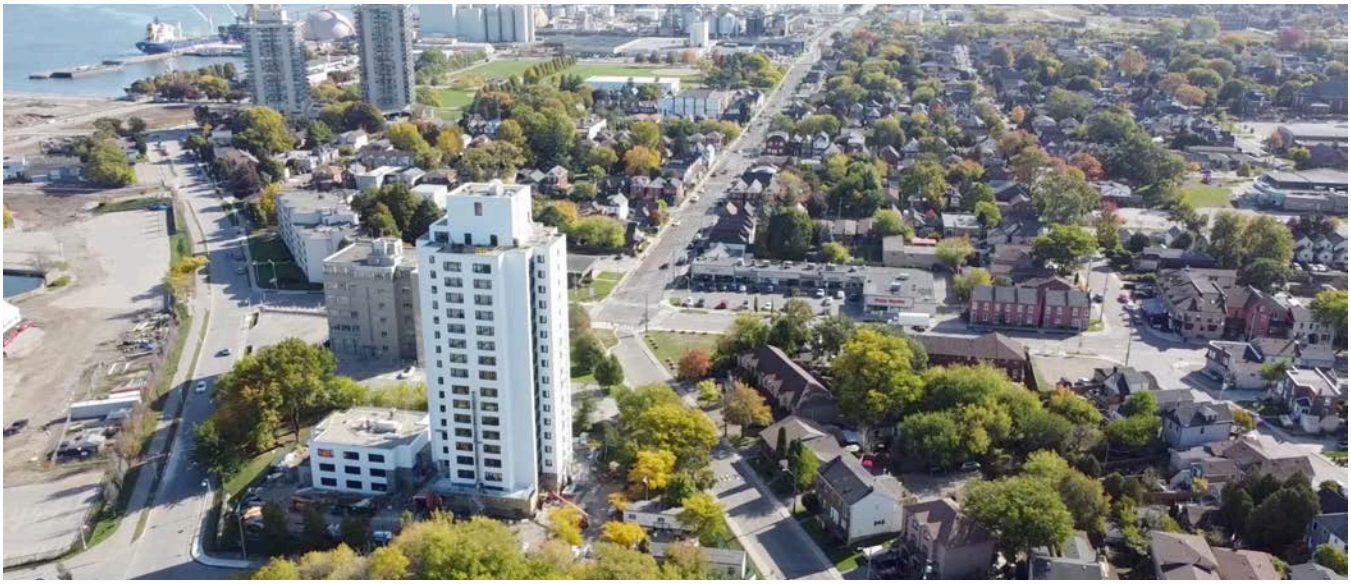
Retrofitting Underscores Real Potential in Aging Apartment Buildings

By Ryan Martin, Product Manager, Exterior Wall, Roofing & Core Solutions (OEM), ROCKWOOL North America



An aerial view of Ken Soble Tower. Photo credit: Cordrin Talaba

A growing share of North America's residential towers are aging, worn, and in need of repairs. With the urgent need to address climate change, prioritizing the renewal of older, inefficient buildings will be critical to reducing carbon emissions and lowering energy demand moving forward.

It's an important measure, given that the global rate of urbanization and economic growth are expected to double the primary demand for energy this century. Couple that with the fact that the operational carbon of buildings—that is, the CO_2 emissions throughout the life of a building—now accounts for approximately 30 per cent of the world's CO_2 emissions, and it becomes clear we have a lot of work to do. However, there are plenty of opportunities for change, and buildings offer the greatest potential. That's because energy efficiency accounts for more than 40 per cent of the carbon emission reductions needed to meet the goals established in the 2016 *Paris Agreement*.

So, where do we start? In Canada, the urban landscape is dotted with post-war apartment towers that comprise nearly half of the affordable housing stock in major centres. According to the Tower Renewal Partnership, led by the Urban Centre for Growth + Renewal, there are over 2,000 such residential buildings in Ontario's Greater Golden Horseshoe Region alone, accounting for the majority of purpose-built rental stock. Yet, many are in desperate need of repair.

Retrofitting makes sense from many angles, especially given that demolition and replacement of these towers is typically more expensive than renewal, not to mention the high environmental cost rebuilding presents. What's more, opting to retrofit elevates the asset, improves its value, and reduces operating costs. It's also a unique opportunity to reimagine how residents experience the building. It ensures progress doesn't mean the loss of these towers but includes their preservation and transformation.

A well-planned retrofit can contribute to the overall goal of reducing greenhouse gas emissions, preserve the supply of affordable urban housing, revitalize neighbourhoods, and improve the comfort, health, and safety of a building, while enhancing resident well-being and social connections.

The Passive House approach ideally aligns with these objectives, creating buildings that are more sustainable, resilient, and healthy. To understand the powerful potential of this approach and retrofits in general, consider one such project that got it right—Ken Soble Tower in Hamilton, Ontario.

KEN SOBLE TOWER

Ken Soble Tower is a purpose-built seniors' rental apartment. Built in 1967 at 18 storeys and 80,000 square feet, it's the oldest high-rise, multi-residential building in CityHousing Hamilton's portfolio and had been in a state of deterioration for some time. The goal was to retrofit the building to achieve EnerPHit certification, a branch of the *Passive House Standard*, and drastically reduce carbon emissions. The building overhaul would include nearly every facet of the building, from the building envelope, mechanical systems, electrical, plumbing, and safety systems, to interior upgrades to each of its 146 units to support aging in

The retrofit underway, featuring the DuROCK PUCCS NC EIFS system with ROCKWOOL stone wool. The system creates the new, white exterior and contributes to the tight and super-insulated building envelope. Photo credit: ERA Architects

place, accessibility, comfort, and overall improvement of the occupant experience. The current building had significant challenges, including a deteriorating envelope, lack of insulation, inadequate ventilation, and lack of thermal controls.

THE TRANSFORMATION

While ERA Architects was originally going to re-clad the building with an entire wall assembly outside the existing brick, the plan for the building envelope was revised after they discovered the DuROCK PUCCS NC EIFS system. This innovative exterior insulation and finish system offered a cladding design with a six-inch thickness of ROCKWOOL stone wool insulation. ERA Architects liked three main things about the system: first and foremost, the non-combustibility (important, given the vulnerability of the senior-aged occupants); second, the excellent moisture control offered by the stone wool and the unique, built-in drainage layer cut into the back side of the insulation; and third, the liquid-applied, water-resistive barrier. Each component of the PUCCS NC EIFS system contributes substantially to building resiliency, health, and safety.

The EIFS system, with its liquid-applied, water-resistive barrier, helped achieve Ken Soble Tower's ambitious airtightness target of 0.6 ACH at 50 Pa. The stone wool continuous insulation incorporated into the wall system offers high thermal performance, resistance to moisture, mould and mildew, high drying potential, fire protection, and excellent acoustical properties. In all, 50,000 square feet of stone wool insulation was incorporated into the new façade, helping realize the R-38 effective R-value required to achieve EnerPHit certification and reduce carbon emissions by a remarkable 94 per cent.

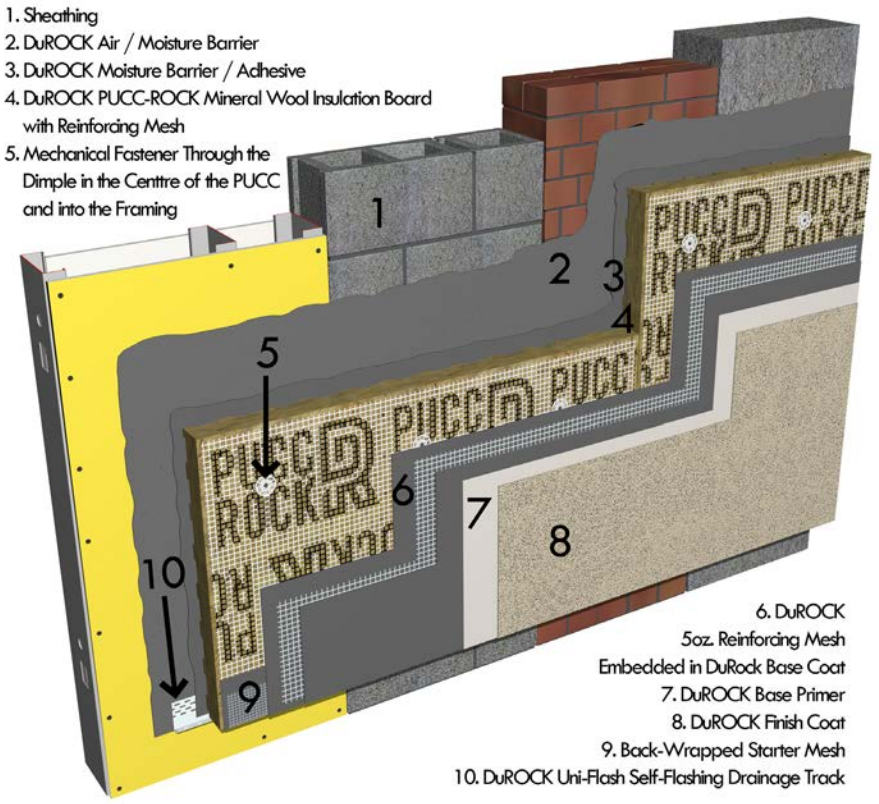
Overall, the EIFS system fit the need for cost-effectiveness (the system helped reduce labour costs), ease of install, high-quality composition, impact resistance, and a favourable sustainability profile. The upgraded building envelope with inorganic stone wool will also help contribute to better air quality, since mould was a previous issue. Additionally, it created a more resilient building, able to stand up to harsher conditions as a result of climate change in the region, effectively future-proofing the building and better protecting its senior residents. In fact, thanks in part to its tight and super-insulated building

envelope, ERA Architects notes that Ken Soble Tower was designed using 2050 climate projections to test thermal comfort in all seasons.

"The building demonstrates passive resilience to extreme conditions," ERA Architects indicates. "In case of failure of active systems, the building will stay warm in winter for up to two days (compared to two hours in a typical building) and below dangerous heat levels in summer for up to four days (compared to a half-day in a typical building)."

Ken Soble Tower does this while improving comfort and substantially reducing energy demand. At its peak, the total energy needed to heat or cool each unit will be equal to the energy needed to run three incandescent light bulbs (100W).

At completion, the retrofit will have resulted in upgrades and improvements to all major systems, the building envelope, building amenities, individual units, life safety, accessibility, and occupant comfort. It now positions Ken Soble Tower as a true asset and a proud, prominent landmark along Hamilton's waterfront—fitting, as it now stands as one of the world's largest EnerPHit-certified projects and a case study that underscores the value of retrofit activity.



A rendering of the layers in the DuROCK PUCCS NC EIFS system with ROCKWOOL stone wool insulation. Photo credit: DuROCK Alfacing International Ltd.

INDUSTRY IMPACT

Projects like Ken Soble Tower demonstrate that retrofit activity can provide multi-faceted benefits to a variety of complex social, economic, and environmental issues. Such transformations positively impact the built environment, the community, the economy, local employment, quality of life for residents, and operating costs for owners. They play a critical role in maintaining a vital part of the housing mix, while contributing to climate action.

With an abundance of aging building stock awaiting transformation, retrofit activity is poised to reshape our urban landscapes, driving innovation in the building industry and bolstering economic growth, while preserving the environment and affordable living. Deep energy retrofits with modern solutions such as an innovative EIFS system with stone wool offer far-reaching benefits. They will be critical moving forward.

Building better is important, but new construction alone won't move the needle enough. Although cities take up only two per cent of the land surface, they generate more than 70 per cent of emissions and consume over two-thirds of the world's energy. When it comes to the built environment, we need a comprehensive approach with deep energy retrofit solutions front-and-centre. ■

Ryan Martin is the product manager for exterior wall, roofing, and core solutions (OEM) at ROCKWOOL (North America). He is passionate about developing new and innovative solutions for stone wool insulation and supporting the great work of ROCKWOOL's diverse network of customers. Ryan can be reached at ryan.martin@rockwool.com.