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VANCOUVER ECONOMIC COMMISSION

BCIT Sustainable Business Leadership

The Business Case for Deconstruction

Economic and environmental impacts of a demolition-deconstruction shift in Metro Vancouver

Industry Whitepaper
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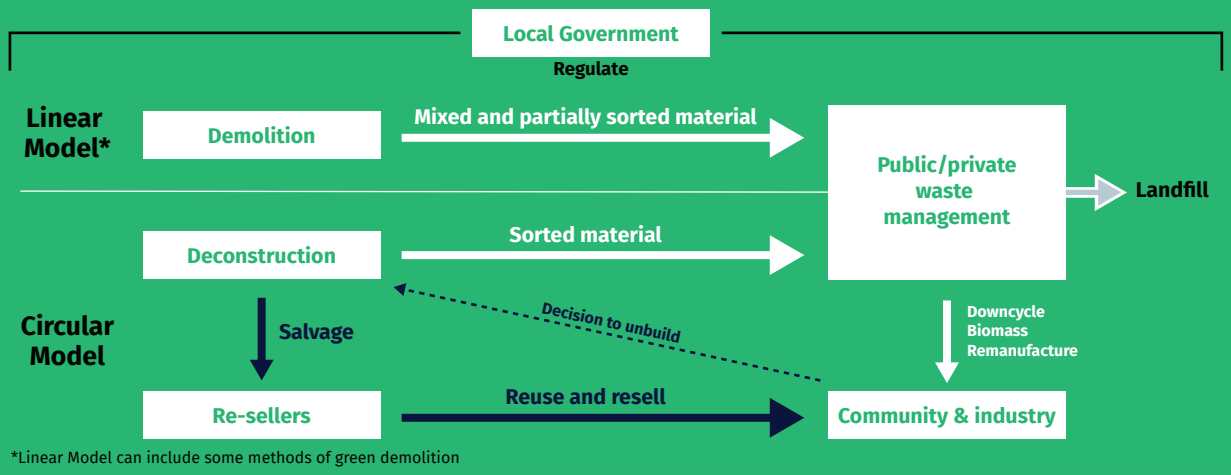
Authors
Kinsey Elliott
Erica Locatelli
Carl Xu

Introduction

This industry briefing summarizes a BCIT research project and report undertaken in partnership with the Unbuilders and the Vancouver Economic Commission (VEC). The report covers analysis of current demolition and deconstruction policies in Metro Vancouver; calculates the potential market size for regional-scale residential deconstruction; projects potential material volumes for deconstructed materials; and outlines recommendations for facilitating a residential demolition-deconstruction shift in Metro Vancouver.



Construction, Demolition and Deconstruction

Building material is traditionally seen as a one-time-use product that is rendered unusable once the building is torn down, with its parts disposed of in landfills. This is highly concerning, as construction is the single largest source of material usage on the planet, accounting for 28.7 billion tonnes of material in 2019.[1] Traditional machine demolition is an inexpensive and timely method, but this process creates substantial amounts of waste while dismissing the environmental impacts and ignoring the value of used building materials.

Alternatively, deconstruction involves dismantling buildings with the goal of maximizing reuse and recycling of its component materials – a complex process that values sustainable practices and requires multiple streams along which demolition materials can flow. Deconstruction is a relatively new business model in Metro Vancouver's construction and demolition (C&D) industry, but one that is growing in regional and global importance. Realizing and cultivating its local potential represents a significant opportunity to increase resilience and circularity in our economy and meet regional sustainability goals.

1 Circle Economy. "The Circularity Gap Report" (Amsterdam, 2020): 32. Accessed from: assets.website-files.com/5e185aa4d27bcf348400ed82/5e26ead616b6d1d157ff4293_20200120%20-%20CGR%20Global%20-%20Report%20web%20single%20page%20-%20210x297mm%20-%20compressed.pdf

Highlight of Key Findings

Reaching Metro Vancouver's Regional C&D Diversion Target

Metro Vancouver's Integrated Solid Waste and Resource Management Plan has set a regional waste diversion target of 80 percent for the C&D industry by 2020. By introducing deconstruction's 94 percent diversion rate into the C&D sector, the region can exceed this goal and divert an additional 289,136 tonnes of landfilled material annually.

Of the current 78 percent regional diversion rate, only 0.3 percent is currently put towards reuse. If the region achieves a 10 percent salvage rate by applying the deconstruction model, the amount of materials reused could reach 179,078 tonnes annually.

Table 1: Unbuilders 5 Sample Deconstruction Projects Overview

Project # (unit:tonne)	Materials Disposed	Wood Salvaged	Materials Recycled	Total Materials Processed	Diversion Rate %	Salvage Rate %
1	0.6	6.22	69.64	76.46	99.22%	8.13%
2	14.75	7.03	107.01	128.79	88.55%	5.46%
3	4.63	11.35	72.52	88.5	94.77%	12.82%
4	7.65	9	73.98	90.63	91.56%	9.93%
5	1.1	15.48	77.43	94.01	98.83%	16.47%
Average	**5.746**	**9.816**	**80.116**	**95.678**	**94.58%**	**10.26%**

- **Diversion rate:** percentage of salvaged and recycled C&D materials against total C&D materials processed
- **Salvage rate:** percentage of salvaged C&D materials against total C&D materials processed
- Refer to appendix E for a breakdown of deconstruction sample projects/sample project diversion rate

Wood Waste Diversion

Wood makes up approximately 61 percent of Metro Vancouver landfill, yet fosters significant economic and environmental value in both salvaging and recycling. Deconstruction diverts 38 percent more wood waste than the current Metro Vancouver average for traditional demolition, demonstrating that the outcome and rate of diverting materials – particularly wood – are directly affected by the processes employed.

Salvaged Wood Value Estimation

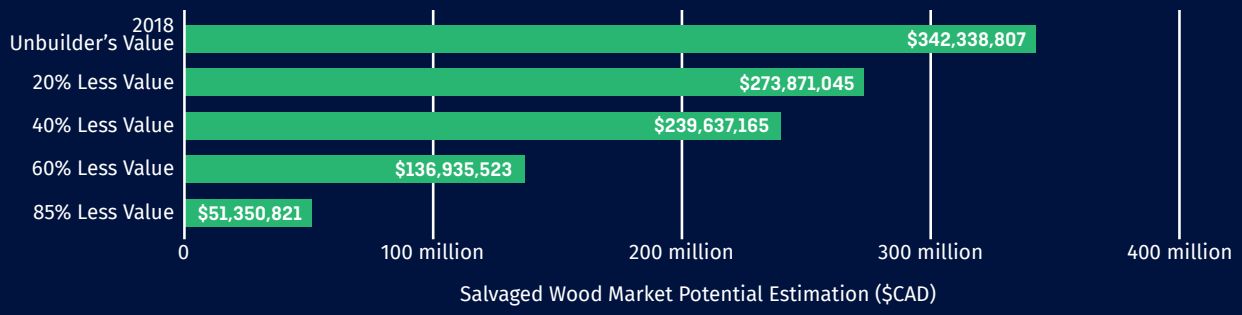
Using a deconstruction model, 30 percent of wood can be salvaged from a typical C&D project in comparison to Metro Vancouver's current regional salvaging rate of one percent. Were the region to universally adopt a deconstruction model, the resulting value of Metro Vancouver's salvaged wood would be approximately $342 million per year (as estimated by current retail values of $2,403 per tonne of wood). Assuming a decrease in value as the supply expands, even at just 15 percent of the current value salvaged materials would represent an annual value of $52 million.

Material Diversion and Municipal Demolition Recycling Requirements

Five municipalities in Metro Vancouver have developed policies with minimum recycling requirements based on the total weight of a demolition project. For example, concrete comprises 57 percent of the total weight of building materials processed in a standard project. Meeting a recycling weight requirement of 70 percent implies that a demolition project need only recycle an additional 13 percent beyond concrete to meet the minimum requirement.

However, while Metro Vancouver's rate of concrete recycling is high, wood continues to account for the highest volume of C&D material by weight that ends up in landfill. In a standard deconstruction project, recycled wood and salvaged wood are the second and third largest weight totals diverted from landfill, pointing to strong potential for wood salvaging and clean wood recycling should a deconstruction model be implemented.

Figure 1: Metro Vancouver Salvaged Wood Market Estimation by Introducing Deconstruction

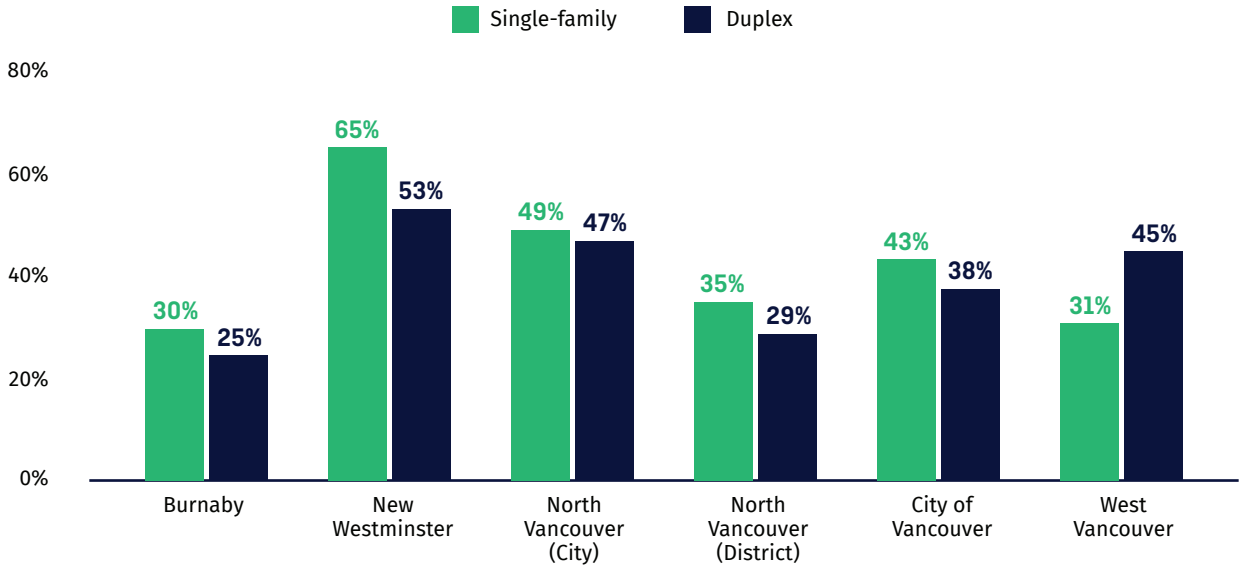


Potential Number and Types of Homes Suitable for Deconstruction

Existing City of Vancouver data shows that approximately 40 percent of annual residential demolitions are of pre-1940 homes; these are also homes with the most suitable material composition for deconstruction. Based on this 40 percent share, and the demographics of home construction dates in six of the largest cities in Metro Vancouver, the research estimates that more than 780 residential demolitions are ideally suited to deconstruction every year across the region.

However, despite deconstruction showing positive environmental and economic impacts, there remains a lack of understanding around how the model works, as well as concerns about the commitment required from policymakers overseeing the industry and contractors receiving the return on associated increases to labour, time and waste diversion efforts.

Figure 2: Pre-1960 Simple-family and Duplex Homes by Percent of Total



Overview of Key Recommendations

Regional Waste

Continue collaborations between Metro Vancouver Solid Waste Services, municipalities and demolition industry groups of interest to develop new strategies and goals for demolition waste diversion beyond 2020, as initiated in the ISWRMP.

Regional Upcycling and Recycling Facilities

Collect and further analyze demolition materials data processed by unlicensed waste facilities and private companies, and identify barriers to optimal recycling and upcycling of demolition materials.

Municipal Policy

All municipalities in Metro Vancouver should enact policies explicitly supporting deconstruction and demolition material salvaging. This will require auditing tipping fee receipts, permit applications and waste management plans to ensure tracking and reporting data to support material diversion.

Photo: Unbuilders

Industry Adaptation

Develop a network of deconstruction groups of interest by convening working groups to further identify and lower possible barriers to promoting deconstruction practices for businesses, policymakers and waste management organizations.

Photo: Unbuilders

Conclusion

Metro Vancouver is emerging as a Canadian circular economy hub, particularly with regards to deconstruction. Unbuilders' groundbreaking work as the country's first commercial deconstruction company continues to inspire – and evolve – as local governments adopt more stringent deconstruction and green demolition bylaws. Well-designed and correctly implemented policies will help drive unique, meaningful business and job creation opportunities that address construction and demolition waste challenges.

Therefore, local governments and regional districts across BC have the opportunity and imperative to continue evaluating waste policies and developing frameworks to reduce environmental impacts and municipal overhead. The Vancouver Economic Commission will continue to research and advocate for needed business models, policy changes and collaboration frameworks to ensure these opportunities are realized, bringing us closer to achieving our region's climate and environmental goals.

Brought to you by

We would like to express our appreciation to all those who were interviewed and consulted in the process of developing this report. We are grateful for the valuable and constructive insight provided during the planning and development of this research.

Authors

Kinsey Elliott | Project Manager
- BA Honors Specialization in Media & Information Communications | University of Western Ontario
- Sustainable Business Leadership Advanced Certificate | British Columbia Institute of Technology

Erica Locatelli | Research Lead
- MSc in Chemistry | University of the Studies of Milan, Italy
- Sustainable Business Leadership Advanced Certificate | British Columbia Institute of Technology

Carl Xu | Administrative & Communications Lead
- BA in Economics and International Trade | Guangdong University Of Foreign Studies, China
- BCIT Sustainable Business Leadership Advanced Certificate

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Alan Shapiro
Faculty Advisor | British Columbia Institute of Technology

Adam Corneil | Client
CEO & Co-Founder | Unbuilders

George Benson | Client
Sector Manager, Built Environment | Vancouver Economic Commission

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About Unbuilders
Unbuilders is Canada's foremost deconstruction company. Based in Vancouver, British Columbia, they unbuild homes by hand and salvage almost everything, including irreplaceable old growth lumber, windows, doors, cabinets, fixtures and appliances. Developed by a team of former carpenters, roofers, framers, and other tradespeople who have hopped the fence from construction to deconstruction, they led by green builder (now unbuilder) Adam Corneil and project manager Dan Armishaw.

VANCOUVER ECONOMIC COMMISSION

About the Vancouver Economic Commission
The Vancouver Economic Commission (VEC) is building a prosperous, inclusive and resilient economy for Vancouver, its businesses and its residents. As the economic development agency for the City of Vancouver, we strengthen Vancouver's thriving economy by supporting local companies, attracting high-impact investment and promoting international trade in the world's fastest-growing, low-carbon economy. VEC works collaboratively to position Vancouver as a global destination for innovative, creative, diverse and sustainable development.

We respectfully acknowledge that VEC is located on the unceded ancestral territories of the Musqueam, Tsleil-Waututh, and Squamish Nations.