Watching our Waste: Executive Summary

A National Construction Waste Analysis in Canada Using LEED™ Certified Project Data.

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Executive Summary

Introduction

The *Watching Our Waste* report analyses the collected construction and demolition (C&D) waste data of 678 LEED Canada 2009 certified projects from across the country. This represents the largest such dataset currently available and is comprised of Industrial, Commercial, Institutional, (ICI) and Multi-Unit Residential buildings (MURBs) that were constructed across Canada, with representation from every province and the Yukon Territory. These LEED certified projects, averaging 88% diversion, demonstrate that a much higher diversion rate than what the construction industry is currently achieving is possible. This level of diversion is possible regardless of whether the projects are rural or urban, and innovative examples of waste diversion policies and market forces can be found in many places, from small municipalities to large urban centres.

Findings

Process matters. Not surprisingly, where single waste streams were reported for these projects, indicating separation of materials on the construction site, there were much higher diversion rates. Where the waste is mixed or "commingled" on site and separated at an off-site recycling facility, the diversion rates are lower. With commingled waste, if the levels of contamination by other materials or waste exceed the recycling facilities' allowable limits, entire containers of materials can be rejected and disposed of.

Despite the high diversion rates of the projects examined, the excess materials were, for the most part, "down-cycled" rather than recycled into a comparable product to the original. For example, structural concrete typically becomes aggregate for roadwork and fill, and wood is chipped and used as mulch or as fuel. ***The loss of economic value – estimated as $100 for every square meter of newly constructed space[1], is representative of the loss of energy, effort and raw resources that go into the production of these materials***. Based on 2018 construction cost estimates by Statistics Canada, this translates **to up to $4.04 billion in avoidable material costs for ICI buildings**.

Impacts

Many communities in Canada either have been, or will shortly be faced with the 'end of life' of their landfills, forcing them to allocate additional land for the purpose, or to transport their waste out of region at great cost and additional environmental impact. When we evaluate waste by volume rather than weight, we can better determine what contribution C&D waste makes to shortening the life of landfills. While concrete makes up the greatest weight of excess materials, it is rarely landfilled. This makes reducing wood waste critical for landfills as it then represents the greatest volume of any single construction material wasted, accounting for at least 21% of industrial, commercial, institutional and multi-unit residential building construction waste. The percentage of wood waste from single-family dwelling demolition and construction is even higher. ***Wasted wood is also the highest contributor to GHG, or embodied carbon, based on the avoidance of new resource use, accounting for 49% of CO_2e of C&D waste.***

[1] This represents the estimated cost of "excess" and un-salvaged materials in the construction of ICI and MURBs.

The 2018 estimate for waste generation for non-residential (ICI) new construction and major renovations is estimated to range from 1.41 million to 4.77 million tonnes, with an embodied carbon estimate between 1.20 to 4.39 million $MTCO_2e$.

Recommendations

When we look at the analysis from *Watching Our Waste*, it becomes very clear that current construction practices are not sustainable. If we are to meet our carbon targets, now and in the future, we need to abandon some of our twentieth-century building practices such as constructing the majority of our buildings on-site, and demolishing our existing buildings without regard for the materials embedded in them. Regulators should be aware that much higher diversion rates than are currently being achieved are possible, and should consider setting targets and creating bylaws accordingly. Beyond diversion, we should be embracing prefabrication, modular construction, purpose-built components[2], and the design of buildings for durability, adaptability and disassembly at end-of-life. Although these efforts may not be rewarded for many, many decades, given our industry's contribution to climate change, and if we believe that "a *society grows great when we plant trees in whose shade we know we will never sit*"[3], then shouldn't we seek to provide future generations with that shade? Or at the very least, ensure that we don't cause the temperature to rise even further?

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[2] Building components manufactured to size, including technologies such as 3D printing.
[3] Various attributions.