NEEP 2019 Quarterly Report
ANNUAL SUMMARY

Advanced Efficiency & Decarbonization Leadership Network

Building Decarbonization Leadership Forum

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.

Building Decarbonization Leadership Forum
Long-Term Market Transformation Goals

➢ By 2022, All Northeast states implement building energy efficiency and strategic electrification policies as top strategies to achieve carbon emission reduction goals.
➢ By 2022, All Northeast states have statewide programs supporting communities to achieve state carbon reduction goals.
➢ By 2030, 30% of existing homes and buildings are benchmarked and retrofitted to reduce carbon emissions 50%.

NEEP's Building Decarbonization Leadership Forum was designed to bring together a diverse cross-section of leaders from business, government, academia, community, and advocacy to inspire, learn, and catalyze regional-scale efforts to accelerate efficient, grid-smart, low-carbon homes and buildings.

In 2019, NEEP hosted its annual Summit but reinvented the gathering by partnering with EPRI and NESCAUM to present Pathways to Decarbonization in the Northeast as part of EPRI's Electrification U.S. Symposium Series. The event drew over 400 people from our primary target audiences to Brooklyn, New York for three days of learning, dialogue, and idea exchange.

Due to the high profile nature of these partnerships and the media market of New York, the Summit had a bigger footprint than normal, resulting in the participation of important key stakeholders. NEEP used this larger event to serve as the gathering space for our forum participants. The program brought together tracks in transportation and buildings, offered inspiring plenary addresses, and engaged a panel of millennial leaders in PowerTalks. Additionally, the event provided many networking opportunities in addition to several deep dive topical sessions, and social activities that encouraged further discussion about these important topics.

Summit speakers and participants addressed pathways, as well as challenges, to meet aggressive state and local energy and carbon reduction goals across the region, with a focus on decarbonizing building and transportation energy use with energy efficiency as a core strategy. Highlighting that we cannot achieve this doing "business as usual," the Summit speakers underlined the need for:

- Urgent action
- To think creatively and innovate while building on the progress of existing efforts
- Inclusion – particularly for disadvantaged communities most at risk from extreme weather and rapid sea level rise
- Leveraging and aligning efforts to catalyze regional scale market transformation.

In addition to the Summit, NEEP advanced the discussion of building decarbonization. We created a new online resource center and associated monthly newsletter - Building Decarb Central - where we highlighted ideas, progress and best practices from around the region and country. We also contributed to building decarbonization communications initiatives including authoring an article on building decarbonization in a special issue of *Electricity Journal.*

Progress Toward 2019 Building Decarbonization Leadership Forum 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:** Five states moved forward decarbonization plans and roadmaps: • The MA Executive Office of Energy and Environmental Affairs is developing MA Decarbonization Roadmap for completion in 2020. • Efficiency Vermont's 2019 update to its Triennial Plan includes partnering with distribution utilities to deploy complementary grid services, flatten loads and reduce carbon emissions. • New Jersey BPU released a draft 2019 Energy Master Plan which calls for development of a Building Decarbonization Roadmap. • Maine passed LD1679 to establish the Maine Climate Council, to develop an action plan and timetable to meet the State's GHG targets. • New York State adopted the Climate Leadership and Community Protection Act which established a Climate Council to develop a Scoping Plan to achieve the GHG emission reduction goals.				
Outcome: Media coverage of efficient, building decarbonization success stories increases across the region. **Progress:** NEEP tracked 24 high profile pieces of media coverage that addressed various topics of building and transportation decarbonization from NEEP's perspective. Additionally, NEEP authored an article on building decarbonization in a special issue of *Electricity Journal.*				

Progress Toward 2019 Building Decarbonization Leadership Forum Outcomes	25%	50%	75%	100%
Outcome: At least three Northeast states (CT, MA., NY, and/or RI) and ten communities implement strategic electrification policies or programs to improve efficiency and decarbonize energy use in public existing building. **Progress:** Strategic electrification is a leading-edge solution to achieve state and local climate goals. NEEP is in the process of developing a CAPEE module that will provide communities with key guidance and thought-leadership on how to implement strategic electrification into their plans and programs. In 2019, a number of states and communities moved forward with policies, programs, and plans that advanced strategic electrification: • Maine passed several bills including energy independence, building energy codes, accelerated adoption of residential advanced heat pumps to displace fossil-based heating, a statewide electrification study, and GHG goals for 2030 and 2050. • New York State adopted the Climate Leadership and Community Protection Act. • Pursuant to Act 62, the Vermont Public Utility Commission investigated the creation of an all-fuels energy efficiency program, expansion of energy efficiency utility programs and services, and funding options for those programs (Case #19-2956). • Ten cities undertook electrification initiatives including: Boston; Burlington; Cambridge; the District of Columbia; Hartford; New York City; Philadelphia; Pittsburgh; Portland; and Providence.				

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 energy landscape is evolving. NEEP's 2019 Building Decarbonization Public Policy Framework highlights the new focus on decarbonization and the increase in penetration of distributed energy resources, smart products, and advances in technology (automation and analytical capabilities referred to as Advanced M&V or M&V2.0). States are beginning to embrace these trends and this is reflected in their EM&V practices as they incorporate advanced M&V tools into program design, implementation, and other operations, and review and consider new metrics. Key examples of ways in which NEEP advanced new approaches, information, best practices, and lessons learned include:

- NEEP's "Stellar EM&V" Workshop – May 2019
- NEEP public webinars on Is Pay for Performance Performing and National and Regional End-Use Load Profiles research
- NEEP brief on "Readiness for Advanced M&V"
- NEEP technical assistance/review of cost-effectiveness initiatives for New Hampshire and Connecticut in which the National Standard Practice Manual guidelines were implemented
- NEEP tracking and advising commercial and residential pilots in which CT utilities applied M&V 2.0 tools to a sample of commercial customer buildings and to residential program evaluation
- NEEP tracked and provided information to interested parties participating in the ISO-NE Demand Response Working Group Study of options for the Forward Capacity Market (FCM) to assess EE performance in all hours (not just peak) to better reflect the full value of EE impacts that bid into the FCM.
- NEEP participated in a National Renewable Energy Lab (NREL) lead, US DOE funded study of End Use Load Shape Profiles in the U.S. Building Stock. Using innovative modeling approaches informed by observed field-data, the project will provide publicly available simulated load shape data to inform state, utility and regional transmission system planning and forecasting. In late 2019, NYSERDA and the MA Clean Energy Center each engaged NEEP to track and use this process to address identified priorities for updated load shape data to serve needs in NY and MA.

These resources are valued inputs to planners and other stakeholders invested in meeting grid needs for reliability and flexibility, and for fully valuing efficiency as an environmental and grid resource.

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:** Three additional states, CT, NH, and PA, joined MA and RI in including non-energy impact in their frameworks. • CT has launched a study that will conclude in 2020 on cost-effectiveness for distributed energy resources. • In December, the NH PUC adopted the Granite State Test for cost-effectiveness. • The PA PUC issued an order that finalizes the specific refinements to the 2021 TRC test for Phase IV of Act 129 and includes limited non-energy benefits.				

Progress Toward 2019 Advanced EM&V Outcomes	25%	50%	75%	100%
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:** NEEP engaged six states (CT, DC, NY, PA, RI, and VT) to track M&V 2.0 use and review NEEP's draft outline of the M&V 2.0 best practices "regulatory handbook."				
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:** A number of states moved this outcome forward in 2019: • NYSERDA now supports a state clean energy dashboard that reports emission reductions and total fuel program impacts. NY has a long term all-fuels target for 2025. • National Grid proposed an all-fuels savings metric for the 2020 update to their 2018-2020 energy efficiency plan. While not approved for the 2020 update, National Grid plans to re-propose it as part of the 2021-2023 efficiency plan. • The MA Executive Office of Energy and Environmental Affairs is developing the MA Decarbonization Roadmap, which will be completed in 2020. • MA utilities implemented programs in 2019 to achieve the all-fuels MMBtu metric outlined in their 2019-2021 energy efficiency plan. • Pursuant to Act 62, the Vermont Public Utility Commission investigated the creation of an all-fuels energy efficiency program, expansion of energy efficiency utility programs and services, and funding options for those programs (Case #19-2956) • NH PUC adopted the Granite State Cost-Effectiveness test at the end of 2019 which includes a recommendation for an all-fuels metric and energy optimization in the forthcoming energy efficiency plan.				
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:** NEEP kept interested Northeast states and stakeholders informed of regional and national efforts: • All New England states (CT, MA, ME, NH, RI, and VT) participated in and provided input to ISO-New England's 2019 Energy Efficiency Forecast to better reflect end use load profile (peak) characteristics, including other ISO-NE efforts to collect information on DERs.				

Progress Toward 2019 Advanced EM&V Outcomes	25%	50%	75%	100%
• NH passed legislation (SB284) to establish a multi-use online energy data platform that requires a consent-driven process for access to or sharing of customer-level energy usage data. • NYSERDA and the MA CEC each engaged NEEP to assess needs for load shape data, and participate in the NREL Load Shape Study to address those needs and provide publicly available data.				

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%.

Leadership at the state level has been ramping up decarbonization policy with a lot of momentum in 2019. In Maine, the Governor signed 10 bills into law that work to achieve the state's carbon reduction goal of 80 percent by 2050, including transitioning the heating and cooling market away from fossil fuels to renewable thermal technology. New York set the bar for greenhouse gas emission reduction targets by setting a carbon neutral goal for 2050. Social and environmental equity were woven throughout state policies in 2019, making sure all consumers benefit from climate policy. This leadership at the state and local level is driving the region towards a reduction in fossil fuel use. By acknowledging the importance of integrating energy efficiency, renewable energy, and strategic electrification, policies are establishing clear strategies to achieve near-term and long-term climate goals.

NEEP's Building Decarbonization Public Policy Framework was finalized and published this year. 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 continued to participate in state policy groups to identify best practices and trends,

while providing technical assistance throughout the year. Policy tracker blogs were published every other month to highlight trends and current events throughout the region (e.g. 2019 in review).

NEEP updated the Regional Energy Efficiency Database (REED) with program year 2017 energy efficiency data and supporting information. NEEP also developed a REED Strategic Vision to help guide REED's path forward, including potentially adding program metrics to better capture evolving energy efficiency program goals. The REED team also convened a region-wide REED stakeholder meeting to discuss these potential changes. REED Renderings were published on a quarterly basis to highlight REED data, and REED data was featured in the annual Energy Efficiency Snapshot.

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:** Five states moved forward decarbonization plans and roadmaps: • The MA Executive Office of Energy and Environmental Affairs is developing MA Decarbonization Roadmap for completion in 2020. • Efficiency Vermont's 2019 update to its Triennial Plan includes partnering with distribution utilities to deploy complementary grid services, flatten loads and reduce carbon emissions. • New Jersey BPU released a draft 2019 Energy Master Plan which calls for development of a Building Decarbonization Roadmap. • Maine passed LD1679 to establish the Maine Climate Council, to develop an action plan and timetable to meet the State's GHG targets. • New York State adopted the Climate Leadership and Community Protection Act which established a Climate Council to develop a Scoping Plan to achieve the GHG emission reduction goals.				
Outcome: At least three additional Northeast states adopt energy efficiency program metrics to reduce total energy consumption in homes and buildings. **Progress:** Four states adopted or are considering adoption of energy efficiency program metrics to reduce total energy consumption: • National Grid proposed an all-fuels savings metric for the 2020 update to their 2018-2020 energy efficiency plan. While not approved for the 2020 update, National Grid plans to re-propose it as part of the 2021-2023 efficiency plan. • The Massachusetts DPU approved all fuels program metric in the MA utilities' 2019-2021 energy efficiency plan.				

Progress Toward 2019 Policy Outcomes	25%	50%	75%	100%
• Pursuant to Act 62, the Vermont Public Utility Commission investigated the creation of an all-fuels energy efficiency program, expansion of energy efficiency utility programs and services, and funding options for those programs (Case #19-2956) • NH PUC adopted the Granite State Cost-Effectiveness test at the end of 2019 which includes a recommendation for an all-fuels metric and energy optimization in the forthcoming 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: • VT (Burlington Electric 2018-2020 Plan), • MA (Joint Energy Efficiency Plan for 2019-2021), • NY (Joint Utilities Energy Efficiency Plan for 2021-2025), • CT (Conservation & Load Management Plan for 2019-2021), and • ME (Efficiency Maine - Triennial Plan IV).				
Outcome: At least three Northeast states (CT, MA, NY, and/or RI) and ten communities implement strategic electrification policies or programs to improve efficiency and decarbonize energy use in public existing building. **Progress:** Strategic electrification is a leading-edge solution to achieve state and local climate goals. NEEP is in the process of developing a CAPEE module that will provide communities with key guidance and thought-leadership on how to implement strategic electrification into their plans and programs. In 2019, a number of states and communities moved forward with policies, programs, and plans that advanced strategic electrification: • Maine passed several bills including energy independence, building energy codes, accelerated adoption of residential advanced heat pumps to displace fossil-based heating, a statewide electrification study, and GHG goals for 2030 and 2050. • New York State adopted the Climate Leadership and Community Protection Act. • Pursuant to Act 62, the Vermont Public Utility Commission investigated the creation of an all-fuels energy efficiency program, expansion of energy efficiency utility programs and services, and funding options for those programs (Case #19-2956).				

Progress Toward 2019 Policy Outcomes	25%	50%	75%	100%
• Ten cities undertook electrification initiatives including: Boston; Burlington; Cambridge; the District of Columbia; Hartford; New York City; Philadelphia; Pittsburgh; Portland; and Providence.				

Efficient and Resilient Buildings & Communities

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.

2019 proved to be a year with significant interest in zero energy schools across many states in the region. In Q4 2019, the MAZE initiative completed its Five-Year Plan for increasing zero energy schools in MA. With the aim to make significant progress in 2020, the goal of the Five-Year Plan is to ultimately create policy that will advance the investment and development of zero energy schools around the state. NEEP also held a webinar, Get The $ And People On-Board For A Zero Energy School, on November 4 about the cost of zero energy schools and included an example of the Acton-Boxborough community building a zero-energy school. While the MAZE initiative is targeted at Massachusetts specifically, resources and best practices can be utilized across the region. NEEP remains engaged with communities in Connecticut, Massachusetts, New Hampshire, Rhode Island, and West Virginia on topics including green zoning, high performance schools, benchmarking, and community energy planning.

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, building energy performance standards, shared energy manager programs, and more. • Upper Merion Township, PA • Watertown, MA • Philadelphia, PA • Keene, NH • Reading, PA • Providence, RI • Northampton, MA • Newton, MA • Carlisle, MA • Ithaca, NY • Concord, NH • Fairhaven, MA • Maine • New York • Washington, DC • New York City • Brookline. MA • Montpelier, VT • Pittsburgh, PA • Cambridge, MA				
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 support improvements at the community level. • In New Hampshire, NEEP assisted the Department of Education to craft a program provide state funding to K-12 public school projects that include high performance features.				

Progress Toward 2019 Communities Outcomes	25%	50%	75%	100%

• The Rhode Island Office of Energy Resources (RIOER) continued development of a shared energy manager initiative 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.
• Other statewide programs include:
   o MA Green Communities
   o Sustainable CT
   o Sustainable Jersey
   o Sustainable PA
   o NY Clean Energy Communities				

Outcome: At least three Northeast states (CT, MA, NY, and/or RI) and ten communities implement strategic electrification policies or programs to improve efficiency and decarbonize energy use in public existing buildings. **Progress:** Strategic electrification is a leading-edge solution to achieve state and local climate goals. NEEP is in the process of developing a CAPEE module that will provide communities with key guidance and thought-leadership on how to implement strategic electrification into their plans and programs. In 2019, a number of states and communities moved forward with policies, programs, and plans that advanced strategic electrification: • Maine passed several bills including energy independence, building energy codes, accelerated adoption of residential advanced heat pumps to displace fossil-based heating, a statewide electrification study, and GHG goals for 2030 and 2050. • New York State adopted the Climate Leadership and Community Protection Act. • Pursuant to Act 62, the Vermont Public Utility Commission investigated the creation of an all-fuels energy efficiency program, expansion of energy efficiency utility programs and services, and funding options for those programs (Case #19-2956). • Ten cities undertook electrification initiatives including: Boston; Burlington; Cambridge; the District of Columbia; Hartford; New York City; Philadelphia; Pittsburgh; Portland; and Providence.				

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%.

2019 was an unprecedented year with code adoption activity in all 13 states in the NEEP region. 2019 also saw stretch code development in Connecticut, Maine, and Vermont in Q4 and Massachusetts, New York, and Washington D.C. throughout the year. Weakening amendments in the adoption of the 2018 IECC (MD, NJ, PA, RI) and 2015 IECC (ME, NH, PA) instead of adopting the codes unamended, dampens overall potential 2019 efficiency gains and cost savings. However, these states had not adopted new codes in three to nine years, indicating a shift towards greater energy efficiency in codes. The region's progress is captured in NEEPs 2019 update to the Zero Energy Road Map Report. This progress will play a significant role in advancing greenhouse gas reductions, occupant utility savings, comfort, and building resiliency.

Energy Code Adoption - In Q4 2019, Vermont and Massachusetts adopted the 2018 IECC with strengthening amendments, both with effective dates in 2020. Delaware and Connecticut continued their review of the 2018 IECC for expected adoption in early 2020. Maine began its code development process by forming an Energy Technical Advisory Group. NEEP serves on the Maine Technical Advisory Group (TAG) to provide ongoing support and resources. The base code for Maine, along with its new stretch code, will be finalized by July 1, 2020. With Maine's recent code adoption, only West Virginia remains without an updated code. Otherwise, all states in the region are among the most efficient energy code adopters in the country.

Energy Code Collaboratives - Maine and New Hampshire energy code collaboratives were very active this past year. Maine focused on adoption, and New Hampshire on code training and compliance.

2021 IECC Model Code - Development of 2021 IECC model code occurred this year, and Q4 IECC member voting resulted in enormous wins for energy efficiency, with 10 percent or more in efficiency gains for both commercial and residential buildings. NEEP assisted efforts to disseminate information to local code officials voting on the IECC 2020 code proposals to inform their consideration of energy efficiency provisions. The 2021 IECC voting results support the most significant energy efficiency gains in a model code since the 2009/2012 IECC code update cycle, including provisions for zero energy buildings and electric vehicles.

MAZE - In Q4 2019, the MAZE initiative continued to engage energy efficiency advocates and stakeholders around a zero energy stretch code in MA. NEEP provided talking points and technical assistance on codes for the BBRS public hearing on November 5. There was continued support for a zero energy stretch code and concern over the restructuring of the EAC, which would be tasked with reviewing said stretch code. As a follow-up, NEEP met with USGBCMA to consider how to address the concerns/opposition raised about the feasibility of zero energy for commercial, high-rise buildings. NEEP also published its Green Zoning Report that addresses the difference between building codes and municipal zoning in MA. The report provides case studies and best practices for how municipalities can use zoning to increase building efficiency without conflicting with the state building energy code.

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:** This year, 6 states adopted the 2015 or 2018 IECC (MA, MD, NH, NJ, RI, VT) while 6 states are in the process of adopting the 2015 IECC or 2018 IECC in 2020 (CT, DC, DE, ME, NY, RI). Four states (MA, MD, NJ, VT) adopted the 2018 IECC. MA and VT adopted with strengthening amendments and NJ with weakening amendments. MD adopted unamended 2018 IECC. Six states (CT, DC, DE, NY, PA, RI) proposed adoption of the 2018 IECC or similar code. DC proposed adoption of a modified 2015 IECC with strengthening amendments to exceed the efficiency of the 2018 IECC and includes a zero-energy appendix. CT and DE are expected to adopt the 2018 IECC in Q1 2020; RI and NY to adopt by mid-2020. Maine began a process to adopt the 2015 IECC by July 1, 2020. New Hampshire adopted the 2015 IECC with weakening amendments. Rhode Island adopted the 2015 IECC. West Virginia adopted the 2009 IECC.				
Outcome: Three Northeast states implement zero energy stretch codes (DC, NY, VT) and three additional Northeast states adopt stretch codes (DE, MA, NJ). **Progress:** • NY and VT adopted updated stretch codes, though they did not include zero energy language. The stretch codes are, however, excellent progress towards zero energy codes. • ME passed legislation to draft its first statewide stretch code by July 1, 2020, the details of which have yet to be determined but may include zero energy language.				

Progress Toward 2019 Codes & Benchmarking Outcomes	25%	50%	75%	100%
• MA began creation of a zero energy stretch code that will be part of its 10th edition of the 780 CMR statewide building energy code to be finalized late 2020. • CT began research on its first stretch code that may include zero energy. • DC proposed a zero energy stretch code for adoption in 2020 as voluntary and be mandatory in two code cycles (2027).				
Outcome: Five Northeast states invest in initiatives to achieve 90+ percent code compliance statewide (CT, DE, MD, NJ, PA). **Progress:** CT, DC, DE, MA, NH, NJ, NY, and RI have ongoing investment in code compliance initiatives. • CT studied energy code compliance with a report by NEEP on compliance rates to be published in Q1 2020. • DE's energy code attribution program for utilities is improving compliance. In Spring 2020, DENRAC is considering releasing an RFP for a code compliance study. • NJ's energy code compliance continuing education program includes 325 seminars offered by Rutgers that are required by law for code enforcement officials, technical assistants, and inspectors. • CT, DC, MA, NH, NY, and VT also have robust code training for new code adoptions and important periodic updates. • ME is considering undertaking training initiatives as part of their adoption of the 2015 IECC and accompanying stretch code. • DC, MA, NJ, NY, and RI utilities claim attribution savings from energy code compliance, while DC programs claim savings from code training.				
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:** While no new communities adopted building energy benchmarking policies in 2019, NEEP is working closely with two cities (Hartford, CT; and Providence, RI) on potential benchmarking policies for 2020 that would impact municipal and commercial buildings. Montpelier, VT committed to implement a residential labeling policy, worked with the state legislature to enable the city to adopt an ordinance, and, then, began the process to develop the ordinance. Philadelphia, PA; Newton, MA, Burlington, VT, and many other cities began exploring what a residential labeling policy would look like for their jurisdiction.				

Progress Toward 2019 Codes & Benchmarking Outcomes	25%	50%	75%	100%
Vermont passed legislation in 2019 reconvening the residential and commercial labeling working groups to develop recommendations for labeling. Massachusetts committed to implementing a residential scorecard program in conjunction with the Mass Save Audit program.				

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%.

In 2019, NEEP continued to build out and expand HELIX, engage with the real estate community, and grow our partnerships with the MLS.

HELIX Growth: NEEP rolled out the business plan and revenue model for HELIX to deploy HELIX as a policy management tool for states and communities, as well as a link to local multiple listing services. We also continued work with Vermont and contractor ClearlyEnergy to develop the "Energy Estimator – powered by HELIX and ClearlyEnergy" for use in the Vermont Home Energy Profile. The Estimator provides an energy cost estimate for homes without the need for an in-person audit. 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 real estate listings across the Northeast by 2025.

Real Estate Community: NEEP focused on outreach and education to help real estate professionals, lenders, and appraisers better understand what the data in HELIX means and how it can be used throughout the real estate transaction process for both the buying and selling of homes. Real estate industry support is key to achieving the goal of using home energy information to value residential real estate and support investment to improve home performance. NEEP hosted various webinars about HELIX and home energy labeling, and conducted trainings in Connecticut, New York, and Maine with Craig Foley, a Real Estate Consultant, using a course curriculum developed by the HELIX team. NEEP also participated in the Vermont Green Realtors Symposium where we spoke with a many Vermont Realtors about how HELIX is currently working in their state.

MLS Partnerships: NEEP engaged multiple listing services throughout the region to integrate HELIX into local markets. The MLS integration process is slow moving on a voluntary basis, but over the course of the year, we maintained progress with NEREN, Cape Cod and the Islands, Berkshire MLS, Maine Listings, RI statewide MLS, and researched opportunities in Mid-Atlantic States to include residential solar data in HELIX and to engage local MLS interest in HELIX – including the District of Columbia, Maryland, Georgia, and California. NEEP invited the local MLS's to participate in the HELIX advisory committee meetings throughout the year to help us assess how this data is being integrated into the market, and to leverage opportunities to streamline integration and share costs (e.g., where multiple MLS's use the same data aggregators). This collaborative approach also maintains and builds interest from the MLS across the region.

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:** HELIX has data for all New England states and New York. The New England Real Estate Network (NEREN) currently auto-populates solar PV data for VT, NH, and part of MA in property listings. NEEP is working with the RI statewide MLS, Cape Cod, Berkshires, and Maine listings to integrate HELIX to their systems to auto-populate data from HELIX to property listings.				
Outcome: Home energy labels in New England and New York property listings increase by 20 percent. **Progress:** The HELIX team completed trainings in CT, NY, and Maine to educate real estate professionals about home energy labeling and encourage them to incorporate this data into their listings. This increases the percent of home energy labels included in property listings by identifying sources of data for real estate professions to use to get the data. According to the NAR Sustainability Report, 35 percent of respondents use MLS green fields to promote green features and 14 percent promote green certifications. These trainings help increase the number of real estate professionals who use the MLS green fields.				
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 began in 2019 with users in CT, NY, RI, and VT.				
Outcome: HELIX is modified to accept and maintain solar data in at least four Northeast states. **Progress:** HELIX has solar PV data from Connecticut, Massachusetts, New Hampshire and Vermont.				

Smart, Efficient Low Carbon Building Energy Solutions

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.

Activity in the region reflects ambitious target growth in the heat pump market. Massachusetts ramped up its installation target to approximately 60,000 air-source systems via Mass Save's three-year plan. Maine plans to install 100,000 air-source systems by 2025. New York set a target of 83,000 residential systems by 2025, which includes both air-source and ground-source heat pumps. Based on a growing trend of states setting ambitious goals for ASHP adoption, NEEP is optimistic the region is poised for a significant market ramp up for ASHP adoption.

Stakeholder engagement via NEEP's ASHP Initiative Working Group meetings was strong throughout the year, and in June 135 stakeholders gathered in Woburn, Massachusetts for the 2019 Air Source Heat Pump Market Transformation Workshop.

NEEP's installer and consumer resources webpage has three new case studies of ASHP installs in the Northeast as well as an Air Source Heat Pump Buying Guide. These resources were designed to increase consumer confidence in advanced heat pump technology by boosting awareness and understanding with easy access to key information.

By year-end, NEEP's cold climate air source heat pump (ccASHP) product list included over 5,200 cold-climate systems. The ccASHP specification and product list have become increasingly market relevant in 2019, and are projected to remain a mainstay of many ASHP programs in the Northeast for 2020. Website visitor data reveals that many end-use consumers visit the site daily, likely to identify suitable high performance heat pumps that qualify for their local rebate program.

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 – MA Clean Energy Center (MassCEC), Mass Save, MA 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:** • NEEP established a regional subscription with the Northwest Energy Efficiency Alliance (NEEA) to provide access to our resources across many of the Northwest region's programs. • NEEP worked directly with the Midwest Energy Efficiency Alliance (MEEA) to align installer training strategies outlined in NEEP's installer guides • New York utilities joined the Initiative via our state partnership with NYSERDA and used the ccASHP specification and Installer guides for their programs • Natural Resources Canada in partnership with provincial governments, leveraged NEEP's market strategies to inform market transformation planning in Canada				
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. Anecdotal feedback indicates that manufacturers use the guide contents as part of their contractor trainings.				

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%.

In 2019, NEEP's Smart Energy Homes work centered around building decarbonization. In March, NEEP published Smart Energy Home: Driving towards Residential Building Decarbonization with an associated webinar that attracted participation from across the region and beyond. NEEP leveraged the HEMS working group throughout 2019 as a vehicle to discuss implementation of strategies to drive further development and adoption of smart energy homes. We see clear evidence that stakeholders, particularly manufacturers, are ramping up their offerings and capabilities of smart home technologies.

NEEP also completed an assessment study on Grid-interactive Efficient Buildings (GEBs). NEEP is excited to support U.S. DOE's GEBs initiative to more effectively drive adoption of smart energy homes and buildings in the region and the country.

In April, NEEP co-led a track at the 2019 HPC National Conference on smart homes and contractor training, where programs from across the region including from MA, MD, NY, and RI were featured. NEEP also presented on guidance for decarbonizing the residential sector through smart energy homes. The "Smart on Smart" series targeted the home performance contractor sector as a key group to promote and deploy smart energy products. With a motivated home performance contractor workforce, we expect to see much greater adoption of smart products in homes.

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 CT, MA, MD., NH, NJ, NY, RI, and VT. **Progress:** In 2019 Pennsylvania, Washington DC, Nova Scotia, New Brunswick, and Ontario energy efficiency programs added smart product offerings to their customers. NEEP worked toward this outcome by supporting the smart thermostat market, convening a home energy management systems (HEMS) working group, participating in the smart thermostat specification				

Progress Toward 2019 Smart Homes Outcomes	25%	50%	75%	100%
development process with ENERGY STAR, and sharing information about the opportunities in regional and national venues.				
Outcome: Programs in five more Northeast states join MA, MD, NY, RI, and VT in NEEP's regional effort to advance smart energy homes by conducting pilots, hosting innovative programs, and/or conducting research. **Progress:** Additional efficiency programs in several states including CT, ME, MD, NH, and the District of Columbia, each 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 EVs and connected water heaters. This will be a key driver to encourage manufacturers to make their SHEMS systems DER-ready. NEEP articulated this need in our Smart Energy Home: Driving Residential Decarbonization Report, which provides a roadmap for manufacturers to include DERs in smart energy home products.				

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).

In 2019, NEEP continued to host the Strategic Energy Management (SEM) Collaborative, which was launched in early 2018. The Collaborative offers stakeholders in the Northeast a pathway to achieve significant energy and carbon savings by accelerating the adoption and use of SEM in the industrial, commercial, and municipal sectors. Through this platform, SEM programs in CT, MA, NY, RI, and VT reported progress with their program offerings. While Pennsylvania does not currently have any SEM programs, there was indication that the state does support SEM adoption by offering training and

coaching through PennTAP. 2019 SEM progress from these states contributed to the goal of SEM becoming a standard business practice by 2025 and 40 percent of the 69,000 manufacturing plants across the region adopting SEM by 2025.

Informed by the Vermont Energy Investment Corporation (VEIC) and the Variable Refrigerant Flow (VRF) working group, NEEP developed the Variable Refrigerant Flow (VRF) Market Strategies Report to highlight the barriers that impede adoption of VRF systems in the region, and strategies to overcome these barriers. NEEP will use this information to guide our work with industry, state agencies, efficiency programs and other interests going forward to accelerate VRF adoption across the Northeast.

Progress Toward 2019 C&I Outcomes	25%	50%	75%	100%
Outcome: Energy efficiency programs in seven Northeast states (CT, MA, NH, NY, PA, RI, and VT.) support SEM as a program measure (an increase of 50 percent). **Progress:** By year end, energy efficiency programs in CT, MA, NH, NY, RI, and VT included SEM in their offerings to customers. Connecticut has an established SEM program that includes both single customer engagement and customer cohorts. While Pennsylvania does not have any SEM programs, the state does provide guidance and training on SEM through PennTAP.	▓	▓	▓	▓
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, U.S. DOE abruptly terminated its funding for this project on August 31 which ended 2019 trainings.	▓	▓	▓	
Outcome: Programs in four states fund and participate in NEEP's R-22 Phase-out Commercial HVAC market assessment and strategy development. **Progress:** This research project was cancelled due to lack of funding.				

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.

The R&D Connector – Buildings as Grid Assets 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 identified key stakeholders to help us assess – as comprehensively as possible – the extent to which buildings in the Northeast currently serve as reliability assets to the grid. NEEP hosted a workshop as part of our annual Summit that explored a number of the important issues underscored in our research and informed the report. The first draft of the report was completed in December 2019, and highlighted as they relates to the advancement of GEBs in the Northeast: drivers, key initiatives, current research and development, barriers, opportunities, and recommendations for regional collaboration on this topic. The final report, Grid-Interactive Efficient Buildings (GEBs) Tri-Region Status, was published in January 2020 and included findings from similar research by MEEA (Midwest Energy Efficiency Alliance) and SWEEP (Southwest Energy Efficiency Project). NEEP is excited to support U.S. DOE's GEBs initiative to effectively drive adoption of smart energy homes and buildings in the region and the country.

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 built visibility of Northeast and US DOE research and development initiatives through the project's stakeholder engagement, R&D Connector: Buildings As Grid Assets workshop, and report dissemination.				
Outcome: Catalyze new regional collaborations to develop, test, and advance smart energy home and building technologies and system integration. **Progress:** NEEP's GEBs research findings led to the recommendations provided in the final report to catalyze new regional collaborations to develop, test and advance smart energy home and building technologies and system integration. NEEP is currently seeking partners and funding to implement several of these recommendations.				

Progress Toward 2019 R&D Connector Outcomes	25%	50%	75%	100%
Outcome: Effectively align US DOE-funded research and technology development to meet regional needs. **Progress:** The research for the GEBs report captured the grid modernization needs of the Northeast region; and the report itself outlines how further research (possibly funded by U.S. DOE) can create pathways towards meeting these needs.				

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.

2019 began with significant appliance standards activity, both at the state and federal level. In Q1 and Q2, state agencies encouraged legislators in many Northeast states (i.e., CT, DC, MA, ME, NY, and RI) to introduce new standards packages modeled after the 2019 Appliance Standards Awareness Project Model State Standards bill. NEEP, in close partnership with ASAP, provided technical assistance to Northeast states to assess and navigate the complexities of adopting and implementing state appliance efficiency standards. NY's bill successfully passed. While no other bills passed, several states made important progress, including getting bills through initial committee review. Advocates in several states expect that these standards will be adopted in 2020.

At the federal level, after nearly two years of very little rulemaking, U.S. DOE's Appliance Standards programs began to pick up momentum. In Q1, U.S. DOE sought comment on several potentially impactful rules, including multiple industry petitions on furnaces and water heating, as well as notices on general service and updating U.S. DOE's process rules. NEEP submitted comments on several dockets and worked with regional partners, including state agencies, to provide technical support for their comment letters to U.S. DOE.

In Q3, U.S. DOE determined that "backstop" standards for general service lamps (GSLs, aka light bulbs) would not take effect in January 2020 and that a previous definition for the GSL category would be significantly reduced. Between the developments with lighting and other U.S. DOE appliance standards, it is clear that the federal government intends to significantly weaken the standards program and the

product categories within the program. In light of this, NEEP assisted state, regional and national partners to consider options to respond including potential legal action.

Progress Toward 2019 Appliance Standards Outcomes	25%	50%	75%	100%
Outcome: At least six Northeast states propose new state appliance standards in 2019. **Progress:** Seven states (CT, DC, MA, ME, NY, PA, and RI) proposed new state appliance standards in 2019.				
Outcome: At least two Northeast states adopt new state appliance standards in 2019. **Progress:** New York adopted a suite of appliance standards for water-using products				
Outcome: At least 10 Northeast states and associated stakeholders actively engage to encourage the U.S. DOE Appliance Standards and U.S. EPA ENERGY STAR programs to keep pace and remain active to increase product energy efficiency. **Progress:** More than ten Northeast stakeholders joined NEEP in submitting comments to US DOE and the U.S. Environmental Protection Agency (US EPA) ENERGY STAR program across several different comment letters. Our collective comments regarding ENERGY STAR's Smart Home Energy Management Systems criteria were particularly well received.				
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 its final rule, published in September, U.S. DOE determined that the 2020 GSL "backstop" standards set to take effect in January 2020 were not to be triggered to go into effect. Several Northeast states and stakeholders consider U.S. DOE's actions unfounded and will most likely raise legal challenges.				