



# State Clean Energy Fund Support for Renewable Energy Projects

## Key Findings from the 2009 CESA National Database

Project Deployment Results from State Renewable Energy Program Activities:  
2009 Annual and 1998–2009 Cumulative Results

WINTER 2011



Prepared by Clean Energy States Alliance  
and Peregrine Energy Group



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## Introduction

Clean Energy States Alliance (CESA) is a national nonprofit organization of public clean energy funds and programs that have banded together to invest in and promote clean energy and low-carbon technologies in their states and, collectively, across the country.

The effect of state clean energy funds continues to grow dramatically. Recent years have seen more projects deployed than ever before due to the financial support of state funding—projects that have leveraged almost \$10 billion in additional funding from outside sources.

This third annual report summarizes key findings from the CESA national database of state-fund-supported renewable energy projects. The database reports on more than 70,000 projects that have been installed and commenced operation with state fund support. The findings span state program efforts across the country and cover the full range of renewable energy technologies, including wind, solar, biomass, geothermal, and small hydroelectric.

## Methodology

CESA and its contractor, Peregrine Energy Group, collected data for over 70,000 clean energy projects from the following 16 CESA member states:

- **AK:** Alaska Energy Authority
- **AZ:** Arizona Commerce Commission; Arizona Public Service
- **CA:** California Public Utilities Commission; California Energy Commission
- **CT:** Connecticut Clean Energy Fund
- **DC:** District of Columbia Dept. of the Environment - Energy Office
- **IL:** Illinois Dept. of Commerce and Economic Activity
- **MA:** Massachusetts Clean Energy Center
- **MD:** Maryland Energy Administration
- **MN:** Minnesota Office of Energy Security; Xcel Energy
- **NJ:** New Jersey Clean Energy Program
- **NM:** New Mexico Energy, Minerals, and Natural Resources Dept.

- **NY:** New York State Energy Research and Development Authority
- **OH:** Ohio Energy Office
- **OR:** Energy Trust of Oregon
- **VT:** Clean Energy Development Fund
- **WI:** Focus on Energy

The data collected include the following:

- Technology type
- Completion/Approval date
- Capacity (for electric projects)
- Annual energy production (for electric projects)
- Location
- Incentive amount
- Total cost

Once collected, the data were standardized and incorporated into a single database to enable analysis and reporting.

## Key Findings

### 1. 2009 saw the greatest number of clean energy projects installed in a single year.

In 2009, state clean energy funds supported the installation of 19,425 clean energy projects. This represents a 37% increase over the number of projects installed in 2008. The 2009 installations bring the total number of projects supported by the funds to 74,908 for the years 1998 through 2009. These project total nearly 3,000 MW of electric generating capacity.

FIGURE 1 Projects Installed by Year

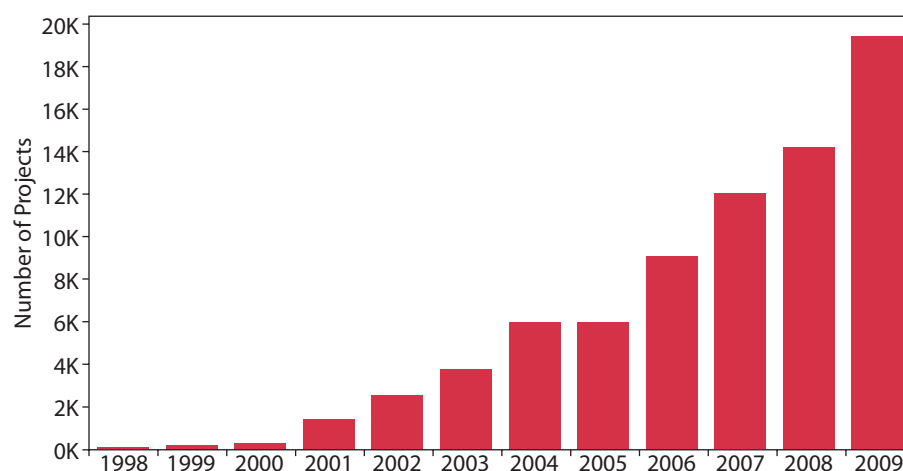
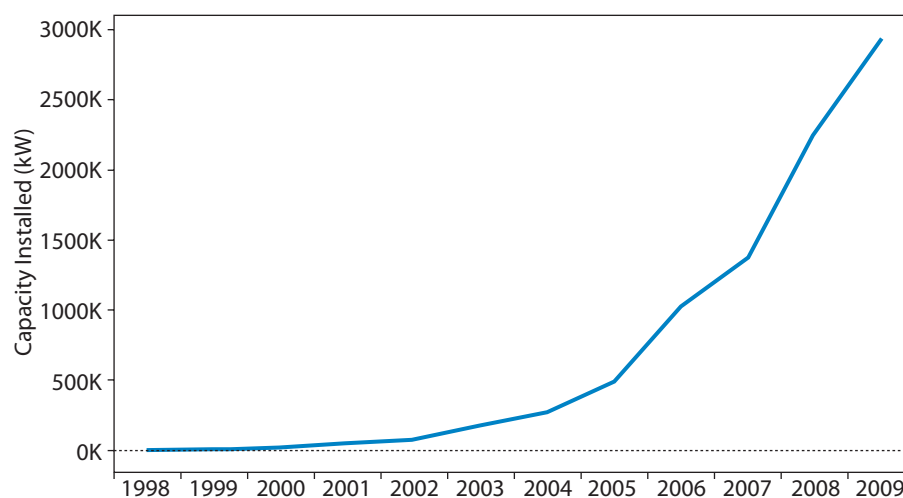
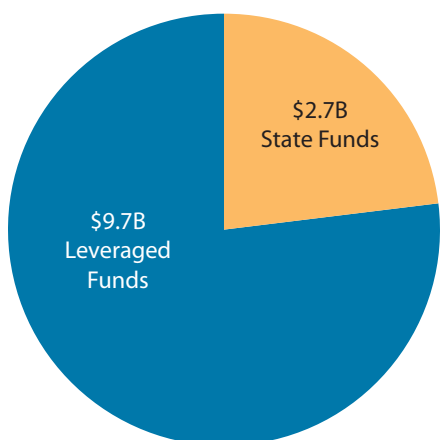


FIGURE 2 Cumulative Capacity Installed



**FIGURE 3 Program Funds and Leveraged Funds from 1998–2009**



**2. From 1998 through 2009, states invested \$2.7 billion in renewable energy projects and leveraged an additional \$9.7 billion.**

For every \$1 invested by states, outside sources provided \$3.6 of additional capital. As a result, the funds' \$2.7 billion investment in renewable energy projects has leveraged approximately \$9.7 billion, bringing the total investment to \$12.4 billion during the years 1998 through 2009.

**3. Projects supported by CESA-member state funds are avoiding significant CO2 emissions.**

The projects installed in 2009 will generate 1.4 million MWh of electricity annually and avoid more than half a million tons of CO<sub>2</sub>. This is equivalent to taking 93,000 cars off the road. Since 1998, state funds have supported the installation of almost 3 gigawatts of clean energy generation capacity. Each year, these projects generate 8.3 GWh of energy and avoid 3.6 million tons of CO<sub>2</sub>, the equivalent of taking about 600,000 cars off the road.

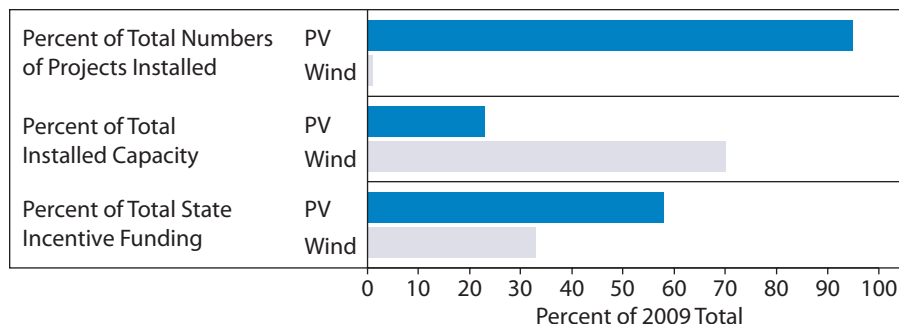
**4. Continuing the trend from past years, PV dominates in number of projects funded per year while wind projects generate the majority of installed capacity.**

Wind and PV projects dwarf all other technologies in terms of generation

**TABLE 1 Projects, capacity, and investments by technology in 2009**

Technology	Number of Projects	Electric Capacity (kW)	State Incentive Amount
Biomass	28	12,151	12,083,010
Fuel Cell	14	8,110	20,240,050
Geothermal	228	N/A (thermal output)	577,250
Hydro	10	25,131	9,664,134
Landfill Gas	1	1,180	344,125
PV	18,485	157,456	318,556,947
Solar Thermal	446	N/A (thermal output)	2,325,471
Wind	213	474,706	182,784,716
<b>Total:</b>	<b>19,425</b>	<b>678,734</b>	<b>\$546,575,704</b>

**FIGURE 4 PV and Wind Projects as Percentage of Totals in 2009**



capacity and total incentive funding per year. However, although PV projects comprise the majority of projects installed per year, the total capacity of PV projects is less than that of wind projects. This is because the majority of PV projects are small scale, while several very large capacity wind projects have been installed each year. For example, from 2006–2009, over ten installed wind projects supported by state funding had capacities greater than 90 MW while the largest PV project was 7 MW.

**5. The average project capacity dropped in 2009 because of the absence of several very large wind projects.**

While the number of projects installed increased greatly in 2009, the average project capacity dropped slightly from 2008 because that year saw the installation of several very large wind projects

with capacities greater than 40 MW. The projects installed in 2009 totaled 679 megawatts of capacity whereas in 2008 they totaled 833 megawatts.

**6. In PV, 2009 saw a decrease in the installation of larger projects and an increase in the rate of residential project installation relative to non-residential project installation.**

As shown in Figure 5, the number of non-residential PV projects completed per year has remained steady at about 500 each year since 2005. In contrast, the number of installed residential PV projects has been steadily increasing, with a sharp increase from 2008–2009. The average project capacity has stayed constant for residential PV projects at around 5.4 kW while that for non-residential PV rose in 2008 but decreased in 2009.

**7. Despite economic conditions, state incentive funding of clean energy projects remained fairly constant from 2008 to 2009.**

The total amount of state incentives for clean energy projects remained fairly constant from 2008 to 2009 despite economic conditions. PV projects received the largest share of incentives, followed by wind projects.

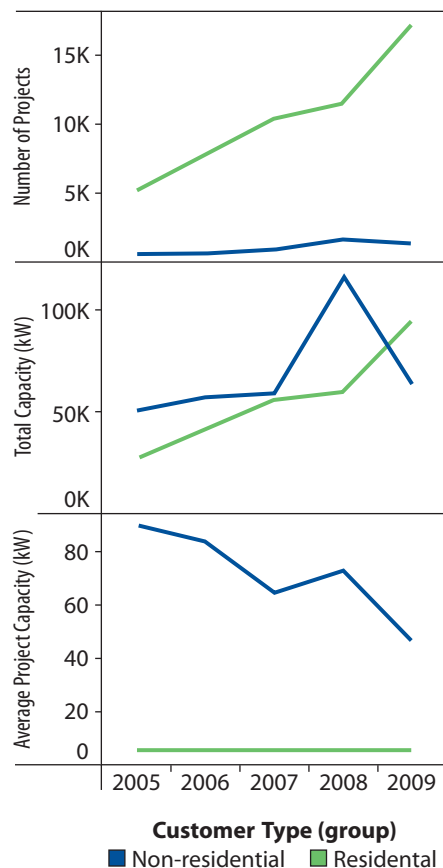
**8. Consistent with past years, the incentive amount per kW of capacity and annual MWh generation is highest for PV and fuel cells.**

The level of state funding that was provided to clean energy projects in 2009 varied significantly by technology, as the charts of incentive dollar per kW capacity and of incentive dollar per MWh annual generation (assuming a 15 year useful life) show. Wind and landfill gas technologies are near commercial in

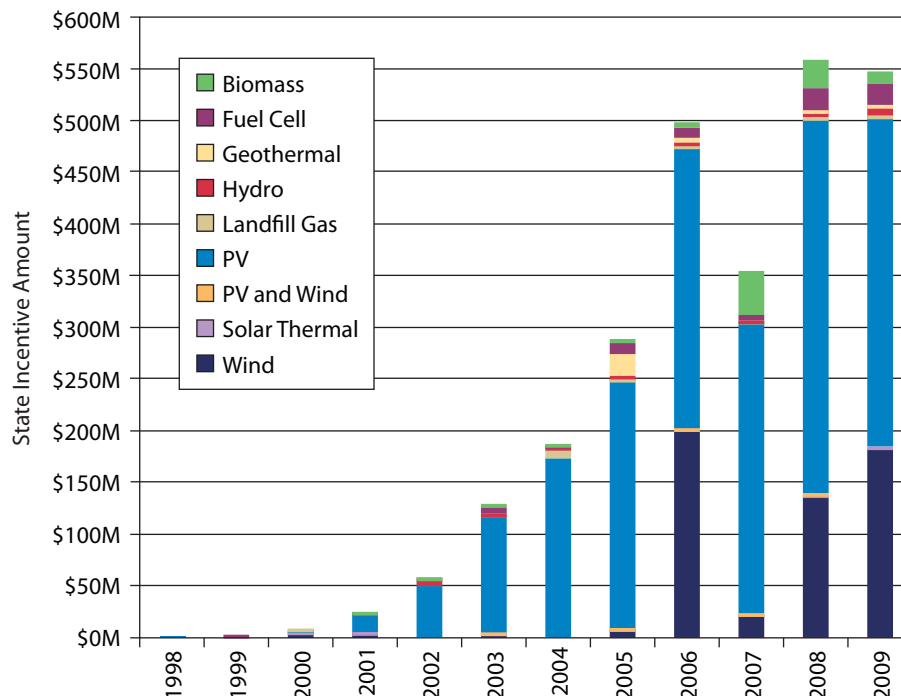
their ability to generate revenue and so require relatively little support from state funds. In contrast, PV and fuel cell technologies are further from being commercial, meaning a significant gap

exists between the project costs and the length of time for a system owner to earn a financial payback. Accordingly, these technologies require greater levels of support from state funds.

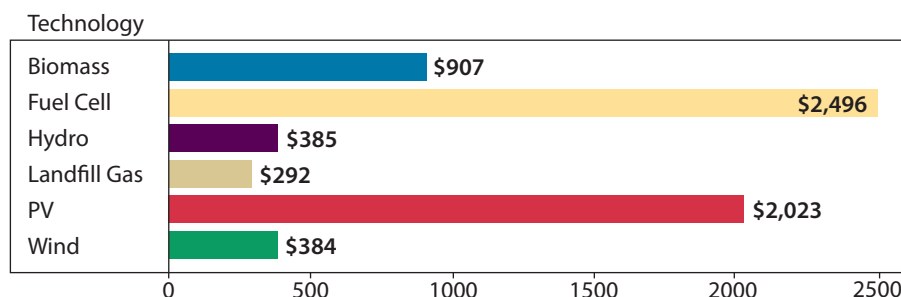
**FIGURE 5 Trends for PV Projects, 2005–2009**



**FIGURE 6 State Incentive Amounts Awarded**



**FIGURE 7 Incentive Amount per Capacity (kW) for 2009 Projects**



**FIGURE 8 Incentive Amount per Generation (MWh over 15-year period) for 2009**

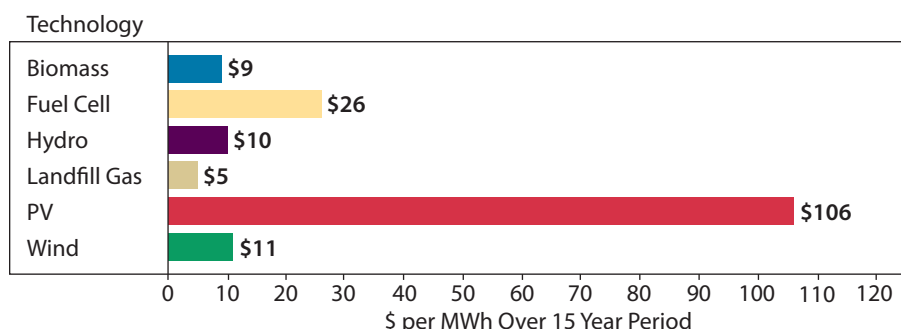
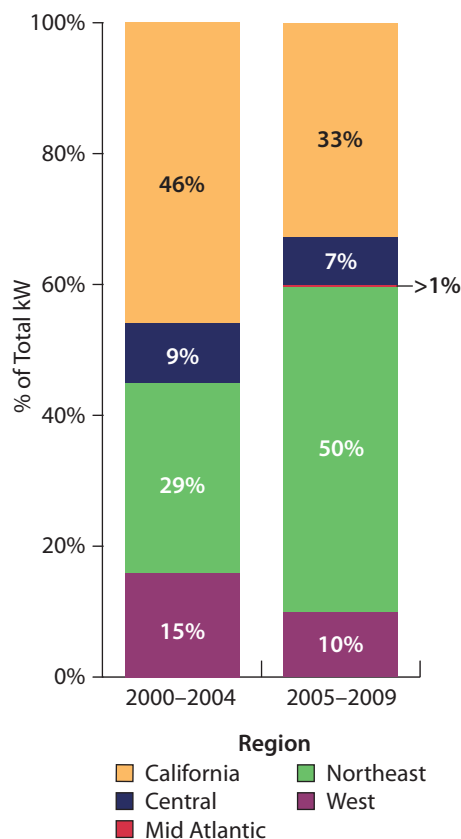


FIGURE 9 **Generating Capacity of Installed Projects by Region**



\*\*West region states include AK, AZ, NM, and OR.  
 Northeast states include CT, MA, NJ, NY, and VT.  
 Mid-Atlantic states include DC and MD. Central  
 states include IL, MN, OH, and WI.

**9. State fund support for renewable energy continues to be distributed throughout the nation, with significant growth particularly in the Northeast.**

The share of state-funded renewable capacity distributed geographically throughout the United States continues increasing, particularly as states in the Northeast invest heavily in clean energy. Figure 5 shows that while from 2000–2004 the majority of state-funded renewable energy capacity was installed in California, from 2005–2009 the majority was installed in the Northeast.

**10. 2009 saw a large increase in the number of state-funded residential geothermal projects.**

States are extending their support to other technologies besides PV and Wind. Specifically, state-funded residential geothermal projects saw a large increase in 2009, growing from under 10 projects in 2008 to over 220 projects in 2009. These projects were all installed in the Mid Atlantic region.

**Conclusions**

Despite the economic climate, states have continued significant funding of clean energy projects, and these funds have had a measurable impact on project deployment. Together, the states included in CESA's database have funded over 70,000 clean energy projects with a total generating capacity of 3 gigawatts in the last 12 years. They have invested \$2.7 billion and leveraged an additional \$9.7 billion. Over the past decade, clean energy funding has become a national effort, as state-funded projects have become more evenly dispersed throughout the nation rather than being concentrated in one region. Continued tracking of state efforts to drive the development of renewable energy will hold important lessons at the national and local levels for addressing the complex energy challenges faced by all parts of the country.



**About Clean Energy States Alliance**

Clean Energy States Alliance (CESA) is a national nonprofit organization that works with clean energy funds and state agencies to expand the nation's clean energy infrastructure and advance markets for clean energy technologies. CESA provides information and technical services to its members and shares its knowledge with the federal government and influential policymakers. CESA's member states manage programs that will invest nearly \$6 billion in the next ten years to support clean energy. CESA is managed by Clean Energy Group.



**About Peregrine Energy Group**

This report was prepared for CESA and Clean Energy Group by the Peregrine Energy Group, an energy consulting firm based in Boston, Massachusetts. Founded in 1992, Peregrine provides strategic and technical services to private and public organizations on a broad range of energy supply and demand issues. Services include strategic planning and policy development; project management; market research; regulatory analysis and advocacy; energy program design and administration; and energy information management and performance benchmarking.

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