THE OVERCLADDING APPROACH FOR MASS DEEP ENERGY RETROFITS: A PILOT PROJECT

03

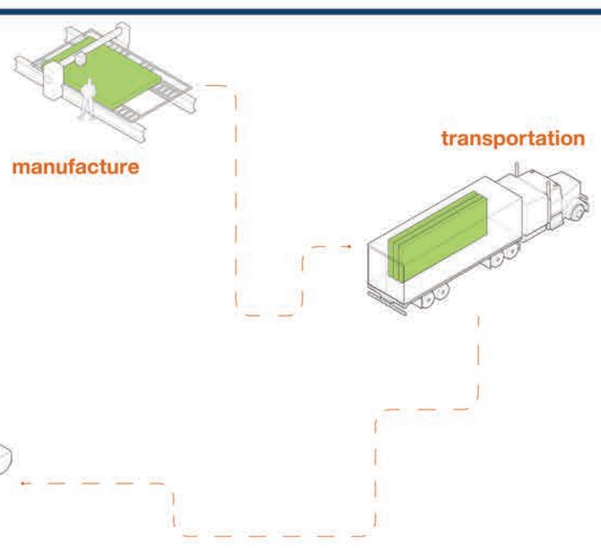
INTRODUCTION

Pilot studies are a critical step in the process researching and developing prefabricated panelized systems for Deep Energy Retrofits (DER). Over-cladding solutions and processes developed in pilot projects can be applied to a vast stock of similar buildings. Throughout this process, the main priorities for implementing panelized retrofit solutions on Multi-Unit Residential Buildings are highlighted. This research aims to provide an overview of the key elements developed during the design of this specific pilot project, ultimately demonstrating the potential for scalable application of a panelized DER.

The building selected as the candidate for a pilot project is Habitations Dublin-Fortune. Located in the neighborhood of Pointe-Saint-Charles, it consists of a concrete superstructure with a building envelope primarily composed of concrete blocks and brick masonry. With its 6 storeys, it qualifies as a Non-Combustible construction according to the National Building Code of Canada[1]. This building is a strategic choice for a pilot project because it shares features with many buildings in the social housing stock in Montreal.

PANELIZATION

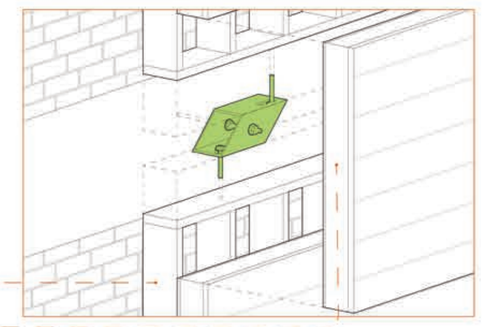
The design and configuration of the panelized solution is determined by the geometry of the building, designed performance targets, off-site manufacturing constraints (i.e., factory system capacity), and finally transport and installation factors including weight and dimension of panels, crane access, etc..



CONNECTION SYSTEM

The connection system plays a crucial role in the performance of over-cladding retrofit solutions. It refers to the fastening devices designed to attach the panels to the existing building. This system serves several key functions:

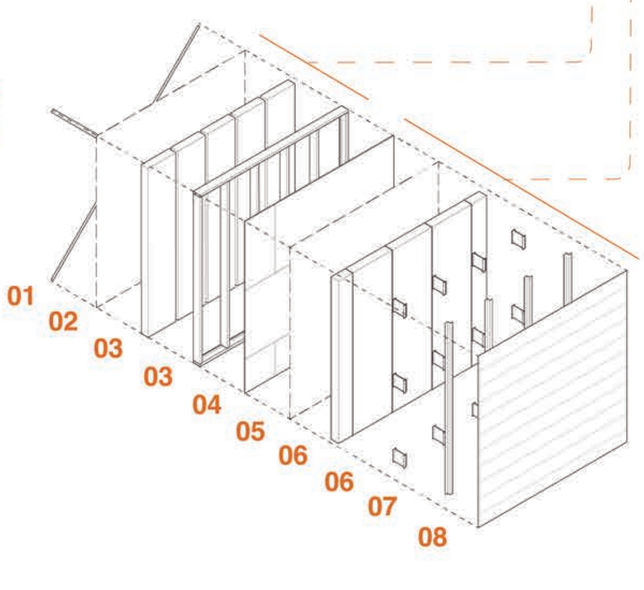
- Securing the panels
- Transferring gravity and lateral loads
- Providing a cavity for services when necessary
- Accommodate façade irregularities
- Allowing for disassembly



PANEL ASSEMBLY

The retrofit panels serve the primary functions of improving the thermal performance and airtightness of the building. Additionally, the panels were designed with materials that are non-combustible, lightweight and have, if possible, low embodied carbon.

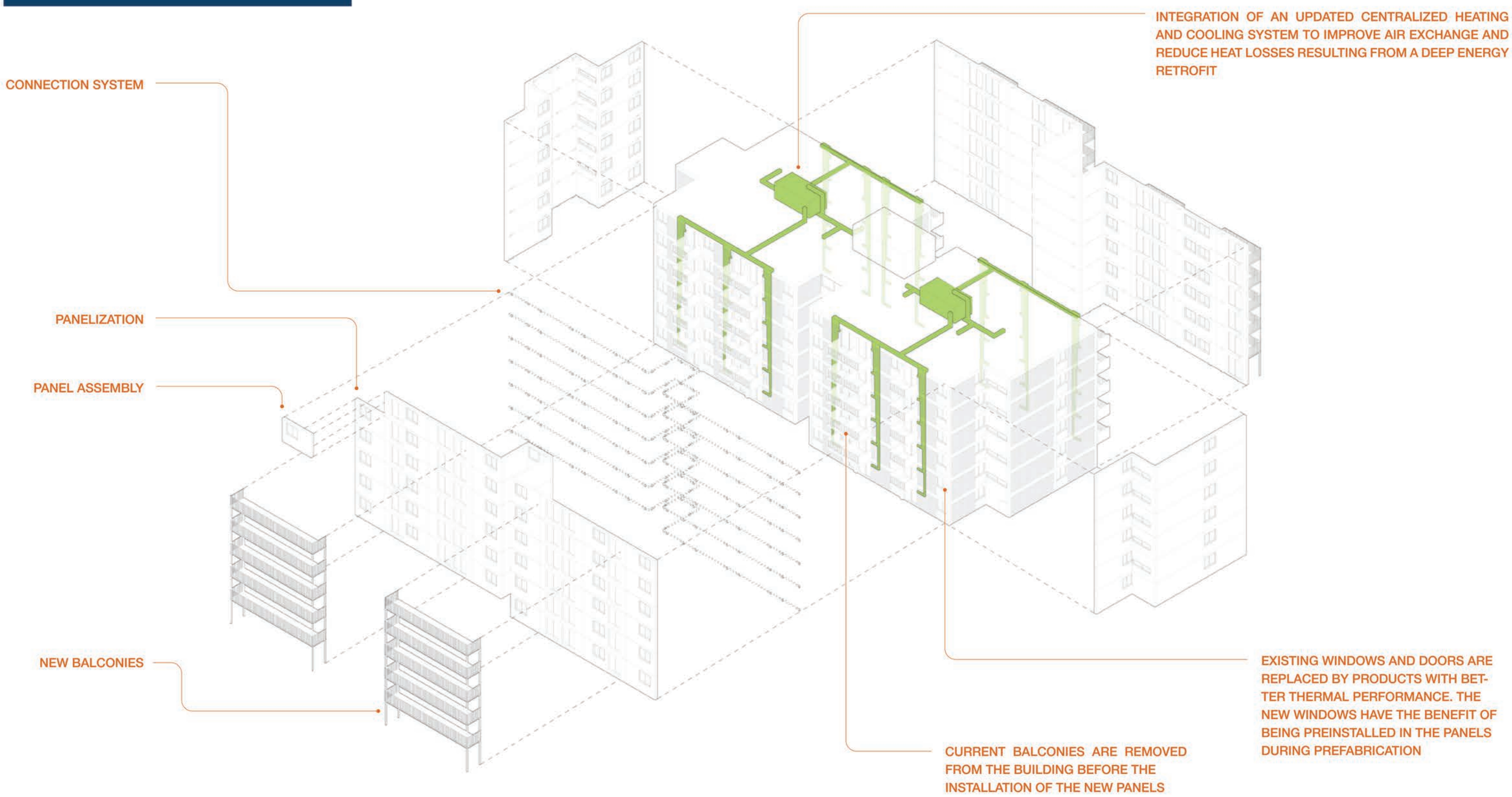
01 steel tension steel straps
02 variable permeability vapour control
03 rock wool batt insulation **R14**
03 galvanized metal studs
04 gypsum sheathing
05 airtightness and weather resistive barrier
06 semi-rigid insulation board and rainscreen **R22**
06 *Cascadia* fiberglass thermal spacers
07 vertical z-girts
08 cladding



BALCONIES

Balconies represent a significant source of heat loss through thermal bridging[2], which the DERs aim to address. The identified solution involves removing the existing balconies, overcladding the façade with the retrofit panels to eliminate thermal bridging from the overhung concrete slabs, and installing a new self-supported free-standing steel balcony structure.

PROJECT OVERVIEW



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[1]National Research Council of Canada. 2022. "Quebec Construction Code, Chapter I - Building, and National Building Code of Canada 2015 (amended). p.157-158

[2]RDH Building Engineering Ltd. 2013. "The Importance of Slab Edge & Balcony Thermal Bridges". RDH, September 24, 2013. Accessed August 7, 2024. https://www.rdh.com/wp-content/uploads/2017/07/Part-1-The-Importance-of-Slab-Edge-Balcony-Thermal-Bridges.pdf

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