NEEP 2019 PROGRAM PORTFOLIO

Accelerating regional collaboration in the Northeast to reduce building sector energy consumption three percent per year and carbon emission 40 percent by 2030.

The devastating impacts of rapid climate change – including extreme weather, increased flooding, and loss of biodiversity – are presenting an increased challenge to the public health, safety, and economic wellbeing of residents in the Northeast. In response, states and communities have adopted aggressive goals to reduce carbon emissions by 40 percent by 2030. In addition to replacing carbon-intensive power plants with clean, renewable resources, state strategies are increasingly focused on reducing building sector energy use which constitutes more than 40 percent of current regional carbon emissions.

Fortunately, the Northeast region is well positioned to take on this sustainability challenge as it consists of a rich nucleus of research, business development, policy leadership, environmental stewardship, cutting-edge clean energy policy and advocacy for a sustainable equitable future that is driving new solutions, exciting examples, and new business opportunities for energy efficient, low-carbon energy solutions.

In that context, in 2018, the NEEP Board of Directors adopted a new strategic frame for NEEP to address this:

Vision: We envision the region's homes, buildings, and communities transformed into efficient, affordable, low-carbon, resilient places to live, work, and play.

Mission: Accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities.

Goal: Assist the Northeast and Mid-Atlantic region to reduce building sector energy consumption three percent per year and carbon emission 40 percent.

NEEP's 2019 Program Portfolio responds to this by offering 11 initiatives focused on engaging regional leadership to overcome market barriers in the regional transformation to efficient, low carbon home and building energy use. These projects are part of an overall three-part strategy focused on:

A. **Advanced Efficiency & Decarbonization Leadership Network**: A virtual regional center for learning and sharing best practices among thought leaders on policy, programs, and market-based solutions to drive progress towards an energy-efficient, resilient, and affordable low-carbon economy, with state and local progress dashboards and exemplars to highlight successes and opportunities for collaboration.

B. **Efficient, Resilient Buildings & Communities:** To rapidly scale up market momentum across the region for low carbon solutions, and support the expansion and success of community initiatives for resilient, healthy, efficient, low carbon buildings and communities across the region to achieve major energy savings.

C. **Smart, Efficient Low Carbon Energy Solutions:** Engage stakeholders and collaborate with others to catalyze market transformation for advanced efficiency, smart strategic electrification technologies, and other building decarbonization solutions through public policy, research, collaboration, programs, and partnerships to leverage regional-scale impacts.

Below is a brief description for NEEP's 2019 Program Portfolio.

2019 Program Summaries

A. Advanced Efficiency & Decarbonization Leadership Network

1. **NEEP Summit and Building Decarbonization Leadership Forum:** Engages a diverse cross-section of leaders from business, government, academia, community, and advocacy to inspire, learn, and catalyze regional-scale efforts to accelerate smart efficient building decarbonization. The 2019 NEEP Summit expands this regional dialogue to engage a broader, public in-depth conversation to drive regional scale progress and market transformation for advanced efficiency and building decarbonization.
2. **Advanced EM&V, Forecasting & Planning Solutions:** Advances new approaches and information to forecast, assess, and evaluate the impact and value of efficient, demand-side resources, programs, and policies to address growing interest in building decarbonization, electrification and buildings as grid assets. It includes U.S. DOE and state-funded collaboratives to update building end-use loadshapes, and to use automated data to measure, verify, and optimize demand-side resource impacts.
3. **State & Local Policy Tracking and Technical Assistance:** Regional tracking and analyses of key metrics, state and local policies, program impacts, and successes with reports, analysis, and technical assistance to inform public policies to accelerate advanced energy efficiency in support of decarbonization including updates to NEEP's Regional Energy Efficiency Database (REED).

B. Efficient and Resilient Buildings & Communities

1. **Efficient, Resilient Community Pathways and Resources:** Best practice guidance, peer information exchange, and technical assistance to support the rapid growth of community initiatives in Northeast states to advance resilient, energy efficient, low-carbon public buildings and communities.
2. **Building Energy Codes and Benchmarking:** Best practice resources and technical assistance to states and communities to save energy, reduce costs, decrease emissions, improve resiliency, and strengthen workforce development through building energy code adoption, enforcement, compliance benchmarking, and home energy labeling.
3. **Home Energy Labeling Information eXchange (HELIX):** Final year of a three year U.S. DOE-funded initiative to automate the availability of home energy scores and ratings for use in residential real estate listings, and to educate real estate professionals and appraisers on the value proposition of home energy information that distinguish energy efficient, clean energy homes.

C. Smart, Efficient Low Carbon Energy Solutions

1. **Air Source Heat Pumps and Smart Controls**: Regional market transformation initiative to accelerate 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.
2. **Smart Energy Homes:** Regional research, best practices peer exchange, and technical guidance and resources to enable residential decarbonization by transforming homes to be efficient and flexible grid assets.
3. **Smart, Low Carbon Commercial and Industrial Solutions:** Regional research, analysis, technical guidance, pilots and best-practices peer exchange to accelerate 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.
4. **R&D Connector – Buildings as Grid Assets:** Supports the advancement of smart, energy efficient homes and buildings as flexible grid assets through shared learning and coordinated research and development.
5. **Federal and State Appliance Efficiency Standards**: Informs, tracks, and engages regional learning, dialogue and provides technical assistance to support minimum product efficiency standards that lock in long-term energy and carbon emission savings enabled by regional and national market transformation activities.

NEEP's Approach:

Engage and Empower Stakeholders: NEEP forges partnerships and brings stakeholders together to develop, advance, accelerate, and integrate advanced energy efficiency solutions with coordinated efforts, regional learning, and resource leveraging.

Advance Regional Market Transformation Opportunities: NEEP engages support for, recommends, tracks, and reports progress of regional market transformation initiatives that drive innovative advanced energy efficiency opportunities.

Independent Analysis and Technical Expertise: NEEP conducts independent analysis and serves as a technical expert on energy efficiency potential, best practices, impacts, evaluation, and integration with other demand side resources.

Advance Knowledge and Best Practices: NEEP develops and distributes regional best practice information resources, and serves as a regional peer exchange network to advance next generation energy efficiency.

NEEP's 2019 Products and Services

- Events, Stakeholder Engagement, Learning Exchange
- Regional Market Transformation Strategies
- Research, Progress Tracking, Analysis, Reports, Case Studies
- Best Practice Guidelines, Tools, Technical Assistance and Resource Centers

Building Decarbonization Leadership Forum

Advanced Efficiency & Decarbonization Leadership Network

MISSION

Bringing 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.

ABOUT THIS PROJECT

Many Northeast states have aggressive long-term energy and carbon reduction goals in line with 40% carbon reduction by 2030. To meet these steep targets, it will take more than "business as usual." We need to accelerate progress on existing efforts, think creatively, leverage each other's work where possible, and align efforts to catalyze regional scale market transformation. The Northeast region is well positioned to take on this challenge as it consists of a rich nucleus of research, business development, policy leadership, environmental stewardship, cutting-edge clean energy policy, and advocacy for a sustainable equitable future. This future is driven by new solutions, exciting examples, and new business opportunities for energy efficient, low-carbon energy solutions.

In that context, NEEP's Building Decarbonization Leadership Forum engages leadership across the region for informal topical dialogues that:

- Connect and inspire efforts to accelerate the energy efficient low carbon transformation of homes and buildings to meet state and regional climate stabilization and resiliency goals.
- Bring together diverse perspectives to build new relationships, problem solve, and catalyze new businesses, programs, and public policies to overcome barriers to regional-scale progress.
- Highlight and elevate public visibility for leadership, exciting developments, and progress of advanced efficiency as a key pathway to decarbonize existing building energy use.
- Inform strategies (NEEP's and others) and work to accelerate the progress and impact of advanced energy efficiency to achieve local, state, and regional climate protection goals.

LONG-TERM MARKET TRANSFORMATION GOALS

2022

All Northeast states implement building energy efficiency and strategic electrification policies as top strategies to achieve carbon emission reduction goals.

All Northeast states have statewide programs supporting communities to achieve state carbon reduction goals.

2030

30% of existing homes and buildings are benchmarked and retrofitted to reduce carbon emissions 50%.

2019 BUILDING DECARBONIZATION LEADERSHIP FORUM PROJECT OUTCOMES

1. 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).
2. Media coverage of efficient, building decarbonization success stories increases across the region.
3. At least three Northeast states (CT, MA, NY and/or RI) and 10 communities implement strategic electrification policies or programs to improve efficiency and decarbonize energy use in public existing building.

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP will engage a cross-section of 20-30 invited leaders from business, government, community, programs, academia, research, and advocacy in facilitated learning exchange dialogues with a focus on recent break-through developments, model efforts, cross-cutting issues, problem solving, and recommendations for scaling success to drive regional scale impacts. The 2019 Building Decarbonization Leadership Forum, led by NEEP Board Members and supported by NEEP staff, will include:

- Four topical Building Decarbonization Leadership Forum meetings (half day)
- NEEP staff will provide meeting summaries and materials, updates, and news to Forum participants between meetings.

TRACKING & ANALYSIS

NEEP will track building decarbonization policy, program, technology and market developments and trends across the region to inform the Building Decarbonization Forum, and to provide visibility to these through our website, newsletter, blog, and social media.

NEEP will also use lessons learned and examples discussed in the meetings to develop public-facing exemplars, invite topical blogs, and other approaches to build public visibility for energy efficiency leadership across the region.

NATIONAL / REGIONAL COLLABORATION

NEEP participates in and contributes to regional national building decarbonization initiatives, and leverages state, federal, and national resources to inform initiatives to advance building decarbonization roadmaps, technologies, policies, and programs.

Advanced EM&V, Forecasting & Planning Solutions

Advanced Efficiency & Decarbonization Leadership Network

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.

ABOUT THIS PROJECT

Two major regional trends – building decarbonization to meet aggressive state carbon emission reduction goals and the evolving role of homes and buildings as flexible electric grid resources – invite new approaches and information to plan, forecast, and assess the value and impacts of building efficiency integrated with other demand-side solutions, including efficient electrification, to provide comfort heating. Whole building and systems analysis approaches are increasingly relevant, as is the need to understand the value of demand-side resources relative to the full range of relevant public policy goals (i.e., environmental sustainability, energy affordability and reliability, resilience, economic productivity, public health and safety). Load shapes, metrics, analytical tools, data sources, non-energy benefits, and methodologies using automated data collection and analyses are among the topics of NEEP's 2019 project to address these needs. Building on and leveraging U.S. DOE and national lab research as well as regional thought leadership and field research, our 2019 focus includes load shape research, Measurement and Evaluation 2.0 (M&V 2.0), as well as best practices to align demand-side resource cost-effectiveness evaluation with the full range of public policy goals served by efficiency and distributed resources.

LONG-TERM MARKET TRANSFORMATION GOALS

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.
- Adopt program metrics and EM&V for demand-side resource programs that reflect total building energy efficiency performance as well as carbon efficiency.
- 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.

2019 PROJECT OUTCOMES

1. Three additional Northeast states include non-energy impacts of energy efficiency in their cost-effectiveness and evaluation frameworks.
2. 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.
3. 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.
4. Six Northeast states participate in the prioritization of loadshape and planning/forecasting information needs for the region to address strategic electrification and advanced efficiency.

REGIONAL TRENDS & LEADERS

- CT, NH, NY, RI, and VT are supporting research on automated data collection and analyses (M&V 2.0) to inform more timely and less costly efficiency EM&V, and to optimize program performance.
- MA, NY, RI and VT now include strategic electrification in statewide energy planning and forecasting.
- DC, MA, NJ, NY, and VT are piloting pay-for-performance programs that support integrated and whole building demand-side solutions as grid reliability resources.
- DC, RI, and VT are aligning their cost-effectiveness practices to value carbon emission reduction and other non-energy impacts of energy efficiency.
- Advanced Metering Infrastructure (AMI) is now fully deployed in DC, MD, ME, and VT, and regulators in CT, MA, and NY are considering AMI deployment built on the lessons of early adopters.
- Smart technology (e.g., smart thermostats and commercial lighting controls) deployment across the region provides new opportunities to leverage data streams for program evaluation as well as loadshape research.

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP will bring together key stakeholders to share information on best practices, resources, and research needs to build understanding and use of advanced efficiency planning, forecasting, and evaluation practices and resources.

- Quarterly webinars of M&V 2.0 State Partners Working Group
- ***New*** Northeast Advisory Group on Advanced Efficiency EM&V (includes loadshapes and planning and forecasting)
- Participation in NEEP working groups (e.g. Strategic Energy Management, HEMS, Buildings, Strategic Electrification, Advanced Efficiency Leadership Forum)
- ***New*** Web-based directory of EM&V providers and software as a service vendors
- Communication via webinars, topical blog posts, and quarterly newsletters
- Two public meetings (M&V 2.0 and Advanced Efficiency EMV/Loadshape)

TECHNICAL ASSISTANCE

NEEP provides customized assistance, facilitation, research or technical review by request.

- Examples include: Mid-Atlantic TRM updates; 2018 EIA-sponsored research on states' trends in efficiency measures; survey of tools and data for strategic electrification planning and forecasting; CT 2017 Cost-effectiveness Workshop; State Partner M&V 2.0 workshops

TRACKING & ANALYSIS

NEEP follows key state and industry developments pertaining to M&V tools, plans and practices to identify and report on trends and issues concerning measurement of demand-side resources in support of advanced efficiency and decarbonization in the region.

- Maintained web-based M&V 2.0 Building Analytics Software Tracker
- ***New*** Tracking states' loadshape studies as part of National Lab Loadshape project – shared at working group meetings
- Quarterly EM&V newsletter
- Tracking of cost-effectiveness practices – shared in webinars/meetings
- Tracking use of advanced M&V – shared in webinars/meetings

TOOLS & GUIDELINES

NEEP's work will advance the development of strategies, tools and best practices to support advanced efficiency in planning, forecasting and evaluation to meet the evolving policy needs for efficiency as a core element of grid-integrated demand-side solutions and state carbon emission reduction strategies.

- Maintained NEEP loadshape library/catalog and data collection protocols (EM&V Forum Products)
- M&V 2.0 Resource Guide and Regulatory Handbook/Best Practice Guidance shared with state partners and U.S. DOE
- Recommendations to address information gaps for state and local strategic electrification planning and forecasting shared in meetings/working group

RESEARCH & REPORTS

NEEP prepares newsletters, blogs, webinars, and reports on topics and issues that help the region address measurement of the full potential of demand-side resources, including their value as grid and decarbonization assets.

- ***New*** Scope for and update to Regional End-Use Loadshape Catalog
- Blogs on advanced efficiency M&V industry developments and trends (2017 example)
- ***New*** White paper on evolving role for EM&V and loadshapes for advanced efficiency and decarbonization

NATIONAL / REGIONAL COLLABORATION

NEEP collaborates nationally and regionally to facilitate the development and dissemination of best practices regarding measurement and reporting and to fill data gaps pertaining to use of demand resources in energy and decarbonization planning, forecasting and integrated efficiency solutions.

- Participation in relevant national/regional leadership groups (e.g., IEPEC Board and Conference, AESP, National Loadshape Project Working Group, Efficiency Valuation Organization (EVO), National Standard Practice Manual Steering Committee, LBNL M&V 2.0 Stakeholder Group, US DOE SEE Action Network, Consortium for Energy Efficiency)
- Assist in conference planning, presentations, technical review of materials

State & Local Policy Tracking and Technical Assistance

Advanced Efficiency & Decarbonization Leadership Network

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.

ABOUT THIS PROJECT

Northeast States lead the nation in energy efficiency policies. Most have also adopted aggressive carbon emission reduction goals for 2030 as well as 2050. Increasingly, states include in energy efficiency programs strategic electrification for "carbon efficiency" along with demand response resources, including energy storage and distributed generation, to respond to electric grid reliability needs for flexible loads. This integrated approach to efficient building decarbonization addresses a growing range of public policy goals including energy affordability and reliability, environmental sustainability, resilience in light of more extreme weather events, economic development, energy justice, and public health.

NEEP assists state and local policy makers in the Northeast to assess, adopt, and implement a wide range of energy efficiency and demand-side policies and programs by tracking trends and developments, and providing information, analyses, best practice guidance and customized technical assistance with links to additional resources for a smart energy policy for a future that holistically looks at efficiency, low carbon energy use and buildings as grid assets. This includes updates to and reports from NEEP's Regional Energy Efficiency Database (REED) which provides ready public access to energy efficiency program results from energy efficiency programs in Northeast states.

LONG-TERM MARKET TRANSFORMATION GOALS

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.

All Northeast states have statewide programs supporting communities to achieve state carbon reduction goals.

2030

All Northeast states adopt policies to reduce building sector energy consumption 3% per year and carbon emissions 40%.

2019 PROJECT OUTCOMES

1. 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).
2. At least three additional Northeast states adopt energy efficiency program metrics to reduce total energy consumption in homes and buildings.
3. 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.
4. 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.

REGIONAL TRENDS & LEADERS

- The District of Columbia's Clean Energy Plan to reduce carbon emissions 50% by 2030 includes an aggressive building decarbonization that includes zero energy building energy codes and accelerating deep efficiency retrofits through building energy performance standards for existing homes and buildings supported by incentives and a Green Energy Bank.
- The RI Public Utility Commission's Power Sector Transformation Initiative provides an innovative regulatory framework for Rhode Island's electric system that is aligned with the State's carbon emission reduction and resiliency goals, including efficient demand-side resources to reduce peaks, and efficient beneficial electrification to reduce use of carbon-intensive fuels.
- Massachusetts' 2018 Act to Advance Clean Energy broadens the scope of energy efficiency cost-effectiveness and enables the inclusion of active demand management and strategic electrification in electric energy efficiency program plans.
- NYSERDA's Clean Energy Fund plan provides a comprehensive suite of initiatives to promote clean, efficient demand-side solutions to reduce carbon emissions 40 percent by 2030 while increasing energy affordability, reliability and resilience.
- National Grid's Northeast 80 x 50 Pathway provides an integrated blueprint for NY and New England to reduce emissions collaboratively.
- Twelve Northeast states offer programs that support community efforts to increase efficiency and reduce carbon

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP promotes progress and highlights leadership across the region for public policies that accelerate advanced energy efficiency through the publication of policy updates, case studies/exemplars and trend analyses, and the maintenance and use of the Regional Energy Efficiency Database (REED).

- NEEP Allies Weekly Tracking Updates
- Policy Tracking and Analysis via Webinars, Topical Blog Posts, Newsletters & Reports
- Participation in state policy working groups (e.g. New York Clean Energy Organizations Collaborative)
- REED database updated to include 2017 data for use in analyses and benchmarking

TECHNICAL ASSISTANCE

NEEP provides invited comments on state and local plans and proposals to advance energy efficiency and demand-side resources and topical technical assistance.

- Customized technical assistance (e.g. comment letters in regulatory proceedings) and coordinated multi-state research by request

TRACKING & ANALYSIS

NEEP tracks key metrics and state and local policies across the region to identify and report on best practices and trends in advancing efficient demand-side solutions. NEEP maintains an online policy tracker for legislative tracking.

- Web-based policy tracker
- Bi-monthly policy tracker blog (e.g., September 2018 Blog)

RESEARCH & REPORTS

NEEP prepares topical analyses and reports that reflect progress and highlight leadership across the region for public policies that accelerate advanced energy efficiency as a key resource to meet energy affordability, reliability and carbon emission reduction goals.

- Annual Regional EE Snapshot Report with REED results (e.g., 2018 EE Snapshot)
- ***New*** Advanced Efficiency Policy Framework providing the key policy elements and pathways for achieving carbon reduction goals
- Policy Tracking and Analysis via Topical Blog Posts, Newsletters & Reports
- Research Report on results of US DOE-sponsored in conjunction with REED database update
- Quarterly "REED Renderings" which provide regional analyses of reported energy efficiency program costs and savings

NATIONAL / REGIONAL COLLABORATION

NEEP will leverage state, federal and national resources to inform state plans and policies.

- Monitor, communicate, present and coordinate with national and regional organizations (NRDC, Acadia Center, Sierra Club, Environmental Defense Fund, ACEEE, Alliance to Save Energy, Green Energy Consumers Alliance, Northeast Clean Energy Council, Advanced Energy Economy, NASEO and others)

Community Pathways and Resources

Efficient and Resilient Buildings and Communities

MISSION

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

ABOUT THIS PROJECT

The Pathways for Efficient and Resilient Communities project supports the rapid expansion of community initiatives across the region to significantly increase energy efficiency. In partnership with community leaders, associations, state and federal agencies, utilities, industry, non-profits, and other stakeholders, the project supports communities and states to lead-by-example by improving the efficiency of public buildings and facilities while paving the way for the proliferation of high performance and zero energy public schools and buildings, LED streetlights, high performance water and waste-water treatment plants, and efficient, clean energy transportation solutions. The project also supports community leaders to promote high levels of efficiency and its related benefits such as health and resiliency improvements, in the homes, businesses, and institutions they serve through advanced building energy codes, building energy benchmarking and home energy labeling, and financing.

LONG-TERM MARKET TRANSFORMATION GOALS

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.

2025

60% of Northeast communities reduce municipal building energy consumption by 20% or more.

2030

60% of Northeast communities have programs to reduce carbon emissions 50% across their residential and commercial sectors.

2019 PROJECT OUTCOMES

1. Twenty-two new Northeast communities commit to energy and carbon reduction goals.
2. 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.
3. 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.

REGIONAL TRENDS & LEADERS

- Several states within the region, including DC, MA, NY, and RI, have developed or modified zero energy policies and programs.
- Smaller communities (e.g., Providence, RI, Ithaca, NY, and Amherst, MA) are following the lead of cities like Boston, MA, Cambridge, MA, and New York, NY to implement zero energy and carbon reduction policies.
- Northeast K-12 schools continue to lead by example; demonstrating successful approaches to achieve high performance and zero energy buildings, with over 120 schools designed, built, and renovated to CHPS standards.
- Northeast states, and local and regional organizations, are responding to resource constraints through collaboration. Organizations such as the NH Local Energy Solutions Work Group and the Maine Climate Table help increase capacity, reduce market confusion and provide a replicable approach to achieve energy and carbon reduction goals.

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP brings together key stakeholders, resources, and analyses in 2019 to assist communities to set and achieve efficiency and carbon reduction goals through:

- Public Buildings, Schools and Communities Working Group
- State-specific Schools Working Groups in Massachusetts, New Hampshire, and Rhode Island
- Three webinars with topics based on stakeholder interest and needs
- An in-person stakeholder forum on the latest strategies, challenges, and opportunities to attain multiple benefits and reduce carbon emissions by improving public building energy efficiency.
- Regional and national presentations and briefings as requested
- Two high performance school tours in conjunction with Healthy School Day 2019
- ***New*** Planning for a 2020 Regional Efficient, Resilient Low Carbon Schools Summit

TRACKING & ANALYSIS

NEEP will track and analyze the progress being made at the regional, state and local level and provide an assessment of regional trends.

- ***New*** Web-based dashboard to track state and communities zero energy and carbon policies
- Tracking of high performance schools by state

TOOLS & GUIDELINES

NEEP advances the development of strategies, tools and best practices to move communities forward with their efficiency planning by providing best practice tools and resources developed by NEEP and others (e.g., U.S. DOE, U.S. EPA, Collaborative for High Performance Schools (CHPS), Institute for Market Transformation (IMT), National Business Institute (NBI), and others).

- Four Northeast High Performance Schools and Community Exemplars
- Maintain and update CAPEE with three new modules (financing, wastewater, transportation)
- ***New*** Fact sheets on the benefits of energy efficiency/indoor air quality and strategic electrification for communities
- ***New*** Create and disseminate video exemplars on the benefits of Energy Efficient Schools/Public Buildings, Strategic Electrification
- Maintain Online Resource center
- Technical Assistance as requested

RESEARCH & REPORTS

NEEP will maintain, update, and support the use of NEEP's regional reports.

- Update and maintain NEEP's Regional Operations and Maintenance Guide for High Performance Schools and Public Buildings
- Maintain and disseminate NEEP's Northeast Collaborative for High Performance Schools Criteria for school construction and design (NE-CHPS V3.1 2015)

NATIONAL/REGIONAL COLLABORATION

NEEP will contribute to and leverage state and national resources to inform community resources and planning.

- Monitor, communicate, present, and coordinate with national and regional organizations (e.g., Massachusetts Facilities Administrators Association (MFAA), NH Local Energy Solutions, Metropolitan Area Planning Council (MAPC), Delaware Valley Regional Planning Commission (DVRPC), etc.)
- Disseminate U.S. DOE best practices and link states to federal programs and resources
- Engage with stakeholders to contribute to the development of national programs such as SEE Action Network and DOE's Zero Energy Schools Accelerator
- Participate as members of the CHPS Board of Directors
- State and Local Energy Efficiency Action Network (SEE Action - Existing Commercial Buildings Working Group)

Building Energy Codes, Benchmarking, and Home Energy Labeling

Efficient and Resilient Buildings and Communities

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.

ABOUT THIS PROJECT

Building Energy Codes, Building Energy Benchmarking, and Home Energy Labeling offer major opportunities to achieve long-term, cost-effective energy savings in new, retrofitted, and existing homes and buildings. In the NEEP region, the energy savings potential from the adoption of model energy codes is more than $260 million dollars from projected new construction in 2016-2020.[1] Effectively implemented, energy codes, benchmarking, and labeling can significantly reduce carbon emissions from homes and buildings which together emit 45 percent of our region's annual carbon pollution. Building energy codes, benchmarking, and labeling offer public officials powerful tools to address climate goals, economic growth, community resiliency, and public health. Pathways to achieve these benefits are described in NEEP's 2017 strategy report "Building Energy Codes for a Carbon-Constrained Era".

LONG-TERM MARKET TRANSFORMATION GOALS

2022

All Northeast states adopt the latest model energy code that increases energy savings.

2030

At least six Northeast States require zero energy for building energy codes for new and renovated homes and buildings.

30% of existing homes and buildings are benchmarked and retrofitted to reduce carbon emissions 50%.

2019 PROJECT OUTCOMES

1. Six Northeast states (DC, DE, MD, NJ, NY, VT) adopt a recent model energy code (2018 IECC).
2. Three Northeast states implement zero energy stretch codes (DC, NY, VT) and three additional Northeast states adopt stretch codes (DE, MA, NJ).
3. Five Northeast states invest in initiatives to achieve 90+ percent code compliance statewide (CT, DE, MD, NJ, PA).
4. 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.

[1] Goldthwaite and Westmoreland, ACEEE Paper, Regional Construction Starts: Trends, Impacts and Energy Codes. https://aceee.org/files/proceedings/2016/data/papers/5_461.pdf

REGIONAL TRENDS & LEADERS

- Seven states (CT, DC, MA, MD, NJ, NY, VT) reference the most recent national model energy codes which save building owners or occupants 8-15 percent on electric and fuel costs. Additionally, model energy codes assure better air quality, durability, and resiliency.
- Seven states (DC, MA, MD, NH, NY, RI, VT) are offering a total of 11 regional stretch codes that provide additional energy as well as water savings beyond base code.
- Three states (DC, NY, VT) are developing next generation zero energy codes; all buildings in these states will be built to zero energy between 2022 and 2030.
- Nine cities, counties, or utilities in the region have adopted building energy benchmarking policies or programs that support the market valuation of energy efficient commercial buildings.
- Five states, jurisdictions, or utilities in the region have implemented residential building energy labeling policies or programs that support the market valuation of energy-efficient residential buildings.

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP brings together key stakeholders, resources and data to build knowledge and understanding of the best paths to advance the adoption and implementation of building energy codes, benchmarking, and labeling policies and programs.

- Facilitate the NEEP Regional Building Energy Codes working group
  - Three webinars on topics determined by working group members
  - One in-person meeting with agenda shaped by working group members
  - Working group is updated regularly via emails on energy code news for the NEEP region and beyond
- Facilitate the Pennsylvania Building Energy Code Compliance Collaborative
  - Four meetings per year: two in-person and two web-based meetings, agendas for which are shaped by collaborative members
- Provide technical assistance to and participate in building energy codes stakeholder groups:
  - Delaware Codes Coalition
  - Maine Codes Working Group (Portland)
  - Rhode Island Code Compliance Enhancement Initiative
- Facilitate NEEP's Regional Home Energy Labeling Stakeholder Group to share best practices with mandatory or voluntary labeling pilots, programs, and policies
- ***New*** Convene a Regional Commercial Building Energy Benchmarking stakeholder meeting
- ***New*** Convene a Massachusetts Getting to Zero Initiative
  - Facilitate a Massachusetts Building Energy Code Stakeholder Group
  - Conduct research and analysis
  - Develop and assist a plan to advance Massachusetts toward zero energy codes

TRACKING & ANALYSIS

NEEP will track and analyze leading efforts and progress across the region and facilitate peer exchange to inspire and transfer learning.

- ***Update*** Web-based energy code tracker available on NEEP website
- ***Update*** Web-based energy code-related policy tracking
- ***New*** Dashboard analyzing energy code compliance rates and cost in the region
- ***New*** Exemplar examining home energy ratings throughout NEEP region to assess the impact on decarbonization.
- ***Update*** Tracking the number of communities and states with residential labeling policies, voluntary or mandatory in a policy summary brief
- ***New*** Tracking of whole building data aggregation policies in a policy summary brief
- ***New*** Online benchmarking dashboard tracking the impacts of building energy benchmarking ordinances in cities that have adopted policies

TOOLS & GUIDELINES

NEEP's work will advance the development of strategies, tools and best practices for state and local government leaders to adopt and effectively implement building energy codes, benchmarking and labeling policies and programs.

- ***Update*** Building Energy Code Adoption Toolkit
- ***Update*** Building Energy Code Compliance Toolkit
- ***Update*** Green Real Estate Resources web resource center
- ***New*** Four state-specific fact sheets – Building Energy Codes and Carbon Reduction
- ***New*** Washington D.C. Exemplar – Building Energy Codes and Zero-Energy
- ***New*** New York State Exemplar – Advanced Stretch Codes
- ***New*** Add Building Energy Code content to NEEP's Northeast Operations and Maintenance Guide for High Performance Schools and Public Buildings with a focus on alterations and retrofits
- Topical blogs, exemplars, and technical assistance as requested

RESEARCH & REPORTS

NEEP will track and analyze state needs, trends and impacts to facilitate the adoption and enforcement of buildings codes and beyond base code initiatives for new buildings and decarbonization of existing buildings.

- ***Update*** Roadmap to Zero Energy Public Buildings: Progress Report
- ***New*** Brief: Linkage to Strategic Electrification and Building Energy Codes
- ***New*** Building Energy Codes and Zoning White Paper addressing how home-rule communities can adopt advanced energy code energy provisions through zoning regulations.
- ***New*** Report on Building Energy Benchmarking trends and needs in the region
- ***New*** Brief on Commercial Building Asset Scores, Pathways, and Solutions
- ***New*** Buildings Energy Lifecycle White Paper accompanied by two webinars

NATIONAL/REGIONAL COLLABORATION

NEEP will leverage state, federal, and national resources to inform state plans and policies.

- Monitor, communicate, present, and coordinate with national and regional organizations (e.g., Regional Energy Efficiency Organizations (REEOs), National Association of State Energy Officials (NASEO), Building Codes Assistance Project (BCAP), Responsible Energy Codes Alliance (RECA), International Code Council, Inc. (ICC))
- ***New*** Collaboration with national partners and allies to develop and implement benchmarking roadmap and tools. Initiative integrates benchmarking, listing and labeling, codes, and national programs such as Energy Star for Existing Homes. (Institute for Market Transformation (IMT), New Buildings Institute (NBI), REEOs)
- Disseminate U.S. DOE and EPA best practices and link states to federal programs and resources (DOE Zero Energy Ready Homes Program, Energy Star for Existing Homes)
- Engage with stakeholders to contribute to the development of national building energy code initiatives (e.g., 2021 Energy Code; regional/national stretch code and zero energy code)
- Continued partnership and collaboration with other REEOs

Home Energy Labeling Information eXchange (HELIX)

Efficient and Resilient Buildings and Communities

MISSION

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

ABOUT THIS PROJECT

The Home Energy Labeling Information eXchange (HELIX) is revolutionizing the valuation of energy in real estate transactions by automating the inclusion of home energy labels and associated data, approved by homeowners, in real estate listings, whether accessed through local Multiple Listing Services (MLS) or portals such as Trulia and Zillow. Providing real estate professionals with access to verified, independent home energy information, enables sellers to better market their properties, empowers buyers to make better-informed investments, and promotes wiser use of home energy, all while being completely voluntary. Home energy labels are a key strategy to establish a market value for energy efficient homes and associated investments to improve energy performance. HELIX is funded by a three-year State Energy Program grant from U.S. DOE (hosted by VT) with state, foundation, and NEEP grant matches. The multi-faceted HELIX team includes organizations and states working to automate the transfer of home energy labeling information to MLS across the region.

LONG-TERM MARKET TRANSFORMATION GOALS

2025

Home energy information is populated in all residential real estate listings across the Northeast.

Lenders, realtors, appraisers in all Northeast states use home energy information to value residential real estate and to support investments to improve energy performance.

2030

30% of existing homes and buildings are benchmarked and retrofitted to reduce carbon emissions 50%.

2019 PROJECT OUTCOMES

1. By year end, HELIX populates home energy information in 20 percent of residential real estate listings in New England and New York State.
2. Home energy labels in New England and New York property listings increase by 20 percent.
3. HELIX has a viable, self-sustaining revenue model ready to begin in 2020.
4. HELIX is modified to accept and maintain solar data in at least four Northeast states.

REGIONAL TRENDS & LEADERS

- HELIX has been successfully beta tested in five states (CT, MA, NH, RI, and VT) and is ready for expansion to at least two additional states (e.g., NJ, PA).
- Ten percent of the residential real estate listings in the current HELIX states have adopted home energy ratings and scores which means that buyers have access to reliable energy information
- Based on a recent NEEP survey to real estate professionals, home buyers are increasingly asking for energy efficiency information before buying or renting a home
- Rooftop PV installations has grown extensively across the region. However, underestimation of the value of solar PV in residential property appraisals and the lack of access to reliable information in real estate listings remain significant market barriers to further investment. HELIX will address these by automating the availability of rooftop PV information in property listings to provide the transparency needed for comparative valuation.

HELIX ATTRIBUTES

Transparency in the real estate market around energy use in homes can help states pursue one of the areas of highest energy use: the building sector. For states with GHG emissions reduction targets, creating an increased demand for energy efficient home improvements is a low-cost way of achieving these goals. By having all of the building data in one database, states can analyze the information to identify trends and create policy or program opportunities to achieve their GHG goals.

- Single consolidated database of energy-related “certification” and “performance” data (see list below)
- Single consolidated database of home energy measures such as solar photovoltaic or thermal installations and heat pump systems
- Links to MLS and data aggregators to populate RESO certification data and solar fields in a MLS - the data can be provided to MLS' via the HELIX API in native RESO Silver Standard format or via direct integration in the MLS software
- Flexible design allowing program oversight of individual auditors or data partners by the program manager
- Flexible permission system with different levels of access rights to the data
- HELIX generates the green addendum, incorporating certifications as well as home energy measures and efficiency features. The Green Addendum is stored on the HELIX Amazon S3 “Simple Storage Service” with a unique link URL recorded in HELIX. HELIX has a built-in API with key based authentication to share this and other information with external systems. HELIX associates an optional expiry date with certifications and labels such as the Green Addendum to prevent dated information from being released to the public.
- Database hosting services
- Database management and maintenance
- Preset and customizable reports
- Shared technical updates across the platform for multi-user benefits
- Repository of compliance data for community policies
- Security and privacy protections for consumers. Privacy protections are implemented at the certification or label level, allowing a subset or all of the home's energy data to remain private. Records or labels opted-out of public release are not shared with MLS' or other external parties.
- Accessibility to community and utility users for analysis and reporting
- Flexibility around database functionality (automated quality assurance, streamlined data reporting)
- Additional technical support available at $140/hour

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP will continue to engage stakeholders (state agencies, real estate professionals and appraisers, gas and electric utilities, efficiency programs, building code officials) in a facilitated learning exchange to guide HELIX development, testing, and use.

- HELIX Advisory Committee
- Two topical webinars based on stakeholder interest and needs
- Quarterly presentations and briefings to external stakeholders
- ***New*** Annual HELIX Stakeholder meeting

TOOLS & GUIDELINES

NEEP will develop strategies and tools, and provide technical assistance to advance HELIX implementation and use.

- Exemplar: Rhode Island's Home Energy Score Pilot and Vermont's integration of HELIX into the MLS
- ***New*** Create HELIX State Implementation Toolkit
- HELIX Fact Sheets
- State Technical Assistance to implementing HELIX including solar PV
- ***New*** Develop an Online Resource Platform
- 10 hours of technical support and consulting

TRACKING & ANALYSIS

NEEP will complete HELIX pilot testing, finalize HELIX as a market-ready resource, and implement a marketing strategy to successfully deploy HELIX in the region and beyond.

- ***New*** Regional Data and Trends Analysis of HELIX impact in the real estate market

RESEARCH & REPORTS

NEEP will use the data analysis from HELIX pilot testing to partner with key stakeholders to support successful HELIX deployment beyond the Northeast.

- Research opportunities for HELIX Mid-Atlantic expansion
- Self-sustaining HELIX Revenue and Business Model

NATIONAL/REGIONAL COLLABORATION

NEEP will help grow market demand for home energy labels through regional/national presentations and conversations, and educational outreach to real estate professionals and appraisers.

- Monitor, communicate, present, and coordinate with national and regional organizations (e.g., NASEO, Home Performance Coalition, Elevate Energy)
- Disseminate U.S. DOE best practice and link states to federal programs and resources
- Engage with stakeholders to contribute to the development of national programs

Air Source Heat Pumps and Smart Controls

Smart, Efficient Low Carbon Building Energy Solutions

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.

ABOUT THIS PROJECT

NEEP's Air Source Heat Pump (ASHP) and Smart Controls regional initiative weaves together and implements our regional market transformation strategies to accelerate market adoption of ASHPs and smart controls. Essential to meet state and local climate stabilization goals by 2030 and 2050, NEEP's market transformation initiative builds on and scales-up the momentum of technology innovation supported by individual state, ratepayer-funded and local energy efficiency, demand response, and carbon reduction policies and programs. **Cold Climate Air Source Heat Pumps** (ccASHPs) and **Variable Refrigerant Flow** (VRF) systems offer Northeast households and businesses a super-efficient clean energy solution to dramatically reduce the use of less efficient, carbon-intensive space heating systems while also offering efficient air conditioning. **Smart controls** bridge ASHP systems with other heating systems to maximize efficiency and occupant comfort while also enabling real-time demand response in thermally-efficient homes to support efficient, reliable grid operation.

LONG-TERM MARKET TRANSFORMATION GOALS

By 2030:

40%

of Northeast homes use high performance ASHPs for heating.

50%

of Northeast homes are "energy smart" with at least two "energy smart" systems (HVAC, water heating, plug loads)

80%

of Northeast homes with high performance ASHPs are retrofitted to improve thermal efficiency performance.

2019 PROJECT OUTCOMES

1. Program and/or policies referencing NEEP's ccASHP specification increases from seven to 10 states and provinces in the Northeast U.S. and Canada.
2. NEEP's regional market transformation strategies and resources for ASHPs are referenced or used in at least five new jurisdictions.
3. 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

REGIONAL TRENDS & LEADERS

- NEEP's 2017 Regional Strategic Electrification Assessment and Action Plan highlight the urgent need to accelerate market adoption of low carbon heating and cooling solutions, including ASHPs, with thermal efficiency and grid integration to achieve state carbon emission reduction goals while growing jobs and maintaining energy affordability.
- Decarbonization of space and water heating is emerging as a priority for most states in the region. Several states including MA, RI, NY, and CT have strategies to drive adoption of "clean" or "renewable" heating and cooling technologies.
- Adoption of ASHP in the region (NY and New England) is quickly increasing. Sales have increased from approximately 50,000 units in in 2013 to approximately 75,000 in 2016; a 50% percent increase in just three years.

2019 Strategies with Associated Products, Services and Technical Assistance

PUBLICLY ACCESSIBLE HIGH PERFORMANCE COLD-CLIMATE AIR SOURCE HEAT PUMP PRODUCT LIST

Since first launching in 2015, the cold-climate ASHP product specification and list has evolved to meet the needs of consumers and installers who live and work in cold climates, as well as meet the needs of efficiency programs across the Northeast U.S. and Canada. Access the current ccASHP product list here.

Updated Product Specification: To stay current with product development and innovation, on January 1, 2019, the V3.0 ccASHP specification will be in effect. In April 2019, the product list will move to an enhanced database that offers a new format and user interface to ease ccASHP product list review and comparison along with user-friendly technical information. Subscribers to NEEP's ASHP initiative will receive enhanced access.

ASHP AND SMART CONTROLS INITIATIVE SUBSCRIPTION

NEEP's Air Source Heat Pump and Smart Controls initiative participants include regional, national, and Canadian interests spanning government, manufacturers, distributors and installers, service providers, program designers, national labs and research institutes, consultants, consumers, advocates, and other interested stakeholders.

To support NEEP's initiative services, beginning April 1, 2019, NEEP will require ASHP and Smart Controls working groups participants to subscribe and agree to fund this work as subscribers either directly or through an agreed upon exchange.

To subscribe to NEEP's ASHP and Smart Controls Initiative for 2019, complete the on-line registration form. A NEEP staff member will follow-up to acknowledge receipt, answer questions, and provide a subscription agreement and invoice. Subscription will begin upon NEEP's receipt of the completed agreement and subscription fee.

STAKEHOLDER ENGAGEMENT

NEEP will engage a diverse group of stakeholders - industry, efficiency programs, state and local government, national labs, U.S. DOE, and advocates - to develop and advance long-term regional market transformation strategies to speed the market introduction and adoption of ccASHPs and smart controls.

- ASHP Working Group*
  - ASHP Sub-Committee (Program Administrator Advisory Committee)
  - ASHP Sub-Committee (Industry Advisory Committee)
  - ASHP Sub-Committee (Consumer Buying Guidance)
  - ASHP Sub-Committee (Installer/Consumer Best Practices)
- VRF Working Group
- Air Source Heat Pump Market Transformation Workshop
- Topical Webinars (three – topics to be selected to meet member needs)
- Presentations and Briefings

TRACKING & ANALYSIS

NEEP will continue to expand its collaboration with U.S. DOE, national labs, and others to track, assess, and provide initiative members reported ccASHP performance data and associated analyses. NEEP will also track and contribute to projects that drive the development of home heating system controls that integrate ccASHPs with other building heating systems.

- ASHP Market Tracking Analyses in Quarterly Working Group Reports

TOOLS & GUIDELINES

NEEP will introduce, in mid-2019, a new format and user interface for the ccASHP Product List that will ease product review and comparison including user-friendly technical information. NEEP will also continue to develop consumer based tools to support the broad use of ccASHPs.

- NEEP's Cold-Climate ASHP Specification and Product List (updated 1/1/19)*
- Cold-Climate VRF Specification and Product List: Opportunity Assessment
- ***New*** ASHP Consumer Buying Guidance Resource
- Dissemination of NEEP's ASHP Installer Guides/Video, and ccASHP Consumer Operations and Maintenance Guide
- ***New*** Case studies of most common ASHP installs
- Online repository of ASHP, VRF, and Smart Controls Reports/ Analysis/Resources

RESEARCH & REPORTS

NEEP will finalize a regional roadmap of market transformation strategies designed to accelerate VRF adoption in the region. The strategy will provide a list of priority actions that the regional VRF Working group will work to implement on an ongoing basis.

- Northeast VRF Market Transformation Strategies Report

NATIONAL/REGIONAL COLLABORATION

NEEP will track, contribute to, and help disseminate relevant research, policies, programs and initiatives, and will attend related conferences and events regionally and nationally to build market momentum to overcome identified market, technology, and policy barriers.

- Monitor, communicate, present, and coordinate with national and regional organizations (i.e. Regional Energy Efficiency Organizations, U.S. DOE, Natural Resources Canada, Home Performance Coalition, ACEEE, Efficiency Canada, Rocky Mountain Institute, advocacy organizations, etc.)
- Disseminate U.S. DOE best practices and link states to federal programs and resources

** In 2019, there will be product listing fees and membership fees associated with NEEP's Cold-Climate ASHP Specification and Product List and NEEP's Northeast/Mid-Atlantic ASHP/VRF Working Group. For more information on these fees, please visit: https://neep.org/ashp*

Smart Energy Homes

Electrification and Advanced Integrated Building Energy Solutions

MISSION

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

ABOUT THIS PROJECT

As the region moves towards a decarbonized energy system, our need is growing for homes that are efficient, flexible, and responsive to the grid as well as customers. The Smart Energy Home has been defined as just that (NEEP 2016): one that optimizes energy use to save energy, drive efficiency retrofits in the home, can interact dynamically with the grid, and can manage new distributed energy resources as they come online. As electric grid, owners, operators, and regulators enable the grid to send signals to manage building energy loads, many major home appliance manufacturers now equip new products (HVAC, water heaters, and plug loads/appliances) with smart controls to serve customer needs while responding to grid load management signals. To guide and accelerate this market transformation, NEEP serves as a regional and national convener and subject matter expert to assist state and federal programs, efficiency program administrators, and industry to work and learn together to harness the power of smart energy home and home energy management systems (HEMS) that enable an affordable, reliable, resilient, and low carbon energy system.

LONG-TERM MARKET TRANSFORMATION GOALS

2022

Virtually all smart products are DER-ready and can work as part of an integrated Smart Energy Home system.

2030

50% of Northeast homes are "energy smart" (i.e., have at least two "energy smart" systems - HVAC, water heating, plug loads/appliances).

30% of existing homes and buildings are benchmarked and retrofitted to reduce carbon emissions 50%.

2019 PROJECT OUTCOMES

1. 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.
2. 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.
3. Most major manufacturers of smart energy home products serving the Northeast U.S. offer DER-ready products by the end of 2019.

REGIONAL TRENDS & LEADERS

- NEEP's 2016 Smart Energy Homes Market Transformation Report identifies major opportunities to accelerate smart thermostats, home energy management technology and solutions for low-carbon water heating and plug load and appliance efficiency.
- Efficiency programs in MA, MD, NY, and VT offer smart home energy pilots to assess and demonstrate a variety of new smart technologies.
- Efficiency programs in MA and VT are partnering to test and assess the role of smart thermostats to optimize efficient home thermal energy performance through partnerships with Fraunhofer Institute and Vermont Energy Investment Corp (VEIC).
- Home performance contractors in MD, NJ, NY, and VT increasingly offer smart home energy products and systems integration as a customer service.

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP will engage diverse stakeholders - industry, efficiency programs, state and local government, national labs, U.S. DOE, U.S EPA and advocates - to develop and advance long-term regional market transformation strategies to speed the market introduction and adoption of smart home technologies that facilitate residential decarbonization.

- Northeast Smart Energy Homes Working Group (also known as the HEMS Working Group)
- ***New*** Decarbonization and Smart Energy Homes webinar –three-part series
- Co-lead the Smart Homes track at HPC National Conference
- Presentations and briefings on residential decarbonization and the smart energy home

TRACKING & ANALYSIS

NEEP will continue to track and report on relevant smart energy home technologies trends and program activity, pilots and technology demonstrations across the region, including the role of such devices to optimize home energy performance, enable demand response and support efficiency program evaluation, measurement and verification.

- Smart Home Market Tracking Analysis, delivered quarterly to working group members.

TOOLS & GUIDELINES

NEEP will help accelerate the availability, adoption, and use of quality, reliable inter-operable smart energy home technologies to meet the future regional needs for reliable, resilient, affordable and low carbon energy.

- NEEP's Smart Energy Home Product Directory provides access to transparent, comparative smart energy home product information via with links to other relevant resources.
- ***New*** Advising and co-chairing U.S. EPA's ENERGY STAR Smart Home Energy Management Systems (SHEMS) Distributed Energy Resources and Demand Response Workgroup.

NATIONAL/REGIONAL COLLABORATION

NEEP will track, contribute to, and help disseminate relevant research, policies, programs and initiatives, and attend related conferences and events regionally and nationally to build market momentum to overcome identified market, technology and policy barriers.

- Monitor, communicate, present and coordinate with national and regional organizations (e.g., Regional Energy Efficiency Organizations, U.S. DOE, U.S. EPA, Home Performance Coalition, ACEEE, CEE, E-Source, advocacy organizations, etc.)

Smart, Low Carbon Commercial and Industrial Solutions

Smart, Efficient Low Carbon Building Energy 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.

ABOUT THIS PROJECT

The combined commercial and industrial sector accounts for roughly 45 percent of energy use in the region. Opportunities for energy efficiency abound, yet barriers persist that prevent cost-effective savings from being achieved. NEEP's Integrated C&I Solutions Project addresses this by identifying new efficiency opportunities and supporting solutions to accelerate their adoption on a regional scale. In 2019, NEEP is focused on two key areas: comprehensive savings through Strategic Energy Management (SEM) and super-efficient HVAC solutions in the commercial market. Space heating accounts for roughly 50 percent of energy use in the commercial market. New heating and cooling technologies such as Variable Refrigerant Flow (VRF) and Advanced Roof-top Units (ARTU) offer the region a pathway to reduce energy use, peak power and carbon impacts.

LONG-TERM MARKET TRANSFORMATION GOALS

2025

Strategic Energy Management becomes a standard business practice and is adopted by 40% of the 69,000 manufacturing plants across the region.

Advanced Roof-top Units and VRF systems grow to 33% of the installed RTU base in all Northeast states (from 1% in 2018)

2019 PROJECT OUTCOMES

1. Energy efficiency programs in seven Northeast states (CT, MA, NH, NY, PA, RI, VT) support SEM as a program measure (an increase of 50 percent)
2. Five end-users (companies/municipalities) in the region receive 50001 Ready recognition
3. Programs in four states fund and participate in NEEP's R-22 Phase-out Commercial HVAC market assessment and strategy development

REGIONAL TRENDS & LEADERS

- A growing number of energy efficiency programs in the Northeast offer Strategic Energy Management as a program to achieve valuable energy and demand savings. Recently, MA and RI joined NY and VT in offering SEM programs for their C&I customers.
- U.S. DOE recently launched an exciting new program, 50001 Ready, to assist C&I companies in implementing SEM in their facilities.[1]
- Decarbonization of space and water heating is an emerging priority for most Northeast states. CT, MA, NY, RI, and VT have strategies to drive adoption of "clean" or "renewable" heating and cooling technologies.
- NEEP's Action Plan to Accelerate Strategic Electrification (NEEP 2018)[2] highlights the importance of electrifying space and water heating in the commercial sectors to reduce building carbon emissions.
- The Commercial HVAC market is facing a significant market event. The former industry-standard refrigerant R-22 (hydrofluorocarbon also known as freon) is being phased out worldwide due to its harmful effects on the ozone layer. The phase out presents a time-sensitive opportunity to replace existing HVAC systems that utilize R-22 with super-efficient, grid responsive technologies (e.g., ARTUs or VRF systems).
- New business models (e.g., energy as a service) offer the business community low-risk options to improve building energy efficiency and enable demand-response to reduce T&D system peak demand using a range of technology options.[3]

[1] See https://www.energy.gov/eere/amo/50001-ready-program

[2] See https://neep.org/reports/strategic-electrification-action-plan

[3] See Getting to Yes: Scaling Comprehensive Efficiency in Commercial Buildings (NEEP 2018) at: https://neep.org/getting-yes-scaling-comprehensive-efficiency-commercial-buildings

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP will engage a diverse stakeholder group - industry, efficiency programs, state and local government, national labs, U.S. DOE and advocates - to develop and advance long-term regional market transformation strategies to speed the market introduction and adoption of SEM and super-efficient HVAC technologies.

- Northeast/Mid-Atlantic SEM Working Group
- SEM Regional Market Transformation Workshop
- Northeast/Mid-Atlantic "R-22 Phase-out" Working Group (dependent on confirmed funding for joint research)
- Presentations and Briefings

TRACKING & ANALYSIS

NEEP will track and analyze leading efforts and progress across the region and facilitate peer exchange to inspire and transfer learning.

- Web-based Resource Center to include a variety of informational resources to support adoption of SEM and strategies that result from Commercial HVAC research.
- Presentations and briefings focused on opportunities for end-users to adopt, and programs to support their adoption, of 50001 Ready

TOOLS & GUIDELINES

NEEP will provide and develop new strategies and tools as well as provide technical assistance to programs and industry to advance the market adoption of Strategic Energy Management.

- Maintain public access to Community Action Planning for Energy Efficiency (CAPEE) technical assistance module for SEM for Municipal Water/Waste Water facilities (NEEP 2018)
- 50001 Ready Recognition Pilot to provide technical support to regional end-users in their pursuit of 50001 Ready recognition
- Maintain public access to NEEP's EM&V Best Practices & Recommendations for Industrial SEM Programs (NEEP 2017)

RESEARCH & REPORTS

NEEP will maintain access to and support use of NEEP's Regional Market Transformation Strategies:

- Northeast and Mid-Atlantic Industrial Sector Report: Market Assessment & Recommended Strategies to Accelerate Energy Efficiency (NEEP 2016)

Subject to confirmed participant joint funding to undertake market research and analysis NEEP will develop:

- ***New*** Commercial HVAC Market Assessment and Strategy Report- Market Strategies to leverage R-22 Phase out event

NATIONAL/REGIONAL COLLABORATION

NEEP will leverage state, federal, and national resources to inform state plans and policies.

- Monitor, communicate, present, and coordinate with national and regional organizations (e.g., U.S. DOE, U.S. EPA, National Labs, National/Regional SEM collaboratives, etc.)
- Disseminate U.S. DOE best practices and link states to federal programs and resources
- Engage with stakeholders to contribute to the development of national programs

R&D Connector - Buildings as Grid Assets

Smart, Efficient Low Carbon Building Energy Solutions

MISSION

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

ABOUT THIS PROJECT

Policymakers and utilities in the Northeast are beginning to recognize Grid-interactive, Efficient Buildings (GEBs) as critical to the realization of a more reliable, affordable, and clean energy system. As these efforts advance, technology cost and performance information is needed to fully include smart home and building technologies in wholesale electricity markets and/or to serve as active resources to meet local distribution system needs. While interest and investment is growing, GEBs research and development (R&D) and adoption programs are not linked to share lessons from existing research efforts nor are they effectively collaborating to accelerate GEB development and adoption. The R&D Connector is a partnership with the U.S. Department of Energy (U.S. DOE) to engage stakeholders to expose regional research needs and initiatives for GEBs, as well as to highlight priority areas for future collaboration and R&D to meet regional needs. It contributes to a new US DOE GEBs project involving NASEO, NARUC and ACEEE to inform development of a national GEBs roadmap.

LONG-TERM MARKET TRANSFORMATION GOALS

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.

2019 PROJECT OUTCOMES

1. 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.
2. Catalyze new regional collaborations to develop, test and advance smart energy home and building technologies and system integration.
3. Effectively align U.S. DOE-funded research and technology development to meet regional needs.

REGIONAL TRENDS & LEADERS

- Energy efficiency programs in six states now link energy efficiency investments in homes and buildings with demand response, and in some cases energy storage, to provide grid reliability services (i.e., CT, MA, ME, NY, PA, and RI).
- At least eight electric utilities in eight Northeast States (CT, DE, MA, ME, NH, NJ, NY, RI, and VT) are implementing non-wires alternative solicitations using building energy efficiency, demand response, and energy storage to defer distribution system upgrades to meet demand growth.
- Recently, ISO New England filed a proposed tariff for FERC review and approval that would allow customer-sited batteries and other energy storage technologies to more fully participate in wholesale energy markets, including the real-time energy market.

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP will participate in and contribute to US DOE's national GEBs stakeholder processes as well as convene and consult a regional GEBs R&D Advisory Committee stakeholders (state energy offices, public and private research organizations, electric utilities, public utility commissions, regional transmission organizations, smart building technology developers, consumer and business interests, and U.S. DOE and national labs) to guide project research and analysis, as well as to inform research, findings, conclusions, and recommendations.

- Regional GEBs R&D Advisory Committee
- Webinar: Northeast U.S. GEB R&D Effort and Opportunities
- Option: Regional Grid-interactive, Efficient Buildings Workshop (*dependent on US DOE and regional support and/or sponsorship*)

RESEARCH & REPORTS

NEEP's research will clarify GEB status, barriers and information in the Northeast U.S., identify current GEBs R&D initiatives, and outline priorities for GEB R&D and opportunities for coordination and collaboration.

- Research paper on the current status and future of GEBs
- A NEEP webpage with links to relevant GEB resources

NATIONAL/REGIONAL COLLABORATION

In addition to participation in the US DOE GEBs project, NEEP will leverage state, federal, and national resources to inform state plans and policies.

- Monitor, communicate, present, and coordinate with national and regional organizations
- Disseminate U.S. DOE best practices and link states to federal programs and resources
- Engage with stakeholders to contribute to the development of a national conversation

Federal and State Appliance Efficiency Standards

Smart, Efficient Low Carbon Building Energy Solutions

MISSION

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

ABOUT THIS PROJECT

Appliance efficiency standards reduce electricity, gas, and water usage, making them an important element in the dual effort to create lasting change within the energy market and to reduce carbon emissions. Federal appliance and equipment standards offer huge potential to impact carbon use. In fact, by 2050, they have the annual potential to curb 200 million metric tons of CO2 that would have otherwise been emitted nationally (ASAP 2016). That is the equivalent of nearly 30 million homes' electricity use over a year. Additionally, if all states in our region adopted new state-level standards for products not covered federally, the region could save nearly 4.5 million metric tons annually by 2035 (ASAP 2017). As decarbonization becomes more of a focal point for the region, there is an opportunity to overlay carbon goals to appliance standards that apply across fuels. State officials can lead-by-example in supporting minimum product efficiency standards that lock in long-term energy savings, align efficiency programs with climate plans, and provide value as part of an integrated carbon reduction plan.

LONG-TERM MARKET TRANSFORMATION GOALS

2022

At least four Northeast states adopt state appliance standards not covered by the federal program.

2025

Federal appliance standards are updated to secure all cost effective energy and carbon savings and include 2019 Northeast states standards.

2019 PROJECT OUTCOMES

1. At least six Northeast states propose new state appliance standards in 2019
2. At least two Northeast states adopt new state appliance standards in 2019
3. At least 10 Northeast states and associated stakeholders actively engage to encourage the U.S. DOE Appliance Standards and EPA Energy Star programs to keep pace and remain active to increase product energy efficiency.
4. The general service lighting (EISA 2020) standard moves forward as intended with a 45 lumen-per-watt minimum efficiency standard in 2020

REGIONAL TRENDS & LEADERS

- State energy and climate stabilization plans include tighter appliance efficiency standards to provide affordable and reliable energy while reducing CO2 emissions (e.g., CT, DC, MA, MD, NY, RI, and VT).
- The U.S. Department of Energy (U.S. DOE) failed to conduct rulemakings or enact minimum appliance efficiency standards mandated by federal law in 2018 and beyond.
- The states of MA, NY, RI, and VT all considered state appliance standards legislation in 2018 including and even going further than those adopted by CA.
- In 2018, VT became the first Northeast state to successfully pass state-level standards legislation since 2011 (CT). The legislation included new standards for a large package of products as well as a backstop to all current federal standards and the EISA 2020 standard.

2019 Strategies with Associated Products, Services and Technical Assistance

STAKEHOLDER ENGAGEMENT

NEEP engages a regional appliance standards stakeholder group to keep abreast of state and federal standards activity, as well as several task forces to take action to support standards adoption.

- Northeast/Mid-Atlantic Appliance Standards Working Group
- In-Person State Standards workshop
- Ad hoc coordination of state-specific and cross-state standard task forces
- Topical blogs and working group updates

TRACKING & ANALYSIS

In coordination with national efforts, NEEP tracks opportunities to achieve significant energy savings from new state and federal appliance standards – several of which lock in the market gains of efficiency programs.

- ***New*** Online tracker, updated once a quarter, tracking the federal appliance standards program and ENERGY STAR product specifications updates
- Tracking state appliance standard adoption and lessons learned which is shared quarterly with working group members

TOOLS & GUIDELINES

NEEP provides technical guidance to assist state efforts in adopting consistent state appliance standards and encouraging strong federal appliance standards.

- Sample letters of support for state or federal standards
- Updates to state standards guidance document
- Links to national studies and analyses

RESEARCH & REPORTS

NEEP provides technical analyses and reports to compliment, support and disseminate the tracking and tools developed to encourage the adoption of state and federal appliance standards.

- Analyses and fact sheets to inform state level appliance standards adoption
- Educational briefings and presentations to educate key stakeholders and decision makers
- Coordinated comments to U.S. DOE to encourage strong and timely federal standards and ENERGY STAR Specification revisions

NATIONAL/REGIONAL COLLABORATION

NEEP will leverage state and national resources and will coordinate regional support for national voluntary programs that establish specifications for and promote market adoption of high efficiency products.

- Coordination with national, regional, and state efforts across the U.S., including participation in the Appliance Standards Awareness Project (ASAP) Steering Committee and the U.S. Climate Alliance and coordination with Natural Resources Defense Council, Environment America, Acadia Center, State of California, etc.