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FUTURE-PROOFING PROJECTS

Developers Lean into High-Efficiency Designs

Looming Code Changes Prompt Building System Swaps

By [Steve Adams](#) | Banker & Tradesman Staff | Feb 26, 2023

As more Greater Boston communities adopt the state's new opt-in energy code with its higher sustainability standards, developers are testing the limits of how far commercial buildings can effectively run without fossil fuel sources.



Berkeley Investments and Harvard University's 176 Lincoln St. project in Allston will include a 252-unit apartment building with all-electric building systems and 538,000 square feet of life science space largely heated and cooled by fossil fuel-free sources. Image courtesy of Berkeley Investments

Developers of life science buildings in Allston and the Fenway are planning to install systems that heat and cool buildings without gas-fired systems except in the most extreme weather conditions. Local hotel and office developers are warming to all-electric systems that shuffle hot and cool air between different areas of the building as needed.

Four communities – Brookline, Cambridge, Somerville and Watertown – already have adopted the opt-in stretch energy code, which requires higher energy efficiency performance for new buildings and major renovations. And Boston is seeking state Department of Energy Resources approval to

join a statewide pilot program, in which 10 communities will ban natural gas hookups in multifamily and office projects outright.

“There’s no actual code language that’s been released yet in terms of what’s required, so there’s a lot of uncertainty,” said **Jacob Bloom**, an associate at architecture firm **CambridgeSeven**.

Last-Minute Tweaks Add Uncertainty

The final language of the new opt-in code, scheduled to take effect July 1, is still being revised by state regulators, adding to the uncertainty for projects set to break ground later this year. A public comment period on the DOER’s latest technical guidance was scheduled to expire on Friday.

In general, the opt-in stretch code requires buildings to be more energy efficient through encouraging the use of electric heat, on-site renewable energy such as solar panels, and Passive House designs. But it gives developers wiggle room in allowing “all-electric ready” buildings, meaning that conduits and wiring can be installed to prepare for electric systems that might be added later.

“Everything they are proposing now seems fully attainable, and there’s nothing that’s super out of line with what we know we can accomplish,” Bloom said.

Cambridge opted the opt-in code for new construction and major renovations in January, including the provision for electric-ready buildings, following similar votes in Brookline, Somerville and Watertown.

Lab Developers Push Boundaries of Technology

Developers of some major commercial projects already under way have chosen building systems designed to minimize the use of natural gas, while saying that New England winters make a complete break from fossil fuels impractical with existing technology.

The shift away from fossil fuels is already taking place even among energy-hungry life science buildings, the dominant form of Boston’s commercial construction.

At 401 Park Drive in the Fenway, developers **Samuels & Assoc.** and **Alexandria Real Estate Equities** are beginning construction of a 550,000-square-foot office and lab building after demolishing the former **Bed Bath & Beyond** store.



Changes to the state’s stretch energy code are being finalized, but current language lets developers build “all-electric ready” buildings that are prepared for – but not built with – expensive fossil fuel-free building systems.

The project team settled on a hybrid design that's expected to rely on electricity for up to 90 percent of the building's heating and cooling, said Chris Schaffner, founder and CEO of Concord-based sustainability consultants The Green Engineer.

A back-up system relies on natural gas for extreme weather conditions, such as the sub-zero temperatures that Boston experienced in early February.

"To me, that's an example of a developer who's trying to do all the right things and has pushed it as far as we can take it with the current technology," said Schaffner, whose firm serves as sustainability consultant on the project.

At 176 Lincoln St. in Allston, Boston-based Berkeley Investments and Harvard University anticipate that a pair of office-lab and R&D buildings will be designed to use 80 percent less fossil fuel than a conventional design. The project, approved this month by the Boston Planning & Development Agency, also includes a 252-unit apartment building that will run on all-electric systems.

For the 538,000-square-foot life science buildings, Berkeley Investments will install high-efficiency chilled water and hot water plants with built-in heat recovery units and electric heat pumps to provide the bulk of heating and cooling requirements.

"As we start the real [construction] drawings of these buildings, there's some learnings, and a lot of this is happening in real time," said Morgan Pierson, Berkeley Investments' senior vice president of development.

Despite the uncertainties of final regulations, the designs by CBT Architects and sustainability consultants Vanderweil Engineers flowed from a handful of overarching goals.

"The policies are constantly changing, but baked into our concept design from the start was a deep core goal of a tight high-performance building envelope, as well as energy efficiency and recovery systems," said Esther Byun, Berkeley's director of development. "All of those design concepts have served us well."

Potential New Barrier to Housing

While environmentally beneficial, the stretch code's requirements for multifamily projects could add another obstacle to Massachusetts' housing crisis.

The opt-in stretch code requires multifamily buildings to be designed to Passive House standards, adding another layer of costs to an industry that's faced steep escalation of material and labor costs in recent years.

"If Boston does adopt an opt-in code, it's going to force multifamily projects to be Passive House, which is a great standard but very difficult," Schaffner said. "We also have a housing crisis and we need to make sure we're balancing that."

Developers have constructed more than 6,500 Passive House units in Massachusetts since 2017, according to DOER data.

Developers of other less energy-intensive building types, such as offices and hotels, are increasingly leaning toward variable refrigerant flow (VFR) systems that can supply heating and cooling to different parts of a building simultaneously, CambridgeSeven's Bloom said.

Similar to heat pumps gaining popularity in residential construction, the systems include heat recovery systems. Rather than simply pulling in exterior air, however, VFR systems circulate interior air from one portion of a building to another as needed, Bloom said.

Currently proposed for the Marketplace Center office and retail expansion project at 200 State St. and used at the Cambria Hotel in Somerville, the systems are expected to gain more widespread adoption in future developments.

"A lot of hotels are implementing VFR because it works well in that compartmentalized approach," Bloom said.

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