Northeast States' Buildings Decarbonization Policies and Programs

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Northeast Energy Efficiency Partnerships

To: MCCC Mitigation Work Group Buildings Ad Hoc Group

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Northeast Energy Efficiency Partnerships

Mission

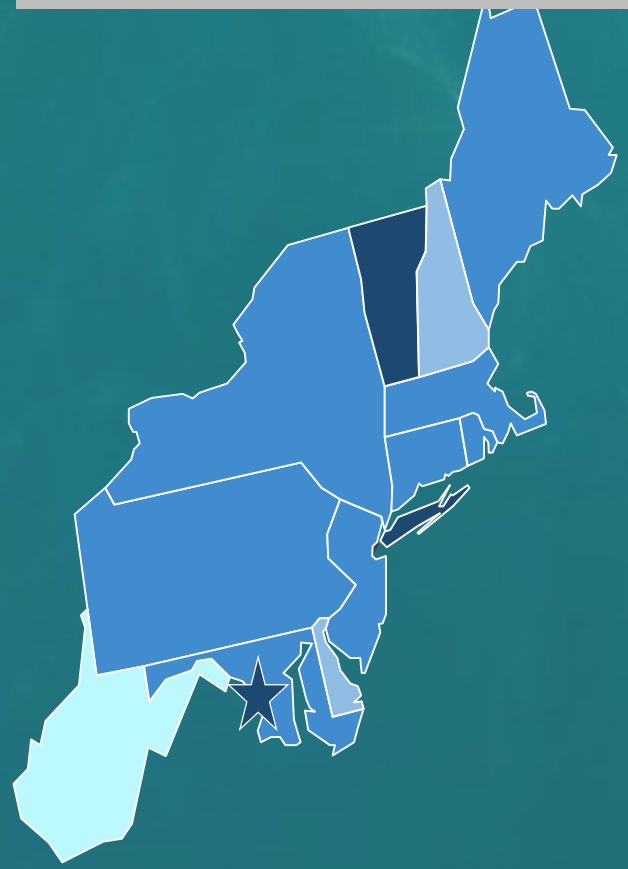
We seek to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities.

Approach

Drive market transformation regionally by fostering collaboration and innovation, developing tools, and disseminating knowledge

Northeast Region's Aggressive Carbon Emission Reduction Targets

2030 Carbon Reductions Goals



0% <30% <45% 50%

Aggressive 2030 Goals

State of Vermont
By 2028 - 50%

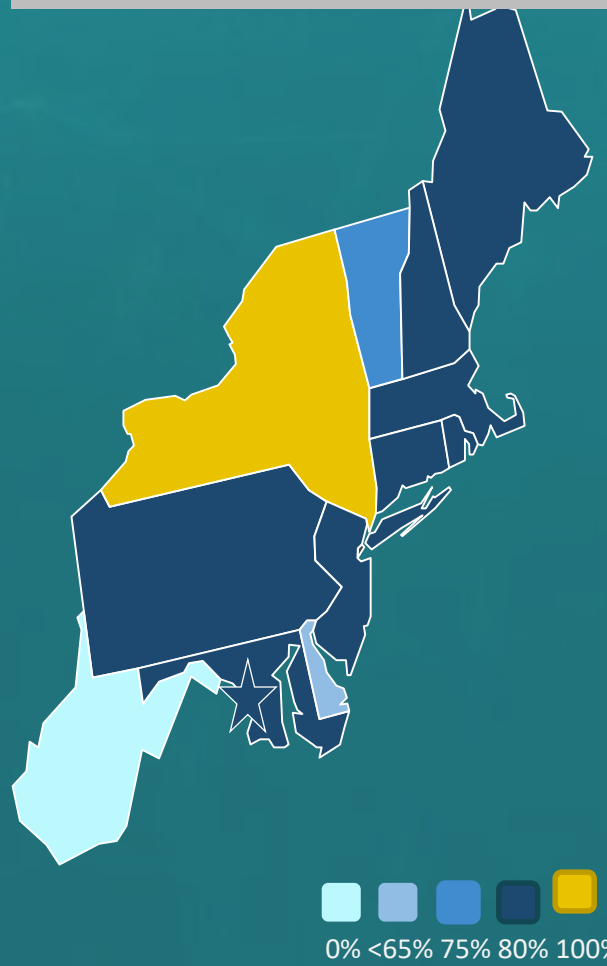
New York City
By 2030 – 30% citywide from 1990 levels, large buildings 40% from 2005 levels

Washington D.C.
By 2032 50% below 2006 levels, ENERGY STAR building status required by 2026

Burlington, VT
By 2025 - 10% from 2010 levels

Montpelier, VT
By 2030 – 80%

2050 Carbon Reductions Goals



0% <65% 75% 80% 100%

Carbon Free Cities by 2050

- **New York City**
- **Washington D.C.**
- **Boston, MA**
- **Cambridge, MA**
- **Somerville, MA**

100% Renewable by 2050

For example:

- **Concord, NH**
- **Reading, PA**
- **New Brunswick, NJ**

And many more...

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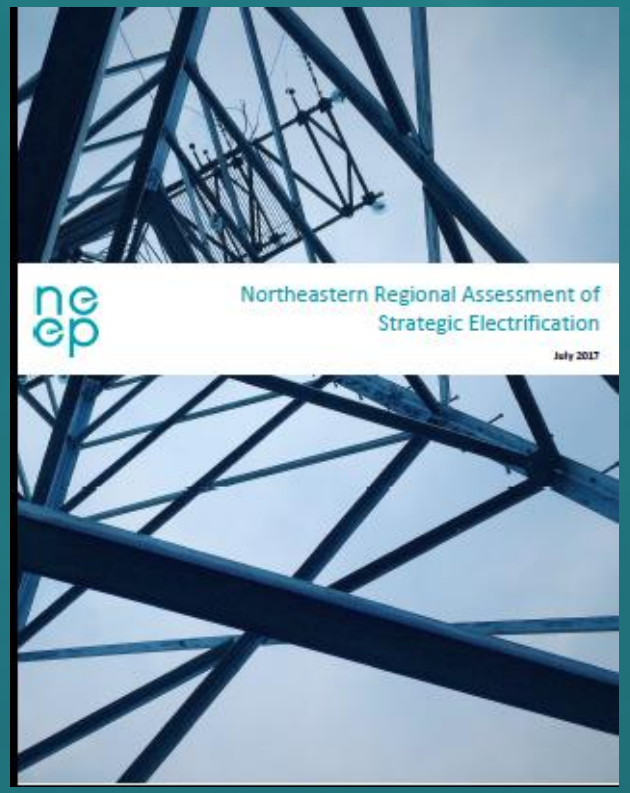
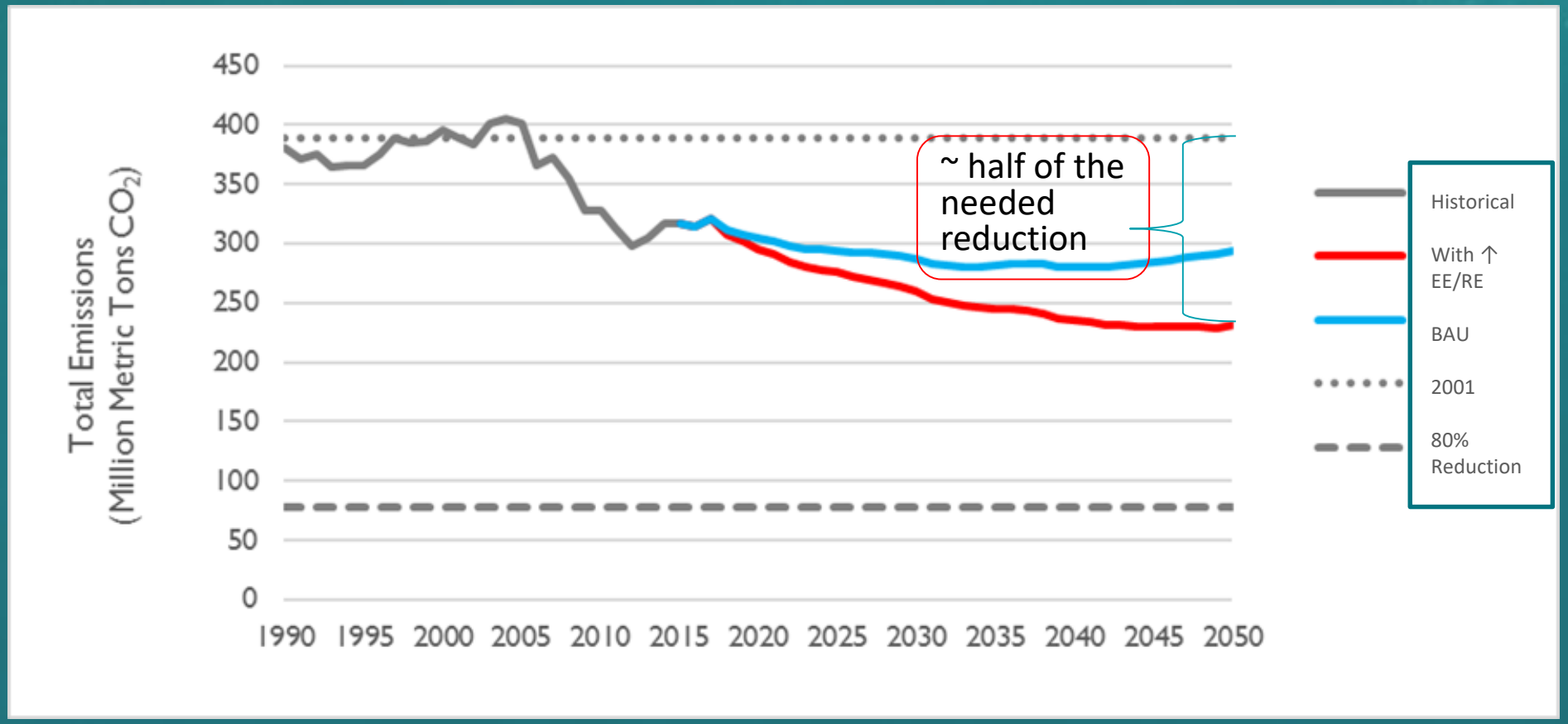
Background in Building Decarbonization



Aren't we on the path to 80% CO2 reductions?



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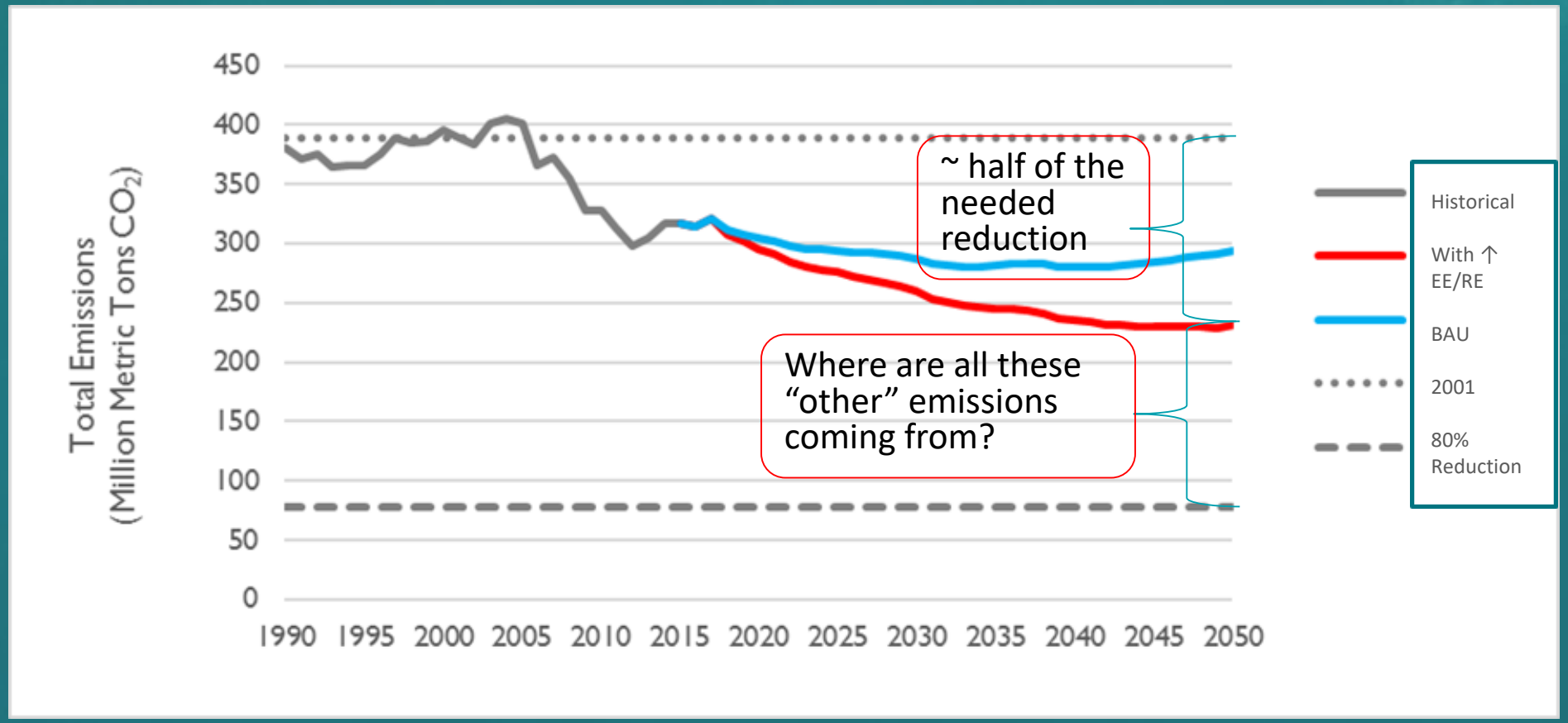
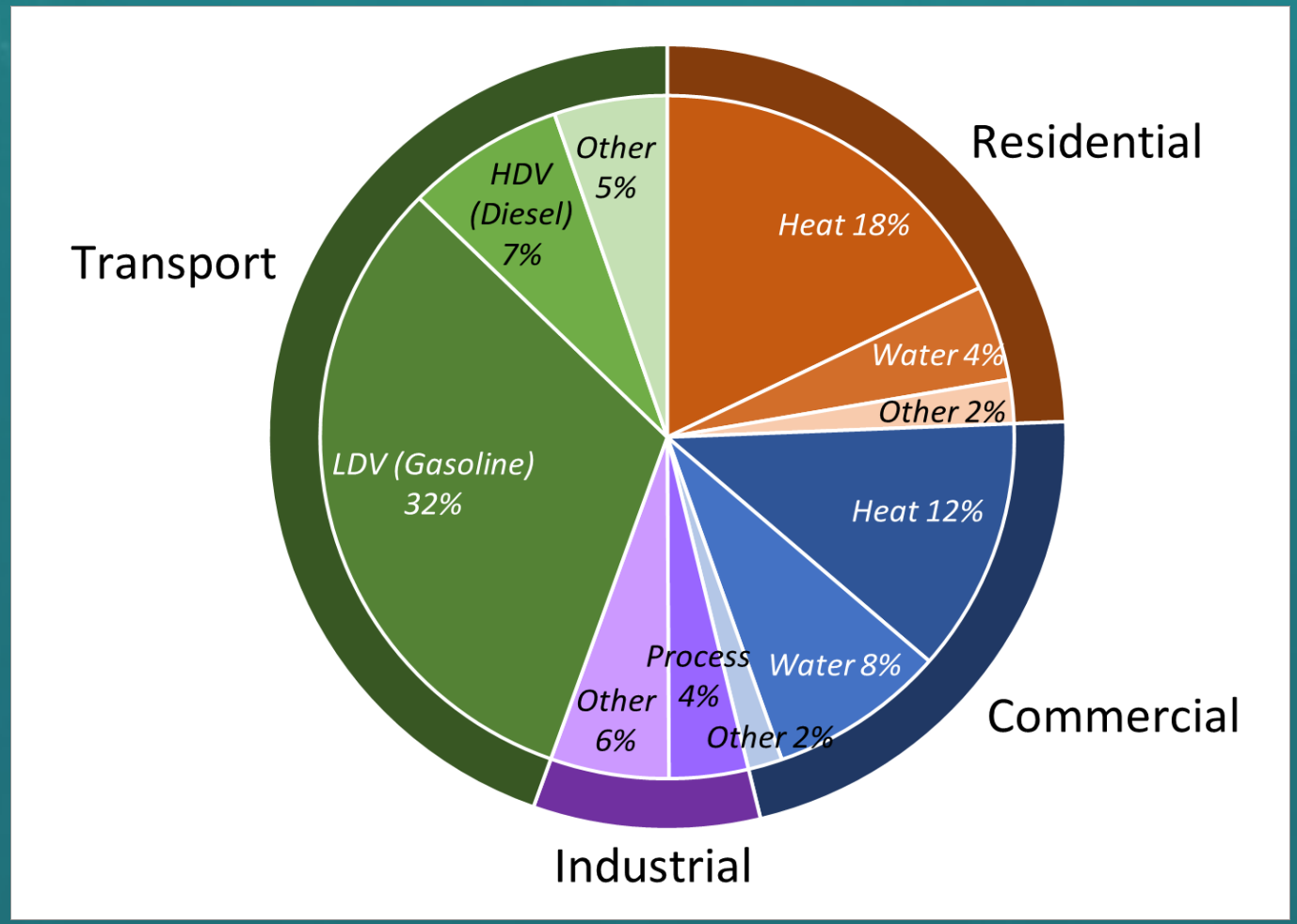
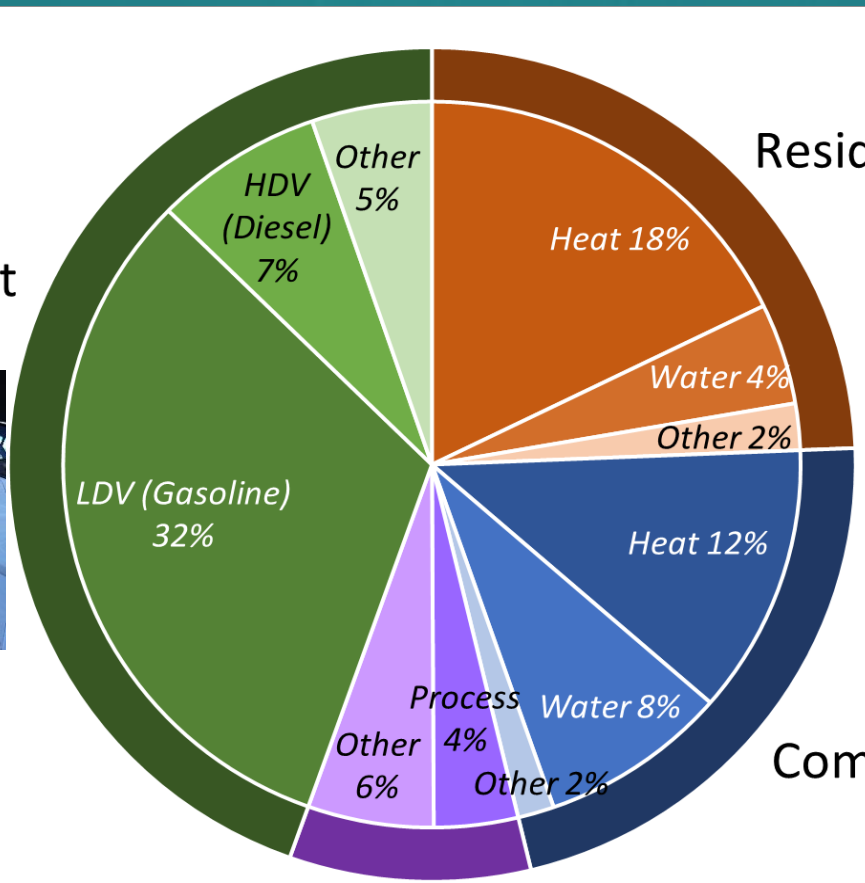


Direct Use of Fossil Fuels (NE/NY)



Advanced Electrification Technologies



Pathways to Deep Decarbonization

Building Decarbonization → 3 Key Elements

Advanced Electric Technologies

Space/Water Heating – Heat Pumps

Deep Energy Efficiency

Thermal Improvements

Grid Integration

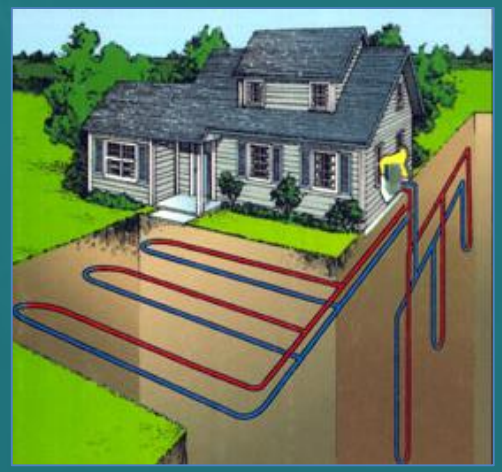
Flexible use of Low-Carbon Electricity

Northeast Strategic Electrification Action Plan – NEEP 2018

Heating Electrification Technologies

Technologies

- Air-Source Heat Pumps
- Ground-Source Heat Pumps
- Solar Thermal



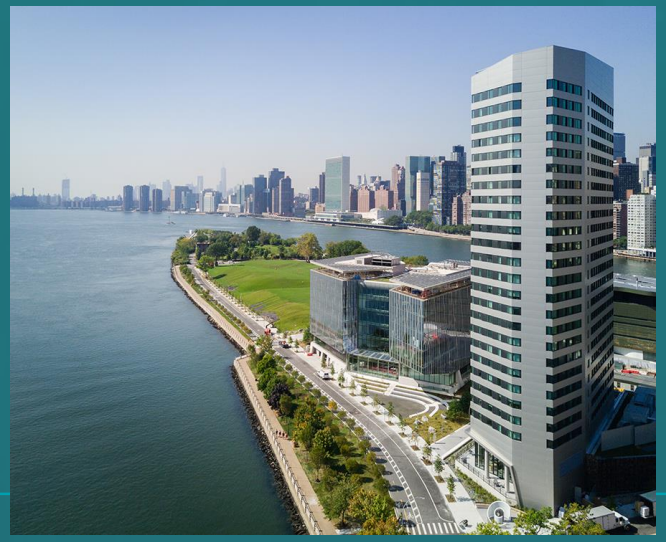
University & College Campus Projects

Clark University Alumni Center

- 35,000 sf building (Event Spaces & Offices)
- 100% heated and cooled by Air-Source VRF
- Advanced controls optimize energy savings

Cornell Tech Dormitory

- 710,000 sf building
- 100% heated and cooled by Air-Source VRF
- 27 City Multi HP/HR units
- Worlds tallest passive house



ASHP Market Size and Trends

- ~100k ASHPs sold in the New York (61k)/New England (36k) region in 2017
  - ~50k ASHPs sold in the same region in 2013
  - ~20% Annual growth over four years
- Still significantly smaller than regional furnace (235k)/boiler(160k)/Central AC (220k) markets

Alternative Building Decarbonization pathways

- Decarbonizing Fuels vs. Electrification
  - Heating Oil -> Renewable Oil
    - Biodiesel, ethanol, synthetic fuels
  - Fossil Natural Gas ->Renewable Gas
    - Landfill gas, anaerobic digesters, gasification, synthetic gas
  - Hydrogen
    - Electrolysis
- Issues of readiness, cost, scalability

Building Decarb Policy and Program Survey

- Carbon neutral targets via legislation (currently via policy)
- Heat pump adoption Targets/Goals
- Promotional Programs for EE and heat pumps
  - Expanding EE program metrics making that easier in cases of fuel switching
- Alternative Portfolio Standards
- Benchmarking and Labeling
- Existing Building Standards
- Building Codes & Appliance Standards
- Lead-by-Example
- Workforce Development
- Supporting communities

Building Decarbonization Roadmapping activities

- Rhode Island
  - Heating Sector Transformation
- Maine
  - Beneficial Electrification Study
- Massachusetts
  - Decarbonization Roadmap (“80x50 Study”)
- New York-
  - Carbon Neutral Buildings Roadmap/Building Electrification Roadmap

Parting thoughts

- Heating electrification technologies offer “here and now” solution for building decarbonization
- Technologies are relatively mature and industry is prepared for growth
- Market demand exists today and is growing
- Continued need for state or utility support in order to scale industries in line with state ambitions
- Industry stakeholders consistently identify three primary hurdles to scale industry:
  - Upfront costs
  - Awareness of technologies
  - Workforce challenges (e.g. forthcoming HVAC retirements)
- Opportunity to bundle weatherization with heating upgrades to reduce heating system upfront costs, improve performance, and gain large savings

NEEP Resources

Building Decarbonization Policies:

- Building Decarbonization Public Policy Framework
- Building Decarb Central
- Building Energy Codes, Benchmarking & Home Energy Labels

Air Source Heat Pumps:

- NEEP Cold Climate ASHP Market Transformation Initiative
- Air Source Heat Pump Buying Guide
- Variable Refrigerant Flow (VRF) Market Strategies Report – 2019

Smart Homes & Buildings

- Grid-interactive Efficient Buildings: A Tri-Regional Status Report
- The Smart Energy Home: Driving Residential Building Decarbonization – 2019

Other NEEP Resources

- Action Plan to Accelerate Strategic Electrification in the Northeast - 2018

For More Information:

www.neep.org

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State and Local Public Policies to Accelerate Building Decarbonization

Public Policy Linkages

- Public Health
- Affordable Housing
- Energy & Environmental Justice
- Climate Resiliency
- Economic Development
- State Procurement & Financing
- Immigration – Climate Refugees