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Recipient:	Northeast Energy Efficiency Partnerships (NEEP) 81 Hartwell Avenue Lexington, MA 02421
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PI:	Laura De Angelo Grants & Contracts Manager Phone: 781-860-9177, ext. 124 Fax: 781-860-9178 Email: ldeangelo@neep.org
Submitted by: (if other than PI)	Same as PI

DOE Project Team:	DOE Contracting Officer - Pamela Brodie, 720-356-1449, Pamela.Brodie@go.doe.gov DOE Project Officer - Steven Palmeri, 720-356-1741, Steve.Palmeri@go.doe.gov Project Engineer - N/A

Signature

April 30, 2018

Date

Project Objective:

With this grant, NEEP sought to accelerate the adoption of energy efficiency in the Northeast and Mid-Atlantic region through regional partnership projects that bring together leadership and staff from state and local government, utilities, industry, environmental and consumer groups, and other related interests to make efficiency visible and understood, reduce energy use in buildings, speed the adoption of high efficiency products, and advance knowledge and best practices. At the time of this grant, the NEEP region included the states of Maine, New Hampshire, Vermont, Massachusetts, New York, Connecticut, Rhode Island, Washington DC, Pennsylvania, Delaware, New Jersey, and Maryland.

Background:

NEEP collaborated with multiple Department of Energy (DOE) Energy Efficiency (EE) programs, including the Buildings Technologies Office (BTO), Office of Strategic Programs (OSP), Weatherization and Intergovernmental Program Office (WIP), and Advanced Manufacturing Office (AMO), to further energy efficiency efforts in the Northeast. Guided by joint DOE and NEEP objectives, NEEP over the five-year agreement period carried out the following major tasks:

Task 1: Building Technologies Office (BTO)

Task 1A: Building Energy Codes

Subtask 1A.1: Coordination and Outreach with National Collaborative
Subtask 1A.2: Technical Assistance for Building Energy Code Adoption
Subtask 1A.3: Compliance Technical Assistance

Task 1B: Support Commercial and Residential Policy Analysis

Subtask 1B.1: Building Energy Rating and Labeling
Subtask 1B.2: High Performance Commercial Buildings
Subtask 1B.3: Emerging Technologies

Task 1C: Clean Energy Workforce Development

Task 2: Office of Strategic Programs (OSP)

Task 2A: Regional EM&V Forum

Subtask 2A.1: Annually Update Steering & Project Committee member and co-chair assignments and contact lists

Subtask 2A.2: Hold Quarterly all-day Project Committee Meetings to manage EM&V Forum projects

Subtask 2A.3: Hold Quarterly Steering Committee meetings to set direction and adopt completed projects

Subtask 2A.4: Build understanding of EM&V best practices and Forum products for state public officials, policy makers, regulators, utilities, RTOs and EM&V practitioners through a range of outreach activities

Subtask 2A.5: Assist states to provide annual data to the Regional Energy Efficiency Database (REED)

Subtask 2A.6: Launch REED Database for public use, analysis and reference

Subtask 2A.7: Prepare and Publish Annual REED Database Summary Report

Subtask 2A.8: Maintain the EM&V Forum Public Library

Subtask 2A.9: Participate in and contribute to relevant national & regional processes

Subtask 2A.10: Discuss for adoption with the Project and Steering committees the Uniform Methods Project

Subtask 2A.11: Adopt the definitions and terms published in the SEE Action Model Energy Efficiency Impact Evaluation Guide

Special OSP Task funded by BTO: Certification Process for Energy Efficiency Evaluators

Task 3: Weatherization and Intergovernmental Programs Office (WIP)

Task 3A: Technical Assistance to States

Subtask 3A.1: Outreach, Training, and Technical Assistance for High Performance Public Buildings

- K-12 Schools
- Operations & Maintenance Best Practices
- NEEP's 2014 Northeast Energy Efficiency Summit

Subtask 3A.2: Outreach & Technical Assistance to State Policymakers to Accelerate Energy Efficiency

- Public Policy Technical Assistance to States
- Model State Evaluation Guidelines

Special WIP Task: Facilitating the Deployment of Energy Efficient Street and Outdoor Lighting

Special WIP Task: Supporting State and Local Governments in Energy Data Collection and Tracking Efforts for Strategic Energy Management

Special WIP Task: Deploying WIP/Better Buildings/SEE Action Resources, Tools, and Solutions that Support the Adoption of Energy Policies, Programs, and Technologies that will Advance Energy Efficiency in State and Local Communities

Special WIP Task: Enable More State and Local Governments to Lead by Example by Providing Tools, Resources, and Best Practices

Special WIP Task: State and Local Energy Planning

Task 4: Advanced Manufacturing Office (AMO)

Task 4A: Northeast Business Leaders for Efficiency and Clean Energy

Special AMO Task: Assist US DOE to develop a plan for and hold the Northeast and Mid-Atlantic Regional Dialogue Meeting (March 13 in Baltimore, Md.)

Special AMO Task: Building on the Dialogue information and results and other relevant resources, prepare a report “Accelerating Industrial Efficiency and CHP in the Northeast/Mid-Atlantic Region” including a summary of the opportunities, barriers/issues and actions needed and recommended high-value roles for NEEP and others

Special AMO Task: Developing/Disseminating Resources to Drive Adoption of Strategic Energy Management within Efficiency Programs in the Northeast - Mid-Atlantic Region

Significant Accomplishments:

Task 1: Building Technologies Office (BTO)

Task 1A: Building Energy Codes

Subtask 1A.1: Coordination and Outreach with National Collaborative

- Throughout the grant period, NEEP engaged with a national network of partners, playing an active role in the National Code Collaborative, a joint partnership between the U.S. Department of Energy (US DOE), the Pacific Northwest National Laboratory (PNNL), the Building Codes Assistance Project (BCAP), the National Association of State Energy Officials (NASEO), and the other regional energy efficiency organizations (REEOs). We also provided regular updates to groups assembled by the Responsible Energy Codes Alliance (RECA) and NASEO in order to coordinate energy code support activities across the country, and guided efforts of the Northeast Home Energy Rating System (NEHERS) Alliance in informing its network of energy professionals across the NEEP region by identifying resources to promote increased code compliance.
- NEEP also supported and facilitated state-level Energy Code Collaboratives throughout the region, including in New Hampshire, Delaware, Pennsylvania, and Vermont. These collaboratives bring together diverse stakeholders to promote transparency and dialogue concerning energy code adoption and compliance, and are designed to assist states that are struggling with declining budgets, resources, and staffing. It is a proven best practice not only in the Northeast and Mid-Atlantic, but also states outside of NEEP's region. This facilitation included convening in-person meetings, setting priorities for code adoptions and compliance, guiding building energy rating efforts, and generally providing guidance, materials, and best practices to support states' efforts to advance efficiency.

Lessons Learned

Collaborating with national stakeholders, including the other REEOs, afforded NEEP with the opportunity to improve on our resources and technical assistance as we were able to utilize their best practices to inform our regional efforts. Collaboration has been crucial to the success of our building energy codes initiatives, helping to ensure that our funding is spent in the most efficient way possible.

Subtask 1A.2: Technical Assistance for Building Energy Code Adoption

- NEEP made the case for continual energy efficiency improvements during the process to update the 2015 International Energy Conservation Code (IECC). To curb efforts to weaken energy efficiency aspects of the code, NEEP prepared and disseminated resources to outline the code's benefits. We conducted individualized outreach to state and local code officials and provided periodic

updates and available resources to our Regional Building Energy Codes Leadership Group in preparation for the IECC hearings. We also distributed letters to every state in our region, encouraging Governors to lift travel restrictions and allow voting representatives to attend the hearings in Atlantic City. The code was finalized in late 2013; see our summary of the results here.

- Throughout the grant period, NEEP assisted states throughout the region to further their code adoption goals. This included adoption of the 2015 IECC – at the time, the latest and most energy efficiency model code – as well as stretch energy codes in several states. The Northeast – Mid-Atlantic region is a leader in the nation in the adoption of progressive building energy codes. In total, five states in the NEEP region have adopted the 2015 IECC. Below is a summary of state energy code support NEEP provided throughout the grant period.
    - **Connecticut:** NEEP participated in Connecticut's review of the 2012 IECC in preparation for adoption in 2015, providing comments supporting the state's proposed adoption. The state then moved to update their energy code for a second time in two years with the adoption of the 2015 IECC. To support this, NEEP provided technical assistance to the state's Department of Energy and Environmental Protection (DEEP), the State Building Inspector, and Connecticut-based non-governmental organizations. At their request, NEEP reviewed proposed code amendments to the 2015 IECC and continued to provide assistance directly through the adoption process, which was finalized in 2017.
    - **Delaware:** NEEP supported Delaware's 2014 adoption of the 2012 IECC, providing guidance as the code, which NEEP helped shape in 2013, became effective. We also provided testimony at a public hearing for the 2012 IECC adoption in the state.
    - **District of Columbia:** NEEP supported adoption of the 2012 IECC, which the District finalized and adopted in 2013.
    - **Maine:** Early in the grant period, NEEP served on Maine's Energy Technical Advisory Group, providing regional and long-term context for a potential 2015 IECC adoption, countering potential amendments that would weaken the proposed code update, and clarifying the advantages of a stronger energy code in the context of current shortcomings in the state's code-built structures. This culminated in the proposed adoption of the 2015 IECC for commercial buildings, which would decrease energy use by about 30 percent in buildings subject to the Maine Uniform Building and Energy Code. The state is still in the process of adopting the 2015 IECC.
    - **Maryland:** NEEP supported Maryland as they became one of the first states in the nation to adopt the 2015 IECC. We provided technical assistance by providing guidance and resources, e.g., to counter-proposed weakening amendments to codes.

- **Massachusetts:** NEEP provided updates to Massachusetts' complicated code update process to ensure stakeholder understanding. We also provided comments on the state's proposed 2015 IECC / ASHRAE 90.1-2013 adoption, which featured strengthening amendments. Additionally, as project lead contractor to the Massachusetts Department of Energy Resources (DOER), NEEP supported their efforts to present an update to the state's 'Stretch' Energy Code for commercial buildings. We delivered the updated code to DOER in the spring of 2012, and assembled a coalition of core stakeholders to support DOER's efforts by submitting comments imploring Massachusetts to prioritize the update. The stretch code is a key component of the Massachusetts Green Communities Program, and it continues to be implemented – as of December 2017, 216 towns and cities require the use of the stretch code. The 2017-2018 version of the stretch code uses a performance-based approach utilizing the HERS scale. The use of the HERS scale will provide local officials with verifiable information on building efficiency as well as grow green energy efficiency jobs within the state.
- **New Hampshire:** NEEP helped to organize support from New Hampshire energy code stakeholders for the proposed 2015 IECC adoption and assisted in the successful counter of two major proposed weakening amendments thereto. The state is still in the process of evaluating the adoption of the 2015 IECC.
- **New Jersey:** Early in the grant period, NEEP met with the New Jersey Code and Standards Division to provide an overview of resources available to the state for code adoption and compliance. Then-Governor Chris Christie would ultimately raid the state's ratepayer-funded Clean Energy Fund to make up for any shortfalls in other areas of the state's annual budget, which unfortunately resulted in little action on energy efficiency going forward.
- **New York:** NEEP first supported New York's 2014 adoption of the 2012 IECC and ASHRAE 90.1-2010 for commercial construction, delivering testimony at two code hearings and submitting comments supporting adoption of code. We later provided guidance as the state completed its 2015 IECC adoption process, which provided a roughly ten-percent boost in efficiency from the state's previous energy code. We also assisted in the design of a state-wide voluntary stretch energy code that would partially ensure code compliance by focusing on performance requirements.
- **Rhode Island:** NEEP supported Rhode Island's efforts to adopt the 2015 IECC. The state is still in the process of evaluating the adoption of the 2015 IECC.
- **Vermont:** NEEP supported Vermont as they became one of the first states in the nation to adopt the 2015 IECC. We provided technical

assistance by providing guidance and resources, e.g., to counter-proposed weakening amendments to codes.

- Throughout the grant period, NEEP hosted regular meetings of our Regional Building Energy Codes Leadership Group to extend knowledge and resources across the region. This typically included four quarterly meetings per year – three via teleconference/webinar, and one in person. These meetings provide an opportunity for key stakeholders to engage and advance topics related to building energy codes, with all twelve states in the NEEP region actively participating, and on average 50 stakeholders in attendance at each webinar and in-person meeting. In addition to state-specific resources, public comments, and presentations, NEEP published and disseminated a number of resources to support code adoptions, including:
    - Model Progressive Building Energy Codes Policy: 2012 Updates
    - Construction Codes in the Northeast: Myths and Realities of Energy Code Adoption and the Economic Effects
    - Building Energy Codes for a Carbon Constrained Era: A Toolkit of Strategies and Examples
    - Model Commercial Stretch Energy Code
    - Model Residential Stretch Energy Code
    - Code Adoption Toolkit
    - Duct Leakage Test Requirements in Northeast Residential Building Energy Codes
    - Energy Code Basics
    - 2015 IECC - Residential Summary - 2013 ICC Public Comment Hearings
    - Changes to Residential Provisions of the 2012 International Energy Conservation Code
    - ANSI/ASHRAE/IES Standard 90.1-2010 Envelope
    - Rating Systems vs. “Stretch” Building Energy Codes
    - Renewable Energy Code Provisions Handout

Lessons Learned

It is important to engage from the start a diverse group of stakeholders in the code adoption process. In addition it is beneficial to utilize the information and resources developed in one state to assist another with their adoption.

Subtask 1A.3: Compliance Technical Assistance

- Throughout the grant period, NEEP assisted states throughout the region, leading code compliance prioritization efforts in the following states:
    - **Connecticut:** NEEP staff advised Connecticut DEEP regarding means for enhancing its energy codes compliance assessment. NEEP also facilitated discussions with the core members of the Connecticut code

coalition to explore the future direction and priorities of the state. In 2017, NEEP began a state code best practices study, partnering with DEEP and the state's utilities, which will conclude in the fall of 2018.

- **New York:** NEEP met with staff from the New York State Energy Research and Development Authority (NYSERDA) to discuss opportunities to collaborate to support their program intended to increase the use of third parties in code enforcement and provide more direct assistance to individual municipalities to expand the use of these promising techniques for improving energy code compliance. In response, we provided NYSERDA with an assessment of other states' activities to support these initiatives, which they used to inform development of their program.
- **Pennsylvania:** NEEP was selected to assume leadership of the Pennsylvania Energy Code Collaborative, which aids the Commonwealth to achieve its 2017 90% energy code compliance requirement and has focused on energy code education and outreach strategies. NEEP continues to facilitate the collaborative and is working with the group to accomplish the tasks set forth in their compliance roadmap.
- **Rhode Island:** NEEP supported cutting-edge compliance enhancement efforts in Rhode Island, in an effort to require utilities to support code compliance and allow them to claim the savings from those programs as part of their regulatory proceedings. NEEP has provided technical assistance to the state to ensure that the results and best practices are shared throughout the region.
- **Vermont:** After launching the Vermont Code Collaborative in 2015, NEEP organized the group's first teleconference to discuss the State Code Compliance Plan. The group continued to meet several times over the year, but at the request of the state, the collaborative was put on hold until they could engage more stakeholders. The group plans to meet again in the summer of 2018.

- In addition to state-specific resources, NEEP published and disseminated a number of resources to support code compliance, including:
  - Model Progressive Building Energy Codes Policy: 2012 Updates
  - Construction Codes in the Northeast: Myths and Realities of Energy Code Adoption and the Economic Effects
  - Building Energy Codes for a Carbon Constrained Era: A Toolkit of Strategies and Examples
  - Code Compliance Toolkit
  - Enhancing Code Compliance Through Utility Claimed Savings

Lessons Learned

Compliance and code adoption go hand in hand; a strong compliance methodology is a key to achieving energy efficiency and carbon reduction goals. Compliance activities within the state can be streamlined by employing electronic on-line permitting, payment options, and inspection request platforms. A comprehensive approach to code compliance is vital for accurate attribution reporting by the state and the state's utilities. Attribution through compliance, in turn, helps achieve economic goals related to cost reduction, housing affordability, job growth, and in reducing environmental impact.

Task 1B: Support Commercial and Residential Policy Analysis

Subtask 1B.1: Building Energy Rating and Labeling

- In 2010, NEEP convened a large group of advocates including local businesses, property owners, and regional and national environmental organizations to promote the benefits of building energy rating disclosure in response to the proposed Boston City Council ordinance to require building energy reporting and disclosure in the city. NEEP developed and disseminated talking points, helped the group strategize, and provided technical support for a multi-pronged approach to garner widespread support for the ordinance. Ultimately, with a 9-4 vote, the Council voted to adopt energy benchmarking for its large buildings, with the goal of promoting energy and carbon savings in Boston's commercial and industrial building sector, which is responsible for almost half of the city's greenhouse gas emissions.
- In 2012, NEEP released the Roadmap to Zero Net Energy Public Buildings - Recommended Steps for the Northeast & Mid-Atlantic, which outlines key steps the public sector can take to facilitate the eventual broad adoption of zero energy building practices. Throughout the grant period, we used this roadmap to support states as they developed policies and practices to put public facilities on the pathway to zero energy. In June 2016, we released Roadmap to Zero Energy Public Buildings: Progress Report. This report details how each state has progressed towards meeting the "critical next steps" in the three years since the original publication. Additionally, the report contains new information regarding policies, regulations, and initiatives that support zero energy policies and construction in the region.
- We also disseminated best practices in building energy rating including resources and programs made available by the US DOE, such as Home Energy Score (HES), Better Buildings Energy Data Accelerator program, and the State and Local Energy Efficiency Action (SEE) Action Network, presenting at numerous regional and national forums.
- NEEP participated in Lawrence Berkeley National Laboratory's (LBNL's) Building Energy Data Exchange Specification (BEDES) initiative to facilitate the utilization and sharing of empirical building energy performance data among software tools and data collection and analysis activities. The information was used to help

inform regional efforts in the update of guidance recommendations, such as the Northeast Collaborative for High Performance Schools (NE CHPS) Criteria.

- NEEP supported officials of the city of Cambridge, Mass. in their efforts to enact an ordinance requiring benchmarking and disclosure of energy information for commercial buildings in the city. NEEP was able to build early support for the proposed ordinance, and, by alerting stakeholders to opportunities for public comment, facilitated a constructive dialogue between City Councilors and those who supported the measure. NEEP compiled a toolkit of materials to encourage stakeholder support, including a description of the ordinance, instructions for testimony submission, and talking points. The city's passage of the ordinance places information on building energy usage within the public domain, sending signals to market actors and creating a market-based mechanism to encourage investment in building energy efficiency.
- In partnership with the Massachusetts DOER, NEEP conducted the Massachusetts Raising the BAR (Building Asset Rating) Pilot. The BAR pilot was a three-phased project that sought to develop and test new methods to assess the energy performance of a building's energy features. The pilot focused on analysis techniques that assess building assets rather than the operations of the building, serving as a complement to tools such as the U.S. Environmental Protection Agency's (US EPA's) ENERGY STAR Portfolio Manager (ESPM). Phase I of the pilot tested two innovative methodologies, which were broadly deployed across a sample of approximately 30 commercial office buildings in the Greater Boston area in Phase II. Phase III focused on extending the program beyond Massachusetts to help inform and shape the national asset rating conversation. NEEP engaged the US DOE and Mass. DOER to maintain alignment between the BAR and Commercial Asset Score programs. A final report was submitted by Mass. DOER to US DOE in 2017.
- NEEP engaged with Portland, Maine at the request of municipal officials to support their efforts to lead the state toward more efficient energy usage policies. NEEP partnered with the city's Sustainability Coordinator to create a fact sheet summarizing Portland's municipal energy efficiency efforts, and also organized a regional webinar to share the city's perspective on benchmarking, performance contracting, green building, and a number of other energy efficiency efforts. We also helped facilitate Portland's enlistment in the US DOE's High Performance Outdoor Lighting Accelerator, through which they pledged to convert a significant portion of their outdoor lighting to light-emitting diodes (LEDs) in the next two years. This endeavor represented NEEP's effort to shift guidance and technical assistance efforts toward the community level.
- NEEP led ground-breaking efforts to connect regional home energy labeling efforts, signing up to participate in US DOE's Home Energy Information Accelerator, which selected five leading local areas in which to expand the availability and use of reliable home energy information at relevant points in residential real estate transactions. NEEP developed a workplan on behalf of the Northeast states confirming several deliverables and program implementation

milestones over the next two years. We then provided technical assistance to Vermont, Massachusetts, Connecticut, and Rhode Island as they rolled out home energy labeling pilots based on the recommendations.

- NEEP published and disseminated a number of resources to support building energy rating efforts throughout the region, including:
    - Building Energy Rating Regional Roundup - Lessons Learned For Policymakers
    - Rating Systems vs. "Stretch" Building Energy Codes
    - Building Energy Rating and Disclosure, Update and Lessons from the Field – a companion report to our 2009 report Valuing Building Energy Efficiency through Disclosure and Upgrade Policies: A Roadmap for the Northeast U.S.

Lessons Learned

It is important to have data and facts to support commercial and residential labeling. In addition, it has been important to have the funding to be able to offer direct technical assistance to states and communities who have limited bandwidth or lack the technical capabilities when looking to adopt or implement these policies.

Subtask 1B.2: High Performance Commercial Buildings

- At the request of US DOE, NEEP's Carolyn Sarno Goldthwaite served as co-Chair of the SEE Action Existing Commercial Building Working Group. The subcommittee, comprised of national thought leaders in the field of energy efficiency, was tasked to lead the development of a national energy efficiency leadership agenda for state and local governments. The subcommittee worked with stakeholders from the US DOE and US EPA to develop an agenda with the objective to establish a national benchmark for state and local government leadership on energy efficiency by defining a suite of bold-yet-practical solutions that could be implemented over the next five years. The resulting 2020 Leadership Agenda for Existing Commercial Buildings defines the baseline actions that states and communities can take by 2020 to demonstrate national energy efficiency leadership.

Lessons Learned

SEE Action was a good vehicle for ensuring that state and local voices were heard at the national level. Through this engagement, we recognized the value in bringing together stakeholders from across the country to share best practices and help develop resources that will assist a variety of stakeholders and encourage leadership at the state and community level.

Subtask 1B.3: Emerging Technologies

- In 2015, NEEP launched a project to develop a regional strategy to accelerate market deployment and adoption of high performance rooftop units (RTUs). Commercial heating, ventilation, and air conditioning (HVAC) is responsible for over 25% of energy use in the region's commercial building sector. High performance RTUs can dramatically reduce electric demand during peak hours, but their uptake faced significant market barriers. Observing this national effort and evolving market opportunities, NEEP convened a regional stakeholder group to characterize the commercial HVAC rooftop market, identify current efficiency program activity, review market trends and barriers, and project savings from accelerated adoption of high performance equipment. Stakeholders in this process include state agencies, US DOE and national lab experts, and HVAC manufacturers, distributors, and installers.
- The Northeast and Mid-Atlantic High Performance Rooftop Unit Market Transformation Strategy Report was published in December 2016. It included a survey of the current market, market barriers, and saving opportunities associated with the adoption of RTUs, and recommended several strategies to accelerate regional adoption of the technology.
- To support the regional RTU assessment and strategy, NEEP hosted a workshop on June 15, 2015, Raise the Rooftop on HVAC Efficiency. The workshop brought existing and potential new market actors together to contemplate new market strategies, including new business models that capture the full variety of value streams to unlock significant energy and peak savings from high performance RTUs, and to identify strategies to make significant progress toward changing the market.
- In January 2017, NEEP published the Northeast/Mid-Atlantic Air-Source Heat Pump (ASHP) Market Transformation Strategies Report to provide a roadmap for accelerated adoption of ASHPs in the region. We leveraged our extensive working group network to characterize the current market, identify market barriers and opportunities, and develop appropriate market strategies to tackle these barriers to regional adoption of ASHPs. The findings project that successful implementation of the recommended regional strategies could achieve a 40% market penetration of ASHPs by 2030. If this is achieved, we can expect $4 billion in annual cost savings as well as 50 billion metric tons of CO_2 equivalent, or the emissions of six and half coal-fired power plants.
- To support the advancement of the ASHP market, development of the strategy report, and ultimately effective implementation of the identified regional market strategies, NEEP hosted workshops in June 2014, October 2015, July 2016, and June 2017, which brought together energy efficiency program administrators, contractors, consultants, policymakers, manufacturers, distributers, installers, etc., to discuss current and important issues related to the expanded use of ASHPs.

- NEEP published two guides for ASHP installers: A Guide to Sizing & Selecting ASHPs in Cold Climates and A Guide to Installing ASHPs in Cold Climates. These guides provide practical, best practice guidance related to sizing, selecting, and installing ASHPs in cold climates. ASHP system performance, including energy efficiency of the systems, can be negatively impacted by poor sizing, system selection, and installation, as is customer comfort. The guides were developed to assist installers in sizing and selecting ASHPs for cold climate applications, while maintaining high efficiency, performance, and customer satisfaction. Dozens of external stakeholders contributed to the contents of the guides, including close partnership with a team at US DOE's Buildings Technologies Office. NEEP hosted a public webinar on March 28, 2017 to present the guides, with 140 stakeholders in attendance.
- In 2015, NEEP developed the Cold-Climate Air-Source Heat Pump (ccASHP) specification and products list. The ccASHP list is a mechanism for the market to differentiate ASHP systems that can operate efficiently in cold climates. By the end of the grant period, seven leading programs – including the Massachusetts Clean Energy Center, Efficiency Vermont, and NYSERDA – had adopted the specification and products list as part of their qualification for incentives. The specification and associated list includes over 500 products and has been downloaded thousands of times since its deployment.

Lessons Learned

NEEP has witnessed a considerable growth in interest across the region in air-source heat pump technology. Because of the technology's ability to deliver energy and carbon emission reductions, interest from energy efficiency to GHG-focused programs has seen a steady increase. The region is poised to be a leader in the accelerated adoption of this technology, particularly in colder climates. NEEP plans to continue its regional initiative and address regional needs including maintenance of our ccASHP specification and product list, as well as work to improve installation practices.

Task 1C: Clean Energy Workforce Development

- At the invitation of the Massachusetts Facilities Administrators Association's (MFAA), and to improve the skillset of the facilities workforce across the region, NEEP organized and presented at energy-focused tracks for their annual conferences throughout the grant period, which brought together facilities and energy managers from around the region. Sessions included:
    - Benchmarking and Operations & Maintenance;
    - Partnering with your Utility Provider; and
    - Strategies on Energy Bill Reduction and Solar PV Projects.
- Throughout the brief period that this task was funded under the grant agreement, NEEP participated in regional workshops for facilities managers and developed resources to support regional workforce development efforts. This included moderating a panel titled "The Certified Building Operator Experience: Savings

Energy Through Lessons Learned" at the N.H. Local Energy Solutions Conference; sharing workforce development best practices through a presentation to the Rhode Island Zero Net Energy Task Force; and updating NEEP's Zero Energy Roadmap to include sections on workforce development and links to new workforce credentialing resources.

Lessons Learned

Communities still lack the resources or understanding to prioritize the training of their workforce. There is more work to be done in this area, as communities are still unsure of the programs that are available or credentials they should be seeking. In addition, there is an opportunity for utility programs to incentivize training programs or for states and communities to require credentialing.

Task 2: Office of Strategic Programs (OSP)

Task 2A: Regional EM&V Forum

Subtask 2A.1: Annually Update Steering & Project Committee member and co-chair assignments and contact lists

- NEEP continuously undertook efforts to maintain active participation from across the region in the Evaluation, Measurement & Verification (EM&V) Forum, as well as recruit new state representatives, where appropriate, on a range of committees. This included ensuring leadership positions were rotated and filled – i.e., Steering committee co-chairs – and building understanding of Forum work and objectives for new members as needed.

Subtask 2A.2: Hold Quarterly all-day Project Committee Meetings to manage EM&V Forum projects

- Participants from throughout the Forum region participated actively in Forum committees and project subcommittees throughout the grant period. NEEP staff facilitated quarterly project committee meetings, as well as numerous project subcommittee meetings that were well attended.

Subtask 2A.3: Hold Quarterly Steering Committee meetings to set direction and adopt completed projects

- The Forum's Steering Committee, represented by energy regulatory commissioners and air regulators from across the Northeast – Mid-Atlantic region, participated in quarterly Steering Committee meetings throughout the grant period. Key responsibilities included adoption of the annual Forum agenda and budget, as well as adoption of the 2012-2014, 2014-2016, and 2016-2018 Forum Strategic Plans.

Subtask 2A.4: Build understanding of EM&V best practices and Forum products for state public officials, policy makers, regulators, utilities, RTOs and EM&V practitioners through a range of outreach activities

- Forum products completed during the grant period include:
  - Attributing Building Energy Code Savings to Energy Efficiency Programs
  - Cost-Effectiveness: Regional Overview and Screening Guidelines
  - Early Replacement Measure Life Studies: Phase 1 and Phase 2
  - Emerging Technologies Research Report
  - Emerging Technologies – Primary Research – Advanced Power Strips
  - Emerging Technologies Primary Research Report – Ductless Heat Pumps
  - Emerging Technologies – Ductless Heat Pumps Meta Study
  - Emerging Technologies – Residential Electric Clothes Dryer Baseline
  - Energy Efficiency as a Transmission and Distribution Resource Using Geotargeting
  - Incremental Cost Studies: Phase 2, Phase 3, and Phase 4
  - Incremental Cost Study: Emerging Technologies
  - Loadshape Studies:
    - End-Use Load Data Update Phase 1
    - Commercial Lighting Loadshape Study
    - Commercial Refrigeration Loadshape Report
    - Loadshape Report and Catalogue
    - Metering Data Collection Protocols
    - Unitary HVAC Loadshape Study
    - Variable Speed Drive Loadshape Report
  - Measure Persistence: Commercial Lighting Persistence Study
  - Mid-Atlantic Technical Reference Manual (TRM): Version 2, Version 3, Version 4, Version 5, and Version 6
  - Model EM&V Methods Standardized Reporting Forms
  - Net Savings Research: Scoping Study, Definitions and Policies, Principles and Guidance, Evolving Policies, and Decision Framework for Determining Net Savings
  - The Changing EM&V Paradigm
- Throughout the grant period, NEEP worked with Forum members and the Steering Committee to encourage state use of Forum products and other relevant EM&V best practices. The Forum also hosted public, informational webinars throughout the grant period to share findings from its research, including on Incremental Cost Studies, Building Codes Attribution, Net Savings, Loadshape Studies, Geotargeting and Demand Response, and M&V 2.0.

- NEEP also hosted EM&V Forum Annual Public Meetings in 2012, 2013, 2014, and 2016, with approximately 100 attendees at each meeting. Each meeting featured several panel discussions and presentations, and provided attendees with updates on current and recently completed EM&V Forum projects to build their understanding and adoption of Forum products.

Subtask 2A.5: Assist states to provide annual data to the Regional Energy Efficiency Database (REED)

- In early 2012, the REED website and data collection tool in development were tested by a sample of state users. By the end of 2012, the REED project contractor had fully developed the database, data collection tools, and website. NEEP staff worked with Forum participants to thoroughly test and refine the REED project materials and populated the database with 2011 energy efficiency program data from all participating states. REED was publicly launched in February 2013, and the Forum continued to collect annual data from participating states throughout the grant period.

Subtask 2A.6: Launch REED Database for public use, analysis and reference

- REED was publicly launched in February 2013, and the Forum continued to collect annual data from participating states throughout the grant period, aligning collection of electric efficiency data with ISO-New England (ISO-NE). The database includes electric and gas energy efficiency program data for 10 jurisdictions: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, Vermont, and Washington D.C. Using a consistent reporting platform, REED allows for simple aggregation or comparison of energy efficiency program impacts at the sub-region, state, sector, or program type levels, and also provides direct links to supporting state energy efficiency information.

Subtask 2A.7: Prepare and Publish Annual REED Database Summary Report

- The Forum released the REED 2011 Annual Report in October 2013, followed by the 2012 Annual Report in August 2013. These reports provide an overview of the high-level impacts of energy efficiency programs at the state and regional level. They also provide for comparisons across states that can help strengthen the credibility of energy efficiency as a resource by increasing our understanding of similarities and differences in results across programs by type, sector, and state. The Forum produced a REED Snapshot of Program Years 2011 – 2013. Subsequently, annual high-level impacts in REED were incorporated into the 2015 Regional Roundup, the Energy Efficiency Snapshots (2016 and 2017) and a 2016 Residential Lighting Deep Dive.
- In 2016, NEEP developed two new REED resources: REED Renderings and the Energy Efficiency Snapshot. The objective of REED Renderings is to bring attention to interesting trends seen in REED data and the stories behind those

trends. The Energy Efficiency Snapshot is intended to provide policymakers, regulators, efficiency proponents, program administrators, and other stakeholders with an easily accessible comparative snapshot of energy efficiency policies and programs across the Northeast – Mid-Atlantic region.

Subtask 2A.8: Maintain the EM&V Forum Public Library

- NEEP regularly updated and maintained our online EM&V Forum Library with new information and studies from Forum states as well as other relevant state, regional, and national EM&V materials.
- NEEP also made regular updates to the Forum Repository of EM&V Studies, Reports, and Evaluations with current external links and newly completed evaluation studies from across the region.

Subtask 2A.9: Participate in and contribute to relevant national & regional processes

- EM&V Forum staff was actively involved in a variety of regional and national-level protocol development activities throughout the grant period, including participation in:
    - The North American Energy Standards Board, Retail Energy Efficiency Measurement and Verification Working Group
    - The comment process for a Federal Energy Regulatory Commission Notice of Proposed Rulemaking on Wholesale Energy Efficiency M&V Standards
    - The National Action Plan on Demand Response, Demand Response M&V Working Group
    - The US DOE Uniform Methods Project Steering Committee
    - The American National Standards Association, Energy Efficiency Standardization Coordinating Council EM&V Work Group
    - The National Efficiency Screening Project
    - The National Energy Efficiency Registry project
    - The National Energy Efficiency Advocates meeting
    - Regional Working Groups for development of Energy Efficiency Measurement and Verification Manuals for ISO-NE Forward Capacity Market and PJM Reliability Pricing Model

Subtask 2A.10: Discuss for adoption with the Project and Steering committees the Uniform Methods Project

- Throughout the grant period, NEEP provided support and input to the US DOE Uniform Methods Project (UMP). This project to build consistency in EM&V methods for a set of priority measures was managed by the National Renewable Energy Laboratory (NREL), informed by a technical advisory group, and guided by a project Steering Committee. NEEP provided comment on draft documents in

2012, and in April 2013, the US DOE published The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures as an initial set of protocols to determine energy efficiency savings. In 2013, 2014, and 2016, with support from Forum technical advisors, NEEP provided comment on draft documents and new measures, including on Net Savings, Residential Behavior, and Strategic Energy Management.

Subtask 2A.11: Adopt the definitions and terms published in the SEE Action Model Energy Efficiency Impact Evaluation Guide

- NEEP collaborated on development and dissemination of the glossary for the SEE Action Impact Evaluation Guide, building on the Forum Glossary.

Lessons Learned

The diversity of activities contributed to many successes of the EM&V Forum, including:

- Policymakers for whom EM&V is one small aspect of their responsibilities were able to stay abreast of cutting edge thinking, information needs, and gain access to benchmarking (REED) to help inform their decision-making and oversight of energy efficiency by participating in Steering Committee meetings and in some other public meetings and webinars.
- By virtue of jointly funded research projects, timely locally-based data and results and spreadsheet tools were made available to program administrators, evaluators, and other stakeholders (e.g. air regulators) on measures and topics that may not have been able to be studied otherwise, for example because the research was very costly, the measures were emerging technologies, or they were intermediate and hence secondary in priority for evaluation within individual companies.
- In some cases, the Forum served as an incubator by developing regional guidance and protocols which subsequently were leveraged in the development of national products which are now being disseminated or implemented. For example, the National Standard Practice Manual on Cost-Effectiveness is an outgrowth of regional cost-effectiveness guidance, and the standardized reporting forms helped inform the National Energy Efficiency Registry.
- The forward-looking and proactive nature of some Forum projects (e.g., the geotargeting paper, loadshape data collection protocols, multi-state TRM, Changing Paradigm paper, Net Savings Guidance) helps state public officials, policy makers, regulators, and EM&V practitioners evolve best practices.
- Forum products helped support the goals of transparency and consistency in EM&V. For example, jointly funded studies provided analytical results that were transparent and based on methods applied consistently across many companies and states.

- The presence of regional policy drivers, specifically the formation of the FCM, helped facilitate development and implementation of protocols to encourage consistency in M&V in the region.

Some challenges were experienced in the delivery of tasks for the EM&V Forum, including:

- It is difficult and in some cases impossible to scope, fund, and complete complex studies involving data collection and analysis and/or sensitive stakeholder review within an annual planning cycle; multiyear project and budget horizons would be more efficient.
- Because state policies vary, achieving transparency in decision-making is a more achievable and realistic goal than achieving consistency in best practice across states. Guidance that aligns practices with policies is more achievable and flexible.
- To optimize effectiveness, Steering Committee structure and function needs to take into account high turnover of regulatory representatives (frequently due to term limits), differences between states in terms of whether the Committee is Commission-only or a mix of Commission and other (e.g., program) representatives.
- The diversity of states within the region (some large and well-funded, others small and emerging) posed challenges to establishing consensus on priorities for activities and funding.

Special OSP Task funded by BTO: Certification Process for Energy Efficiency Evaluators

- NEEP kicked off the Certification Process for the Energy Efficiency Evaluators project on November 3, 2015, hosting a meeting with the research team and US DOE staff. After launch, a Project Advisory Panel was established and the research team assembled a list of evaluation subject matter experts and selected candidates to interview to obtain information to support characterization of the steps involved in evaluations of gross impacts and of the skills, knowledge, training, and experience that are required to conduct evaluations using the methods. Key stakeholders in the project included US DOE, Advisory Panel members, the International Energy Program Evaluation Conference (IEPEC), and the Association of Energy Service Professionals (AESP) Board.
- NEEP presented a high-level summary of initial findings and recommendations for next steps to US DOE, and began preparation of interview questions and scheduling of interviews with Advisory Panel members. NEEP and the project team also collected information about existing certification models related to either evaluation or energy program M&V and organized the information in tables enabling comparison of key features and metrics. This background information was intended to help inform its assessment of feasibility, action paths, and development of certification model constructs for US DOE's consideration.

- The research team concluded that deployment of certification would require US DOE to make numerous gateway decisions that would influence the development and shape of the certification. Consequently, the project scope was modified to add consideration of roadmap/decision points and to keep the content development of certification models at a higher level rather than delving heavily into details on curriculum contents.
- NEEP and the project team completed interviews and other research, and drafting of the project report began. We also submitted deliverables to US DOE including the list of Core Content for Entry Level Certification and the draft Roadmap to Evaluation Certification, which incorporated results of interviews and other research.
- The final report, Scoping the Certification of Energy Program Impact Evaluators, was published in August 2016. It incorporated feedback obtained through a peer review process that included Advisory Panel members, US DOE, and IEPEC leadership. The final report was accompanied by a Roadmap spreadsheet. Members of the project team and US DOE convened an informal session at the 2016 ACEEE Summer Study to discuss findings from the study and to solicit comments and questions from industry stakeholders to initiate dissemination of the final deliverables and to obtain insights to inform DOE's Phase 2 effort.
- NEEP supported US DOE and LBNL in development of the Phase 2 Scope of Work and assisted in planning for additional dissemination of the final deliverables – for example, via webinars, newsletters, or conference materials.

Lessons Learned

Due to the multidisciplinary nature of evaluation as a profession, scoping of a certification presents many challenges in terms of defining competencies and thus it makes sense to proceed incrementally, and start with an introductory scope. More information is needed to inform future decisions regarding business planning aspects of a potential certification; the roadmap helps identify some of the next steps needed. Stakeholder perspectives are mixed concerning the need for and value of certification for energy efficiency evaluators. While the impetus for scoping this certification of evaluation was the Clean Power Plan, there is acknowledgment that energy efficiency evaluation as an industry has matured to the point where consideration of a certification had merit with or without the Clean Power Plan.

Task 3: Weatherization and Intergovernmental Programs Office (WIP)

Task 3A: Technical Assistance to States

Subtask 3A.1: Outreach, Training, and Technical Assistance for High Performance Public Buildings

K-12 Schools

- NEEP worked closely with the National Collaborative for High Performance Schools (CHPS) to strengthen the administration of the CHPS protocol throughout the region and to aid in the development of a national green schools movement.
- In 2013, for the fifth year, NEEP was asked to serve on the planning committee for the annual Rhode Island Sustainable Schools Summit. The 2013 Summit was expanded to include stakeholders and best practices from schools throughout New England. NEEP advised the committee on additional stakeholders to include and helped to refine workshop sessions with a focus on energy efficiency.
- NEEP was invited to guest lecture to architecture and engineering students at the Rhode Island School of Design (RISD) and Brown University on high performance schools. Approximately 15 students in the master's degree program were informed of the benefits of constructing, operating, and maintaining energy efficient and environmentally sustainable schools, highlighting strategies from the Northeast CHPS (NE-CHPS) Protocol.
- NEEP participated in the New England 'Education Built to Last' Facilities Best Practice Tour as part of the U.S. Department of Education's Green Ribbon Schools Initiative. The initiative recognizes schools nationwide that have proven exemplary in reducing environmental impact and costs, improving the health and wellness of students and staff. NEEP staff had the opportunity to provide comments at the kick-off forum held by the Department of Education to encourage cross collaboration and best practice sharing with other agencies, such as the US DOE.
- NEEP convened two meetings with the Rhode Island Department of Education, Rhode Island Office of Energy Resources, and National Grid to advance best practices for school construction and operations and to support inter-department collaboration. The group discussed how to streamline benchmarking efforts for schools, and provided comments on a Request for Quote for energy management consulting.
- To share best practices of exemplar school projects throughout the region, NEEP created case studies highlighting schools that are built to NE-CHPS and MA-CHPS standards:
    - Claiborne Pell Elementary School (Newport, R.I.)
    - East Bay MET School (Newport, R.I.)

  - Archie R. Cole Middle School (East Greenwich, R.I.)
  - Keene Middle School (Keene, N.H.)
  - Abbot-Downing School (Concord, N.H.)
  - Freeman Kennedy School (Norfolk, Mass.)
  - Rochester Memorial Elementary (Rochester, Mass.)
  - Sherwood Middle School (Shrewsbury, Mass.)
- Hosted panels on building energy and a tours at two high performance schools at NEEP's 2014 Summit:
  - NEEP organized a full-day Buildings Workshop including panels discussing: 1) Building Resiliency; and 2) the Role of Financing in the Drive toward Zero Net Energy. The panels included representatives from green banks, mortgage underwriters, energy efficiency utilities, architects, and state energy officials.
  - NEEP arranged a tour of two local high performance schools. Hosted by the Rhode Island Department of Education's Joseph da Silva, the tours allowed roughly 40 participants to visit the zero energy-designed Paul W. Crowley Metropolitan Regional Career and Technical Center and the zero net energy capable Claiborne Pell Elementary School. The tour helped build support for high performance school construction standards by allowing participants to view the tangible benefits of building to these standards.

Lessons Learned

School stakeholders are challenged with access to reliable information, and have a difficult time making the case for high performance schools and buildings. There is still a great need to provide access to information and technical assistance. The process is slow and can take many years to get stakeholder buy-in. It is important to have the necessary funding and time to commit to helping stakeholders.

Operations & Maintenance Best Practices

- NEEP published the Regional Operations and Maintenance Guide for High Performance Schools and Public Buildings in the Northeast and Mid-Atlantic: Strategies for creating green, healthy & energy efficient existing buildings in your state or local government.
- In August 2013, NEEP traveled to Albany, N.Y. to participate in meetings with the New York Department of Education and the New York State Energy Research and Development Authority (NYSERDA). The discussion focused on the sharing of best practices for ensuring schools are operated and maintained to be energy efficient, with a focus on indoor environmental quality, as well as NEEP's Regional Operations & Maintenance (O&M) Guide and supporting the update to NY-CHPS.

- NEEP staff regularly participated in committee meetings dedicated to high performance building best practices in state and federal government, including:
    - SEE Action Existing Commercial Buildings Working Group
    - New Hampshire High Performance Schools Working Group
    - Massachusetts Green Schools Working Group
    - NEEEA Conference / R.I. Sustainable Schools Summit Planning Committee
    - Boston Society of Architects, Committee on the Advancement of Sustainability and Schools Committees
- At the invitation of The Rhode Island Office of Energy Resources (OER) NEEP's Carolyn Sarno Goldthwaite was invited to participate in a meeting in December 2013 of the Rhode Island Public Energy Partnership (RIPEP) to present on NEEP's O&M Guide for public buildings. Funded by the US DOE, RIPEP was a three-year (2012-2015) collaborative effort to achieve deep energy savings in state and municipal facilities and build a sustained, effective infrastructure for ongoing savings.
- To share information and best practices, as well as to inform its efforts, NEEP convened its High Performance Schools & Public Buildings Leadership Groups quarterly throughout the year.
- NEEP disseminated guidance presented in our Roadmap to Zero Net Energy Public Buildings - Recommended Steps for the Northeast & Mid-Atlantic.
- NEEP released the latest update to the Northeast Collaborative for High Performance Schools' construction and renovation criteria, NE-CHPS 3.0. Version 3.0 included reference to the New Buildings Institute's Advanced Buildings New Construction Guide as a prescriptive pathway to meet the Criteria's energy usage requirements. Many utilities throughout the Northeast already endorse NBI's Guide, and such collaboration will make it easier for NE-CHPS-designed schools to obtain utility incentives. NEEP also created a draft NE-CHPS 3.0 Rhode Island Addendum based on comments by the Rhode Island Department of Education during the draft criteria public comment period. Similar addendums are possible for other states. These efforts will encourage states who utilize NE-CHPS, like Rhode Island, to build and maintain high performance schools.

Lessons Learned

- Design teams need to integrate facilities staff in the process when designing new buildings.
- Building owners still do not prioritize training of workforce.
- It is important to be part of other stakeholder groups to help either guide our efforts or to help inform theirs.
- It is important to take lessons learned from other parts of the region or country and update our resources such as the O&M guide.

NEEP's 2014 Northeast Energy Efficiency Summit

- On June 2 & 3, 2014 over 300 people converged at the Newport Hyatt for the 2014 Northeast Energy Efficiency Summit titled "*The Low Carbon Future – Scaling Up Energy Efficiency in a Brave, Dynamic World*" to build a positive and motivating narrative about the future of energy efficiency in the midst of major change in energy use, technology, grid modernization, climate change impacts, and a changing utility business model. Participants included state officials and administrators, industry, utilities, efficiency service providers, advocates, legislators, members of the media, and students.
- Topical Workshops: Three topical workshops brought together stakeholders to share best practices, identify opportunities to scale up efficiency, and discuss the role of evaluation.
    - Cold-Climate Air Source Heat Pumps: Warming Up the Market
    - Daybreak on Zero Net Energy Buildings: Illuminating Our Future with Comprehensive Strategies for the Built Environment
    - Evaluating Energy Efficiency: 5 Top Things You Should Know About the Emerging Evaluation World
- High Performance School Tours: NEEP facilitated and led tours of two high performance Rhode Island schools: Claiborne Pell Elementary School (Zero Net Energy Capable); and The East Bay Met School (Zero Net Energy Designed). Both facilities are built and maintained as good learning environments through compliance with the RIDE School Construction Regulations and to NE-CHPS standards. Participants were provided with a brief overview of the projects led by Rhode Island Department of Education School Construction Coordinator Joe Da Silva.
- Keynote Speaker and Panel Discussions: The 2014 Summit kicked off with an exciting keynote speaker and panel discussions led by influential thought leaders:
    - Sue Coakley - Executive Director, Northeast Energy Efficiency Partnerships
    - Gene Rodrigues - Vice President, ICF International
    - Marion Gold - Commissioner, Rhode Island Officer of Energy Resources
    - Bobbi Kates Garnick - Energy Undersecretary, Massachusetts Executive Office of Energy & the Environment
- Summit Speakers Program: The 2014 Summit featured the *NEEP Power Talks*, a series of eight 15-minute presentations that gave selected Power Talk speakers an opportunity to present their ideas about how to scale up energy efficiency region in an engaging, dynamic way designed to generate conversation and spur audience engagement. Speakers included:
    - Abigail Anthony, Rhode Island Director, Environment Northeast - Energy Vision - Maximizing Energy Efficiency for Maximum Results

  - Ed White, Vice President of Customer Strategy & Environmental, National Grid
  - Matthias Kurwig, Co-Founder Enervee - Efficiency at Their Fingertips - Bringing Products to Consumers in the 21st Century
  - Carl Spector, Director of Climate and Environmental Planning, City of Boston - A Brave New City - Boston's Path to Scaling Up Efficiency
  - Ann Berwick, Chair, MA Department of Public Utilities
  - Scott Johnstone, Executive Director, Vermont Energy Investment Corp. - The Utility Challenge - Staying Relevant in a Changing Energy Landscape
  - Bennett Fisher, CEO and Co-Founder of Retroficiency - The Building Genome Project - Using Data to Transform Building Efficiency
  - Penni McLean Conner, Chief Customer Officer and Senior Vice President of Customer Group, Northeast Utilities –Untethered

- Business Leader Recognition: NEEP honored fourteen 2014 Northeast Business Leaders for Energy Efficiency from around the region with a cumulative annual cost savings of $3 million. The diversity of the awardees – from an inn and brewery to a pharmaceutical manufacturer to a sports networks – show that efficiency measures can be deployed across myriad industries with positive effects on the environment, the community, and the bottom line. State Champions were selected by an Advisory Committee and featured in a video case study. All business leaders were featured in written case studies and were individually recognized at the Summit.

Lessons Learned

The 2014 Summit succeeded by featuring inspiring speakers as well as providing opportunities for in-depth dialogue in topical workshops to address rapid changes in energy and environmental policy, technology, and customer needs and interests. Participants responded well to the new Power Talk structure and appreciated the more targeted focus on “one big idea” per speaker rather than large panels where speakers have limited time for discussion. People also appreciated that break-out workshops offered the opportunity for in-depth discussion on specific topics. In a time of rapid change and uncertainty, the focus on the multiple benefits of energy efficiency to address state policy needs as well as on emerging programs and strategies to increase energy savings was timely and helpful to summit participants.

Subtask 3A.2: Outreach & Technical Assistance to State Policymakers to Accelerate Energy Efficiency

Public Policy Technical Assistance to States

- Throughout the grant period, NEEP tracked and contributed to a number of stakeholder activities including the Massachusetts Energy Efficiency Advisory Council, the New Hampshire Energy Efficiency and Sustainable Energy Board, the Connecticut Energy Efficiency Board, the Grid Modernization Working Group

convened by the Massachusetts Department of Public Utilities, the Regional Greenhouse Gas Initiative (RGGI) advocates, the ISO-New England Planning Advisory Committee, the Massachusetts Global Warming Solutions Project, the policy committee of the New England Clean Energy Council, the Maryland EmPOWER Planning Cost-Effectiveness Working Group, the Massachusetts Energy Efficiency Advisory Council, the Rhode Island Energy Efficiency and Resource Management Council, the New Hampshire Energy Efficiency and Sustainable Energy Board, the Delaware Energy Efficiency Advisory Council, the Connecticut Energy Efficiency Board, and the New York E^2 Working Group.

- Throughout the grant period, NEEP participated in events and engaged with partner organizations across the region to build relationships and promote policy best practices. Groups and events engaged with included Local Environmental Action 2013 in Boston, the Restructuring Roundtable, an invitation to meet with Massachusetts Attorney General Martha Coakley, Pace Energy and Climate Center, Delaware Interfaith Power and Light, Environment Northeast, Clean Water Action, Massachusetts Climate Action Network, Chesapeake Climate Action Network Sierra Club, Conservation Law Foundation, the Energy Foundation's annual conference, and many more.
- NEEP disseminated information on regional energy efficiency policy trends and programs through the Regional Roundups in 2015, 2016, and 2017, the Energy Efficiency Snapshot, NEEP's blog, and REED Renderings, a blog series of the Regional Energy Efficiency Database (REED).
- NEEP was annually invited to review the American Council for an Energy-Efficient Economy's draft State Energy Efficiency Scorecard. We were pleased that ACEEE staff often accepted our guidance with regard to points awarded for the Northeast and Mid-Atlantic states for its energy efficiency policies.
- In 2014, with new faces in energy offices and regulatory agencies in several states, NEEP reached out to arrange introductory meetings with new commissioners and key staff of the Rhode Island Public Utility Commission, the new Commissioner of the Connecticut Department of Energy and Environmental Protection, and the new commissioner appointed to the New Hampshire Public Utilities Commission.
- NEEP worked closely with our advocacy allies around the country – particularly with the other REEOs – to ensure that efficiency played an important role as the U.S. Environmental Protection Agency (EPA) finalized guidelines for states as part of its Clean Power Plan under Section 111(d) of the Clean Air Act. Part of this work also involved encouraging and facilitating collaboration between state air regulators (i.e., departments of environmental protection) and state energy offices and regulators to best translate energy efficiency programs and policies into potential compliance plans under 111(d). We provided feedback to EPA reflecting the belief that the Regional Greenhouse Gas Initiative (RGGI) and the state energy efficiency programs, goals, and policies could form the basis of compliance strategies for Northeast states in response to the new regulations on carbon emissions from existing power plants. We engaged a broad range of

stakeholders to support specific recommendations to the US EPA regarding principles and guidelines for the evaluation, measurement and verification (EM&V) of energy efficiency policies and programs included in state carbon emission compliance plans. The US EPA adopted many of the core EM&V principles we recommended.

- NEEP tracked the topic of expanding natural gas availability, following and considering the issues of capacity, cost, fuel mix, expansion, leaks, and the role of energy efficiency. NEEP served as an invited participant on the MA Attorney General's Advisory Committee to inform the AG's 2015 Regional Electric Reliability Options Study that found that new gas pipelines in the region are not needed given the impacts of energy efficiency policies and programs.
- Well before utilities announced proposed rate hikes to deliver electricity in the winter of 2014, NEEP and the Northeast regional representatives of the National Association of State Energy Officials (NASEO) joined forces to foster interstate dialogue and cooperation on a public communications plan. NEEP invited New England and New York stakeholders to develop shared messages for consumers and businesses about the need to take advantage of energy efficiency opportunities in advance of the winter season. NEEP partnered with Cater Communications to aid in the drafting of a common messaging platform that states can then use, if they choose, to develop more specific outreach to their residents and businesses.
- A hallmark of NEEP's work in this area is to track regulatory and legislative proceedings as well as state savings goals and investment levels. We worked closely with the EM&V Forum and REED staff to make relevant information available to external partners and stakeholders. One such example is NEEP's Policy Tracker, which identifies current or recently pending legislation within our jurisdiction and is updated on a regular basis.
- NEEP supported both "emerging" and established states throughout the grant period, with a particular focus on the following states:
- **Emerging States:**
    - **Delaware:** In early 2014, NEEP informed development of legislation passed to create ratepayer-funded efficiency programs in Delaware. NEEP helped lead a coalition to inform legislators of the many benefits to getting this landmark bill passed. Through its Energy Efficiency Advisory Council (EEAC), the Department of Natural Resources and Environmental Control (DNREC), Division of Energy and Climate, utility companies, and involved stakeholders launched the first phase of statewide, ratepayer-funded energy efficiency programs under An Act Relative to the Sustainable Energy Utility, that, for the first time, required utilities to deliver energy efficiency programs to residents and businesses. In addition, the Act called for the establishment of the EEAC to guide development and implementation of energy efficiency programs. Our relationships with DNREC as well as with members of the EEAC facilitated our sharing of regional best practices and resources from the DOE. In 2017, DNREC and

the Delaware Sustainable Energy Utility launched Energize Delaware funded by the Delaware Energy Investment Fund (supported by RGGI revenues and ratepayer funding via a Public Utility Tax on commercial and industrial customers) to deliver statewide energy efficiency programs accompanied by ongoing EM&V. NEEP assisted by managing an annual update to a Tri-State Technical Reference Manual used and funded by Maryland, Delaware, and the District of Columbia. Unfortunately, while the energy efficiency programs continue in Delaware, the program is undermined by an ongoing diversion of Public Utility Tax revenues away from efficiency to the general state fund.

- **New Hampshire:** NEEP engaged with the state energy office, the Public Utility Commission (NH PUC), the Energy Efficiency and Sustainable Energy Board (EESE Board), utilities and other stakeholders in New Hampshire as the state examined appropriate means for advancing energy efficiency policy. NEEP informed development and passage of HB 1129, which created a legislative review committee of an energy efficiency resource standard (EERS). At the urging of the EESE Board, the NH PUC in 2014 began an extensive stakeholder engagement and interview process, culminating in issuance in February 2015 of an EERS Straw Proposal. The proposal prescribed an energy efficiency resource standard that used the current utility core programs as a starting point, and added very little by way of additional savings. NEEP regularly consulted with the PUC and energy office staff about the construct and operations of the EERS. We also provided public comments to the energy office on its State Energy Strategy, which included an emphasis on efficiency and the need for savings targets and a strategy to get there. Later in 2015, with NEEP's encouragement, the PUC opened a stakeholder-guided proceeding to examine implementation of the EERS. NEEP was invited to serve as a non-intervening technical expert in this collaborative process including the PUC, program administrators, and third parties. NEEP coordinated with environmental groups, the Regulatory Assistance Project (RAP), and directly with the NH Office of Energy and Planning (OEP) and PUC. In 2017, at the request of the NH PUC and utilities, NEEP presented in front of the PUC and prepared a report of Non-Energy Impacts to inform cost-effectiveness analysis of energy efficiency programs. The PUC has used this report to inform its cost-benefit working group established in 2018 to determine the NEIs to include in cost-effectiveness testing. NH's EERS also went into effect in 2018.
- **Maryland:** NEEP played a leading role in working with the Maryland Energy Administration (MEA) and other key stakeholders to devise a revised screening framework – providing input on best practices and evolving thinking on cost-effectiveness of ratepayer-funded energy efficiency programs. We educated and collaborated with in-state policy allies about the importance of updating the state's regulatory practices to better harness the power of efficiency. We also worked with MEA and other key stakeholders to provide comment on the EmPOWER Maryland

Act for the 2015-2017 plan year. NEEP worked as part of a coalition of clean energy advocates to both protect and better the EmPOWER Maryland programs. Despite a change in administration, EmPOWER Maryland has continued to provide statewide energy efficiency programs. More recent goals set by the PSC require utilities to ramp up savings by 0.2% per year to reach 2% incremental savings (Order No. 87082). In 2017, the legislature passed SB 184, which codified the 2% energy savings goal into law through 2023. Maryland also supports community energy efficiency initiatives as well as initiatives to improve public building energy performance.

- **Pennsylvania:** In 2015, Pennsylvania's Public Utilities Commission issued a tentative implementation order for Phase III of Pennsylvania's Act 129 Energy Efficiency and Conservation Programs, the state's ratepayer-funded energy efficiency resource standard programs. While ruling favorably on the continuation of the Act 129 programs, the Commission asked for input on several specific elements, including comprehensive program design and whether or how programs should be coordinated with demand response programs. In April 2015, NEEP filed formal written comments in response to the Commission's inquiries, praising it for extending Act 129 and suggesting some key strategic program elements to help define complementary demand response and energy efficiency strategies. The PUC's final implementation order referenced NEEP's comments more than two dozen times and required the utilities to cumulatively achieve energy savings of 2.3% over three-years. Regulatory policies for energy efficiency have not significantly advanced since then. Phase III targets set five-year cumulative targets of 5,710,487 MWh, equivalent to about 0.77% incremental savings per year through 2020. Pennsylvania's alternative rate making proceeding remains open and is examining decoupling performance incentives and allowing for more incentives to pursue energy efficiency. This new model will allow the state to achieve more savings. No new filings have been made since August 2017. The legislature is also examining alternative ratemaking via HB 1782, which builds off the PUC's open docket on alternative ratemaking. This bill would allow utilities in rate cases to establish alternative rates and rate mechanisms, including (but not limited to) decoupling mechanisms, performance-based rates, and cost-recovery mechanisms and rates to support and recover the allocated costs to deploy distributed energy resources. This bill has been laid on the table.

Established States:

- **Massachusetts:** NEEP supported expanded access to energy efficiency programs for oil heat customers across the region, which is heavily reliant on unregulated delivered fuels. In particular, we played a lead role in developing background materials on benefits and cost-effectiveness in creating an oil heat energy efficiency fund in Massachusetts. Such a mechanism would have augmented and complemented existing Mass

Save energy efficiency programs funded by gas and electric ratepayers. A change in gubernatorial administration in January 2015 marked a noticeable change in attitude regarding energy efficiency policy in the state. With two new commissioners appointed to the Department of Public Utilities (DPU), one with little experience and background in energy matters, and the other a former lobbyist for power generators and a business group, signals from Gov. Charlie Baker seemed to indicate a desire to cut energy costs, and a misunderstanding of the role of energy efficiency as a first-order energy resource. Meanwhile, the state's Energy Efficiency Advisory Council (EEAC) moved forward in engaging stakeholders to inform the next three-year statewide energy efficiency programs, to cover years 2016-2018. NEEP participated in a stakeholder meeting to present its best practice recommendations and followed up with formal comments to the EEAC regarding the 2016-2018 statewide plans. We also filed comments regarding an unprecedented joint request for proposals issued by Massachusetts, Rhode Island, and Connecticut for "clean energy resources" and transmission, including procurement of new natural gas capacity into the region. NEEP's comments focused on the need for the states to consider non-transmission alternatives, such as energy efficiency on a regional scale, before committing to new transmission infrastructure, such as gas pipelines, that would be paid for by a tariff on electric ratepayers. Massachusetts continues to rank number one on ACEEE's State Energy Efficiency Scorecard due to strong state and utility programs and policies, as well as its transportation and buildings initiatives. In 2016, Massachusetts achieved three percent energy savings from its utility energy efficiency programs. National Grid filed a formal proposal for a Non-Wires Alternative Project on the island of Nantucket, only to later withdraw the proposal due to an error in the discount rate of the undersea cable that would have been deferred. Massachusetts has also set an energy storage target of 200 MWh of energy storage by 2020 following the legislation that enabled the Mass. DOER to set targets for energy storage deployment.

- **New York:** In 2014, New York was in the midst of some of the most momentous energy policy proceedings in recent memory, beginning with the ambitious and all-encompassing "Reforming the Energy Vision" (REV) docket. NEEP participated in meetings and hearings, regular calls with clean energy advocates, and submitted public comments on Track 1 of the REV. We also submitted comments in support of PSEG Long Island's Utility 2.0 Plan, praising the organization for their focus on efficiency and clean energy in the context of a modernizing grid, and their view of the evolving role for utilities. There was concern that state regulators seemed convinced that private markets and financing would play a prominent role in delivering energy efficiency programs that were formerly administered by NYSERDA and the state's electric and gas utilities. NEEP participated in the Clean Energy Organizations Collaborative (CEOC), a group of NGOs dedicated to accelerating clean energy via the REV proceeding. To

help stakeholders better understand the impact of these proceedings, NEEP released a six page summary of the 126-page State Energy Plan and an eight-page summary of the 130-page Order Adopting Regulatory Policy Framework and Implementation plan. In June 2015, NEEP and other members of the CEOC met with Public Service Commission Chair Audrey Zibelman on a range of issues concerning the state's overall goals and efficiency program implementation, stressing the importance of continued program savings goals and suggesting the possibility of a stakeholder engagement forum through which goals might be determined. In 2016, the utilities filed individual Energy Efficiency Transition Implementation Plans (ETIPS), as well as Distributed System Implementation Plans. The former will be the vehicle for utility investments in energy efficiency moving forward, while the latter will be the vehicle for grid modernization investments (e.g., advanced metering infrastructure, distribution system hardening, electric vehicles supply infrastructure). More recently, the utilities also filed a Joint Supplemental Distributed System Implementation Plan (SDSIP), which suggests approaches for how to revise distribution system planning. As part of New York's REV, NYSERDA launched a Clean Energy Communities program in August 2016. NEEP continues to participate in the CEOC group, as well as an energy efficiency group that formed out of the CEOC that is focusing on educating the state on the importance and relevance of a strong energy efficiency plan Governor Cuomo has committed to establishing a comprehensive energy efficiency plan in 2018. This plan will ramp up energy efficiency efforts in New York.

- **Connecticut:** Following the issuance in early 2015 of its Integrated Resource Plan (IRP) for the state, the Department of Energy and Environmental Protection (DEEP) then moved into implementation via the state's next three-year, statewide Conservation and Load Management (C&LM) plan, which delivers energy efficiency programs via the state's electric and gas utilities and municipal electric companies. NEEP contributed by participating in joint proceedings and input sessions. In addition, as noted earlier, Connecticut's governor joined with his counterparts in Rhode Island and Massachusetts in heavily lobbying for increased natural gas capacity expansion, despite the state's commitments to greenhouse gas reductions and the failure of pipeline owners to secure firm contracts for that increased gas capacity. Notable aspects of the C&LM plan include demand response pilots, as well as a peak time rebate program that will be offered by United Illuminating (Iberdrola) in 2018. DEEP approved portions of each proposal related to DER hosting capacity analysis, targeting of DERs, and DER forecasting, but rejected proposals for investments in energy storage citing a lack of cost-benefit analysis. Connecticut has also released the 2018 update the Comprehensive Energy Strategy, which NEEP provided comments on in 2017. This Plan identifies strategic electrification as an essential strategy for the state to achieve its carbon and clean energy goals as well as grid

modernization and using energy efficiency as a resource. Unfortunately, the Connecticut legislature redirected ratepayer funding collected by the regulated utilities in 2018 to the state budget, reducing energy efficiency funding by 40 percent making it difficult to implement the new State Comprehensive Energy Strategy.

- **Vermont**: In June 2015, NEEP traveled to Montpelier, Vt. to participate in a stakeholder meeting on Vermont's Comprehensive Energy Plan, hosted by the state's Department of Public Service. We directed stakeholders toward NEEP's stakeholder driven cold-climate air source heat pump specification, and suggested that Public Service Department staff review and embrace established standards for attributing energy savings to utility program administrators for their support of building energy code education and enforcement. The major distribution utilities in Vermont filed plans to satisfy their Energy Transformation Portfolio obligations under last year's Renewable Energy Standard. The Energy Transformation (Tier III) provision of Act 56, passed by the Vermont Legislature in 2015, set targets for utility-led or utility-partnership projects that will reduce fossil fuel usage. The legislated target starts at two percent of sales (BTU equivalency) in 2017, rising by two-thirds of a percent each year until it reaches 12 percent in 2032. The utilities have established plans in 2017 and 2018. The plans included support for air source heat pumps, electric vehicles, electric vehicle supply equipment, and whole-home weatherization.

Lessons Learned

Similar to our comments regarding NEEP's assistance to Northeast States for state energy planning, NEEP's objective tracking of state energy policy developments in the Northeast as well as regional and national best practices in state efficiency policy and programs enables us to provide a unique and valued perspective to help states keep energy efficiency a priority during a time of significant change in energy system needs and economics. We have found that it is important to provide comments to inform state officials as well as stakeholders to inform multiple parties that actively participate in administrative, regulatory and legislative proceedings. We offer this by providing invited comments into generic regulatory or administrative proceedings, as well as by participating in and presenting in state energy efficiency advisory councils and boards. Our input helps states keep on the leading edge of energy efficiency. Several states have turned to NEEP for advice and recommendations to improve their ACEEE State Energy Efficiency Scorecard ranking (e.g., R.I., Conn., and N.H.).

Model State Evaluation Guidelines

- The Forum launched the EM&V Methods Standardized Reporting Forms project (renamed project), which involved developing the 'food label' equivalent for EM&V methods used by program administrators (or relevant state entities) to evaluate and determine savings from their energy efficiency programs. The objective of this effort was to build standardized transparency and understanding

of EM&V practices, and was coordinated with US DOE's Uniform Methods Project (UMP). The project contractor, Cadmus Group, developed draft standardized forms for project subcommittee review and comment in 2014, including an *Impact Evaluation Summary Form* and a *Program Portfolio EM&V Methods Summary* form. The forms were planned to be finalized in June 2014, and presented to the Steering Committee in late July for adoption.

- Final draft forms were developed to provide standardized transparency of EM&V practices used by efficiency program administrators. These forms reflect input from the Forum state Public Utility Commissions, Departments of Environmental Protection, State Energy Offices, program administrators, as well as US DOE, US EPA, and ISO New England. These forms were shared with the EM&V Forum Steering Committee and were presented to Forum members via webinar. Subsequently they were also shared with the National Energy Efficiency Registry. Discussions with some Forum members revealed that as of 2015 the Forum states' priorities were not focused on use or adoption of standardized forms.

Lessons Learned

Although NEEP determined that adoption of the forms was not a priority for the Steering Committee, the forms delivered regional value as an educational tool and guidance available to enhance transparency in documentation of energy efficiency program impact results. The forms also contributed by informing a national effort, namely the design of the National Energy Efficiency Registry (NEER) project which is a national effort to record and document energy efficiency impacts.

One lesson from this project is that timing and local need/demand for such a product can affect the ability for successful adoption and implementation. Because many Forum states have their own well-established evaluation reporting and documentation requirements, their expertise contributed to developing a high quality product, but these states did not perceive a strong need to adopt such a product. One takeaway is that these could be used or leveraged in other national efforts – e.g., extensions of the UMP effort in US DOE or in evaluator certification training materials – as well as informing the NEER product, for example.

Special WIP Task: Facilitating the Deployment of Energy Efficient Street and Outdoor Lighting

- NEEP published LED Street Lighting Assessment and Strategies for the Northeast and Mid-Atlantic in January 2015, which assesses the status of—and opportunities associated with—LED street lighting in the region. The report uses quantitative analysis to estimate street lighting inventories within the region and qualitative analysis to identify technical, regulatory, and financial barriers faced by cities and towns seeking to convert their inventories to LEDs. It highlights strategies that cities and towns from throughout the region have successfully employed to convert their fixtures from legacy technologies to LEDs. The report will provide value to communities seeking to understand street lighting in the

context of public facility operation and maintenance best practices, and will serve as a resource to help unlock up to 1.76 TWh of potential energy savings.

Lessons Learned

Communities seeking to upgrade their streetlights to LEDs may face a long and complicated road ahead. Stakeholders embarking on an LED streetlight upgrade project benefit greatly by learning from their peers that have undertaken similar projects. Developing case studies and providing direct technical assistance to communities is an important component of moving the region forward with the deployment of energy efficient street lighting.

Special WIP Task: Supporting State and Local Governments in Energy Data Collection and Tracking Efforts for Strategic Energy Management

- NEEP published the report, Public Sector Building Energy Benchmarking: Utility Data Access Options and Opportunities in December 2016. The report surveys the current landscape of public sector building energy benchmarking policies and programs in the Northeast and Mid-Atlantic region. It examines the tools used to access utility data and how municipalities across the region are using them to track usage as part of building energy benchmarking mandates. The report then highlights municipalities that serve as exemplars for accessing and using data to guide energy management decisions. Finally, the report offers a series of observed best practices to help steer public entities and municipalities onto a path toward effectively implementing building energy benchmarking initiatives.

Lessons Learned

Even with efforts to streamline access to utility data, building energy benchmarking can still be a challenge for municipal and state governments. Agencies must ensure they have accurate building and meter inventories to ensure all utility accounts are linked appropriately. Another lesson learned is that the enactment of additional benchmarking ordinances actually applies pressure to utility companies to offer streamlined access to utility data. This, in turn, makes benchmarking more feasible for others.

Special WIP Task: Deploying WIP/Better Buildings/SEE Action Resources, Tools, and Solutions that Support the Adoption of Energy Policies, Programs, and Technologies that will Advance Energy Efficiency in State and Local Communities.

- Through our ongoing relationships with state energy policymakers – energy offices, regulatory commissions, and stakeholder advisory councils – and by leveraging our relationships with utility program administrators and other key stakeholders, NEEP has become a trusted expert to provide direct technical and strategic policy support. These relationships also put NEEP in a unique position to direct those stakeholders to DOE resources – from both the SEE Action Network and the WIP State and Local Resource Center – when and where they

are most needed and can be most relevant. Throughout the funded grant period, NEEP disseminated resources in the following states:

- **Emerging States – Delaware and New Hampshire**
  - Setting Energy Savings Targets for Utilities
  - Analyzing and Managing Bill Impacts of Energy Efficiency Programs: Principles and Recommendations
  - Energy Efficiency Program Impact Evaluation Guide
  - Energy Efficiency Collaboratives

  Below is one testimonial provided by a leading utility staffer involved in the process:

  "As a utility representative involved in New Hampshire's regulatory proceeding investigating the creation of an Energy Efficiency Resource Standard, I found 'Setting Energy Savings Targets for Utilities' to be very informative -- particularly on the surrounding issues that need to be considered and fully addressed in tandem with establishing mandated energy savings targets." - Eric Stanley, Manager of Energy Efficiency and Customer Programs at Liberty Utilities

- **Established States – Connecticut and Massachusetts**

  Bringing new information and resources to established efficiency states can be a bit more challenging, as these states often believe that as leaders, they might not need much guidance. In the cases of Connecticut and Massachusetts, NEEP worked through relationships with state energy offices, utilities, and the successful Energy Efficiency Board (Conn.) and Energy Efficiency Advisory Council (Mass.) to seek opportunities to inject best practices guidance from the SEE Action Network into the discussion, featuring the following papers in our communications:
  - Sustained Energy Savings Achieved through Successful Industrial Customer Interaction with Ratepayer Programs: Case Studies
  - A Policymaker's Guide to Scaling Home Energy Upgrades
  - Delivering Energy Efficiency to Middle Income Single Family Households
  - Insights from Smart Meters: Ramp-up, Dependability and Short-term Persistence of Savings from Home Energy Reports
  - Analyzing and Managing Bill Impacts of Energy Efficiency Programs: Principles and Recommendations

- This funding also supported development of the 2016 *Regional Roundup of Energy Efficiency Policy*, which offers policymakers, regulators, program administrators, and other stakeholders a comparative view of the progress of energy efficiency policies and programs across the Northeast - Mid-Atlantic

region. The 2016 *Roundup* looks through the lens of "Next Generation" Energy Efficiency – what are the most advanced states doing, and what steps can policymakers take to keep their states moving forward?

Lessons Learned

All Northeast states are interested in energy efficiency as a public policy to reduce energy costs and provide affordable, reliable energy resources. Leading states with a long history of energy efficiency policies and programs seek new opportunities to achieve cost effective savings. NEEP's value add to such states includes information (from US DOE and other sources as well as from our own analyses) about new and emerging efficiency policies, programs, and strategies to address underserved market sectors (e.g., multifamily and industrial), and opportunities to build on the successes of other states. NEEP's value add to emerging states is to help them learn from the experience of leading states in addressing specific needs and issues (e.g., cost-effectiveness analyses; structure of energy efficiency resource standards; evaluation, measurement and verification requirements) in a manner that builds knowledge among the range of stakeholders (e.g., via presentations and briefings at technical sessions; custom reports and analyses). For both leading and emerging states, NEEP's role as an objective regional resource offers utilities as well as state officials opportunities to learn and advance their knowledge and best practice from national as well as regional best practices.

Special WIP Task: Enable More State and Local Governments to Lead by Example by Providing Tools, Resources, and Best Practices

- NEEP released the Public Sector Building Energy Benchmarking: Utility Data Access Options and Opportunities whitepaper in December 2016. This report, supported by the US DOE, highlights the regional landscape of building energy benchmarking policies and programs and details efforts to gain streamlined access to energy data. These programs and efforts serve as models to inform public-sector entities about energy benchmarking. The goal of the report is to assist building managers with the benchmarking process by streamlining access to energy data.
- NEEP provided technical assistance to the Cities of Portland and South Portland, Maine resulting in building energy benchmarking ordinances being passed in each jurisdiction. NEEP provided research, analysis, and disseminated resources including Building Energy Rating and Disclosure Policies: Update and Lessons from the Field guide and the Public Sector Building Energy Benchmarking: Utility Data Access Options and Opportunities report. These benchmarking ordinances are the first of their kind in Maine and will enable city officials to track building energy performance as they work to accomplish their sustainability goals.
- NEEP engaged in various discussions with local government officials to improve energy efficiency in public buildings:
    - The Towns of Lexington, Mass. and Swampscott, Mass. approached NEEP to learn more about using NE-CHPS for a school project. NEEP

provided technical assistance and data to municipal personnel to help them make the case for using NE-CHPS for their upcoming school projects.

- Provided technical support to the NH Local Energy Solutions group regarding schools and public buildings projects.

- NEEP developed a new exemplar for the City of Providence, R.I. This exemplar highlights some key energy improvements made to city infrastructure such as public buildings, schools, and street lighting. A High Performance School Exemplar was also developed for Kingswood Regional Middle and High School. These exemplars demonstrate that the public building sector is leading by example and serve as models for future projects.
- NEEP finalized and published the latest update to the Regional Operations & Maintenance Guide for High Performance Schools and Public Buildings in the Northeast and Mid-Atlantic. This update, produced through a collaborative process amongst various stakeholders, provides strategies for the latest and greatest in facility operations. Much of the information in the original guide remains relevant today, but it became clear a refresh was needed to cover new information on lighting retrofits, electric vehicle charging, financing, recycling, and more. This report ensures that existing buildings are properly maintained to improve occupant health and energy efficiency.
- The Public Buildings Leadership Group assembled quarterly via webinar to highlight new resources and share best practices, including current regional trends with EPA's Portfolio Manager, Connecticut's Clean Energy Communities Program, and US DOE resources.
- NEEP participated in US DOE's Home Energy Information Accelerator, a forum for national collaboration for promoting the scaling up of rating programs, by providing progress updates from across the region.
- NEEP coordinated with the Natural Resources Defense Council on the data aggregation threshold in the New York Distributed System Implementation Planning process. NEEP discussed potential technical assistance we could offer to provide a regional, objective perspective of what jurisdictions are using for whole-building data aggregation thresholds and best practices within the Northeast and Mid-Atlantic states.
- NEEP guided the Rhode Island OER and the working groups they convened to implement building energy rating across the state's entire building stock. For residential buildings, NEEP provided updates on synergistic efforts like HELIX at the group's quarterly meeting and provided technical assistance as the state prepared to pilot DOE's Home Energy Score via National Grid's home performance program.
- NEEP formed a new relationship with the NYC Mayor's Office of Sustainability, which is interested in catalyzing energy savings in the underserved small multifamily market, to pair with its transparency ordinance for large commercial buildings. We provided technical guidance on various rating programs that are

available, as well as different strategies for introducing rating programs or policies at the time of listing of properties for sale.

- NEEP maintains a document that catalogs all of the benchmarking policies that have been enacted throughout the region. Most recently, the document was updated and published online to include the adoption of benchmarking policies in both Portland and South Portland, Maine. The purpose of this resource is to provide a quick and easy snapshot of the basics of benchmarking and also some more detailed information on the policies that have been enacted in the NEEP region.

Lessons Learned

- It is important to engage a variety of stakeholders from the start in efforts to enact benchmarking ordinances.
- The champion for these efforts comes in many different forms – from a facilities director to community energy task force member.
- Communities are bandwidth constrained and have limited funding, time, and knowledge.
- There are competing stakeholders – e.g., other NGOs and for-profit organizations – telling communities what they should do.

Special WIP Task: State and Local Energy Planning

- With funding for this task, NEEP placed references to several resources from the US DOE's State and Local Solution Center. These references were placed in the New York Clean Energy Advisory Council's Energy Efficiency Best Practices Working Group's Report on Energy Efficiency Best Practices, filed pursuant to the New York Public Service Commission's Reforming the Energy Vision (REV) proceeding. Due to the highly influential role of the New York REV proceeding, this report on energy efficiency best practice will likely be circulated broadly and cited repeatedly. This will likely be an enormously impactful report**.** The following resources were cited in the final version of the report as references:

SEE Action Materials Cited:

- Energy Efficiency Collaboratives
- Making it Count: Understanding the Value of Energy Efficiency Financing Programs Funded by Utility Customers
- Accessing Secondary Markets as a Capital Source for Energy Efficiency Program Finance: Program Design Considerations for Policymakers and Administrators
- Energy Efficiency Finance Programs: Use Case Analysis to Define Data Needs and Guidelines
- Insights from Smart Meters: Ramp-Up, Dependability, and Short-Term Persistence of Savings from Home Energy Reports

- Insights from Smart Meters: Identifying Specific Actions, Behaviors, and Characteristics That Drive Savings in Behavior-Based Programs
- Insights from Smart Meters: The Potential for Peak-Hour Savings from Behavior Based Programs
- Strategic Energy Management for State and Local Governments
- Industrial Energy Efficiency: Designing Effective State Programs for the Industrial Sector
- Sustained Energy Savings Achieved through Successful Industrial Customer Interaction with Ratepayer Programs: Case Studies

Other US DOE Materials Cited

- Energy Data Access Toolkit (Better Building Accelerator)
- Overview of Current and Future Use Cases for Residential Connected Thermostats
- Insights on Smart Grid Customer Engagement
- Catalogue of State Energy Efficiency Potential Studies

NEEP Materials Authored under Previous WIP Grants, cited in Best Practices Report

- LED Street Lighting Assessment and Strategies in the Northeast and Mid-Atlantic
- Public Sector Building Energy Benchmarking: Utility Data Access Options and Opportunities

- NEEP reported to US DOE staff with a summary of NEEP's policy monitoring and tracking activities related to state energy planning through links highlighting major trends and developments on a monthly basis. Many of these developments were also embodied in our 2016 Legislative Tracker, August 2016 Policy Tracker, October 2016 Policy Tracker, December 2016 Policy Tracker, and February 2017 Policy Tracker. NEEP's Spring 2017 Energy Efficiency Snapshot also provided a quantitative overview of comparison of program savings, spending, and strategies across states in the Northeast and Mid-Atlantic. NEEP's Spring 2016 Energy Efficiency Snapshot was used by the consultants to the Connecticut Energy Efficiency Board to help educate Board members during their annual retreat on strategies and program savings in neighboring states. The fourth substantive slide of the 2016 Snapshot directly cites DOE's 2016 US Energy and Employment Report.
- Three of the most notable energy planning proceedings where we provided written input included: 1) NEEP's input on Connecticut's State Energy Strategy and Conservation and Load Management Plan Update; 2) NEEP's input on the Supplemental Distributed System Implementation Plan filed with the Public Service Commission by the joint utilities of New York and Energy Efficiency Best Practices Report; and 3) NEEP's input on New Hampshire's Energy Efficiency Resource Standard. All of these comments referenced US DOE resources.

NEEP also presented on SEE Action Resources (et al.) at a conference of the Northeast Public Power Association.

- NEEP corresponded with US DOE staff and provided recommendations for how State and Local Solution Center materials could be revised to find better tracking with policymakers. Namely, NEEP recommended as a result of input from on-the-ground state stakeholders: 1) updating materials that were of value but out of date and recording revision dates at the prologue of such materials; and 2) making materials more accessible to policymakers and regulators by encouraging other Regional Energy Efficiency Organizations to disseminate in their states through regulatory proceeding participation.
- In early 2017, NEEP published the 2017 Regional Roundup of Energy Efficiency in the Northeast and Mid-Atlantic. Along with state-level highlights, the report examines regional trends and shared challenges in harnessing the potential of energy efficiency to meet today's pressing energy and environmental challenges — controlling energy costs, improving system reliability, reducing the need for expensive new generation and transmission projects, modernizing the electric grid, strengthening the economy, growing jobs, improving public health, and curbing emissions of greenhouse gases and other pollutants. For 2017, NEEP took a new approach to the Regional Roundup, deciding to present it in slide format in hopes that it might be more accessible to time-strapped policymakers.

Lessons Learned

The value of energy efficiency continues to evolve and increase in the Northeast region. Initially, the value largely focused on avoiding higher energy costs and avoiding air pollution associated with power generation. In recent years, energy efficiency, coupled with demand response and load management using a range of technologies (e.g., smart meters and thermostats), have grown to play an important role in deferring the construction of grid infrastructure upgrades to meet peak energy needs at the system as well as local levels – using tools such as "Non-Wire Alternative Solicitations". With so many new practices to realize the value of energy efficiency to meet evolving energy policy needs, NEEP has helped states keep up with regional and national developments through our targeted dissemination of US DOE information. Tracking best practice resources in policy and program as well as state energy policy proceedings has helped us match resources to expand knowledge and opportunities to meet state-specific needs.

Task 4: Advanced Manufacturing Office (AMO)

Task 4A: Northeast Business Leaders for Efficiency and Clean Energy

- NEEP's former Northeast Business Leaders for Energy Efficiency Program was a unique opportunity for energy efficiency program administrators to profile customers who demonstrated exceptional leadership and best practices in energy efficiency throughout the operations and maintenance of their business.

These leaders were recognized at the annual NEEP Summit, and provided important examples of the economic and environmental benefits of energy efficiency.

- The 2016 program highlighted six regional business voices in support of energy efficiency from a variety of specific projects and overall commitments to doing more with less energy use. Through their efforts to curb energy demand, these businesses – who collectively achieved an annual electricity savings of over 18 million kWh, over 83,000 therms, and $2.4 million – are exemplar cases of reaching environmental and budgetary goals via investments in efficiency.

Lessons Learned

Producing a series of short videos highlighting best practices among a variety of businesses was helpful in raising awareness of risk management and available incentives in undertaking efficiency measures. They were a good tool to show others what is possible.

Additionally, providing a venue for businesses to share their stories – and receive recognition for it – proved valuable in a variety of ways. Many businesses can be hesitant to speak on policy and regulations, but they were more forthcoming in sharing their story. The awards allowed us to de-politicize efficiency.

Special AMO Task: Assist US DOE to develop a plan for and hold the Northeast and Mid-Atlantic Regional Dialogue Meeting (March 13 in Baltimore, Md.)

- In response to then-President Obama's 2012 Executive Order Accelerating Investment in Industrial Energy Efficiency, which called for 40 GW of new Combined Heat and Power (CHP) capacity over the next decade, the US DOE held a series of regional meetings to discuss Industrial Energy Efficiency (IEE) and CHP opportunities. The Northeast and Mid-Atlantic Regional Dialogue Meeting, co-sponsored by NEEP and the SEE Action Network, was held in Baltimore, Md. on March 13, 2013 and brought together policymakers, utilities, industrial customers, vendors, and other stakeholders. The Dialogue focused on fostering a regional discussion of state best practice policies and investment models to overcome the numerous barriers to IEE and CHP investments. The meeting also focused on IEE and CHP successes, opportunities, and new approaches—all with an eye toward state and regional policy, including the role of ratepayer-funded energy efficiency programs.

Lessons Learned

One of the key conclusions that came out of the Northeast and Mid-Atlantic Regional Dialogue Meeting was that CHP installations were most successful when the owner considered a system approach that combined IEE and CHP. Such an approach helps to ensure that the facility is truly managing overall energy use from both an electric and thermal perspective, as well as ensure that systems were designed for maximum cost effectiveness, supported critical processes and provided system resiliency for the facility.

Special AMO Task: Building on the Dialogue information and results and other relevant resources, prepare a report "Accelerating Industrial Efficiency and CHP in the Northeast/Mid-Atlantic Region" including a summary of the opportunities, barriers/issues and actions needed and recommended high-value roles for NEEP and others

- NEEP submitted to US DOE on August 30, 2013 a report titled A Systems Approach to Economic Industrial Efficiency and Combined Heat and Power in the Northeast and Mid-Atlantic States. The report built upon information gleaned from the Northeast and Mid-Atlantic Regional Dialogue Meeting co-hosted by US DOE and NEEP in Baltimore, Md. in March 2013. It provided a summary of the opportunities, barriers, and actions needed, as well as recommended high-value roles for NEEP and others to support the acceleration of IEE and CHP in the Northeast - Mid-Atlantic region through the advancement of public policies and industrial efficiency programs, and deployment of high efficiency advanced manufacturing technologies and best practices.

Lessons Learned

NEEP could be positioned to bring unique and substantial value to helping achieve the regional vision outlined in this document. NEEP's role in maximizing energy efficient solutions through regional partnerships and the ability to leverage knowledge, capability, learning, and funding to increase the impacts of individual state efforts can provide a means to assist stakeholders in the action plan defined in the report so that identified policy gaps for IEE and CHP can be successfully addressed.

Special AMO Task: Developing/Disseminating Resources to Drive Adoption of Strategic Energy Management within Efficiency Programs in the Northeast - Mid-Atlantic Region

- In early 2015, NEEP launched our Industrial Energy Efficiency (IEE) initiative and began by assembling a group of regional stakeholders to advise and advance the initiative. Participants were identified, engaged, and committed to advancing Strategic Energy Management (SEM) among industrial customers in the Northeast – Mid-Atlantic region. The objective of the initiative is to accelerate the adoption of SEM across the regional industrial sector to develop resources, including a regional market assessment and strategies to drive adoption of SEM.
- Shortly after launching the initiative, NEEP began research to inform development of the regional SEM market assessment. The final report, Northeast/Mid-Atlantic Industrial Sector Report: Market Assessment and Recommended Strategies to accelerate Energy Efficiency, was published in May 2016. The report provides an industry overview and quantification of industrial energy use, and outlines tools and resources available from US DOE as well as from utility and state programs in the region. It serves as a reference for concepts and terminology in the industry and IEE, especially SEM. The report also includes recommended strategies for how to move IEE forward in the region through the expanded adoption of SEM. NEEP gathered valuable information

from many of the regional stakeholders in development of the market assessment.

- The initiative and development of the market assessment and regional strategies were informed by the SEM Collaborative working group, which was co-led by NEEP and Efficiency Vermont. The Collaborative met regularly via teleconference throughout the grant period to discuss the status of the market assessment and planning for SEM-related events. The group offered a structured information exchange between industrial program administrators in the region either implementing or exploring SEM as a program measure.
- NEEP hosted the Northeast Industrial Energy Efficiency Summit on November 12-13, 2015 in Bretton Woods, N.H. We worked in coordination with trainers from US DOE to prepare for a day-long training on SEM, as well as the second day of the event, which helped to shape the regional market assessment and recommended strategies. Attendance was approximately 80 overall; 25 attended the DOE training and 23 attended the workshop, including DOE representatives.
- On November 15, 2016 NEEP convened 30 stakeholders from around the region at the Northeast SEM Collaborative Workshop to discuss the critical barriers regional efficiency programs are facing in assessing the potential incorporation of SEM into their program offerings as pathways forward. The workshop was held at Schneider Electric in Andover, Massachusetts.
- NEEP developed a two-page Strategic Energy Management for Energy Efficiency Program Primer that leverages existing materials to communicate a clearer definition of SEM, targeted to the general market, including energy efficiency programs. Market stakeholders lack basic understanding of what constitutes SEM, especially energy efficiency programs who are confused about the difference between SEM offerings and what industrial programs have traditionally offered.
- In early 2017, NEEP published a report on SEM Evaluation, Measurement and Verification (EM&V) Best Practices. The report identifies best practices for measuring savings from SEM programs, evaluating those measured savings, and screening for cost effectiveness. SEM in the industrial sector is an emerging opportunity to achieve significant energy savings through both increased capital projects as well as operations and maintenance (O&M). To inform the report, NEEP circulated draft reports with several leading stakeholders including the US DOE, national laboratories, energy efficiency program administrators, and other SEM experts. We anticipate the report will be used by states and energy efficiency programs to inform their consideration of launching SEM offerings.
- NEEP participated in US DOE's annual Better Buildings Summits in 2015, 2016, and 2017. These events offered opportunities for NEEP to learn about effective implementation of SEM, share updates on our initiative, and learn about new DOE resources, such as 50001 Ready. NEEP works with regional partners to utilize the resources available through this program, making promotion and adoption of SEM more accessible to potential stakeholders.

- Throughout the grant period, NEEP updated a living document to summarize program activity in the region related to industrial energy efficiency, and SEM in particular. The report was sent directly to DOE staff.

Lessons Learned

Just over the past few years, we have seen a significant shift in energy efficiency program interest and adoption of SEM as a program measure. In 2015, Efficiency Vermont was the only program offering SEM (or Continuous Energy Improvement) engagements to their customers. By the end of 2017, NYSERDA had launched a new SEM program, and Massachusetts, Rhode Island, and Connecticut had all begun to develop pilot programs. Issues related to cost effectiveness has been a key challenge that many programs have faced in their development of programs. In response to this issue, we developed our report focused on EM&V and cost effectiveness issues noted above.