PEMBINA Institute

REFRAMED INITIATIVE BY PEMBINA INSTITUTE

April 2026

Exploring prefabricated retrofits for occupied suites

How prefabrication streamlines construction, shortens in-suite time, and improves the overall occupant experience

Using prefabricated components and assemblies when retrofitting and renewing occupied suites can minimize disruption and avoid the need to relocate building residents. This approach can significantly improve the experience for tenants and has the potential to reduce project costs while accelerating the pace of retrofits in multi-unit residential buildings (MURBs) across Canada.

Minimizing disruption benefits everyone

In-suite retrofit activity can be very disruptive, particularly for vulnerable communities. Despite the clear benefits of retrofits, both in-suite activity and relocation diminish trust between tenants and building operators or trades, and ultimately add complexity, time, and costs to retrofit activity.

Modern construction innovations in MURB retrofits

Modern methods of construction increasingly make construction activity faster, smarter, and more affordable. Although this approach is typically reserved for new construction or exterior panelization in retrofits, modular and prefabricated components and assemblies have the potential to significantly reduce the frequency and scope of in-suite retrofit activity.

Living spaces within social housing often contain similar layouts and repeated elements that are well suited to the standardized and replicable nature of off-site prefabrication. Using robust scanning and verification tools, components for prefabrication can be identified during both design and construction.

Across occupied suites, this approach holds potential to deliver more predictable scheduling, fewer material losses, and reduced labour costs. Alongside reducing the time construction teams need to spend in-suite, a streamlined process also cuts the exposure of building occupants to dust, noise, and other irritants associated with retrofit activities.

Advantages of prefabrication for in-suite components and assemblies

- Reduces or eliminates tenant or occupant relocation.
- Fewer occupant–contractor interactions and less potential for conflict.
- Reduces exposure to hazardous materials in aging MURBs.
- Reduces risk for general contractors, trades and building owners.
- Optimizes resource allocation, project sequencing and scheduling.
- Maximizes performance and minimizes costs.

REFRAMED INITIATIVE BY PEMBINA INSTITUTE

The Pembina Institute's Reframed Initiative is a research and convening platform that surfaces deep retrofit solutions and works to scale retrofit activity.

The benefits of a unified approach

Bolstered by modern tools such as building information modelling and digital replica of spaces, called digital twins, retrofit projects benefit from streamlined coordination, enhanced communication between project proponents, and reduced project risk from the start. Digital twins can help sequence in-suite activity before physical construction takes place and identify opportunities for workflow efficiencies, serving to eliminate gaps between trades, and contributing to efficiency, adaptability, and less waste.

A challenge with this approach is the cost and complexity of both prefabrication and digital tools, which often exceed the resources of single-building owners or social housing providers. However, owners of MURB portfolios or those oriented to long-term holdings are well suited to using these tools. This can both improve the retrofit process and contribute to life cycle management of project materials, such as construction schematics or other documentation, an important enabler of future retrofits.

Technology spotlight

Pre-insulated ducts or bulkheads: Rapid install snap-in-place ventilation ductwork can eliminate sheet metal and drywall work.

Plug-and-play electrical components: Pre-cut to measure, snap-and-plug electrical solutions can reduce time spent in occupied spaces.

Multi-trade assemblies: Heating, cooling and ventilation equipment with components pre-assembled are faster and cleaner to install.

Interior wall panels with integrated systems: Complete with millwork and cabinetry, panels can be installed on pre-designed structural members, replacing drywall and reducing waste.

Unitized mechanical packages: Systems that include a heat pump, domestic hot water tank and heat recovery ventilator can minimize time in-suite.

Applying prefabrication to interior spaces is not new. In addition to widespread use in commercial and office spaces requiring frequent reorganization and durable surfaces, prefabrication was used in Germany's Güterstraße 30 Passive House retrofit project, which sought to minimize occupant disruption through a "prefabricate as much as possible" approach. This led to the use of many prefabricated technical components that enable trades to be in and out of occupied units in a single day.

Advancing in-suite prefabrication opportunities with the Reframed Initiative

While the upfront investment of prefabricated solutions represents an investment beyond conventional practices, the potential to realize faster, cleaner, safer and less disruptive in-suite retrofit activity — and an improved occupant experience — is clear. But to lower barriers to using these tools, institutional inertia will have to be overcome and capacity built.

In its earlier work, the Pembina Institute's Reframed Initiative highlighted the benefits of the integrated design process in driving cost, energy, and emissions efficiency. Building on these lessons, it will continue to explore innovative approaches to accelerating cost-effective and less disruptive retrofits that improve the tenant retrofit experience.

References

North American Insulation Manufacturers Association, *A Field Guide to Retrofits in Occupied Buildings* (2020).