

**Estimates of Renewable Energy Capacity
Serving U.S. Green Power Markets
(as of December 2004)**

*Lori Bird and Blair Swezey
National Renewable Energy Laboratory*

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This memo provides estimates of renewable energy capacity that is being supported through green power markets in the United States. As of the end of 2004, more than 2,200 megawatts (MW) of new renewables capacity was being used to supply green power customers, with another 455 MW either under construction or formally announced (Table 1).

Table 1 – New Renewables Capacity Supplying Green Power Markets, 2004

Source	MW in Place	%	MW Planned	%
Wind	2,045.6	91.6	364.5	80.1
Biomass	135.6	6.1	58.8	12.9
Solar	8.1	0.4	0.4	0.1
Geothermal	35.5	1.6	0.0	0.0
Small Hydro	8.5	0.4	31.3	6.9
Total	2,233.3	100.0	455.0	100.0

In assembling this data, we have focused on *new* renewable resources used to serve green power customers. We define new renewable resources as projects or portions of projects built specifically to serve green power customers or recently constructed projects that are used to supply green power customers and meet the regional *Green-e* standards¹ for new renewables. Although, in some cases, pre-existing renewable energy projects may be used for green power supply, we do not include this capacity in our estimates because it was built prior to the emergence of green power markets. We also do not include capacity used to meet state renewables portfolio standard (RPS) requirements or other renewable energy mandates.

In these estimates, we generally count the entire capacity of a given renewable energy project irrespective of whether the output has been fully subscribed by green power purchasers. For example, a utility or developer may complete a project before the entire output has been sold to prospective customers. Thus, our estimates may include some capacity for which a green power buyer has not yet

¹ See the Green-e standards at http://www.green-e.org/what_is/standard/standard.html.

been secured. However, in cases where a portion of a project is used to meet a renewable energy mandate, we count only the remainder of the project.

We have also segmented the capacity data by the type of market in which the green power is being sold, i.e., through utility green pricing programs, in competitive green power markets, or to wholesale or retail customers in the form of renewable energy certificates (RECs).²

The green power market is evolving rapidly with new suppliers and supply sources emerging on a regular basis. While we believe that the data presented here represent a reasonably accurate portrayal of green power market supply, we also recognize the inherent limits in identifying all market transactions.

Green Pricing

In total, about 700 MW of new renewables capacity has been installed to supply utility green pricing programs with another 230 MW announced by utilities (Table 2). To date, wind, solar, and biomass—primarily in the form of landfill gas—are the renewable resources most commonly used for utility programs, with wind representing the largest portion of the total capacity.

Table 2 – New Renewables Capacity Supplying Green Pricing Programs, 2004

Source	MW in Place	%	MW Planned	%
Wind	584.0	82.8	139.7	61.1
Biomass	76.3	10.8	57.5	25.1
Solar	6.1	0.9	0.2	0.1
Geothermal	30.5	4.3	0.0	0.0
Small Hydro	8.5	1.2	31.3	13.7
Total	705.5	100.0	228.7	100.0

Table A-1 provides capacity detail by individual utility company with the capacity attributed to the primary utility that either built the project or contracted for the renewable energy output. Some utilities sell portions of project output to other utilities. For example, Platte River Power Authority, a publicly owned wholesale electric utility, operates a 6-MW wind project in Medicine Bow, Wyoming, from which it provides power to its four municipal utility members. In Table A-1, all of the capacity is attributed to Platte River. Similarly, Xcel Energy purchases the output of about 73 MW of wind energy capacity from which it supplies its green pricing programs in Colorado, New

² RECs, also known as green tags or tradable renewable energy certificates, represent the unique attributes of renewable energy that are sold separate from commodity electricity.

Mexico, and Minnesota but also sells power at wholesale to a number of other utilities, which use the wind energy to supply their own green pricing programs. In Table A-1, all of this capacity is counted under Xcel Energy. Table A-2 presents estimates of capacity planned to supply utility green pricing programs.

A number of utilities purchase their renewable energy supplies from unrelated utilities or other suppliers that sell renewable energy (or the associated RECs) at wholesale from projects that may not have been developed specifically to serve green pricing programs. We estimate that these wholesale purchases—mostly wind—total about 50 average megawatts (aMW), which is equivalent to nearly 150 MW of nameplate capacity. This capacity is listed separately at the end of Table A-1.

In states where an RPS or other renewable purchase obligation is in place—such as Arizona, Iowa, Minnesota, Texas, and Wisconsin—we count only capacity that is dedicated to supplying green pricing programs and not used to meet the portfolio requirements. In cases where utilities are subject to RPS requirements, we attribute new renewable energy capacity for green pricing programs based on actual sales of green power to customers.

Competitive Markets and Renewable Energy Certificates

We estimate that about 1,530 MW of new renewables capacity serves customers purchasing green power in competitive markets or as RECs,³ in both retail and wholesale markets (Table 3). About 225 MW of additional renewables capacity is planned.

Table 3 – New Renewables Capacity Supplying Competitive Markets and Renewable Energy Certificates, 2004

Source	MW in Place	%	MW Planned	%
Wind	1,461.6	95.7	224.8	99.3
Biomass	59.3	3.9	1.3	0.6
Solar	2.0	0.1	0.2	0.1
Geothermal	5.0	0.3	0.0	0.0
Small Hydro	0.0	0.0	0.0	0.0
Total	1,527.9	100.0	226.3	100.0

³ REC-based green power products are available to consumers nationwide. In competitive markets, consumers can purchase RECs without having to switch retail service providers and, likewise, utility customers can purchase RECs separately from utility-supplied power, irrespective of whether their utility offers a green power product. RECs can be supplied from a variety of renewable energy sources located throughout the country, or in a particular region or locality. For a list of REC-based green power products, see <http://www.eere.energy.gov/greenpower/markets/certificates.shtml?page=1>.

Specifically, we count projects that meet at least one of the following criteria: 1) a green power marketer is actively selling the project output to green power customers, 2) a significant portion of the project output is sold to supply voluntary green power markets, or 3) the entity with the power purchase agreement has announced or told us of its intention to sell RECs in voluntary markets. As noted earlier, we do not count projects for which the output or RECs are used to meet an RPS or other renewable energy mandate. In addition, we do not include projects that are rate-based by a utility unless RECs from these projects are also being sold to supply voluntary green power markets.

Table A-3 provides capacity detail for green power marketers and REC suppliers. Table A-4 presents detail on capacity planned to supply REC marketers or to serve green power customers in competitive markets. As noted previously, these capacity estimates do not include existing renewable resources. For example, a number of marketers in the Northeast offer green power products supplied in part from existing renewable resources—only the new renewables capacity used to supply these products is counted in Table A-3. Nearly all of the new renewables capacity developed for competitive green power markets is wind-based.

Some utilities purchase the RECs or output from some of these projects and resell the renewable energy to their retail customers through green pricing programs. As noted previously, where this is the case, this capacity is attributed to utility green pricing and included in Table A-1. Again, we estimate that the amount of capacity resold through green pricing programs is nearly 150 MW.

Nearly 400 MW of the total capacity presented in Table 3 is being marketed to utilities and other customers in the Pacific Northwest. In addition, more than 200 MW of new renewables capacity has been developed in New York, Pennsylvania, and West Virginia, which serves green power customers in the Northeast, and more than 750 MW of new capacity in California, Kansas, Texas, and Wyoming also supplies green power markets.