

State Renewable Energy Requirements and Goals: Status Through 2003

by
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As of the end of 2003, 15 States have programs to encourage the development of renewable energy for electricity generation. Of the 17 programs (two States have multiple programs), 9 are renewable portfolio standards (RPS), 4 are renewable energy mandates, and 4 are renewable energy goals. RPS provisions generally require that a specified share of electricity generation or sales come from qualifying renewable technologies. Mandates, on the other hand, require the construction of set amounts of new renewable capacity using specified technologies. Goal-based programs are voluntary, and generally the goals can be met with a mix of renewable technologies. As of the end of 2003, 2,004 megawatts (86 percent) of the 2,335 megawatts of new renewable energy capacity constructed in the 15 States was a result of mandates, and the vast majority (93 percent) of the new capacity consisted of wind power installations. Nearly 51 percent (1,186 megawatts) of all the new capacity was installed in Texas. However, because RPS and voluntary goal programs are newer and often include output from existing capacity and alternative compliance options, they have not had large impacts to date.

Introduction

Fifteen States have established requirements or goals to increase renewable energy use.¹ They have enacted either (1) renewable portfolio standards (RPS) that set increasing percentage shares of electricity generation or sales, (2) mandates that specify quantities of new generating capacity to be built, or (3) voluntary goals. This paper summarizes the renewable energy programs of those 15 States and their renewable capacity through December 31, 2003.² Of the 15 States, 9 States have RPS, 4 States have mandates, and 4 States have voluntary programs.³ This paper identifies key characteristics of the programs—including their requirements and target time frames for compliance, acceptable and excluded renewable energy sources, alternatives to building new capacity, and potential sanctions—and the amounts of renewable capacity constructed through the end of 2003.

Renewable Portfolio Standards

The type of program used most frequently by the States is an RPS requiring that some specified percentage of

electricity supply be provided by qualifying renewable energy sources (Table 1). Most State RPS programs were initiated when privately owned electric utilities were being deregulated, in order to ensure their continued investment in renewables.

In most of the States with RPS programs, the years of required compliance begin after 2000, with New Mexico's 2006 initial compliance year being the latest. All but Maine require an increasing percentage over time, until a target level is reached. Requirements for years after the final targets are reached are not always explicitly stated, but most appear to continue at the highest specified percentage.

Because other features of RPS programs and existing electricity supplies differ from State to State, the percentage of renewable energy specified in a given State's RPS does not reveal the actual amount of new renewable energy capacity required. Most of the programs include output from existing capacity (except for those in Arizona, and excluding historical levels of output in Massachusetts); generation supplied from other States (Arizona accepts only solar from other States, and

¹This report was assembled by EIA from a number of sources and in a series of steps, beginning with a review of State RPS and other program summaries available on web sites, followed by a review of State laws and regulations, and then further clarified by direct contact with State public utility commissions, electric utilities, and others. In most cases, information in this report can be found in the States' laws and regulations. In some cases, however, characteristics are not explicitly described in records but have been clarified either in practice or by decisions and interpretations of the State offices running the programs or by the utilities subject to them. Specific current information about any State's renewables requirements can be obtained by contacting the State's public utility commission or accessing its web site (see "For More Information" at the end of this report). Additional information for this report was obtained from the Renewable Energy Policy Project, web site www.repp.org/rps_map.html, and the North Carolina Solar Center's Database of State Incentives for Renewable Energy (DSIRE), web site www.dsireusa.org. Among web sites with useful analyses of State renewable energy programs, see http://eetd.lbl.gov/ea/EMS/EMS_pubs.html.

²There is no Federal renewable energy mandate.

³Two States have multiple programs.

Nevada and Texas accept only limited amounts); credit trading (except California); and conventional hydroelectric power (except Massachusetts).⁴ Key differences among the States include their definitions of qualifying renewables, alternatives to new renewable capacity, approaches to cost recovery, opt-out provisions, and enforcement mechanisms.

Qualifying Renewables

RPS definitions of qualifying renewable technologies vary widely among the States (Table 2). Landfill gas, solar thermal electric, solar photovoltaic, and wind energy are acceptable in all nine States with RPS programs, but the rules vary for other technologies. Although biomass is also accepted in all nine of the States, its acceptability hinges on the particular environmental requirements in each State. Connecticut accepts

only “sustainable” biomass.⁵ Massachusetts accepts only low-emission advanced biomass conversion technologies, such as biomass gasification, and Nevada accepts only agricultural crops or residues. In five States, municipal solid waste (MSW) is excluded. At least 5 percent of Nevada’s RPS (increasing over time from 0.25 to 0.75 percent of sales) must be provided by solar technologies.

The treatment of hydroelectric power also varies, accounting for some of the variation in the scale of State RPS requirements. Most accept only “small hydro-power” (usually limited to plants smaller than 5 to 30 megawatts). Arizona and Massachusetts exclude hydro-power altogether. Wisconsin accepts hydroelectric plants up to 60 megawatts. Maine’s 30-percent RPS, which includes conventional hydroelectric plants up to 100 megawatts, captures most of the hydroelectric

Table 1. Basic Features of State Renewable Energy Requirements as of December 31, 2003

State	Part of Deregulation	Initial Year Enacted	Beginning and Last Specified Requirements	Accepts Existing Capacity	Out-of-State Supply	Credit Trading
Renewable Portfolio Standards						
Arizona	Yes	1996	0.2-1.1% of sales, 2001-2007	No	Solar only	Yes
California	No	2002	+1% of sales per year, to 20.0% by 2017	Yes	Yes	No
Connecticut	Yes	2003	6.5-10.0% of generation, 2003-2010	Yes	Yes	Yes
Maine	Yes	1997	30.0% of sales by 1999	Yes	Yes	Yes
Massachusetts	Yes	1997	1.0-4.0% of sales, 2003-2009	No	Yes	Yes
Nevada	No	2001	5.0-15.0% of sales, 2003-2013; 5% of requirements must be solar	Yes	Yes	Yes
New Jersey	Yes	1999	3.0-6.5% of sales, 2001-2008	Yes	Yes	Yes
New Mexico	No	2002	5.0-10.0% of sales, 2006-2011	Yes	Yes	Yes
Wisconsin	No	1999	0.5-2.2% of sales, 2001-2011	Yes	Yes	Yes
Mandates						
Iowa	No	1983	105 megawatts (no set date)	No	NS	No
Minnesota	No	1994	1,125 megawatts wind by 2010 + 125 megawatts biomass ^a	No	Yes	No
Texas	No	1999	400-2,000 megawatts, 2003-2009	No	Yes	Yes
Wisconsin	No	1997	50 megawatts by 2000	No	No	No
Goals						
Hawaii	No	2001	9.0% of sales by 2010	Yes	NA	No
Illinois	No	2001	15.0% of sales by 2020	NS	No	No
Minnesota ^b	No	2003	1.0-10.0% of sales, 2005-2015	NS	Yes	Yes
Pennsylvania	Yes	1998	Individual agreements with five utilities	NS	NS	NS

^aVarious dates, beginning in 2003. The original requirement for 125 megawatts of biomass capacity has been reduced.

^bSpecific characteristics are being determined. See web site www.puc.state.mn.us, Docket 03-869.

NS = not specified in the State requirement. NA = not applicable.

Source: Energy Information Administration, Office of Integrated Analysis and Forecasting.

⁴“Credits” are a market-based means of distinguishing the renewable characteristic of electricity from the electricity itself. Credits are tradable certificates documenting that specified kilowatthours of electricity were generated from qualifying renewable energy sources, are independent of the kilowatthours generated, and do not represent the delivery of actual electricity to the buyer.

⁵Although Connecticut does not define “sustainable biomass,” “sustainable” usually means “when harvested, is replaced by new biomass such that no net depletion occurs.” See Biomass Energy Research Association (BERA) “An Introduction to Biomass Energy, A Renewable Resource,” by Donald L. Klass, accessible at <http://www.bera1.org/about.html> (February 3, 2004).

plants in the State, including some pumped storage. Connecticut's RPS accepts existing and new run-of-river hydroelectric plants not larger than 5 megawatts. Wisconsin allows existing hydropower to count toward a maximum of 0.6 percent of the energy requirements, potentially exceeding the 0.5-percent target for the first compliance year.

Alternatives to New Renewables Capacity

Most of the State RPS programs include alternatives to the construction of new renewable capacity (Table 3). Seven States accept fuel cells powered by renewable sources, and Connecticut and Maine also accept natural gas fuel cells as well. In Arizona and Nevada, non-electric technologies (such as solar hot water heating and air conditioning) can be used to meet the RPS requirements.

Some States favor certain renewable energy technologies by offering more than one credit per kilowatthour. This practice may stimulate the favored technologies but can also reduce the effective size of the RPS if the

technologies are developed. For example, Arizona offers extra credits for in-State manufacture, in-State installation, and early installation of distributed solar technologies and for participation in solar incentive programs, which in total could reduce the amount of renewables needed to meet Arizona's RPS by as much as 50 percent. Nevada's RPS grants 2.4 credits for off-grid photovoltaics, increased to 2.55 credits for grid-connected photovoltaics (to account for line losses). New Mexico provides 2 credits for biomass, geothermal, landfill gas, and fuel cells and 3 credits for solar technologies.

Cost Recovery

The States use several approaches for funding their RPS programs, including passing the higher costs directly to all utility ratepayers (referred to as "rate-basing"), applying a charge on selected categories of sales, or encouraging consumers voluntarily to pay a premium for renewable power (through "green power," "green markets," or "green pricing" programs). Six States allow ratebasing, and three apply a separate charge—usually referred to as "system benefits charge"

Table 2. Acceptable Technologies and Resources for State Renewable Energy Requirements as of December 31, 2003

State	Biomass	Biomass Co-firing	Biomass Cogeneration	Geothermal	Conventional Hydroelectric	Landfill Gas	Municipal Solid Waste	Ocean or Tidal	Solar	Wind
Renewable Portfolio Standards										
Arizona	Yes	NS	NS	Yes ^a	No	Yes	NS	No	Yes	Yes
California	Yes	NS	NS	Yes	Small only	Yes	Yes	Yes	Yes	Yes
Connecticut	Yes	NS	NS	No	Small only	Yes	Yes	Yes	Yes	Yes
Maine	Yes	Yes	Yes	Yes	Small only	Yes	Yes	Yes	Yes	Yes
Massachusetts	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes
Nevada	Yes	NS	NS	Yes	Small only	Yes	No	No	Yes	Yes
New Jersey	Yes	Yes	NS	Yes	Small only	Yes	No	Yes	Yes	Yes
New Mexico	Yes	Yes	NS	Yes	Small only	Yes	No	No	Yes	Yes
Wisconsin	Yes	Yes	NS	Yes	Small only	Yes	No	Yes	Yes	Yes
Mandates										
Iowa	Yes	NS	Yes	NS	Small only	Yes	Yes	NS	Yes	Yes
Minnesota	Yes	NS	NS	No	Small only	Yes	Yes	No	Yes	Yes
Texas	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Wisconsin	Yes	Yes	NS	Yes	Small only	Yes	No	Yes	Yes	Yes
Goals										
Hawaii	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Illinois	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Yes
Minnesota ^b	Yes	NS	NS	No	Small only	Yes	Yes	No	Yes	Yes
Pennsylvania	Yes	NS	NS	Yes	No	Yes	No ^c	Yes	Yes	Yes

^aAccepted by waiver only.

^bSpecific characteristics are being determined. See web site www.puc.state.mn.us, Docket 03-869.

^cYes by exception, for General Public Utilities (GPU) only.

NS = not specified in the State requirement.

Source: Energy Information Administration, Office of Integrated Analysis and Forecasting.

(SBC)—that is collected per kilowatt-hour or as a fixed charge levied on selected customer groups. Arizona levies both an SBC and an environmental charge. Four States (Arizona, Maine, New Mexico, and Wisconsin) also allow RPS costs to be recovered through green power programs. Two States (Connecticut and Massachusetts) exclude capacity purchased in green power programs from contributing to their RPS requirements.

Except for Maine, States may reduce their RPS requirements if costs are excessive (“cost-outs”). Arizona’s RPS increases after 2004 only if the cost of renewable energy declines sufficiently. California’s RPS is limited by its SBC funding. In Connecticut, Massachusetts, and New Jersey, fees ranging from 5.0 to 5.5 cents per kilowatt-hour may be levied if the required renewables are not purchased. Nevada, New Jersey, and Wisconsin require that costs be reasonable and prudent. New Mexico requires life-cycle costs to be similar to those for nonrenewable sources. The State laws may leave the specification of “excessive,” “sufficient,” “reasonable and prudent,” or other such limits to be determined later.

Non-Cost Outs and Delay Provisions

Except for Arizona, New Jersey, and Wisconsin, States may also reduce or eliminate RPS requirements for non-cost reasons. California’s three investor-owned utilities do not have to comply with the RPS if they are deemed not creditworthy.⁶ New Mexico excuses utilities from the RPS altogether if existing long-term contracts for non-RPS technologies cover all the utilities’ requirements.

Some RPS States may delay compliance. If a California utility does not meet a specific year’s requirement, it may do so over the next 3 years, so long as those future years’ requirements are also met. Maine’s RPS allows compliance within a 2-year period, or even longer upon commission ruling. Massachusetts can meet initial 2003 requirements using otherwise qualified generation that occurred in 2002 (reverse delay). For New Jersey, a shortfall in one year can be made up in the next.

Table 3. Acceptable Alternatives to and Cost Support for Renewable Technologies for State Renewable Energy Requirements as of December 31, 2003

State	Fuel Cells	Non-electric Alternatives	Favored Technologies	System Benefits Charges	Green Power	Cost Outs	Non-Cost Outs/Delays	Penalties
Renewable Portfolio Standards								
Arizona	No	Yes	Solar	Yes	Yes	Yes	No	No
California	Renewable fuels only	No	No	Yes	NS	Yes	Yes	Yes
Connecticut	Renewables and natural gas	No	No	No	No	Yes	Yes	Yes
Maine	Renewables and natural gas	No	No	No	Yes	No	Yes	Yes
Massachusetts	Renewable fuels only	No	No	No	No	Yes	Yes	Yes
Nevada	No	Yes	Solar	No	NS	Yes	Yes	Yes
New Jersey	Renewable fuels only	No	No	Yes	NS	Yes	Yes ^a	Yes
New Mexico	Renewable fuels only	No	All but wind/hydro	No	Yes	Yes	Yes	Yes
Wisconsin	Renewable fuels only	No	No	No	Yes	Yes	No	Yes
Mandates								
Iowa	No	No	No	No	NS	No	No	NS
Minnesota	Yes	No	Wind, biomass	No	NS	No	No	Yes
Texas	Renewable fuels only	Yes	No	No	Yes	Yes	Yes	Yes
Wisconsin	Renewable fuels only	No	No	No	Yes	NS	Yes	NS
Goals								
Hawaii	Renewable fuels only	Yes	No	No	NS	No	Yes	No
Illinois	No	No	No	NS	NS	Yes	No	No
Minnesota ^b	Yes	No	NS	No	NS	NS	Yes	No
Pennsylvania	No	No	No	Yes	NS	Yes	Yes	No

^aDelays only.

^bSpecific characteristics are being determined. See web site www.puc.state.mn.us, Docket 03-869.

NS = not specified in the State requirement.

Source: Energy Information Administration, Office of Integrated Analysis and Forecasting.

⁶As of 2004, all three California utilities were considered to be creditworthy.

Enforcement

Most State RPS programs do not appear to have specific enforcement procedures, except for the option of revoking the operating licenses of covered utilities as a sanction. Collaboration and cooperation appear to be preferred enforcement tools. In addition, California's RPS provides for a penalty of 5 cents per kilowatthour, up to \$25 million. Maine can require payments into a renewable resources research and development fund. Nevada, New Mexico, and Wisconsin can rely on fines for noncompliance, and New Jersey permits the disallowance of costs along with prohibitions against accepting new retail customers. Through the end of 2003, no electric utility in any State had incurred a penalty for noncompliance with a State RPS.

RPS Stimulation of New Renewable Capacity

It is difficult to determine whether specific renewable energy projects were caused by State RPS programs. Individual projects are developed for a variety of reasons, some unrelated to State RPS requirements. Moreover, the States' annual expectations for their RPS programs usually are not specified or measured in terms of new capacity.

Based on discussions with the States in the spring of 2004, Table 4 compares the amounts of new renewable capacity they expected their programs to stimulate through 2003 with the qualifying amounts actually built. As shown, most of the RPS States did not expect their programs to stimulate new capacity by the end of 2003. Only Arizona and Nevada expected their RPS programs to lead to new capacity by that time.

Table 4. Cumulative New RPS Capacity Expected From State Requirements, and Actual New Qualifying Capacity, Through December 31, 2003
(Megawatts, Nameplate Capacity)

State	RPS Expected	Actual Qualifying
Arizona	65	14
California	0	201
Connecticut	0	0
Maine	0	0
Massachusetts	0	9
New Jersey	0	0
New Mexico	0	0
Nevada	133	0
Wisconsin	0	97
Total	198	321

Source: Energy Information Administration, Office of Integrated Analysis and Forecasting.

Given that the State RPS programs are relatively new, it is not surprising that they had not stimulated much new capacity by the end of 2003. Five States showed no new renewable capacity. Although the renewable capacity added in California and Wisconsin can be used to comply with their RPS programs, it is believed—but not definitively known—to have been constructed in response to other Federal, State, or local incentives (such as the Federal production tax credits for wind energy), to meet environmental requirements, or for commercial reasons in the context of existing law and regulation. In fact, only 9 of the 14 megawatts of new renewable capacity brought on line in Arizona is unambiguously a result of the State's RPS program, although most or all of the 94 megawatts of new wind capacity contributing to Wisconsin's RPS goal is reported to have been built primarily in response to requirements.

To date, RPS requirements are being met for the most part by output from existing renewable capacity within States or from adjacent States. Some requirements are being met by purchasing credits or by expecting deficiencies to be made up in the future. In Nevada, 2003 requirements will be partially made up with anticipated new capacity in 2004 and 2005. In Maine and Wisconsin, renewable generation currently exceeds the amount required. As a result, they are earning credits that can be used in future years, and they do not expect to need additional renewable capacity until after 2010.

The 321 megawatts of new renewable energy capacity that entered service in the nine States with RPS programs accounted for 13.7 percent of the 2,335 megawatts of total new renewable energy capacity identified as contributing to all State programs (RPS, mandates, and goals) through 2003 (Table 5). The 9 megawatts of new photovoltaic capacity added in Arizona accounted for only 0.4 percent of the total. Among the new capacity contributing to RPS programs, new wind power provided the vast majority (84.0 percent), landfill gas 6.9 percent, conventional hydroelectricity 6.2 percent, and photovoltaics 2.8 percent.

Mandates

Whereas State RPS programs specify percentages of generation and a broad range of alternatives, mandates narrowly specify the new capacity required (see Table 1). To date, State mandates for new renewable energy capacity have accounted for 86 percent of all new renewable energy capacity from State programs, and the 1,186 megawatts from the Texas mandate alone accounted for nearly 51 percent of the total.

Iowa's 1983 mandate, the oldest, ordered its three investor-owned utilities to develop 105 megawatts of new renewable energy capacity in Iowa (or in their service

areas), with each utility's share based on its share of peak demand. No deadline was set. Originally, for rate-making purposes, the Iowa Utilities Board interpreted the 105 megawatts specified in the statute as "average capacity" based on kilowatthours output. The 260 megawatts of wind and other capacity installed under the Iowa mandate by 1999 is the nameplate equivalent capacity of the 105 average megawatts under the Iowa law. The State has since rescinded the "average capacity" concept, which is no longer part of the Iowa Utilities Board rules. Additional wind capacity built in Iowa since 1999 was not mandated. However, Iowa may increase the mandated requirement if the total peak demand for electricity in the State exceeds 120 percent of its 1990 peak—something that has not occurred to date.

Minnesota's 1994 mandate required Xcel Energy (then Northern States Power) to acquire 425 megawatts of wind capacity by December 31, 2002, plus 125 megawatts of biomass capacity, in exchange for storing additional nuclear waste at its Prairie Island plant. In 1999 Xcel was ordered to acquire 400 additional megawatts of wind capacity by 2006, and in 2003 it was ordered to add another 300 megawatts by 2010. Significant shares must come from small facilities (2 megawatts of capacity or less), distributed State-wide. Mandated wind capacity is being acquired on schedule (476 megawatts), but biomass acquisitions (25 megawatts through December 31, 2003) have not been accomplished because of difficulties encountered with the technology and financing for new biomass capacity. The 2003 legislation requires a power

Table 5. Estimated Capacity Contributing to State Renewable Energy Programs Through 2003
(Megawatts, Nameplate Capacity)

State	Biomass ^a	Geo-thermal	Conventional Hydro-electric	Landfill Gas	Municipal Solid Waste	Ocean or Tidal	Solar Photo-voltaics	Wind	Other/Unknown	Total
Renewable Portfolio Standards										
Arizona	0 ^b	0	0	5 ^b	0	0	9	0	0	14
California	0	0	20 ^c	6 ^c	0	0	0	175 ^c	0	201
Connecticut	0	0	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0	0	0
Massachusetts	0	0	0	8 ^c	0	0	0	1 ^c	0	9
Nevada	0	0	0	0	0	0	0	0	0	0
New Jersey	0	0	0	0	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0	0	0	0	0
Wisconsin	0	0	0	3	0	0	— ^d	94	0	97
Mandates										
Iowa	16	0	0	0	0	0	0	237	7	260
Minnesota	25	0	0	0	0	0	0	476	0	501
Texas	5	0	10	31	0	0	0.2	1,140	0	1,186
Wisconsin	7	0	0	0	0	0	0	50	0	57
Goals										
Hawaii	0	0	0	0	0	0	0	0	0	0
Illinois	0	0	0	0	0	0	0	0	0	0
Minnesota	0	0	0	0	0	0	0	0	0	0
Pennsylvania ^e	0	0	0	0	0	0	0	10	0	10
Total	53	0	30	53	0	0	9.2	2,183	7	2,335
Share of Total	2.3%	0%	1.3%	2.3%	0%	0%	0.4%	93.5%	0.3%	100.0%

^aIncludes biomass co-firing and cogeneration capacity, but none is known to have been built.

^bIn Arizona, a 3-megawatt biomass-fueled plant slated for 2003 entered service in early 2004 and is not shown here. In addition to capacity shown here, the Salt River project added a 4-megawatt landfill gas project under a separate requirement.

^cNew capacity that contributes to the State's RPS requirement but was built for other reasons.

^dIn Wisconsin, 20 kilowatts of solar capacity was also built. The RPS also spurred biomass co-firing in varying proportions at 79 megawatts of existing fossil-fueled capacity, as well as refurbishment and operation of 7.2 megawatts of existing hydroelectric capacity.

^ePennsylvania's program has resulted in 10 megawatts of new renewables capacity. In addition, 118 megawatts of new wind capacity in Pennsylvania and 66 megawatts in West Virginia were supported by separate sustainable development funds.

Source: Energy Information Administration, Office of Integrated Analysis and Forecasting.

purchase agreement for 10 to 20 megawatts of biomass energy, operational by 2005, at no more than \$55 per megawatthour.

The 1999 renewable energy mandate in Texas requires the installation of 2,000 megawatts of new generating capacity by 2009. It has resulted in more new renewable energy generating capacity than any other State-level requirement to date, with 1,140 megawatts of new wind capacity installed by the end of 2003, plus small amounts of landfill gas and other capacity. The Texas mandate includes municipal electric utilities and cooperatives as well as investor-owned utilities. Penalties for deficiencies are primarily the lesser of \$50 per megawatthour or 200 percent of the average cost of credits. Under current law, the 2,000 megawatt requirement remains unchanged from 2009 to 2019.

Before its 1999 RPS, Wisconsin in 1998 required four eastern utilities to install 50 megawatts of new renewable energy capacity by December 31, 2000. The mandate was met with nearly 57 megawatts of new capacity, including three wind projects—Rosiere (11.2 megawatts), Lincoln (9.2 megawatts), and Montfort (30 megawatts)—and the 6.5-megawatt Minergy biomass project using papermill waste.

Voluntary Goals, Objectives, and Settlements

Four States—Hawaii, Illinois, Minnesota, and Pennsylvania—have instituted programs that encourage, but do not require, new renewable energy capacity (see Table 1). Hawaii's 2001 renewable portfolio goal resembles a typical RPS, except for the absence of penalties and the inability to obtain supply from other States. The program is intended to increase the renewable share of the State's electricity supply from 7 percent of net electricity sales in 2003 to 9 percent by 2010. Existing capacity qualifies, and the full range of renewables is accepted, as well as some energy conservation. Utilities in Hawaii are reported to have exceeded the 2003 goal of 7 percent using existing generation, averaging 8.2 percent State-wide.

Illinois passed legislation in 2001 that sets a target of at least 5 percent of electricity production from qualified renewables by 2010 and 15 percent by 2020; however, the goal is not supported by schedules, a menu of acceptable renewable technologies or alternatives other than solar and wind, compliance mechanisms (other than the possibility of a \$50 per megawatthour penalty for

noncompliance), credit trading, or most of the other features of State RPS programs.

In Minnesota, utilities other than Xcel, including municipals and cooperatives, are subject to the State's 2001 Renewable Energy Objective (amended in 2003), which requires a "good faith effort" to increase renewable energy's contribution from 1 percent of sales in 2005 to 10 percent by 2015. By law, the objective is considered to be a mandate for Xcel. At least 0.5 percent should be generated from biomass by 2005 and 1.0 percent by 2010. The objective accommodates basic renewable technology options, as well as hydroelectric facilities less than 60 megawatts, hydrogen fuel cells, and municipal solid waste. Following the 2003 amendments, the Minnesota Public Utility Commission is developing a weighted scale that will favor some (so far unspecified) renewables, based on public interest. Although the program lacks specific penalties, utilities must report both plans and progress.⁷

Pennsylvania does not have an RPS or other renewable energy mandate and has no renewable energy capacity target or requirement. However, as part of utility restructuring legislation in 1996, five Pennsylvania utilities settled restructuring cases on terms requiring that any future "competitive default supply" would include a minimum percentage of renewables.⁸ Among these, only the Pennsylvania Electric Company (PECO) energy program was implemented, and one default supplier, Green Mountain Energy, built the 10.4-megawatt Garrett (Pennsylvania) wind project partly in response to the PECO program.

In addition, the five utilities' restructuring settlements established four sustainable energy funds and other activities that are reported to have either directly or indirectly supported the development of significant amounts of new wind capacity and small amounts of other generating capacity. These include four utility-scale wind projects in Pennsylvania, totaling 118 megawatts (Meyersdale, Mill Run, Somerset, and Waymart), as well as the 66-megawatt Mountaineer wind project in West Virginia. Finally, although the totals are not known, a number of small new landfill gas and photovoltaic projects have been triggered by these energy funds.

Conclusions

State renewable portfolio standards, mandates, and renewable energy goals are all relatively new, with the

⁷According to a Minnesota Public Utilities Commission staff briefing paper, Minnesota Statute 216C.051, Subd. 7, lists as preferred renewable energy technologies first solar and wind, second biomass and low-head or refurbished hydropower, and finally landfill gas, natural-gas-fired cogeneration, and waste materials or byproducts combined with natural gas. Briefing dated September 23, 2003, Docket Number E-999/CI-03-869, page 7, web site www.puc.State.mn.us/docs/briefing_papers/b03-0119.pdf.

⁸"Competitive default supply" refers to suppliers serving customers who do not choose among alternative suppliers.

majority just now entering their initial compliance years. Nevertheless, this review indicates that requirements or goals for new renewable energy capacity in 15 States had resulted in an estimated 2,335 megawatts of new renewable electricity supply by the end of 2003. Most of the new capacity is fueled by wind power (2,183 megawatts), with smaller amounts of landfill gas, hydroelectricity, biomass, and solar photovoltaic technologies.

Of total State-level programs, State mandates—especially in Texas—account for the vast majority of new renewable energy capacity. Through 2003, 321 megawatts of renewable capacity have been built that contribute to State RPS programs, and State renewable mandates have led to the development of 2,004 megawatts of renewable capacity.⁹ Without doubt, some State initiatives have significantly propelled the development of renewable energy capacity, especially in Texas (1,186 megawatts), Minnesota (501 megawatts), and Iowa

(260 megawatts) and to some extent in Wisconsin, Arizona, California, and Massachusetts as well.

Because of alternative compliance options, opt-out provisions, and other limitations, it is difficult to project the future impact of the State RPS programs. Moreover, some States, including Hawaii and New Jersey, may be accelerating their programs in 2004; and additional States, including Maryland, New York, and Rhode Island, have either passed legislation or proposed new programs. As recent history has shown, however, new capacity from State RPS requirements can be either delayed or significantly less than the RPS requirements initially suggest, because utilities facing RPS requirements can choose alternatives to building new renewable energy capacity. As a result, the amount of new generating capacity ultimately built under State programs may be less than the maximum potential initially anticipated from the statutes.

⁹The development of some small amounts of additional renewable energy capacity may also have occurred in States in which RPS programs, mandates, or goals do not exist, in anticipation of income from future renewable energy credits for sales to entities in States with renewable energy programs.

For More Information

For additional information about State renewable portfolio standards, mandates, goals, and settlements, see the following web sites, which provide laws, rules, and program descriptions by public utility commissions or other State agencies:

- **Arizona:** For Arizona’s legal basis, see rule R14-2-1618 at http://www.sos.state.az.us/public_services/Title_14/14-02.htm; for additional information, see the Arizona Corporation Commission web site, at <http://www.cc.state.az.us/utility/electric/environmental.htm>.
- **California:** For the California Energy Commission, see <http://www.energy.ca.gov/portfolio>; for the California Public Utilities Commission, see <http://www.cpuc.ca.gov/static/industry/electric/renewableenergy/index.htm>; for guidebooks, see <http://www.energy.ca.gov/portfolio/documents/index.html>.
- **Connecticut:** For original legislation, see <http://www.cga.state.ct.us/ps98/act/pa/pa%2D0028.htm>; for revisions, see <http://www.cga.state.ct.us/2003/act/Pa/2003PA-00135-R00SB-00733-PA.htm> and <http://www.cga.state.ct.us/2003/act/Pa/2003PA-00221-R00HB-06428-PA.htm>. For general descriptive information, see <http://www.wattsnewct.com>, under “renewables.”
- **Hawaii:** For law, see http://www.capitol.hawaii.gov/session2001/bills/HB173_cd1_.htm; for Hawaii Department of Business, Economic Development & Tourism, see <http://www.state.hi.us/dbedt/ert/rps.html>.
- **Illinois:** See <http://www.commerce.state.il.us/com/energy/renewable.html>.
- **Iowa:** For law, see <http://www.legis.state.ia.us/cgi-bin/IACODE/Code2003SUPPLEMENT.pl> (enter “476” for “chapter” and “41” for “section”); for description, see <http://www.state.ia.us/dnr/energy/MAIN/PUBS/IRERG/documents/RenewableEnergyResources.pdf>.
- **Maine:** For the Maine statute, see <http://janus.state.me.us/legis/statutes/35-A/title35-Asec3210.html>; for the Maine rule, see <http://www.state.me.us/mpuc/rules/Part%203/ch-311.htm>.
- **Massachusetts:** For the Massachusetts regulation, see <http://www.mass.gov/doer/rps/225cmr.pdf>; for descriptive information, see Massachusetts Division of Energy Resources, <http://www.mass.gov/doer/rps/index.htm>.
- **Minnesota:** For the Minnesota renewable energy mandate, see <http://www.revisor.leg.state.mn.us/stats/216B/2423.html>; for its renewable energy objective, see <http://www.revisor.leg.state.mn.us/stats/216B/1691.html>; for 2004 implementation orders, see <http://www.puc.state.mn.us> (enter “03-869” as the docket search).
- **Nevada:** For law, see http://www.leg.state.nv.us/71st/bills/SB/SB372_EN.pdf. For Nevada Public Utilities Commission materials, see http://www.puc.state.nv.us/renewable_energy.htm.
- **New Jersey:** For law, see <http://www.bpu.state.nj.us/wwwroot/energy/DeregLaw.pdf>; for standard, see <http://www.bpu.state.nj.us/wwwroot/energy/portfoliostands.pdf>; for the New Jersey web site, see <http://www.njcep.com/>.
- **New Mexico:** For rule, see <http://www.nmprc.state.nm.us/utility/pdf/3619finalrule.pdf>.
- **Pennsylvania:** For Pennsylvania code, see <http://www.pacode.com/secure/data/052/chapter54/chap54toc.html>; for the Pennsylvania Sustainable Energy Board, see http://puc.paonline.com/electric/reports/PASustainable_Energy_Board_2003AR.pdf.
- **Texas:** For rule, see: <http://www.puc.state.tx.us/rules/subrules/electric/25.173/25.173ei.cfm>; for web site, see <http://www.texasrenewables.com>.
- **Wisconsin:** For law, see http://www.legis.state.wi.us/lc/jlc99/im99_6.pdf; for Wisconsin Department of Administration web site, see http://www.doa.state.wi.us/pagesubtext_detail.asp?linksubcatid=563&linkcatid=288&linkid=