

GREATER INTEGRATION OF ENERGY SYSTEMS

The utility-owned electric distribution grid must be modernized to support electrification, share the solar power generated on its roofs, and ensure resilience. Simultaneously, developing and sharing alternative thermal energy resources—such as the earth, nearby water bodies, and waste heat—can efficiently displace fuel-based heating.

Connecting Outcomes to Goals

Net-Zero Emissions	Resilience	Increasing Social Equity
Integrated energy systems shift energy supply and demand across time and space to more optimally serve energy needs with diverse resources.	Modernized and more deeply integrated energy systems better withstand disruptions such as extreme weather.	Modernized electricity systems will improve service to formerly neglected communities and provide opportunities for cost savings.

Progress Assessment

Boston's grid today cannot support the demands of electrification and the growth of distributed energy resources such as rooftop solar.⁹⁸ Some efforts to meet growing demand have faced community opposition.⁹⁹ Opportunities exist for sharing thermal energy and resources (e.g., ground and water); however, utility-led pilots have been evolving slowly¹⁰⁰ and innovative non-utility examples are non-existent. State regulatory law has limited the City's ability to drive forward such integrated solutions in new developments to demonstrate both the technology and partnerships necessary to create modern energy systems.^{101,102} Such action is limited by the conflicting interest of Boston's regulated utilities, the jurisdictional constraints that limit the City's ability to promote new integrated energy systems. While the City has an office that has been actively engaged in energy planning for some time, its capacity will need to be greatly scaled to meet the needs of a rapidly transitioning city.

Equity Implications & Indicators

State of Energy Infrastructure by Neighborhood: A legacy of environmental burdens in frontline communities and underinvestment in energy systems requires restorative justice through planning that ensures that these communities receive the benefits associated with modernized infrastructure. More transparency from utilities on the state of energy supply systems across the city can help to shed light on potential disparities.

Big Lifts

Local Energy Planning: Integrating energy systems for net-zero emissions and resilience requires more active local planning to better meet local needs, leverage local energy resources, and build support for new infrastructure. Energy planning is currently conducted at the state level by the Department of Public Utilities. Providing more avenues, powers, and resources for local planning should aim to accelerate the integration of energy systems by better identifying opportunities and roadblocks to energy system modernization.

Figure 11. Much of Boston's distribution grid will need to be upgraded to support solar generation and increasing electricity demand.

Eversource distributed generation hosting capacity map⁹⁸ for Charleston, Downtown, and East Boston. Colors in bright or dark red reflect sections of the electricity distribution grid that do not have the capacity to accommodate a significant amount of rooftop solar or other distributed energy resources.

