

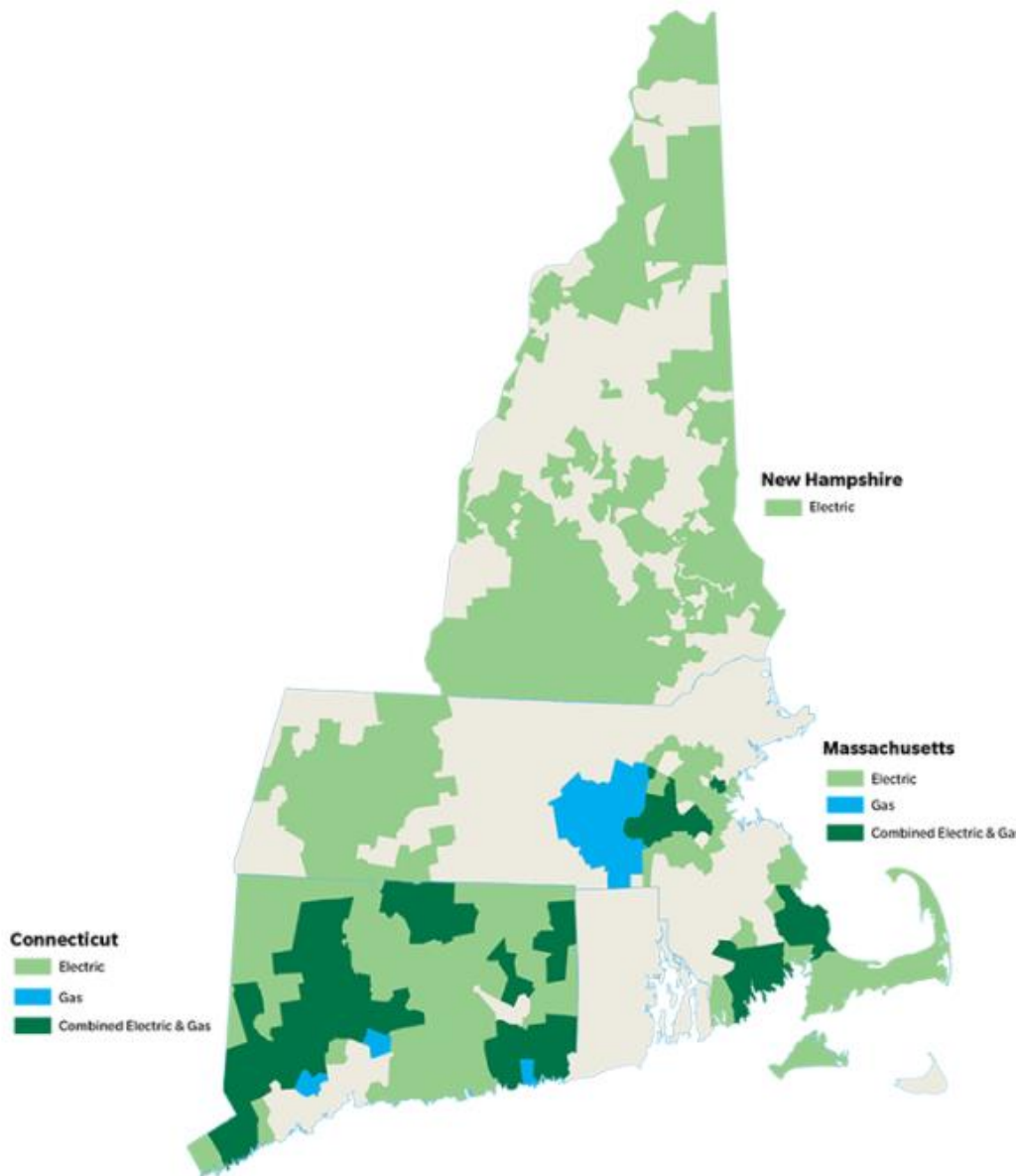
Northeast Gas Association

Lowering Carbon in Our Gas Supply

Jim Ruberti

Project Manager Technical Sales, Eversource

Eversource Overview



Eversource is New England's largest energy delivery company and serves approximately 4 million electric, natural gas and water customers in Connecticut, Massachusetts and New Hampshire.

Eversource has approximately 530,000 gas customers in CT and MA.

Eversource and Columbia Gas Massachusetts to join in Fall 2020, an additional 300,000 customers.

Lost Messages

Natural Gas is:

- ***Sustainable***
- ***Low-emitting high-efficiency fuel source***
- ***Cost effective***
- ***Reliable***



Recent Headlines – Anti-Gas Pressure Growing

Ashland officials challenge Eversource pipe plan

1. No gas

CHESTO MEANS BUSINESS

Communities feeling pipeline pressure

By Jon Chesto Globe Staff, February 27, 2019, 7:18 p.m.

Cuomo's Natural Gas Blockade

shale boom has lowered energy regulatory obstacles in New England. All of this is ominous since the reg- perately needs more natural gas to make from the

get ahead, stay ahead FOR MARKET INFORMATION GO TO...
GAS HOOKUPS HALTED

Companies cite pipeline capacity for many moratorium

By JONATHAN NG a dozen towns already under The HG&E moratorium is ates the system. Gordon van Welie, presi sify risks that there will not. Including securi more nural

Berkeley became first US city to ban natural gas. Here's what that may mean for the future

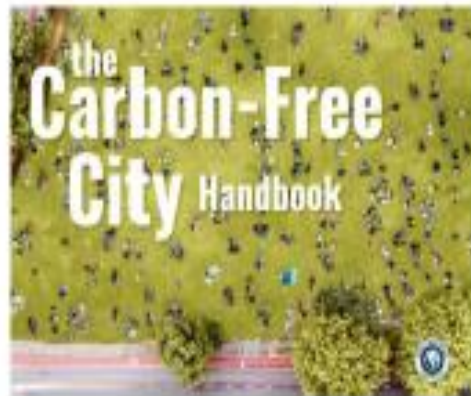
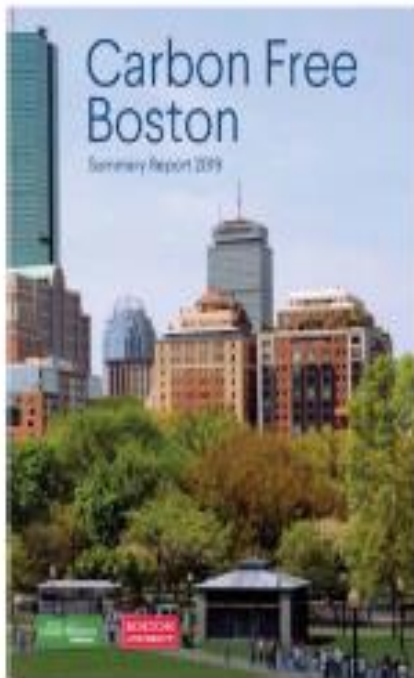
The California city Tuesday voted to ban...

Brookline Proposal Would Ban New Natural Gas Connections In Town

US cities see blueprint for building electrification in Berkeley gas ban

Cities target gas heaters, stoves in new front of climate fight

Eversource Customers Implementing Drastic Carbon Reduction Initiatives



CITY OF CAMBRIDGE LOW CARBON ENERGY SUPPLY STRATEGY



Boston, Cambridge, Harvard and MIT



Harvard researchers are tackling climate change by helping us better understand the scope of its effects and generating promising new solutions. Consequently, the University community is also taking action.

In 2016, Harvard achieved its 20-year goal to reduce its campus greenhouse gas emissions by 30 percent. Emissions per student increased by 77 percent. This was a net of reduction.

FOSSIL FUEL-FREE BY 2050

FOSSIL FUEL-NEUTRAL BY 2024



Designing the low-carbon campus of the future

Earth reached its highest temperature on record in 2016, beating the record-breaking temperatures of the three previous years. The change in climate suggested by this statistic has far-reaching ramifications for all of our planet's inhabitants. At the same time, the U.S. National Aeronautics and Space Administration (NASA) has recorded that carbon dioxide levels in Earth's atmosphere are higher now than at any point in the past 400,000 years.

Challenges – It's Complicated



NE LA- Climate Collective members address LA Dept. of Water and Power's board of commissioners on stopping a Utah gas fired power plant to replace an existing coal fired power plant.

Sustainability – Our Future

- ❑ What is it? - Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural **environment**. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in **productive harmony** to support present and future generations.
- ❑ Sustainability is based on “Three Pillars” :
 - Economic
 - Social
 - Environmental

Eversource Gas GHG Perspective

- ❑ Eversource Gas has approximately 6,700 miles of main that emitted approximately 169,000 mT CO₂e in 2018.
 - Down from 218,000 mTCo₂e in 2011 a 22% reduction
- ❑ Eversource Gas' throughput is approximately 120 BCF/yr.
 - Resulting in approximately 6.6 million mTCO₂e in emissions.
 - As oil this would be 9 million mTCO₂e in emissions.
 - As electric this would be 11 million mTCO₂e in emissions - and a little more costly.
- ❑ In 2018 US EPA reported emissions from the natural gas supply chain as 1% of its throughput – first time.



Eversource's Commitment To Environmental Sustainability and Carbon Neutrality

*Eversource aims to be carbon neutral by 2030,
and the benefits of our regional clean energy
initiatives will more than offset Eversource's
greenhouse gas emissions.*



CLIMATE LEADERSHIP

Reducing our Carbon Footprint from Corporate Operations:

We are targeting these steps to help us attain our long-term emissions reduction goals:

- Reduce our own energy use by improving the efficiency of our facilities and reducing fleet emissions.
- Reduce line losses in the electric transmission and distribution system.
- Reduce sulfur hexafluoride in our electrical gas-insulated switchgear.
- Replace remaining bare steel and cast-iron mains in our natural gas distribution system to improve safety and eliminate methane leaks.

Our Current Focus

☐ Aggressive Gas main replacement

- Approximately 60 miles of main per year
- Reduces CO₂e emissions by 1,500 mT annually

☐ Gas Conversions

- On 2019 we added approximately 9,200 new customers, each residence represents a 2.4 mT CO₂e annual carbon reduction
- At reduced cost

☐ Promote CNGV - a reduced carbon fossil fuel

- A carbon neutral transportation fuel option (RNG)

☐ Promote Natural Gas Energy Efficiency Projects

- Statewide Energy Efficiency programs reduced natural gas use by 1.2% in 2017

Eversource Introducing New Clean Energy Concepts

Filed November 6, 2019 expect to be in place for January 2021.

Focus on greening up operations by reducing emissions and exploring clean energy programs for the natural gas customer:

- **Gas Demand Response**: Demonstration to determine if a gas demand response program would shave peak demand, alleviate physical pipeline constraints, reduce capacity, and reduce overall emissions
- **Geothermal Heating**: Demonstration on deployment and study of geothermal networks in different residential and commercial & industrial scenarios
- **Responsible and Renewable Natural Gas**: Establish criteria to enable Renewable and Responsible Natural Gas supply – **a Carbon Neutral Option**
- **Combined Heat and Power Systems (CHP)**
 - Twice the carbon reduction at half the price as solar
- **Additional Evolving Gas Technologies** – Heat pumps
 - Increased efficiencies during high demand periods- a force multiplier

Other Carbon Reduction

HERE'S WHAT OUR CUSTOMERS HAD TO SAY

"How Horizons at Marlborough is a senior living community serving more than 400 residents. CHP was a great fit for us because we have a steady demand for hot water (for both heat and domestic use). The 150kW CHP unit has been operating since 2015, providing net savings of more than \$100,000 per year."
—John DiBussio
Mechanical Systems Manager

"At our university in Worcester MA, our CHP unit provides electricity, steam and hot water heat to campus buildings covering 1.1 million square feet. The unit we operate is a natural gas-fired, 2.0 MW reciprocating engine and is operational 24/7, keeping the university's utility costs down."
—Mark Leahy
Claus University



Want to know more?

To learn more about CHP and distributed generation, and the benefits to your organization and the environment, contact:

Tom O'Rourke
508-305-7050
Thomas.ourke@eversource.com



Electric cost savings and reliability... it makes sense to look at **combined heat and power**

Eversource is the trusted source for energy expertise.

Combined Heat and Power (CHP) can save your facility considerable money on your energy bills due to its high efficiency. It provides a hedge against electricity cost increases, while protecting you from disruptions to your electric service. [Web page](#) to your electric service.

WHAT IS A FUEL CELL?

A fuel cell is an electromechanical device that converts the chemical energy from the methane in natural gas into electricity through a chemical reaction with oxygen.

Fuel cells have no moving parts—they are quiet and reliable, with durability of up to 20 years.

Fuel is converted directly to electricity and heat with a total system efficiency that can be much higher than other generation sources given the same amount of fuel.

Fuel cells use hydrogen as a fuel to drive an electro-chemical process that produces electricity with water and heat as the only by-products.

Hydrogen fuel cells are a clean, reliable, quiet and efficient source of high quality electric power.

Hydrogen is an abundant element in water, biomass and fossil fuels. Today, most hydrogen is derived from natural gas—emitting carbon dioxide as a by-product.

Benefits to Your Business
Reduced operating costs
Lowers grid electric use and overall electric costs.

Resiliency
Fast return to normal operations during a grid outage.

Business Continuity
N+1 redundant or backup power source to critical non-life safety loads during a grid outage.

Islanding Capability
Continuous operations island mode upon a grid outage.

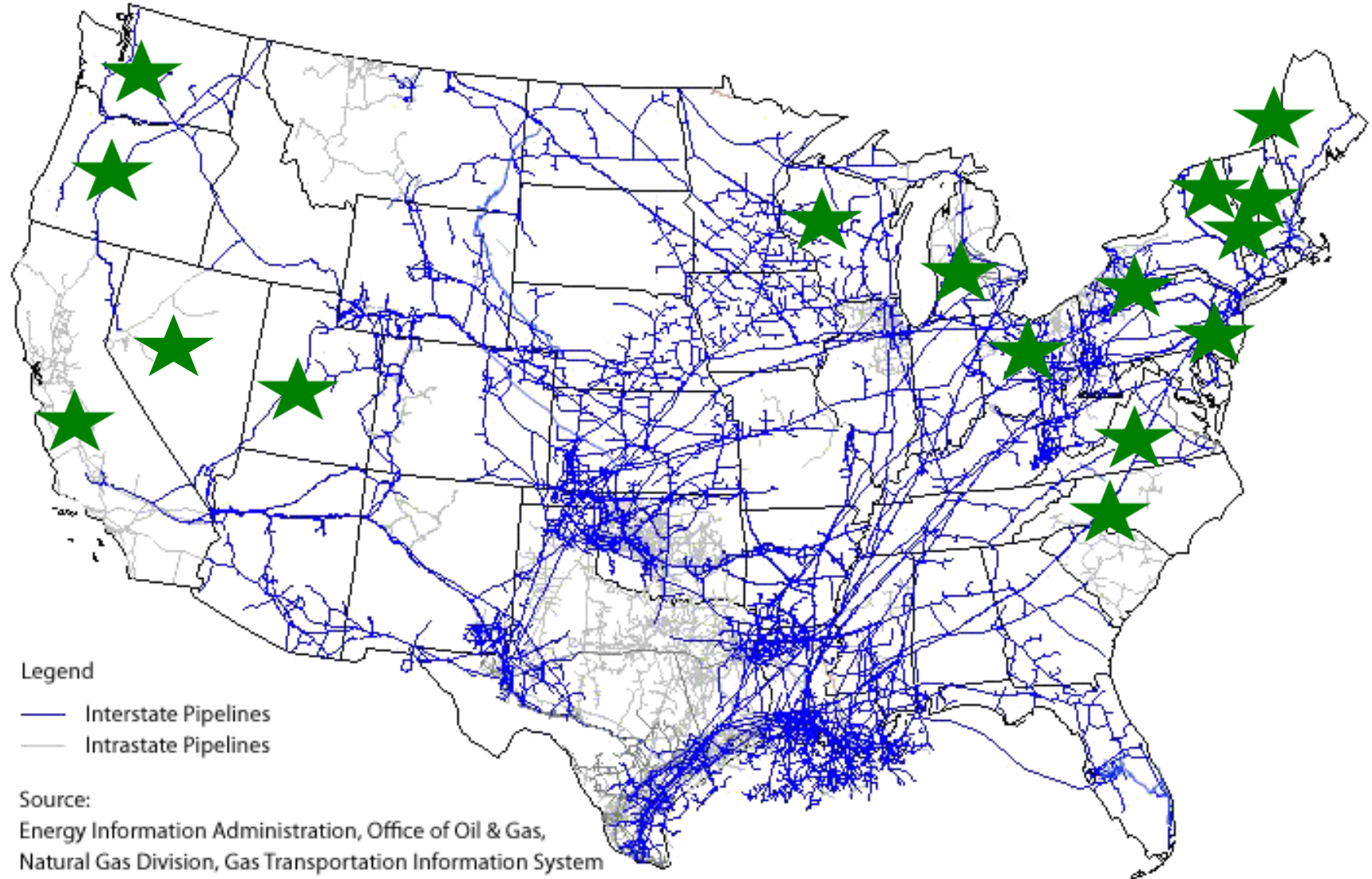
Microgrid Capability
24/7/365 resilient power to ensure operational integrity for critical public safety facilities.

Lowers Overall Carbon Footprint Contribution
Clean and efficient source of high quality power—no combustion.

HOW IT WORKS



Harnessing the Power of an Existing National Distribution Grid



 States with Customer RNG Offerings