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State Clean Energy Funds Support Utility-Scale Projects

With annual collections topping $500 million, they can become a major development driver.

BY MARK BOLINGER & RYAN WISER

Editor's note: *This article is based on a longer Lawrence Berkeley National Laboratory report, and summarizes the support that clean energy funds have provided to utility-scale renewable energy projects – and wind projects in particular – in recent years. The entire report can be found at: http://eetd.lbl.gov/ea/ems/cases/lbnl-56422.pdf.*

At least 14 states across the U.S. have established funds to promote the development and commercialization of renewable energy technologies. Most often financed by a small surcharge on retail electricity rates, these funds currently collect more than $500 million/year in aggregate in support of renewables. At this funding level, state clean energy funds are positioned to be a major driver of renewable energy development.

Though state clean energy funds have pursued a variety of approaches in the use of their funds, support for the deployment of utility-scale renewable energy projects – such as commercial wind, biomass and geothermal projects – has been a principal target of most funds.

Information presented has been compiled from a database of projects supported by funds that are members of the Clean Energy States Alliance (CESA). CESA is a nonprofit, membership-based, multi-state coalition consisting of most of the clean energy funds throughout the U.S. (specifically 18 funds in 14 states). More information on CESA is available at www.cleanenergystates.org.

The database contains information on all nonphotovoltaic, utility-scale (defined here as 1 MW or larger in nameplate capacity), new renewable energy projects (whether currently online or not) that have received (or been obligated) construction- or production-related financial support from CESA-member clean energy funds.

> *The rapid growth in new obligated capacity in the early years has slowed markedly since 2003.*

The database does not include projects that have received only predevelopment support, nor does it cover R&D or other nondeployment activities. In addition, several clean energy funds, including those in California and New York, now provide direct financial assistance to projects participating in each state's renewables portfolio standard (RPS) – the database does not include such RPS-related support.

The remainder of this article provides summary information compiled from the database as of March 2006.

Key findings

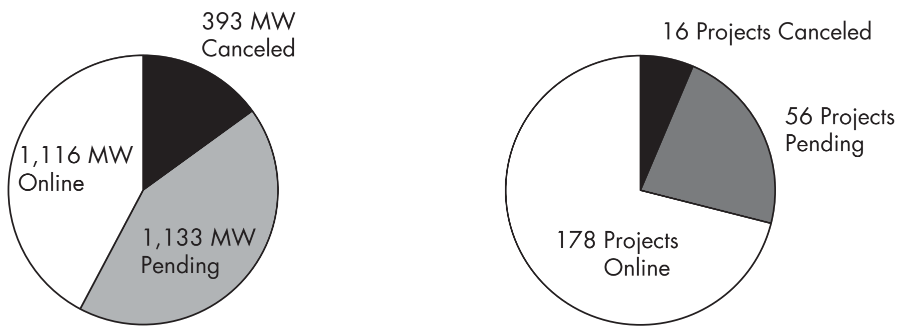
• State clean energy fund support for utility-scale renewable energy projects is significant.

Of the 14 states with CESA-member clean energy funds, eight have provided construction or operational support to utility-scale renewable energy projects.

As shown in Figure 1 and Table 1, since 1998, clean energy funds in these eight states have set aside or obligated more than $475 million in construction or operational support for 250 renewable energy projects totaling 2,642 MW. After accounting for cancellations – 16 projects totaling 393 MW have had their incentives canceled to date – and penalties due to missed milestones, the total amount of funding currently obligated stands at nearly $400 million. So far, 178 projects totaling 1,116

Fig. 1

Status of Renewable Projects and Capacity Supported



The status of renewable energy projects and the generation capacity they support are shown. Courtesy of Lawerence Berkeley National Laboratory

MW have been built, while 56 projects totaling 1,133 MW are still in the development pipeline.

• Wind energy is a major recipient of financial support.

Wind power clearly dominates the numbers in Table 1: 970 MW of obligated wind capacity are now online, and more than 900 MW are still pending. Wind has captured more than 60% of total funding to utility-scale renewable projects, and accounts for more than 80% of all obligated, online and pending capacity.

• California has been the biggest supporter of wind historically, but other states have been more active recently.

Table 2 breaks out support for utility-scale wind power by state. Among the eight states listed, California tends to dominate, accounting for nearly half of all capacity obligated funding, and roughly one-third of all dollars obligated.

This not only reflects the sheer size of California's renewable energy program, but also its early initiative: California's first auction of production incentives to utility-scale renewable energy projects occurred in June 1998 – roughly two years prior to similar activity in other states. By the same token, however, California has not encumbered new funding for such projects since 2001, and has also experienced difficulty in bringing funded projects online – 70% of all pending wind capacity is in California.

This lapse is due in part to the creation of the California RPS, under which the role of California's program that formerly targeted new utility-scale projects has changed to providing supplemental energy payments (SEPs) intended to cover the above-market cost of RPS contracts.

Meanwhile, much of the activity in other states has been more recent, and in some cases has resulted in greater success in bringing funded projects online. Minnesota, for example, has encouraged more than 90% of funded capacity to come online through the use of an attractive 10-year production incentive for wind projects 2 MW or less in size.

New York's high cancellation rate, on the other hand, reflects four projects totaling 267 MW that agreed to forfeit their incentives, as required, in order to participate in New York's RPS. One of these four projects has since received support under the state's RPS (as noted earlier, though, our database does not include this RPS-related support).

• The amount of wind power capacity supported by state funds continues to increase, though the growth rate has slowed markedly.

As shown in Figure 2, with the exception of 1999 and 2004, the amount of wind power capacity being supported by these eight states has risen each year. Likewise, the amount of obligated capacity that has come online has also risen, with proportionally larger increases in 2001, 2003 and 2005 – all years in which the federal production tax credit (PTC) was scheduled to expire, thereby encouraging completion of wind projects prior to year's end.

Even so, the rapid growth in new obligated capacity in the early years has slowed markedly since 2003, perhaps partly in response to the slower-than-expected pace of development among projects already obligated funding. The transition of California and New York toward supporting such projects through RPS policies has no doubt also played a role in slowing the growth of new obligated capacity.

• Development difficulties have been encountered.

It is apparent from Figure 2 that the amount of obligated wind capacity coming online has not kept pace with the amount of new wind capacity being obligated funds: the gap between the two currently stands at 1,238 MW, a level that has remained more or less constant since 2002 (again, as shown in Tables 1 and 2, 330 MW of this amount has been canceled or withdrawn – mostly in New York – leaving 908 MW still pending).

This is partly a reflection of unforeseen difficulties in the development process, such as permitting challenges, periodic lapses in the federal PTC, and difficulty securing a power purchase agreement (lack of power purchase agreements is a key reason why both California and New

How different incentive types interact with the PTC is an important consideration.

York have moved toward an RPS structure that relies in part upon state renewable energy funds).

On an aggregate basis, the length of the "development cycle" (i.e., the amount of time before a given amount of obligated wind capacity actually comes online) has, to date, been about five years on average – no doubt longer than most would have anticipated back in 1998.

• States are increasingly using new and innovative incentive structures to support wind projects.

The structure of state clean energy fund support for wind projects has evolved somewhat over time. In the late 1990s, production incentives and grants were the predominant form of support. While both are still regularly employed, a number of states have begun to expand their offerings to include debt financing, negotiated purchases of a

Support for Utility-Scale Wind Projects, by Resource Type (as of March 2006)

Resource Type	# of Projects	Obligated Funding ($)		Capacity (MW)			
		Original	Current	Original	Canceled	Pending	Online
Biomass	9	20,347,840	16,407,902	98.7	9.5	77.9	11.3
Digester Gas	3	4,108,210	4,108,210	6.0	0.0	6.0	0.0
Geothermal	4	80,331,618	80,331,618	156.9	0.0	97.9	59.0
Hydro	8	14,946,409	13,757,139	50.8	0.0	18.5	32.3
Landfill Gas	30	41,974,893	33,689,649	91.7	23.7	24.6	43.4
Waste Tire	1	7,232,413	0	30.0	30.0	0.0	0.0
Wind	195	306,247,300	249,241,580	2,208.2	330.1	908.4	969.7
Total	250	475,188,683	397,536,098	2,642.3	393.3	1,133.3	1,115.7

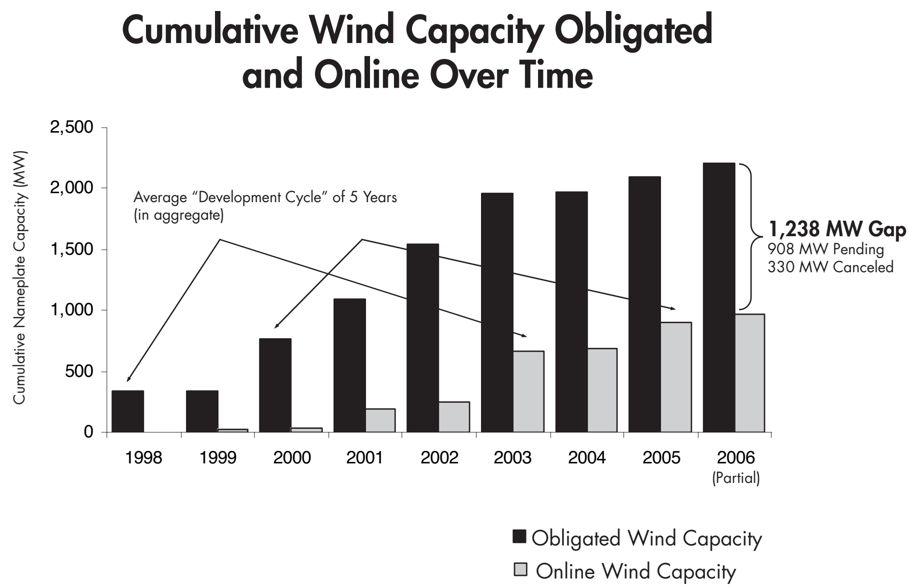
Table 1. The support for utility-scale renewable projects, by resource type, shows wind is far ahead of other energy sources. Courtesy of Lawerence Berkeley National Laboratory.

Support for Utility-Scale Wind Projects, by State (as of March 2006)

Project Location	# of Projects	Obligated Funding ($)		Capacity (MW)			
		Original	Current	Original	Canceled	Pending	Online
CA	25	113,567,613	80,611,894	976.9	3.0	634.6	339.3
IL	5	8,425,000	8,425,000	112.5	0.0	6.0	106.5
MA*	2	27,183,142	27,183,142	45.0	0.0	45.0	0.0
MN	143	97,279,545	97,279,545	234.6	0.0	18.3	216.3
NJ	2	6,600,000	3,500,000	28.5	21.0	0.0	7.5
NY	6	22,100,000	7,000,000	308.1	266.5	0.0	41.6
OR	2	3,800,000	3,800,000	116.0	0.0	0.0	116.0
PA	10	27,292,000	21,442,000	386.6	39.6	204.5	142.5
Total	195	306,247,300	249,241,581	2,208.2	330.1	908.4	969.7

Table 2. The support for utility-scale wind projects by state is illustrated. Courtesy of Lawerence Berkeley National Laboratory.

Fig. 2



The cumulative wind capacity obligated and online over time shows a steady, upward trend. Courtesy of Lawrence Berkeley National Laboratory.

project's renewable energy credits (RECs) and "insurance" products that mitigate the project's price risk in the absence of a long-term power purchase agreement.

Figure 3 shows the prevalence of each type of incentive employed, based on the percentage of total dollars currently obligated (i.e., ignoring canceled projects). Real-time production incentives account for 74% of all dollars obligated to wind projects. Another 6% involves a variation on real-time production incentives, in which, instead of paying out funding over time, funding is provided in a lump sum at the start of commercial operations and then earned by the project over time through electricity production or delivery of RECs (the lump sum is secured by a letter credit, which is drawn down as the project produces power).

Such an incentive provides similar value to the project as an up-front grant, without negatively impacting the project's ability to capture the federal PTC. Various forms of long-term REC purchase and price insurance products (e.g., put options and price collars) account for 11% of all dollars obligated.

Meanwhile, a few states have provided debt financing equal to about 4% of all dollars obligated, and traditional grants make up the remaining 6%.

• Support is predominantly production-based, rewarding electricity generation rather than project construction.

In aggregate, incentives that are based on actual production make up 91% of all dollars obligated (i.e., 74% real-time production payments plus 6% advance production payments, or REC purchases plus 11% REC price insurance, or ongoing REC purchase commitments). More so than grants, such production-based incentives align the interests of project developers, state funds and society in building or supporting projects that efficiently produce the maximum amount of clean, renewable energy.

Just as importantly, unlike grants, production-based incentives are unlikely to trigger the anti-double-dipping provisions of the federal PTC contained in Section 45 of the U.S. tax code. How different incentive types interact with the PTC is an important consideration, given the PTC's potential value to a wind project.

• Normalized incentive levels vary based on a number of factors.

Figure 4 shows the normalized (five-year production incentive equivalent) range of state clean energy fund support for wind power (ignoring canceled projects). The wide range of incentive levels in Minnesota and Illinois reflects support for smaller "community wind" projects, a few of which have been funded quite generously, perhaps justified by the disproportional impact of transaction costs and diseconomies of scale that small projects must sometimes overcome.

In all cases, however, the capacity-weighted average normalized incentive falls close to the low end of the range, implying that there is not much capacity at the high end of the range.

Although sample size (in terms of both the number of projects and capacity involved) is small, New Jersey and Massachusetts have offered some of the highest incentives to wind projects. This is perhaps reflective of difficulties that developers have had in siting and permitting wind projects in both states.

Oregon and Pennsylvania, meanwhile, have each provided incentives that were ultimately not needed or used by the project (which explains the $0/MWh minimum incentive level in both states), though the mere existence of the offer of financial support was reportedly important to the project's success in both cases.

Though in some states, such as Massachusetts, the primary objective of awarding an incentive is to enable a project to secure financing in the absence of a long-term power purchase agreement (PPA), one can also think about these incentives in terms of the impact they can have on either long-term PPA prices or equity returns.

As revealed by a financial pro forma model, a five-year production payment of $20/MWh – roughly the weighted-average level awarded in Massachusetts, Minnesota and New York – can either boost the after-tax equity internal rate of return by about 140 basis points on an unlever-

Fig. 3

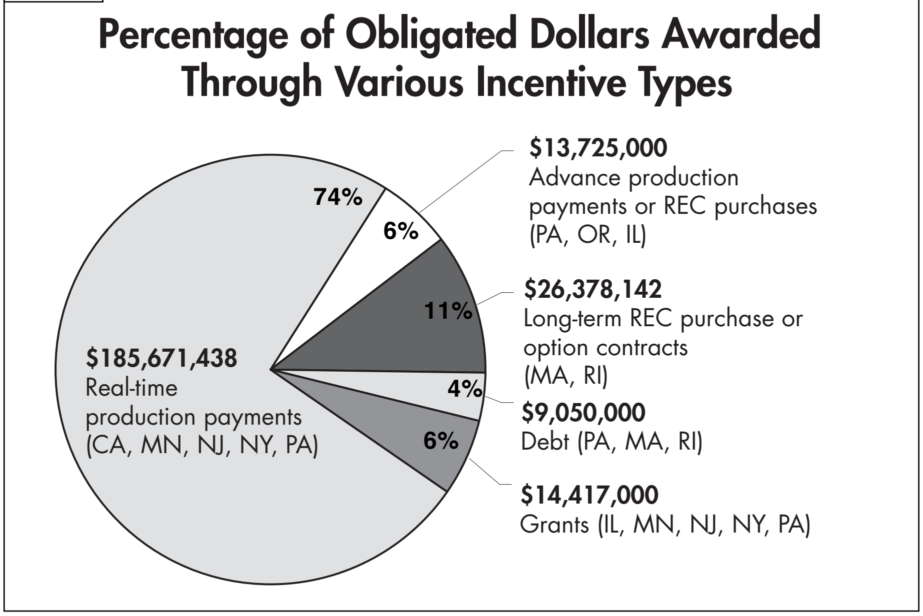


Fig. 4

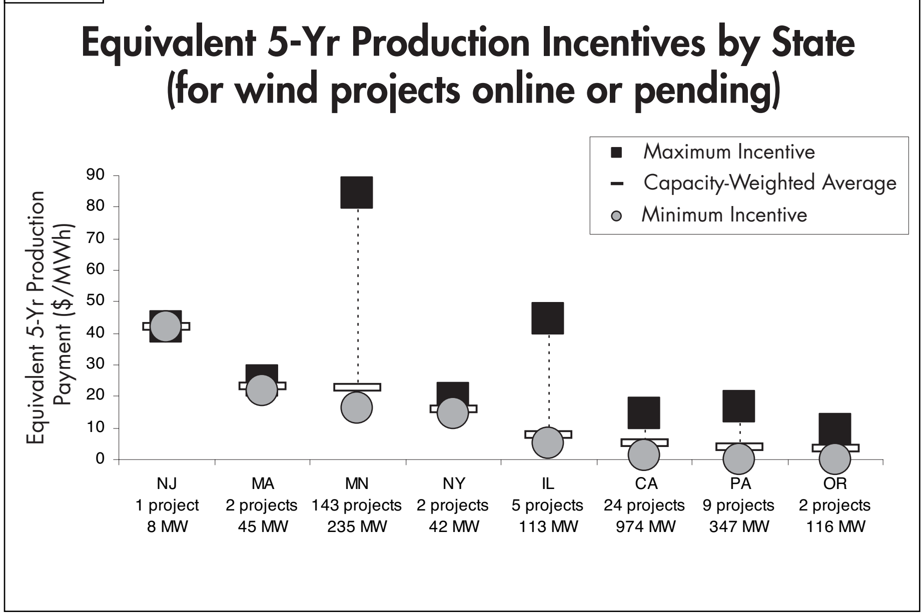


Figure 3. Nearly three-fourths of obligated dollars awarded through various incentive types are for real-time production payments. Courtesy of Lawrence Berkeley National Laboratory. Figure 4. The equivalent five-year production incentives by state for wind projects online or pending are shown. Courtesy of Lawrence Berkeley National Laboratory.

aged basis, or alternatively can reduce a 20-year PPA price by about $9/MWh on a levelized basis (or some combination of the two).

Clearly, these are significant impacts (though half the states shown in Figure 4 have not provided incentives as high as $20/MWh).

State clean energy fund support for utility-scale renewables has often been relegated to "neglected stepchild" status in comparison to more-widely heralded state RPS policies. Though it is likely that RPS policies will be much more significant than clean energy funds in driving this market segment in the future, CESA-member state clean energy funds have nevertheless committed a substantial amount of funding in support of utility-scale (> 1 MW) wind power projects to date.

This funding, currently almost $250 million, is already supporting 970 MW of new wind capacity, and could eventually support up to 1,878 MW – 908 MW of obligated capacity still remains in the development pipeline.

Furthermore, state clean energy fund support for such projects has, for the most part, been anything but staid. State funds have been experimenting with increasingly innovative financial incentives, ranging from advance production payments provided up-front but earned over time, to various forms of debt financing, to options and other forms of price insurance on a project's RECs.

In some cases, these financial instruments have been designed to address fundamental shortcomings of state RPS policies (e.g., lack of long-term PPAs). In this way, many state clean energy funds have grown over time into what seems to be an appropriate and important role when it comes to supporting utility-scale renewables: serving as a valuable complement to the state RPS policies that are more likely to dominate this market in the future. NWP

The mere existence of the offer of financial support was reportedly important to the project's success.

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