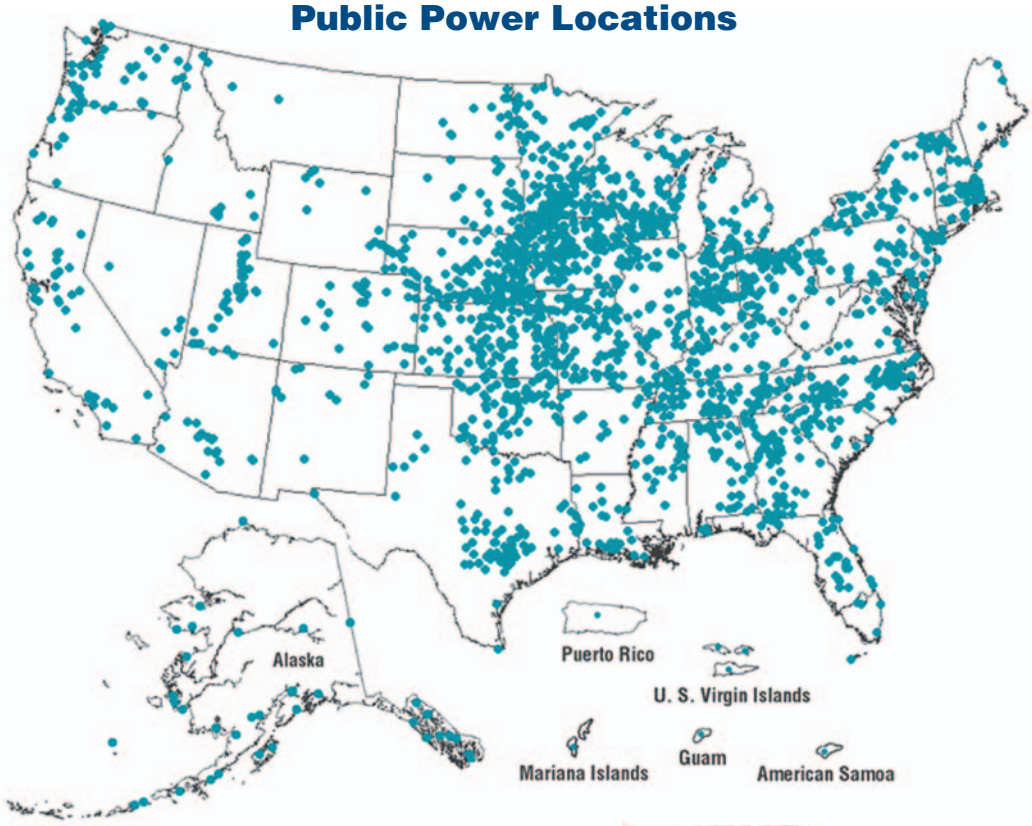
PUBLIC POWER: AN AMERICAN TRADITION THAT WORKS

There are more than 2,000 public power utilities in the United States. Together, they provide electricity to 40 million people in 49 states.

Public power is both a big city and a small town phenomenon. Los Angeles, Phoenix, and Omaha have municipal utilities—but so do hundreds of small towns. Public power is rooted in the American tradition of local people cooperating to meet community needs. Public utilities strive to deliver reliable, affordable power, or as they say, “Keep the lights on and the rates low.”

A NATURAL PARTNERSHIP — Wind power and public power are natural partners. Clean, competitive, pollution-free wind energy is a good way to meet the economic and environmental challenges of the future. According to the American Public Power Association, “Because the customers are the owners of public power utilities, it makes sense for public power to be a leader in using green energy.” As of September 2002, 24 municipal utilities offered wind energy as part of their energy portfolios.

Public Power Locations



WIND POWERING AMERICA

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Page 4—Vern Moore, NMPP Energy/PIX11062; Waverly Light and Power/PIX11515.
Page 6—Waverly Light and Power/PIX11517.

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