# Envelope Retrofit Guide: Net-Zero Energy Strategies for Existing Buildings

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## ABSTRACT

Most of the buildings that will exist in 2050 in New York State have already been built today. With buildings responsible for over half of the carbon emissions in our state, it is crucial to improve the performance of existing buildings to meet increasingly stringent city, state, and international energy codes and greenhouse gas reduction targets.

The magnitude of this task is sobering. Much of the existing building stock is ill-equipped to meet emissions targets like New York City's Climate Mobilization Act, which will trigger retrofits of 50,000 buildings over the next ten years. Design professionals are essential participants in this transition, but few comprehensive guidance documents exist to help architects retrofit existing buildings to net-zero ready standards. Further, many architects do not have the technical expertise in building science to evaluate retrofit strategies on their own.

To address these concerns, we are producing an Envelope Retrofit Guide to provide comprehensive technical information and guidance to architects in the schematic stages of net zero ready retrofit projects. The Guide will focus on the building envelope: a critical component of net zero projects that, unlike mechanical systems, is the primary responsibility of the architect. We will analyze retrofit strategies for mass-masonry and wood-frame residential buildings, two of the most common building types in our state, considering a variety of materials and systems and their implications for performance, constructability, durability, cost, and embodied energy. This presentation will review our current progress on the Guide, and outline areas for future research.

## BIOGRAPHY

Gabrielle Brainard, AIA, CHPD, teaches architecture and building science at Rensselear Polytechnic Institute, Columbia GSAPP, and Pratt Institute. Her teaching and research focuses on the building science of enclosure systems, high-R-value envelopes, facade retrofits, and hands-on teaching methods in building science. Previously, she was an enclosure consultant at

Heintges and a senior technical architect at SHoP Architects, where she concentrated on the design and execution of custom facades for large-scale commercial and residential buildings.