



## Transforming real estate for a sustainable future

### Embracing the circular economy: Sustainable fit-outs through materials reuse

Significant focus has been placed on helping to reduce the operational emissions of office fit-outs through energy-efficiency and emission removal, with many global companies establishing Science Based Targets Initiative (SBTi) validated net-zero targets and signing onto the World Green Building Council's Net-Zero Building Commitment. While these efforts are beneficial, it is important not to overlook other aspects of sustainability. Exploring circular economy strategies in real estate fit-out projects can offer additional environmental advantages and financial gains. One effective circular economy strategy is the reuse of materials.

#### The role of fit-out materials in the circular economy

Materials associated with interior building fit-outs account for approximately 10% of global emissions<sup>1</sup>. These emissions are generated from the extraction of raw materials, processing, manufacturing, and transportation of products, and are often referred to as 'embodied carbon' or 'upfront carbon'. During office decommissioning, retrofits, and upgrades, many building materials are removed from sites and disposed of in landfills prematurely. This results in a linear economy that contributes to the loss of material resources and the carbon embodied in these products.

## Benefits of a materials reuse strategy

Materials reuse involves designers and architects creatively incorporating recovered, reused, or repurposed products into office spaces. Common materials can include furniture, demountable partitions, kitchen equipment, flooring, ceilings, etc. Investing time and effort in this closed-loop approach can offer several benefits:

- **Reduced embodied carbon:** Avoids embodied emissions associated with manufacturing new materials and transporting them to the site.
- **Decreased raw material extraction:** Lowers the demand for new raw materials, minimizing the environmental and potential human impact associated with mining, logging, and other extraction processes.
- **Landfill waste avoidance:** Prevents resources from ending up in landfills, reducing waste and the associated environmental hazards.
- **Cost savings:** Cuts costs by reducing the need to purchase new products, decreasing reliance on volatile global markets, and reducing disposal expenses.

## Challenges of a material reuse strategy and potential ways to overcome them

Common challenges or potential barriers that may be encountered when incorporating recovered, reused, and repurposed products in an office fit-out include:

- **Design flexibility:** Reusing materials may limit design options. As aesthetic, performance, and efficiencies in designs change, it may be difficult to repurpose materials with outdated specifications. A potential solution to addressing this challenge is to engage a design team specializing in adaptive reuse. They can provide innovative solutions that incorporate reused materials without compromising on aesthetic or functional goals.
- **Scheduling coordination:** Coordinating the storage and timing of materials reuse can be complex. This can be addressed by planning ahead to allow additional leeway, helping to ensure that relevant business functions involved have sufficient time and adequate opportunities to find appropriate solutions.
- **Additional cost and effort:** Accommodating materials reuse can be time-consuming, adding additional stages (i.e., materials inventory, pre-refurbishment audits, on-site validation, staging, warranty checks, repairs etc.) to the process and could result in real or perceived costs. In some cases, the perceived cost of embedding circularity is due to lack of foresight and planning; utilizing existing technologies that help streamline the

inventory process and recommend optimal material pathways, such as materials passports and renovation passports<sup>2</sup>, can help mitigate these challenges and make the process more efficient.

- **Price competition:** Secondary materials can struggle to compete with more affordable primary raw materials, particularly where external costs like CO<sub>2</sub> emissions are not included in prices. This can make it more difficult to establish circular business models. A potential solution to address this is to go beyond upfront costs when making the business case, clearly assessing life cycle costing and quantifying externalities (e.g., model the avoided environmental costs) and communicating to stakeholders early to build support for circular approaches. Research can also be done early in the project stages to help determine the availability of local and national programs that provide funding for circular construction projects, or sustainable financing loans with favorable terms for sustainable projects.
- **Transparency and digital traceability:** Effective control of complex material flows can require reliable data, and a lack of digital systems is slowing down the development of intelligent traceability and monitoring solutions. While retroactively addressing traceability is challenging, a proactive approach is to implement material passports—digital records that capture key information about building materials, such as their origin, composition, and quality. These passports help verify the quality and provenance of secondary materials.

## Takeaway

Embracing materials reuse can yield significant environmental and financial benefits. While the building industry strives to meet ambitious SBTi-validated net-zero goals, which emphasize operational carbon reduction, it is equally important to adopt a circular economy approach that considers material efficiency. While it is easier to reuse materials if the spaces were initially designed with disassembly or circularity in mind, there are opportunities to reuse, repurpose, or recycle.

By addressing the challenges associated with materials reuse and embracing innovative solutions, companies can create office spaces that are not only functional and aesthetically pleasing but also environmentally responsible. Circular practices can play a pivotal role in shaping the future of office fit-outs, and reuse of materials is an important strategy in achieving sustainable transformation.

# Case study: Materials reuse in the Ottawa office refresh

## Background

Deloitte Canada's Ottawa office, originally refurbished in 2013, has been a testament to forward-thinking design and non-obsolescence, contributing to Deloitte Canada's decision to remain in the existing location with plans for expansion and a refresh to align with evolving design standards and specifications. This decision was driven by a focus on sustainability, cost-effectiveness, and maintaining a modern and functional workspace.

## Objective

The primary goal of the refresh was to update the office space to support new ways of working, reflect current brand standards, and incorporate inclusive design trends while ensuring that the aesthetics and functionality would remain relevant for years to come. The project aimed to leverage the durability and timelessness of the original materials, minimizing waste, and maximizing resource efficiency.

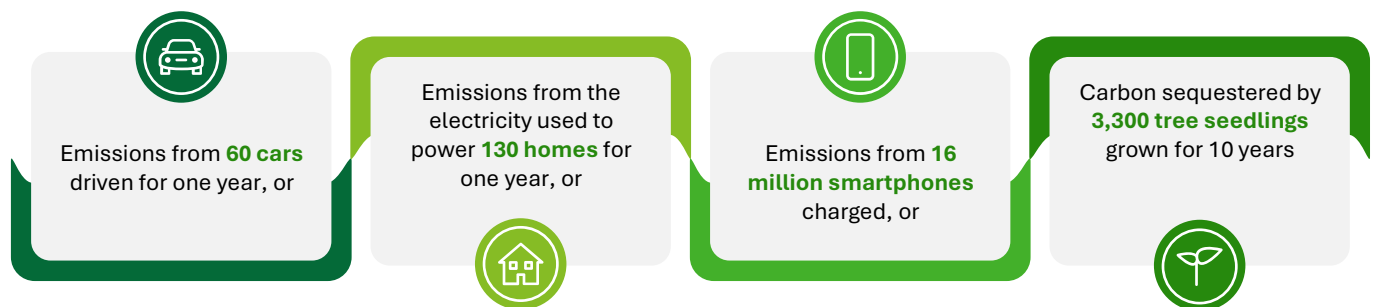
## Approach

**1. Assessment of existing materials:** The first step involved a thorough evaluation of the materials used in the 2013 refurbishment. This included assessing the condition and potential for reuse of flooring, fixtures, furniture, and other architectural elements. The original investment prioritized quality and longevity, which facilitated the reuse strategy.

**2. Design integration:** The design team worked to integrate existing materials into the new aesthetic framework. By focusing on neutral palettes and versatile designs, the refresh aimed to incorporate elements that would not become dated quickly. This approach ensured that the office would maintain a modern look while preserving the integrity of the original materials.

## Outcomes from the proposed design

- **Materials recovered<sup>3</sup>:** Quantity of products reused includes:
  - Over 1,100 furniture pieces.
  - Over 250 square meters (over 2,690 square feet) of demountable wall panels.
  - Over 6,900 carpet tiles, measuring over 1,700 square meters (over 18,300 square feet).
- **Waste diverted:** Over 38,000 kg (over 83,775 lbs) of materials diverted from landfills.
- **Cost avoided:** The estimated cost avoided from not purchasing new materials is over CAD 1,000,000 (approximately USD 730,000).<sup>4</sup>
- **Emissions mitigated<sup>5</sup>:** Almost 200,000 kg of Carbon Dioxide Equivalent (CO<sub>2</sub>e) (approximately 441,000 lbs), equivalent to:<sup>6</sup>



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## Endnotes:

1. RESET, [Embodied carbon and circularity in office interiors: Part 1](#), April 2022, p. 4.
2. UK Green Building Council, "[Material passports](#)," and Build Up, "[Renovation passports](#),"
3. Only furniture and demountable walls/partitions and carpet were included in this assessment. Additional materials reused include ceiling tiles, flooring, millwork, partitions, appliances and equipment, lighting and plumbing fixture, and more, but were not included in assessment as volumes are difficult to determine. The inclusion of those materials would result in even higher avoidance of above noted outcomes.
4. Statistics Canada, [Canadian Inflation Tracker](#): Household operations, furnishings and equipment, January 2013–December 2024.
5. US Environmental Protection Agency, [Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts \(TRACI\)](#) methodology.
6. Car and home equivalencies calculated from [Natural Resource Canada's Greenhouse Gas equivalencies Calculator](#), based on Canadian averages. Smart phone and tree seedling equivalencies calculated from [EPA's Greenhouse Gas Equivalencies Calculator](#).



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