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# New England Solar Cost-Reduction Partnership

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## A Progress Report

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CleanEnergy States Alliance

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The U.S. Department of Energy SunShot Initiative is a collaborative national effort that aggressively drives innovation to make solar energy fully cost-competitive with traditional energy sources before the end of the decade. Through SunShot, DOE supports efforts by private companies, academia, and national laboratories to drive down the cost of solar electricity to $0.06 per kilowatt-hour. Learn more at http://www.energy.gov/sunshot.

This report was prepared by the Clean Energy States Alliance (CESA) on behalf of the New England Solar Cost-Reduction Partnership, a project under the U.S. Department of Energy SunShot Initiative Rooftop Solar Challenge II program to reduce the costs of solar deployment across five New England states. The New England Solar Cost-Reduction Partnership is working to build a robust regional solar market by targeting non-hardware "soft" costs for photovoltaic (PV) electricity systems and increasing coordination across Connecticut, Massachusetts, New Hampshire, Rhode Island, and Vermont. In addition to its managing partner, CESA, the Partnership consists of the following agencies:

- Connecticut's Clean Energy Finance and Investment Authority (CEFIA)
- Massachusetts Department of Energy Resources (MA DOER) and the Massachusetts Clean Energy Center (MassCEC)
- New Hampshire Office of Energy and Planning (NH OEP)
- Rhode Island Office of Energy Resources (RI OER) and Commerce Rhode Island (Commerce RI)
- Vermont Public Service Department (VT PSD)

CESA thanks these agencies and their staff for their help in preparing this report and for their continued, steadfast efforts on this project. To learn more about Rooftop Solar Challenge II, see http://www.eere.energy.gov/solarchallenge/.

# New England Solar Cost-Reduction Partnership


## Summary

This report provides background on the New England Solar Cost-Reduction Partnership, some of the lessons and best practices that have been gleaned from the project to date, areas where participating states are focusing their soft-cost reduction efforts moving forward, and steps stakeholders can take to help advance the Partnership's goals.

## Background

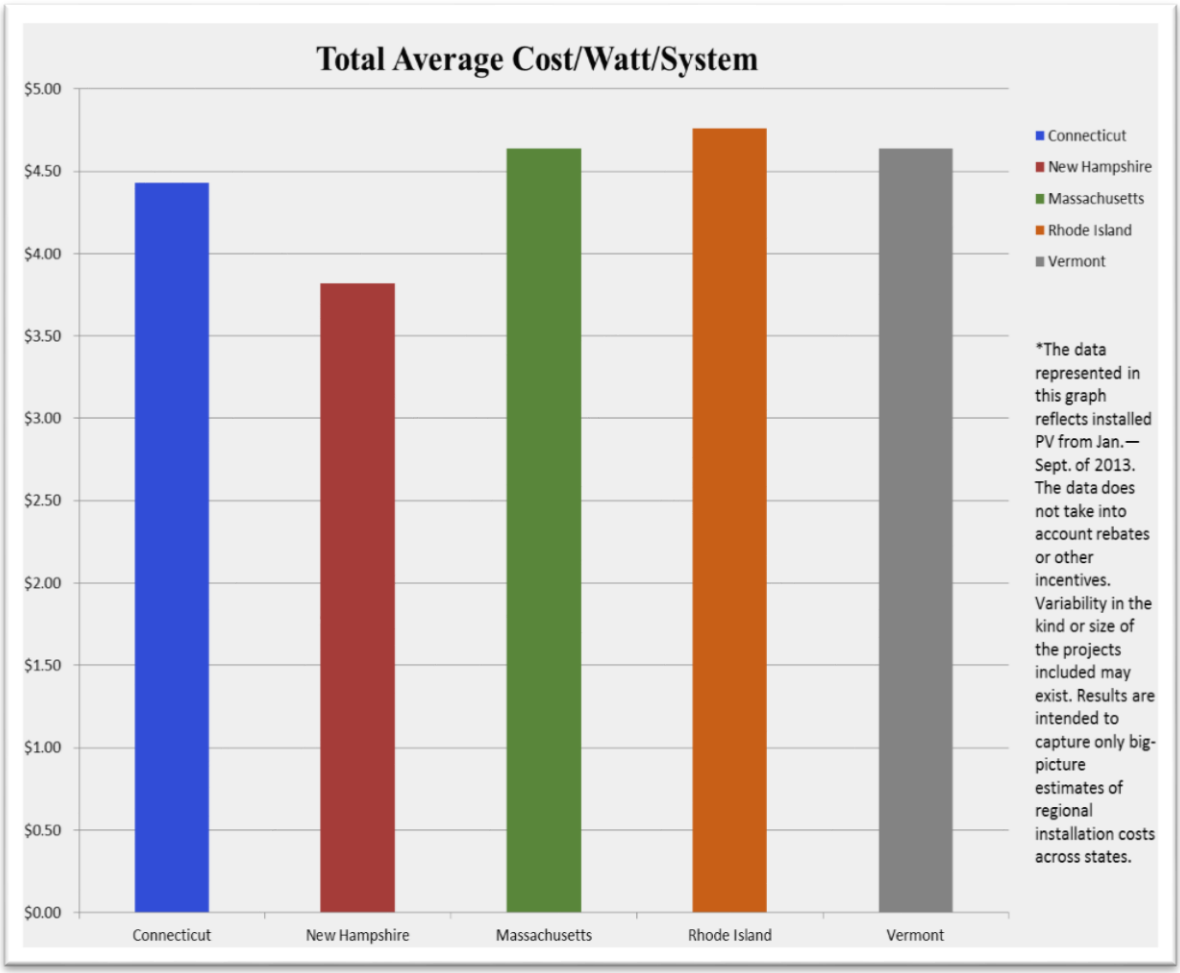
New England states have shown a strong commitment to reducing the cost of solar PV. Through the U.S. Department of Energy SunShot Rooftop Solar Challenge I, Connecticut and Massachusetts undertook measures that have produced verifiable state-wide PV cost reductions. Other New England states have implemented PV cost-reduction programs and innovations as well. But inefficiencies and inconsistencies in solar rules and procedures persist and continue to present barriers to more widespread rooftop PV deployment. To help drive down solar soft costs and enable scaled deployment of rooftop solar, five New England states—Connecticut, Massachusetts, New Hampshire, Rhode Island, and Vermont—with support and coordination from CESA, have forged the New England Solar Cost-Reduction Partnership. The Partnership is tackling a wide range of barriers to PV deployment, including: difficult, costly, and slow permitting and interconnection processes in some locations; the need for new financing tools and cost-efficient group purchasing arrangements; and unfavorable zoning rules for solar in some jurisdictions.

The Partnership is reducing solar soft costs by pursuing four broad objectives:

1. Increase coordination among participating states and with key stakeholders in those states.

2. Refine, combine, and deploy innovative tools and practices from Connecticut and Massachusetts Rooftop Solar Challenge I projects, and from other earlier efforts in those states and Vermont.
3. Implement other best practices more widely across the region, with a particular focus on achieving more consistent policies and practices across state lines.
4. Communicate lessons learned and best practices beyond New England.

As part of our initial work, we collected and collated information to better understand the regional solar landscape. We surveyed participating states' solar policies and programs, and made the results available at www.cesa.org/projects/states-advancing-solar/solar-resource-library/resource/summary-table-of-new-england-solar-policies-and-programs. The Partnership also analyzed solar installation cost data from the New England region to help us ascertain regional solar pre-project cost baselines. The graph below shows the average dollars per watt per system of January to September 2013 installations from across participating states.



As the graph above illustrates, while some solar installation cost variability exists, average dollars per watt per system varied by less than one dollar among the states. For a fuller analysis of 2013 solar installation cost data from across the participating states, email nate@cleanegroup.org.

At the outset of the project, the Partnership held a regional meeting for solar industry representatives to provide information about the project and to hear ideas for actions states could take to reduce solar soft costs. At the meeting, CESA shared information about Rooftop Solar Challenge II and the Partnership project. Participating states provided information about their respective focus areas and work plans. Solar industry representatives and other attendees discussed potential soft-cost focus areas for the Partnership to explore. Among the important ideas that emerged, solar industry representatives noted uncertainty about the eligibility of community solar participants for the federal residential solar tax credit, an issue which the Partnership has subsequently been working to address.

## Achievements, Best Practices, and Lessons Learned

While the Partnership has been actively working in this project for under a year, already we have made significant progress. Below are some of the areas where the Partnership has been engaged.

### Community Shared Solar

Several participating states have group net metering legislation in place. Group net metering allows utility customers to share the electricity output from a single power project, typically in proportion to their ownership of the shared system. This enables people who might not otherwise be able to adopt solar on their own—perhaps because of their status as renters, or because of high upfront costs or unsuitable siting conditions—to participate in a community shared solar project. In this way, community shared solar expands the solar market. But community shared solar can also help reduce solar soft costs by leveraging economies of scale. By participating in community shared solar arrangements, participants can lower certain solar balance-of-system costs (e.g., customer acquisition expenses).

The Partnership is taking important steps to make community shared solar more accessible. Massachusetts is working with three of its municipalities on community shared solar-related projects:

- The City of Boston is conducting a feasibility study for community shared solar on its public buildings.
- The City of Cambridge is pursuing a solar guide for condominium associations. This guide will present information on how Massachusetts condominium associations or members of condominium associations can go solar. One of the topics the guide will address is potential community shared solar arrangements for condominium associations.
- The Town of Winchester is conducting a feasibility analysis for a prospective community shared solar project to be sited on a building owned by a local, non-profit organization.

CESA is working with stakeholders in Massachusetts and Vermont to explore the possibility of petitioning the Internal Revenue Service for additional guidance on the circumstances in which community shared solar participants are eligible for the federal residential solar tax credit (IRC § 25D).

## Financing

Participating states are exploring solar-friendly financing arrangements to encourage solar deployment by reducing the financial barrier of up-front installation costs. Such programs can provide favorable terms for homeowners to spread out the PV systems' costs over time.

Through Rooftop Solar Challenge I, Connecticut made substantial progress in developing innovative financing programs, including the Connecticut Solar Loan, the Connecticut Solar Lease II, and a commercial Property Assessed Clean Energy (PACE) program. Connecticut is exploring residential PACE financing as well. The Rhode Island General Assembly passed PACE enabling legislation. The Rhode Island Office of Energy Resources is currently drafting PACE implementing regulations. Massachusetts is developing a residential solar loan program to provide homeowners, including those with low credit scores, access to cash-flow positive loans. Vermont is exploring creating credit enhancements for developers and electricity off-takers to encourage lenders to provide debt for community shared solar projects in the state. CESA has also begun researching available third-party financing options for homeowners who want to go solar. This fall, CESA will produce a guide for homeowners on solar leases, loans and power purchase agreements.

## Interconnection

Each state regulates the process by which a solar electricity generator can connect to a distribution grid by establishing interconnection standards. Many states have established special grid interconnection requirements for PV systems that have been approved by state public utility commissions.

Through Rooftop Solar Challenge II, participating states are working with their utilities to streamline interconnection standards for small-scale residential PV systems. Each participating state has worked with its utilities to identify specific steps the utilities can take to improve interconnection processes.

Vermont has an expedited solar registration and interconnection approval process for PV systems sized 15 kW or less. Under Vermont's process, the authority to issue permits for PV installations is centralized through the Vermont Public Service Board. After submittal of a small-scale PV registration application, the local utility has ten days to object to the permit issuance. If the utility does not object, a permit, known as a Certificate of Public Good, is automatically deemed issued to the applicant on the eleventh day. Other participating states have learned about Vermont's small-scale solar registration and interconnection approval process.

## Permitting and E-Permitting

Municipalities in Connecticut, Massachusetts, New Hampshire, and Rhode Island are responsible for providing permitting requirements for new solar system installations. While many residential solar systems share similar design characteristics, local permitting requirements vary and can be unnecessarily complex, costly, and slow. Some of our participating states have produced or are working on permitting guides or other advisory support to local jurisdictions to help them simplify and streamline their residential solar permitting requirements. For example, under Rooftop Solar Challenge I, Massachusetts released a Recommended Model Permitting Processes document, which the state will be updating in the coming weeks under Rooftop Solar Challenge

II. Connecticut recently released a Connecticut Rooftop Solar PV Permitting Guide and has been conducting outreach to its municipalities to encourage municipal adoption.[1] New Hampshire and Rhode Island have both compiled information about their states' municipal permitting practices and will be creating model permitting guides of their own.

Another way to streamline PV permitting processes is through online permitting, or e-permitting. E-permitting can speed up transaction times and limit bureaucratic redundancies. Rhode Island is moving toward e-permitting for its municipalities. The Rhode Island Department of Administration released an e-permitting Request for Proposals in February of 2014 and is currently in the process of selecting a vendor to implement e-permitting for all Rhode Island state-owned buildings. The selected vendor will also make e-permitting available to all Rhode Island municipalities on a voluntary basis. Over a dozen municipalities in Connecticut are using ViewPermit, an enterprise-level customized permitting platform, for their entire municipal e-permitting needs. SimplyCivic, a Rooftop Solar Challenge II partner, has developed an online permitting software system available to Connecticut municipalities to pilot for free through 2014. Several Connecticut municipalities are exploring using SimplyCivic for e-permitting. Several Massachusetts municipalities will receive SimplyCivic demonstrations this year as well.

## Structural Review

Many municipal building departments in New England require a Professional Engineer to review and provide stamped drawings for solar PV applications before issuing permits for them. Such structural reviews can be costly and time consuming. In some cases, these reviews are necessary. But, for some residential solar applications when specific structural criteria are satisfied, it may be possible to streamline the process by waiving the full Professional Engineer review requirement without compromising structural reliability or system safety.

Several participating states have taken steps to make structural review guidance available to municipalities for small residential applications to limit the instances where a full Professional Engineer review is required. Under Rooftop Solar Challenge I, Massachusetts consulted with an engineering firm to create a prescriptive process for a structural approval of small PV systems when certain structural criteria are met. With consultation from another engineering firm, Connecticut recently released its own structural review worksheet to evaluate the integrity of a roof's framing for a proposed PV system. New Hampshire is exploring generating a PV structural review guidance of its own as well.

## Solarize

Solarize is a PV group purchasing program that aims to lower acquisition costs for residential PV installations by combining four components:

1. *Discount, Tiered Pricing:* Pre-negotiated group buying discounts increase as more people sign up within a target community (i.e., the more people who go solar under a Solarize campaign, the lower the price for everyone who participates in the community).

[1] Connecticut has made its PV permitting guide widely available to municipalities and other stakeholders and has conducted two webinars on its Rooftop Solar PV Permitting Guide. Recordings of these webinars can be view at https://ctcleanenergy.wistia.com/medias/47iub86ak7 and http://ctcleanenergy.wistia.com/medias/0eme2q21nb respectively.

2. *Community-Driven Outreach:* These methods may include social media campaigns, town meetings, and booths at community events.

3. *Competitively-Selected Installers:* Through a competitive bidding process, the targeted community selects an installer or installers to service the area throughout the duration of the Solarize campaign. This reduces installers' customer acquisition and screening costs and saves the consumer from the effort of shopping around for a reputable, price-competitive installer.

4. *Limited Time Offer:* Solarize campaigns are *limited time offers*. This motivates customers to act quickly, or risk missing the window of opportunity to install solar PV at a reduced rate.

Solarize cost savings result from coordinated education, promotion, and outreach effort provided by town volunteers, along with discounted, tiered pricing which takes advantage of economies of scale. These savings are passed along to homeowners who enroll in the program.

Both Connecticut and Massachusetts have robust Solarize programs, which started under Rooftop Solar Challenge I and have continued under Rooftop Solar Challenge II. Solarize in Connecticut and Massachusetts has been tremendously successful in increasing the rate of residential PV adoption by expanding the potential customer base,[2] speeding up solar deployment,[3] and driving down installation prices for consumers.[4] To date, Connecticut and Massachusetts have launched Solarize campaigns in a combined 80 municipalities and have collectively generated over 18,000 kW of total PV capacity.[5] Rhode Island will be piloting a Solarize program in three of its municipalities. In September, CESA will publish a Solarize Guidebook for state program managers seeking to establish Solarize programs in their states.

## Zoning

Generally, municipalities can regulate the installation of PV systems through their zoning authority. Municipalities can support residential PV generation by enacting solar-friendly zoning ordinances or bylaws which do not unreasonably restrict homeowners' ability to adopt solar.

Connecticut has included a model zoning ordinance and general zoning guidance in its Connecticut Rooftop Solar PV Permitting Guide. Connecticut has also integrated solar-friendly zoning into its Clean Energy Community program. Connecticut municipalities may receive Clean Energy Community points for amending their zoning regulations to make them significantly more flexible for and friendly towards solar PV.

Massachusetts has developed a model solar zoning bylaw and policy guidance. Massachusetts recently conducted a webinar on its model solar zoning bylaw to introduce the bylaw to the

[2] In Connecticut, for example, 20 percent of households who signed a contract for solar had never considered going solar before.
[3] In Massachusetts, for example, the number of small-scale solar projects has more than doubled in the vast majority of participating Solarize communities as a result of the program.
[4] In Connecticut, for example, Solarize has resulted in cost reductions of between 20%-30% for consumers.
[5] Because the time lag between homeowner contract signing and actual solar installation, some of electric capacity encapsulated in this number may have yet to be installed.

state's municipalities. Further outreach efforts by Massachusetts on its model solar zoning are currently underway.

Using the model solar zoning documents developed by Connecticut and Massachusetts, Rhode Island provided feedback on the City of Providence's proposed zoning ordinance to make Providence's zoning update significantly more solar friendly.

## State Focus Areas

Through our project, each participating state has identified at least two priority cost-reduction focus areas that it intends to work on and has developed a plan for advancing work in each of these areas. Below are participating states' priority focus areas and specific expected outcomes for each area.

### Connecticut

| Focus Area | Expected Outcomes |
|---|---|
| **Permitting** | Permitting Guide disseminated to 169 CT municipalities; At least 20 CT municipalities adopt model permit process and process improvement elements |
| **Permitting** | 50 demos of Simply Civic given to CT municipalities, at least 8 municipalities using an online platform for solar PV permit application submission |
| **Zoning** | Model zoning guidance distributed to municipalities as a resource, CEFIA will work with communities to implement solar-friendly zoning regulations |
| **Solarize** | Solarize implemented in at least 11 communities and 20% projected cost reduction in installed costs achieved |
| **Financing** | 75% of active local solar PV installers trained on financing products. Ratepayer contribution to installed costs reduced to 20% |
| **Interconnection** | United Illuminating and Connecticut Light and Power will release updated Interconnection Guidelines by the end of 2014 or early 2015 |

### Massachusetts

| Focus Area | Expected Outcomes |
|---|---|
| **Financing** | $30 million dollar solar loan program that engages local credit unions and banks across MA to provide solar loans for solar customers of varied income brackets |
| **Zoning** | Solar zoning bylaw and guidance documents/resources for towns to easily adopt for both ground mounted and roof mounted solar systems of all sizes |

| Focus Area | Expected Outcomes |
|---|---|
| **Solarize** | Increase market penetration and reduce costs in at least 10 MA communities, achieving a projected 20% reduction installed costs; thus far, 495 systems have been installed with a total capacity of 3,173 kW |
| **Permitting** | Easy to use, code and state compliant model permitting resources for building and electrical inspectors |

## New Hampshire

| Focus Area | Expected Outcomes |
|---|---|
| **Permitting & Zoning** | With outreach from OEP, NH municipalities will consider adopting model permitting and zoning processes informed by the model distributed to them under this grant. This will lead to at least (6) NH municipalities either adopting or preparing for presentation at Town Meeting model permitting and zoning during Budget Period 2. |
| **Interconnection** | 1. The state's largest utility will have taken steps toward interconnection process improvements and associated non-hardware cost reductions for solar energy in the state, including:<br>a. tracking interconnection timeline data and reporting to OEP<br>b. reviewing and considering FERC's proposed revisions to the Small Generator Interconnection Procedures, and reporting on the applicability to NH<br>2. Information on the interconnection process in NH will be provided on the OEP website |
| **Online Information Portal** | A centralized information source on solar PV, including permitting, zoning and the interconnection process in NH will be provided on the OEP website |

## Rhode Island

| Focus Area | Expected Outcomes |
|---|---|
| **Permitting** | A completed and published guide to electrical and building permits in RI by December 2014 |
| **e-Permitting** | By the end of 2015, all state building and electrical and most municipal building and electric permits should be issued by the state's online permitting platform |
| **Zoning** | Working in partnership with Statewide Planning, RI expects to have touched all or nearly all of its cities and towns as they update |

| Focus Area | Expected Outcomes |
|---|---|
| | their town plans by the end of 2016; RI is working to include model zoning ordinance language in the guidance provided to the cities and towns |
| **Solarize** | A Solarize program in RI with an added incentive for projects that face west or southwest; Get 100kW of southwest or west facing projects installed in targeted municipalities by summer 2015 |

### Vermont

| Focus Area | Expected Outcomes |
|---|---|
| **Interconnection** | Vermont will eliminate requirement that home owners have to show proof of insurance for small net metered PV and will increase registration process from 10kw to 15kW. |
| **Financing** | A loan product which allows Vermonters to finance the purchase of a portion of a community solar system |

## Publications & Other Resources

The following is a list of publications and other resources produced by the Partnership:

### Connecticut

- Connecticut Rooftop Solar PV Permitting Guide: www.energizect.com/sites/default/files/uploads/(1)%20CT%20Rooftop%20Solar%20PV%20Permitting%20Guide%20v1.0.pdf

- Webinar Recording: The Rooftop Solar PV Permitting Guide: https://ctcleanenergy.wistia.com/medias/47iub86ak7

- Webinar Recording: How Your Community Can Earn Clean Energy Communities Credit with Solar PV Permitting: http://ctcleanenergy.wistia.com/medias/0eme2q21nb

### Massachusetts

- Recommended Model Permitting Processes and Structural Review Guidance for Roftop Solar PV in Massachusetts: www.mass.gov/eea/docs/doer/renewables/solar/recommended-model-permitting.pdf

- Massachusetts Model Zoning for the Regulation of Solar Energy Systems: www.mass.gov/eea/docs/doer/green-communities/grant-program/model-solar-zoning.pdf

- Massachusetts Policy Guidance for Regulating Solar Energy Systems:

www.mass.gov/eea/docs/doer/green-communities/grant-program/model-solar-zoning-guidance.pdf

- Webinar Recording: Regulating Solar Energy Systems at the Local Level in Massachusetts: www.mass.gov/eea/docs/doer/green-communities/pubs-reports/sunshot-initiative-guidance-for-ma-municipalities.wmv

## CESA

- CESA Webinar Recording: Solar Mapping as Tools for Advancing Solar Energy: www.cleanenergystates.org/projects/states-advancing-solar/solar-resource-library/resource/cesa-webinar-recording-solar-maps-as-tools-for-advancing-solar-energy

- CESA Webinar Recording: Solarize Connecticut—Program Results and Secrets of Success: www.cleanenergystates.org/assets/Uploads/Solarize-CT-032814.wmv

- CESA Summary of New England States' Solar Policies and Programs: www.cleanenergystates.org/projects/states-advancing-solar/solar-resource-library/resource/summary-table-of-new-england-solar-policies-and-programs

- CESA Case Study: A Model of Collaborative Solar Purchasing—The Alameda County Regional Renewable Energy Procurement Project: http://www.cesa.org/assets/2014-Files/RREP-Case-Study

## Project Webpage

- www.cesa.org/projects/new-england-solar-cost-reduction-partnership/

## How Stakeholders Can Help

Municipalities, elected officials, solar advocates, and solar industry representatives can help the New England Solar Cost-Reduction Partnership's achieve its goals by encouraging policymakers to simplify, standardize, and streamline rules, policies, and practices related to solar deployment. The following is a list of specific actions stakeholders can do to help:

- Communicate with and provide feedback to state agencies that implement and administer solar programs.
- Attend webinars and share information about available solar resources and programs.
- Urge municipalities to adopt model solar permitting and zoning bylaws.
- Participate on your local energy committee.
- Disseminate information to solar customers about low-cost financing programs and options.
- Volunteer or participate in Solarize campaigns.
- Attend structural review, electrical inspection, and building inspector training sessions on structural review, electrical inspector, or building inspector trainings and informations sessions.

The New England Solar Cost-Reduction Partnership's efforts are ongoing. If you have any questions about rooftop Solar Challenge II or the New England Solar Cost-Reduction Partnership, contact Nate Hausman at the Clean Energy States Alliance by phone at (802)223-2554 x206 or by email at nate@cleanegroup.org.





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The Clean Energy States Alliance (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy. CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

CESA works with state leaders, federal agencies, industry representatives, and other stakeholders to develop and promote clean energy technologies and markets. It supports effective state and local policies, programs, and innovation in the clean energy sector, with emphasis on renewable energy, power generation, financing strategies, and economic development. CESA facilitates information sharing, provides technical assistance, coordinates multi-state collaborative projects, and communicates the positions and achievements of its members.

## www.cesa.org