Decarbonizing District Energy

City of Cambridge
Planning Board Annual Utility Report

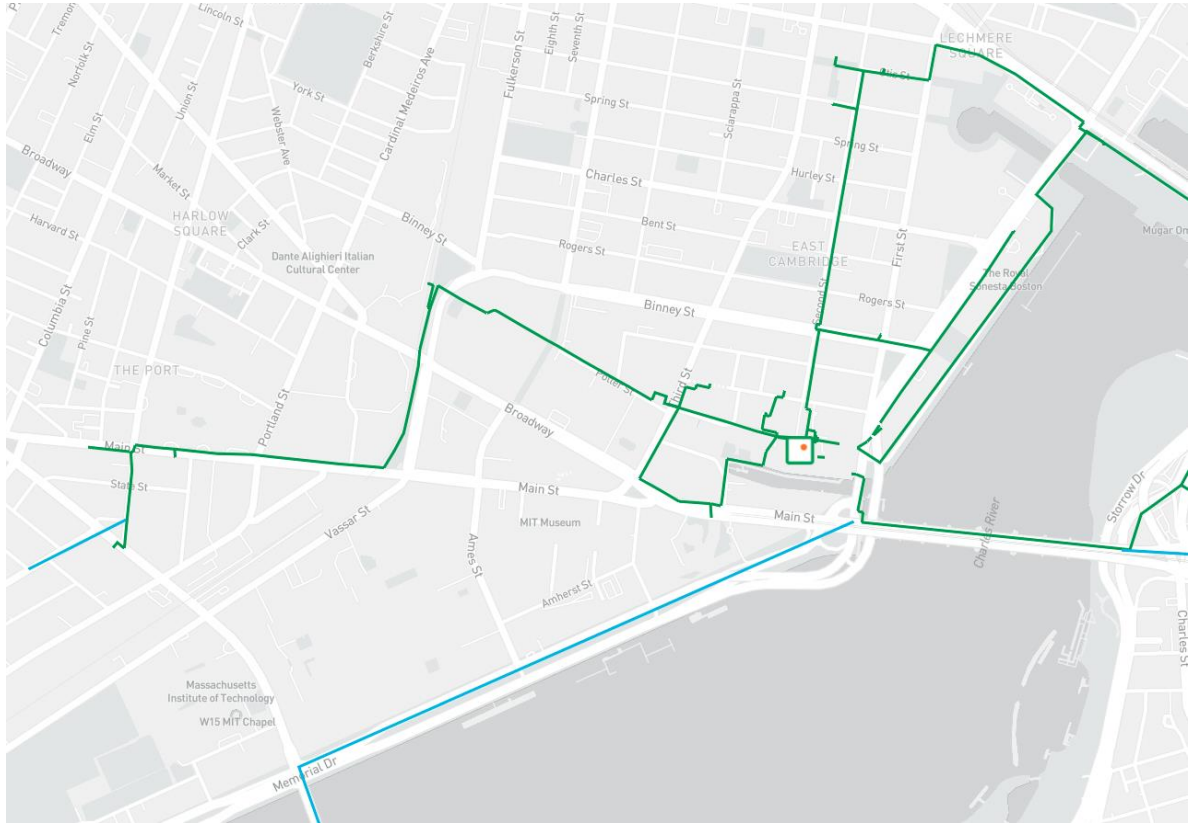
June 30, 2026

VICINITY

The Cambridge district energy system

District energy **saves over 97,113 tons of carbon emissions annually** for Boston and Cambridge

- **Serving Cambridge today:**
  - Provide service to approximately **7.6 million square feet** of commercial space
  - Serve **15 buildings** across key sectors, including life science, healthcare, and commercial real estate through
  - Connected through **4.1-miles** of robust underground piping infrastructure
- **Sustainable advantages:**
  - Importing **renewable electricity** with a direct connection to the high-voltage electric grid
  - Leveraging the **Charles River as an untapped renewable energy source**
  - Delivering carbon-free **eSteam™** to decarbonize the building sector
  - Enables customers to meet **BEUDO compliance** requirements while reducing emissions



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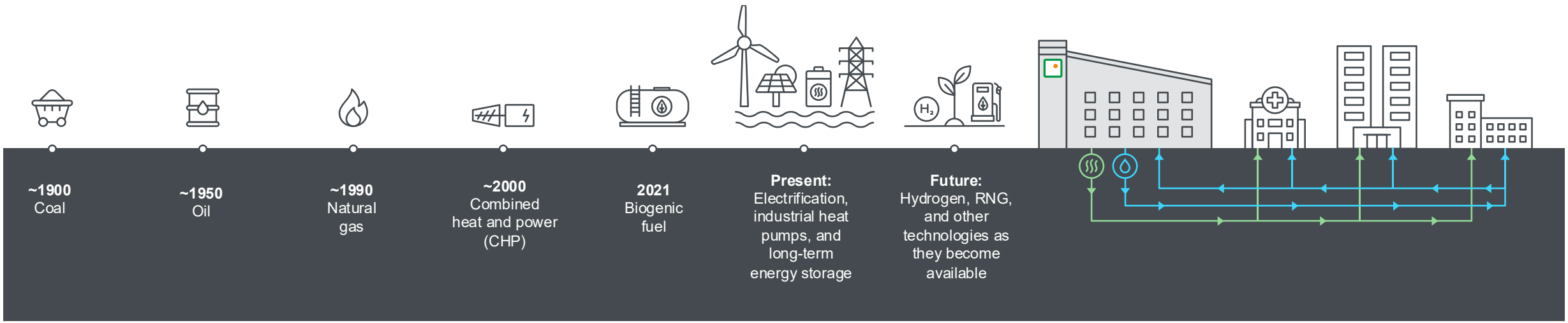
Leveraging existing infrastructure, new technologies, and renewable energy sources to decarbonize the building-energy sector

District energy has a 75-year history of greening its fuel sources. Vicinity will deploy innovative technologies to achieve ***net zero carbon emissions before 2050***.



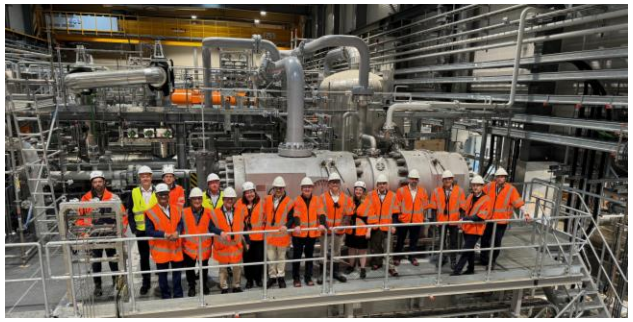
Electrification in Boston and Cambridge

42MW Electric boiler

- Entered service in November 2024.
- Existing, readily available technology.
- Enhances reliability and reduces emissions and grid demand.
- Surplus renewable energy (solar & wind) events
- Relegated to back-up/peaking capacity by 2028

Gen 1 Heat Pumps

- Enters service in 2028 and 2032.
- Circulates 24.5 million to 49 million gallons of water daily from the adjacent Charles River/Broad Canal.
- Water sourced, high efficiency and reliability to meet industrial demands for consistent thermal energy production.
- Reduces reliance on traditional fossil-fuel based energy sources.



Gen 2 Heat Pumps

- Turbo Compound expanded CO_2 cycle
- Up to 30% efficiency improvement over Generation 1 technologies
- 2024: On-line in Esbjerg, Denmark. Similar temp profile to steam district heat pump.
- Development for steam district heating system currently underway.

Thermal storage

- Enables valley surfing for better renewable pricing.
- Relieves grid stress by reducing power consumption during peak periods.
- Links offshore wind generation surplus periods (overnight) with district energy peak use period.

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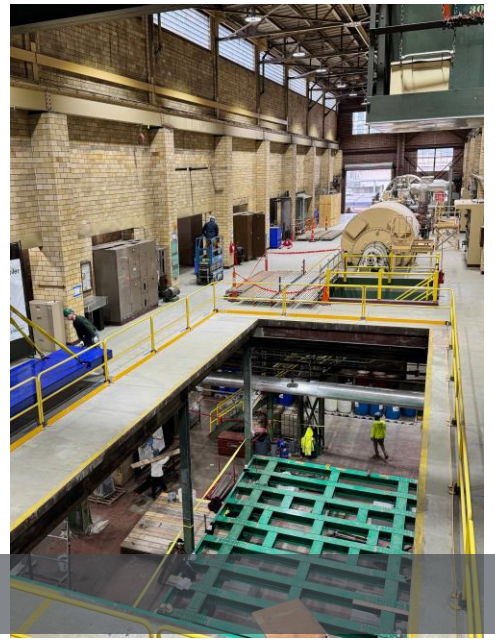
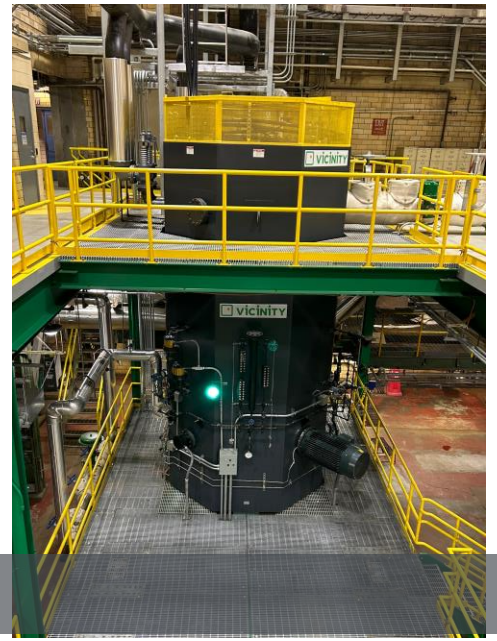
Stage 1 Complete: Installation of 42MW Electric Boiler





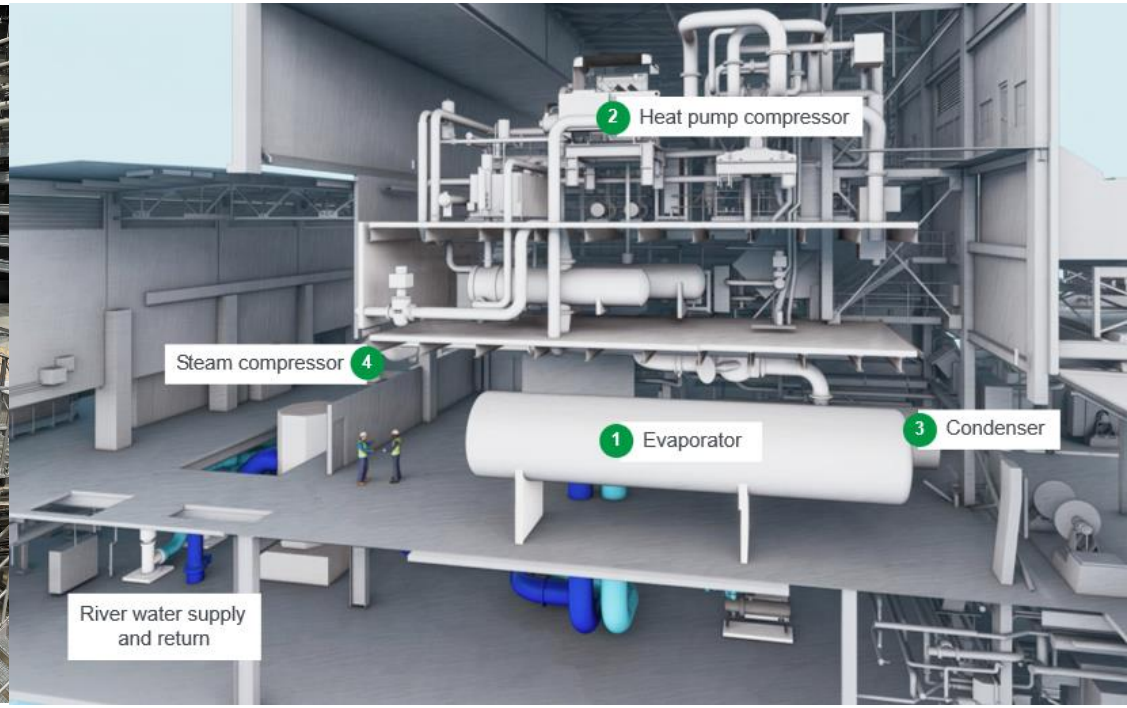
ESteam volumes by year

2025: 18,000 mlbs

2026: 135,000 mlbs

2027: 270,000+ mlbs

Stage 2 Underway: Design and Installation of 35MW Heat Pump



Building on this momentum, we continue advancing our electrification efforts to prepare for our heat pump complex, which will enter service in 2028.

District energy electrification reduces grid demand and increases wide-scale decarbonization

Electrification of Vicinity's district heating system is critical to reducing the need for individual building heating electrification

Page 9:

"Additionally, solutions like **electrification of the steam district heating system (with service directly from the transmission system) in the downtown area could help reduce the need for individual building heating electrification, reducing the associated demand** and thereby further improving the available distribution bulk substation headroom."

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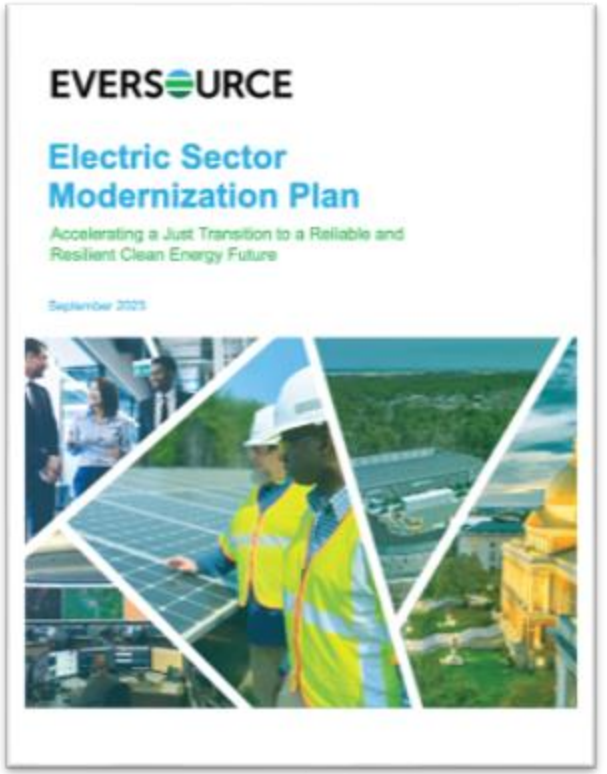
"….especially since **district heating solutions are already in place** that could potentially utilize either ground source heat pumps, or renewable fuels, to effectively heat large quantities of buildings with a centralized point **requiring significantly less distribution infrastructure in the region**."



https://www.mass.gov/doc/gmacesmp-drafteversource/download

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