2019 Quarter-Three Report

Advanced Evaluation, Measurement & Verification

Mission: Projects, research, and technical assistance to advance understanding and standardization of information and approaches needed to plan, forecast and assess energy resource value and impacts.

Advanced EM&V, Forecasting & Planning Solutions
Long-Term Market Transformation Goals

- By 2025, all Northeast states adopt resource evaluation practices that reflect the full energy and non-energy impact and value of demand-side resources to meet public policy goals.
- By 2025, all Northeast states adopt program metrics and EM&V for demand-side resource programs that reflect total building energy efficiency performance as well as carbon efficiency.
- By 2025, all Northeast states use M&V 2.0 to assess demand-side resource impacts, and to optimize programs to serve customer as well as grid needs for energy reliability, flexibility and affordability.

The third quarter of 2019 was characterized largely by work to support ongoing projects that are facilitating dialogue related to NEEP's long-term goals noted above, including:

- Planned two public webinars that will be delivered in fourth quarter – one on Pay for Performance programs and one on the National End Use Load Profile study being funded by the U.S. Department of Energy (US DOE). Both of these webinars communicate and illustrate uses of measurement and verification at the whole premise level.
- Provided cursory technical review of materials from a US DOE project to develop end use load profiles for the nation. This is in preparation for work that will commence later in 2019 on a regional loadshape needs assessment. Loadshapes describing timing of energy use and savings are a key ingredient in assessing the emissions impacts of energy programs and policies.
- Monitored state partners' work on cost-effectiveness frameworks and provided input to blogs and comments that can lead to updated cost-effectiveness frameworks. While non-energy impacts (NEI) are not necessarily included in primary tests of cost-effectiveness, they are gaining traction as useful information for program planning and implementation and as secondary tests.
- Participated in an ISO-New England (ISO-NE) Markets Committee meeting to discuss the Forward Capacity Market (FCM) issue and continued to brief FCM stakeholders about ongoing discussions in the region regarding any next steps following the ISO-NE report on measurement of energy efficiency performance in all hours.
- Shared preliminary results of the commercial program M&V 2.0 pilot study by editing the national conference paper and moderating the panel at which the paper was presented.
- Began scoping a brief that will discuss the role of EM&V in total building energy performance policy strategies.

Progress Toward 2019 Advanced EM&V Outcomes	25%	50%	75%	100%
Outcome: Three additional Northeast states include non-energy impacts of energy efficiency in their cost-effectiveness and evaluation frameworks. **Progress:** Additional states have yet to embrace non-energy impacts in their frameworks, but there is evidence of slightly positive progress in that two states recognize the value of following a process to align policy and cost-effectiveness metrics. New Hampshire went through the National Standard Practice Manual (NSPM) process and is landing on utility test as the primary test, which aligns well with its current policy. It will include other tests as secondary to inform efficiency planning. Connecticut is launching research on cost-effectiveness framework to address distributed energy resources (DERs); comments for program administrator on the total resource cost (TRC) include recommendation to monetize avoided carbon.				
Outcome: Five Northeast states contribute to NEEP's development of a regional M&V 2.0 best practices manual to evaluate efficiency programs, optimize efficiency programs and customer service, and support home and building energy benchmarking. **Progress:** Six states (Conn., Vt., N.Y., N.H., R.I., Penn., as well as D.C.) are tracking this effort, participating in partner updates and review of a draft outline of the manual. M&V 2.0 as an evaluation resource is currently a relatively low priority among some of the states in the region so input is limited.				
Outcome: Two Northeast states adopt program metrics and EM&V for demand-side resource programs that reflect total building energy efficiency performance as well as carbon efficiency. **Progress:** In addition to traditional energy efficiency home retrofit programs, the total building energy efficiency performance approach with EM&V exists in the form of behavioral programs and more emerging in the form of Strategic Energy Management (SEM) and Pay for Performance (P4P) program designs. These trends are not widely penetrating the region yet. However, N.Y., Vt., and D.C. are gaining experience with P4P; Vt. and N.Y. with SEM; Mass., Vt., and N.Y. are addressing carbon efficiency; and N.H. is studying energy optimization.				
Outcome: Six Northeast states participate in the prioritization of loadshape and planning/forecasting information needs for the region to address strategic electrification and advanced efficiency. **Progress:** Due to delayed funding, NEEP activities relating to loadshape prioritization are limited. However, Vt., N.Y., and Mass. have been providing input to the US DOE End Use Load Profiles NTAG and data collection process. Stakeholders in Mass. have been actively engaged in an ISO-NE study of				

options to assess energy efficiency performance in all hours. New England states also participate in review of the ISO-NE energy efficiency forecast; both of these ISO-NE activities are helping to raise awareness of the relevance of the topic of loadshape needs in the region.				

Air Source Heat Pumps and Smart Controls

Mission: Accelerating market adoption of high-efficiency residential and commercial air source heat pumps, smart controls and services with thermal efficiency improvements that provide deep energy savings and carbon reduction while enabling real-time load management to support efficient, reliable grid operation.

Air Source Heat Pumps and Smart Controls
Long-Term Market Transformation Goals

- By 2030, 40% of Northeast homes use high performance ASHPs for heating.
- By 2030, 50% of Northeast homes are "energy smart" with at least two "energy smart" systems (HVAC, water heating, plug loads).
- By 2030, 80% of Northeast homes with high performance ASHPs are retrofitted to improve thermal efficiency performance.

The air source heat pump (ASHP) initiative gathered at the end of August via webinar, attended by approximately 40 regional stakeholders to discuss ongoing activities in line with the initiative's high-level market transformation strategies. Based on a growing trend of states setting ambitious goals for ASHP adoption, stakeholders agree that it is more important than ever to ensure the systems are being installed correctly.

NEEP launched work in July to develop two ASHP resources geared toward consumers. One will focus on providing consumers with buying guidance on ASHPs, and the other will be a series of case studies of ASHP installs in the Northeast. The objective of these resources is to boost awareness, understanding, and confidence of consumers.

NEEP's cold climate air-source heat pump (ccASHP) product list now houses over 5,000 cold-climate systems. The ccASHP Specification and product list has become the go-to resource in the region for programs to identify and promote high performance heat pumps, with the website receiving approximately 100 unique visitors a day. The product list is an important tool in promoting the highest performing systems which we believe will lead to greater consumer satisfaction and confidence and assist in growing the ASHP market toward 40% adoption by 2030.

Progress Toward 2019 ASHPs & Smart Controls Outcomes	25%	50%	75%	100%
Outcome: Program and/or policies referencing NEEP's ccASHP specification increases from seven to 10 states and provinces in the Northeast U.S. and Canada. **Progress:** Eleven programs inside and outside of the region now reference the ccASHP specification/product list – Mass. Clean Energy Center (MassCEC), Mass Save, Mass. Alternative Energy Portfolio Standard, Eversource-NH, Efficiency Vermont, NYSERDA, PSEG Long Island, New Jersey Clean Energy Program, Efficiency Nova Scotia, Otter Tail Power Company, Holy Cross Energy, and Northwest Energy Efficiency Alliance.				
Outcome: NEEP's regional market transformation strategies and resources for ASHPs are referenced or used in at least five new jurisdictions. **Progress:** • Mass Save and NYSERDA are moving forward with Integrated Control incentives; • NYSERDA is developing installer training based on NEEP guides; • NEEP is consulting with National Grid - Rhode Island on their program design. Many aspects of NEEP's key strategies are included (consumer education, ccASHP Specification, etc.); and • NEEP established a regional subscription with the Northwest Energy Efficiency Alliance to provide access to our resources across many of the Northwest region's programs.				
Outcome: At least five Northeast states and 75 percent of manufacturers with products listed on NEEP's 2019 ccASHP list reference or use NEEP's best practice 2018 ccASHP installer guidance and/or 2019 consumer guidance to select ccASHP systems. **Progress:** NYSERDA uses NEEP's installer guides for their in-field monitoring pilot, in addition to MassCEC, Mass Save, and Efficiency Vermont who link to the guides on their websites. We have received some anecdotal feedback that the guide contents are being adopted by manufacturers as part of their trainings to contractors.				

Federal & State Appliance Efficiency Standards

Mission: Supporting minimum product efficiency standards that lock in long-term energy and carbon emission savings enabled by regional and national market transformation activities.

Federal and State Appliance Efficiency Standards
Long-Term Market Transformation Goals

- By 2022, at least four Northeast states adopt state appliance standards not covered by the federal program.
- By 2025, federal appliance standards are updated to secure all cost effective energy and carbon savings and include 2019 Northeast states standards.

While state appliance standards activity slowed a bit in the third quarter, a number of disappointing actions took place at the federal level. The most significant action was US DOE making the determination that "backstop" standards for general service lamps (GSL, aka light bulbs) would not be taking effect in January 2020, and that a previous definition for the GSL category would be significantly shrunken. NEEP worked with regional and national partners to determine appropriate responses. Several national partners are planning legal action, which NEEP and regional stakeholders support. In a related process, US DOE proposed no new standards for the general service incandescent lamp category, a subset of the broader GSL category. NEEP will be developing regional responses to this rulemaking. Between the developments with lighting and other US DOE appliance standards actions, it is clear that the federal government is intent on significantly weakening the standards program and the product categories within the program. Fortunately, there are ways for states to respond in the face of this.

Progress Toward 2019 Appliance Standards Outcomes	25%	50%	75%	100%
Outcome: At least six Northeast states propose new state appliance standards in 2019. **Progress:** Five states (N.Y., Maine, Mass., R.I., Conn., as well as D.C.) proposed new state appliance standards in 2019, with two or three others (N.J., Md., and/or Pa.) expected to do so in the fourth quarter.				
Outcome: At least two Northeast states adopt new state appliance standards in 2019. **Progress:** No states have yet adopted new appliance standards in 2019.				
Outcome: At least 10 Northeast states and associated stakeholders actively engage to encourage the US DOE Appliance Standards and US EPA ENERGY STAR programs to keep pace and remain active to increase product energy efficiency. **Progress:** Several stakeholders have joined NEEP in submitting comments to US DOE and the U.S. Environmental Protection Agency (US EPA) ENERGY STAR program.				

Outcome: The general service lighting (EISA 2020) standard moves forward as intended with a 45 lumen-per-watt minimum efficiency standard in 2020. **Progress:** In a final rule published by US DOE in September, the 2020 GSL "backstop" standards set to take effect in January 2020 were determined not to be triggered and will not go into effect. NEEP began work with partners on a response. US DOE's actions are considered illegal and will most likely face a series of legal challenges. NEEP is working with partners via our Appliance Standards Working Group, as well as with the Appliance Standards Awareness Project (ASAP) and other national partners.				

Building Energy Codes, Benchmarking, and Home Energy Labeling

Mission: Assisting states and communities to save energy, reduce costs, decrease emissions, improve resiliency, and strengthen workforce development through best practices in building energy code adoption, enforcement, compliance benchmarking, and home energy labeling.

Building Energy Codes, Benchmarking, and Home Energy Labeling
Long-Term Market Transformation Goals

- By 2022, all Northeast states adopt the latest model energy code that increases energy savings.
- By 2030, at least six Northeast states require zero energy for building energy codes for new and renovated homes and buildings.
- By 2030, 30% of existing homes and buildings are benchmarked and retrofitted to reduce carbon emissions 50%.

This initiative is focused on improving energy efficiency through the adoption and enforcement of statewide building energy codes and stretch codes and benchmarking, labeling, and tracking activities. In the third quarter, NEEP focused on code adoption, stretch codes, code collaboratives, and benchmarking as follows:

Adoption: New Hampshire, West Virginia, and Rhode Island adopted the 2015 International Energy Conservation Code (IECC). New Hampshire and Rhode Island's adoption included weakening amendments, making the overall efficiency of the adopted version of the code less than the model code. Massachusetts, Vermont, and New Jersey adopted the 2018 IECC. Massachusetts and Vermont's adoption includes strengthening amendments, while New Jersey's included slight weakening amendments. Connecticut, Delaware, and New York have all proposed adoption of the 2018 IECC and are expected to formally adopt the code before the end of 2019. The District of Columbia is also expected to adopt before the end of the year a modified 2015 IECC that will exceed the efficiency of the 2018 IECC and will include a zero energy appendix. The appendix is optional but will become the base code in 2027. Maine passed legislation that permits the state to adopt either the 2015 or 2018 IECC after review and recommendations from committees and state departments. Adoption, as per the legislation, is expected by July 2020. Lastly, Pennsylvania and Rhode Island are currently reviewing the 2018 IECC for adoption. Rhode Island may adopt by mid-2020 and Pennsylvania by 2021.

Stretch Code: Stretch code activity also picked up in the third quarter. New York and Vermont adopted updated stretch codes and Maine resolved to draft a statewide stretch code by July 2020 in conjunction with their new base code. These stretch codes will provide the ability to construct buildings between nine and 20 percent more efficient than the respective state's base code. Stretch codes support a path toward all zero energy buildings in the region by pushing jurisdictions to achieve greater energy efficiency. NEEP provided technical assistance to the aforementioned states in their base and stretch code initiatives.

Code Collaboratives: This quarter also saw the reconstitution of the New Hampshire Code Collaborative (NHCC) and further formalization of the Maine Energy Code Collaborative (MECC). State code collaboratives empower local stakeholders to discuss code-related issues including adoption, compliance, and the creation of stretch codes at the state level; inform workforce development and code enforcement initiatives; and provide support to states by conducting research and providing feedback. The NHCC and MECC will begin meeting more regularly to support code adoption, compliance, and enforcement initiatives in their respective states. NEEP will facilitate all of these meetings and provide technical assistance, best practice guidelines, and recommendations on future work.

Benchmarking: There was also action on benchmarking projects in multiple states. NEEP is providing technical assistance to Montpelier and Burlington, Vermont on their prospective benchmarking and labeling initiatives. In Montpelier, at the request of the city, NEEP is helping to draft the ordinance language for the residential energy efficiency disclosure policy. In Burlington, NEEP is beginning to work on the rental energy efficiency disclosure policy. Additionally, the city of Providence, Rhode Island is seeking to pass a benchmarking ordinance for commercial buildings. NEEP has been working closely with city staff on engagement strategies to ensure the ordinance has support from the community.

Progress Toward 2019 Codes & Benchmarking Outcomes	25%	50%	75%	100%
Outcome: Six Northeast states (D.C., Del., Md., N.J., N.Y., Vt.) adopt a recent model energy code (2018 IECC). **Progress:** Three states (N.H., W.V., and R.I.) adopted the 2015 IECC, with N.H. and R.I. adopting with weakening amendments. Three other states (Mass., Vt., and N.J. adopted the 2018 IECC, with Mass. and Vt. adopting with strengthening amendments and N.J. with weakening amendments. Additionally, three states (Conn., Del., and N.Y.) have proposed adoption of the 2018 IECC and D.C. has proposed adoption of a modified 2015 IECC with strengthening amendments to exceed the efficiency of the 2018 IECC and a zero-energy appendix. All four are expected to adopt the updated codes by the end of 2019. Lastly, Maine passed legislation enabling the state to adopt either the 2015 or 2018 IECC, with adoption expected by July 2020, and two states (R.I. and Penn.) are reviewing the 2018 IECC for adoption, expected in mid-2020 and 2021, respectively.				

Outcome: Three Northeast states implement zero energy stretch codes (D.C., N.Y., Vt.) and three additional Northeast states adopt stretch codes (Del., Mass., N.J.). **Progress:** Washington, D.C. is on track to adopt a zero energy stretch code by the end of 2019. N.Y. and Vt. adopted updated stretch codes, but they did not adopt zero energy stretch codes. They are, however, great progress towards zero energy codes, which cannot be passed or realistically met overnight. Maine passed legislation to draft a statewide stretch code by July 1, 2020, the details of which have yet to be determined but may include zero energy language. Massachusetts has begun creation of a zero energy stretch code and hopes to approve it in early 2020. The region has made great strides towards zero energy codes, though no official zero energy code has been adopted.				
Outcome: Five Northeast states invest in initiatives to achieve 90+ percent code compliance statewide (Conn., Del., Md., N.J., Penn.). **Progress:** Connecticut is actively studying code compliance and a report by NEEP on compliance rates will be published by the end of 2019. Delaware has an ongoing code attribution program for utilities that is improving compliance. The state is considering conducting newer code compliance studies. New Jersey has a very rigorous code compliance continuing education program that includes 325 seminars offered by Rutgers University that are required by law for code enforcement officials, technical assistants, and inspectors. N.Y., Conn., Mass., D.C., and N.H. also have robust code trainings for new code adoptions and important periodic updates. D.C., N.Y., N.J., Mass., and R.I. claim attribution savings from code compliance, while D.C. even claims savings from code training. Altogether, Conn., N.Y., Del., N.J., Mass., D.C., N.H., and R.I. have ongoing investment in code compliance initiatives.				
Outcome: Two Northeast states and cities commit to create and implement a benchmarking and labeling (e.g., ENERGY STAR for Existing Homes) policy roadmap as a building decarbonization strategy. **Progress:** Montpelier, Vermont is currently developing ordinance language for their residential time of listing energy efficiency disclosure policy. This policy is a part of the city's greenhouse gas (GHG) reduction plan. Burlington has also identified benchmarking and labeling within its Zero Energy Burlington plan published in September 2019. Massachusetts had a statewide benchmarking bill introduced at the state house. The state is also launching a scorecard program with the Mass Save audit program. Providence, Rhode Island is in the process of introducing a commercial building energy benchmarking ordinance. New Jersey identifies benchmarking and labeling as a strategy in their draft 2019 Energy Master Plan.				

Efficient, Resilient Community Pathways and Resources

Mission: Best practice guidance, peer information exchange, and technical assistance to advance resilient, energy efficient, low-carbon public buildings and communities.

Efficient, Resilient Community Pathways and Resources
Long-Term Market Transformation Goals

- By 2022, All Northeast states adopt policies to assist in reaching their goal to reduce building sector energy consumption 3% per year and carbon emissions 40% by 2030.
- By 2025, 60% of Northeast communities reduce municipal building energy consumption by 20% or more.
- By 2030, 60% of Northeast communities have programs to reduce carbon emissions 50% across their residential and commercial sectors.

This initiative is focused on building capacities at both the statewide and local level to ensure that jurisdictions across the region are informed about energy and carbon reduction projects. In August, NEEP's Regional High Performance Communities Working Group held an in-person meeting to share insights into key topics such as resiliency, strategic electrification, zero energy schools, and more. This network of leaders provides a forum for stakeholders to learn from one another and incorporate information into programs, plans, policies, and projects. In addition, direct engagements with states and communities enable NEEP to provide focused technical assistance including presentations, resources, and model policy language. During the third quarter, NEEP engaged with stakeholders on the community level about zero energy school projects, at the state and local level about benchmarking efforts, and resources were developed on the topics of benchmarking and data aggregation for small, medium, and rural communities.

Progress Toward 2019 Communities Outcomes	25%	50%	75%	100%
Outcome: Twenty-two new Northeast communities commit to energy- and carbon-reduction goals. **Progress:** Communities in the region continued to lead by example by committing to energy and carbon reduction goals. This progress is highlighted by Burlington, Vermont's commitment to becoming a zero energy community by 2030 in their Net Zero Energy Roadmap. Additionally, NEEP worked with the city of Boston on their Climate Action Plan update, which establishes a plan for the adoption of a building energy performance standard for the city. Through NEEP's Achieving Community Efficiency (ACE) and Massachusetts Achieving Zero Energy (MAZE) projects, we are able to share lessons learned and resources with other smaller communities on high performance building projects and community-wide initiatives such as benchmarking.				

Outcome: At least nine Northeast states have policies, plans, or programs that encourage the development of high performance and/or zero energy buildings at the local level. **Progress:** Leadership at the state level is critically important to driving improvements at the community level. In New Hampshire, NEEP is engaged with the Department of Education to craft a program that would provide state funding to K-12 public school projects that include high performance features. Work continues in Rhode Island on the shared energy manager project, an initiative being led by the Rhode Island Office of Energy Resources (RI OER) to provide communities with staffed professionals to take on energy initiatives. These collaborative efforts with state partners provide forums to share best practices and lessons learned that help move the region toward resilient and efficient communities.				
Outcome: At least three Northeast states (Conn, Mass., N.Y., and/or R.I.) and ten communities implement strategic electrification policies or programs to improve efficiency and decarbonize energy use in public existing buildings. **Progress:** Strategic electrification remains a topic of interest amongst states and communities in the region, but questions persist about how to tackle this important yet challenging initiative. The pathways to decarbonize existing buildings can vary greatly based on a number of attributes. NEEP engages with stakeholders to collect information about the goals and approaches that leading cities and states are taking. This information will culminate in the development of a module for our Community Action Planning for Energy Efficiency (CAPEE) tool that will enable communities to understand the importance of strategic electrification, key steps needed, and how to develop a community action plan.				

Home Energy Labeling Information eXchange (HELIX)

Mission: Making the energy efficiency of homes visible and understood at time-of-sale or rental.

Home Energy Labeling Information eXchange (HELIX)
Long-Term Market Transformation Goals

- By 2025, home energy information is populated in all residential real estate listings across the Northeast.
- By 2025, lenders, realtors, appraisers in all Northeast states use home energy information to value residential real estate and to support investments to improve energy performance.
- By 2030, 30 percent of existing homes and buildings are benchmarked and retrofitted to reduce carbon emissions 50%.

NEEP provided two real estate professional trainings in Connecticut with over 80 professionals attending. The agents were engaged and eager to get access to data via HELIX, and wanted to know how

they could engage their multiple listing service (MLS) and continue to grow in the green real estate space. NEEP pointed attendees to our green real estate resource page, where we continue to update resources. We will continue working in Connecticut to integrate HELIX with the local MLS, and to engage real estate professionals on in the importance of HELIX, connect with states outside of the pilot region, and incorporate more data sources into HELIX. A blog was written about the HELIX trainings.

We continued work with Vermont and contractor ClearlyEnergy to develop the "Energy Estimator – powered by HELIX and ClearlyEnergy" to provide an energy cost estimate for homes that will be used in the Vermont Home Energy Profile. This tool is also available for other jurisdictions to use, and will provide an easy, low-cost way to achieve our goal of populating home energy information in all listings by 2025. We are engaging lenders, real estate professionals, and appraisers throughout this process to ensure the label is valued in the market place.

A solar photovoltaic (PV) toolkit was developed for states as we look to expand beyond the New England region. This toolkit explains the data points and process for integrating the information into HELIX. We provide this resource when reaching out to states (e.g., Maine and the Mid-Atlantic region) to identify their interest in integrating solar PV into the real estate market. It has been helpful in showing the best practices other states have used for authorizing HELIX access to the data.

Progress Toward 2019 HELIX Outcomes	25%	50%	75%	100%
Outcome: By year end, HELIX populates home energy information in 20 percent of residential real estate listings in New England and New York State. **Progress:** The New England Real Estate Network (NEREN) will roll out solar PV and certification data for Vt., N.H., Conn., Maine, and part of Mass.; Vt. and Mass. are currently live. We are still working with the R.I. statewide MLS, Cape Cod, Berkshires, and Maine listings to incorporate HELIX.				
Outcome: Home energy labels in New England and New York property listings increase by 20 percent. **Progress:** NEREN is currently auto-populating solar PV and is working to incorporate certification data; it is expected to roll out by the end of 2019. Currently, home energy labels need to be manually populated by the listing agent.				
Outcome: HELIX has a viable, self-sustaining revenue model ready to begin in 2020. **Progress:** The HELIX business plan was finalized and submitted to U.S. DOE, and the new revenue model is being implemented with users in Conn., Vt., R.I., and N.Y.				
Outcome: HELIX is modified to accept and maintain solar data in at least four Northeast states.				

Progress: Currently, HELIX has solar data for N.H., Conn., Mass., and Vt.; R.I. is in progress.				

R&D Connector - Buildings as Grid Assets

Mission: Supporting the advancement of smart, energy efficient homes and buildings as flexible grid assets through shared learning and coordinated research and development.

R&D Connector - Buildings as Grid Assets
Long-Term Market Transformation Goal

- By 2030, 50% of Northeast homes and buildings are "energy smart" with either two "energy smart" systems (HVAC, water heating, plug loads) or smart building management systems able to respond to grid service needs.

NEEP's 2019 R&D Connector project aims to increase the visibility of Northeast and US DOE research and development initiatives to test, assess, and advance smart energy home and building systems to optimize grid reliability, flexibility, and resilience; catalyze new regional collaborations to develop, test, and advance smart energy home and building technologies and system integration; and to effectively align US DOE-funded research and technology development to meet regional needs. The project kicked off in April 2019 with development of a plan to capture information related to the status, drivers, challenges, and opportunities for grid-interactive efficient buildings (GEBs) in Northeast states. NEEP then identified key stakeholders that would help us to capture – as comprehensively as possible – the extent to which buildings in the Northeast currently serve as assets to the grid. NEEP has started compiling information that was gathered via stakeholder engagement and internet research into a report on our findings.

Progress Toward 2019 R&D Connector Outcomes	25%	50%	75%	100%
Outcome: Increase the visibility of Northeast and US DOE research and development initiatives to test, assess, and advance smart energy home and building systems to optimize grid reliability, flexibility, and resilience. **Progress:** NEEP developed a plan to capture the current grid-interactive efficient buildings (GEBs) landscape in the Northeast. Via stakeholder engagement and internet research, NEEP has learned about GEBs-related initiatives and technologies that are currently being developed and/or deployed. These findings will be published in a report later in 2019.				
Outcome: Catalyze new regional collaborations to develop, test, and advance smart energy home and building technologies and system integration. **Progress:** NEEP has been gathering information on the development, testing, and advancement of smart energy home and building technologies and system integration. With an understanding of the current landscape of these				

technologies, NEEP is now exploring how to catalyze regional collaborations in an effort to further their application, development, and deployment.				
Outcome: Effectively align US DOE-funded research and technology development to meet regional needs. **Progress:** Having gathered all pertinent information for aligning US DOE-funded research and technology development to meet regional needs, NEEP is currently analyzing how this can be done effectively.				

Smart Energy Homes

Mission: Enabling residential decarbonization by transforming homes to be efficient and flexible grid assets.

Smart Energy Homes
Long-Term Market Transformation Goals

- By 2022, virtually all smart products are DER-ready and can work as part of an integrated Smart Energy Home system.
- By 2030, 50% of Northeast homes are "energy smart" (i.e., have at least two "energy smart" systems - HVAC, water heating, plug loads/appliances).
- By 2030, 30% of existing homes and buildings are benchmarked and retrofitted to reduce carbon emissions 50%.

NEEP spent much of the summer of 2019 conducting research focused on the status, drivers, challenges, and opportunities for grid-interactive efficient buildings (GEBs) in Northeast states. GEBs is how the US DOE is describing what NEEP has termed Smart Energy Homes since 2017. The fundamentals are the same: efficient structures that are capable of providing flexibility to the grid and benefits to consumers. NEEP hosted a workshop as part of our annual summit that explored a number of the important issues highlighted in our research with regional stakeholders. We began compiling information that was gathered via stakeholder engagement, the workshop, and internet research into a report. We are excited to support US DOE's GEBs initiative so that we can more effectively drive adoption of smart energy homes and buildings in the region and the country.

Progress Toward 2019 Smart Homes Outcomes	25%	50%	75%	100%
Outcome: Six more efficiency programs in the Northeast U.S. and Canada offer incentives for smart homes or smart home energy management products joining Conn., Mass., Md., N.H., N.J., N.Y., R.I., and Vt. **Progress:** NEEP has worked toward this outcome for the past five years by supporting the smart thermostat market, convening a home energy management systems (HEMS) working group, participating in the smart thermostat specification development process with ENERGY STAR, and sharing				

information about the opportunities in regional and national venues. Pennsylvania, Washington, D.C., Nova Scotia, and New Brunswick, Ontario have all added smart product offerings to their customers.				
Outcome: Programs in five more Northeast states join Mass., Md., N.Y., R.I., and Vt. in NEEP's regional effort to advance smart energy homes by conducting pilots, hosting innovative programs, and/or conducting research. **Progress:** Several states including Maine, Connecticut, New Hampshire, and Maryland, as well as Washington, D.C., have all launched new smart energy homes pilot programs.				
Outcome: Most major manufacturers of smart energy home products serving the Northeast U.S. offer DER-ready products by the end of 2019. **Progress:** ENERGY STAR finalized a new specification for Smart Home Energy Management Systems (SHEMS), and NEEP facilitated input to its development and revision. The final criteria supports integration of DERs, including electric vehicles (EVs) and connected water heaters. This will be a key driver to encourage manufacturers to make their SHEMS systems DER-ready. This need was articulated in NEEP's residential decarbonization report, which provides a roadmap for manufacturers.				

Smart, Low Carbon Commercial and Industrial Solutions

Mission: Accelerating adoption of high efficiency technologies, practices and business models that provide integrated commercial and industrial sector solutions that increase efficiency and productivity, reduce costs and carbon emissions, and respond to grid needs.

Smart, Low Carbon Commercial and Industrial Solutions
Long-Term Market Transformation Goals

- By 2025, Strategic Energy Management becomes a standard business practice and is adopted by 40% of the 69,000 manufacturing plants across the region.
- By 2025, Advanced Roof-top Units and VRF systems grow to 33% of the installed RTU base in all Northeast states (from 1% in 2018).

NEEP continues to host the Strategic Energy Management (SEM) Collaborative, launched in early 2018, which offers stakeholders in the Northeast a pathway to achieving significant energy and carbon savings by accelerating the adoption of SEM in the industrial, commercial, and municipal sectors. Through this collaborative, SEM programs in Vt., N.Y., Mass., R.I., and Conn. have reported progress with their program offerings. While Pennsylvania does not currently have any SEM programs, the state does support SEM adoption by offering training and coaching. SEM progress from these states contributes to the goal of SEM becoming a standard business practice by 2025 and 40% of the 69,000 manufacturing plants across the region adopting SEM by 2025. Informed by meetings with the Vermont Energy Investment Corporation (VEIC) and the Variable Refrigerant Flow (VRF) Working Group, NEEP developed

a draft report to highlight the barriers that impede adoption of VRF systems in the region, and strategies for overcoming these barriers. The report will chart a clear set of strategies – which NEEP will advance with regional support – to drive accelerated adoption of VRF systems in the region.

Progress Toward 2019 C&I Outcomes	25%	50%	75%	100%
Outcome: Energy efficiency programs in seven Northeast states (Conn., Mass., N.H., N.Y., Penn., R.I., and Vt.) support SEM as a program measure (an increase of 50 percent). **Progress:** Currently, energy efficiency programs in most of the targeted states noted above recognize SEM. Connecticut has an established SEM program that includes both single customer engagement and customer cohorts. Pennsylvania does not have any SEM programs, but provides guidance and training on SEM.				
Outcome: Five end-users (companies/municipalities) in the region receive 50001 Ready recognition. **Progress:** Three end-users received 50001 Ready training, conducted by contractor Cascade Energy, on August 6, 2019. The 50001 Ready training workshop comprised attendees from the following three water and wastewater sites: 1) Narragansett Bay Commission – Fields Point; 2) Narragansett Bay Commission – Bucklin Point; and 3) South Essex Sewage District. Unfortunately, funding for this project was abruptly terminated on August 31, and work on this project will not take place for the remainder of 2019.				
Outcome: Programs in four states fund and participate in NEEP's R-22 Phase-out Commercial HVAC market assessment and strategy development. **Progress:** This project is not moving forward.				

State & Local Policy Tracking and Technical Assistance

Mission: Tracking, analyses, reports and technical assistance to help state and local government adopt public policies that reduce building sector energy consumption 3% per year and carbon emissions 40% by 2030.

State & Local Policy Tracking and Technical Assistance
Long-Term Market Transformation Goals

- By 2022, the Northeast region continues to lead the nation in efficient demand-side resources and carbon emission reduction and provides an inspiring model for others to follow.
- By 2022, all Northeast states have statewide programs supporting communities to achieve state carbon reduction goals.
- By 2030, all Northeast states adopt policies to reduce building sector energy consumption 3% per year and carbon emissions 40%.

NEEP' Building Decarbonization Public Policy Framework was finalized and published in the third quarter. The purpose of this framework is to identify policy pathways for states and communities to achieve deep decarbonization of buildings and bring them together for a cohesive view. This framework is the basis for NEEP's building decarbonization work and will be used to provide technical assistance to states and communities. NEEP continues to participate in state policy groups to identify best practices and trends, while providing technical assistance. We also published a policy tracker and REED rendering.

Additionally, we are planning a fall Regional Energy Efficiency Database (REED) meeting to engage key stakeholders to help guide REED's evolution so that it continues to be a relevant regional energy efficiency data resource to inform evolving state energy efficiency policies and programs. REED is an information resource for regional stakeholders, and informs the U.S. DOE Energy Information Administration (EIA) forecasts of energy efficiency. This meeting will provide an opportunity to hear from states about their future needs and plans to develop, track, and report new energy efficiency data metrics related to changing and expanding policy goals, discuss key challenges associated with these new data metrics, and determine their implications for REED's evolution.

Progress Toward 2019 Policy Outcomes	25%	50%	75%	100%
Outcome: At least two Northeast states join leading cities to adopt roadmaps to accelerate home and building decarbonization to meet state carbon emission reduction goals (e.g., with efficient electrification of fossil heating, thermal efficiency, smart controls, demand response, building energy labeling and performance standards, and zero energy building codes). **Progress:** New Jersey released their draft 2019 Energy Management Plan; Maine passed LD1679 to establish the Maine Climate Council, which will develop the action plan and timetable to meet the state's GHG targets; and New York passed a comprehensive climate action bill.				
Outcome: At least three additional Northeast states adopt energy efficiency program metrics to reduce total energy consumption in homes and buildings. **Progress:** New legislation in Vermont (H63) established an all-fuels program; Massachusetts included an all-fuels MMBtu metric in their 2019-2021 energy efficiency plan, which was approved by the Massachusetts				

Department of Public Utilities (MA DPU) in January 2019; New York has a long-term all-fuels target for 2025; and Rhode Island proposed an all-fuels metric in the 2020 update to their 2018-2020 energy efficiency plan.				
Outcome: Ratepayer-funded efficiency programs in five Northeast states provide "all fuels" energy efficiency services to accelerate high performance, low-carbon homes and buildings aligned with state carbon emission reduction goals. **Progress:** Ratepayer-funded efficiency programs provide all-fuels services in several states, including in Vt. (Burlington Electric 2018-2020 plan), Mass. (Joint Energy Efficiency Plan for 2019-2021), N.Y. (Joint Utilities Energy Efficiency Plan for 2021-2025), Conn. (Conservation & Load Management Plan fir 2019-2021), and Maine (Triennial Plan IV). Additionally, Vermont legislation H63 established an all-fuels program.				
Outcome: At least three Northeast states (Conn., Mass., N.Y., and/or R.I.) and ten communities implement strategic electrification policies or programs to improve efficiency and decarbonize energy use in public existing building. **Progress:** Maine passed various bills including energy independence, building energy codes, an electrification study, and GHG targets for 2030 and 2050; New York passed the Climate Leadership and Community Protection Act; Vermont initiated its proceeding that is looking at current energy services, gaps, and whether there should be an increase in services and/or an all-fuels utility (case #19-2956); Boston, Mass. released the 2019 climate action plan; and Burlington, Vt. released the Zero Energy Burlington Roadmap.				