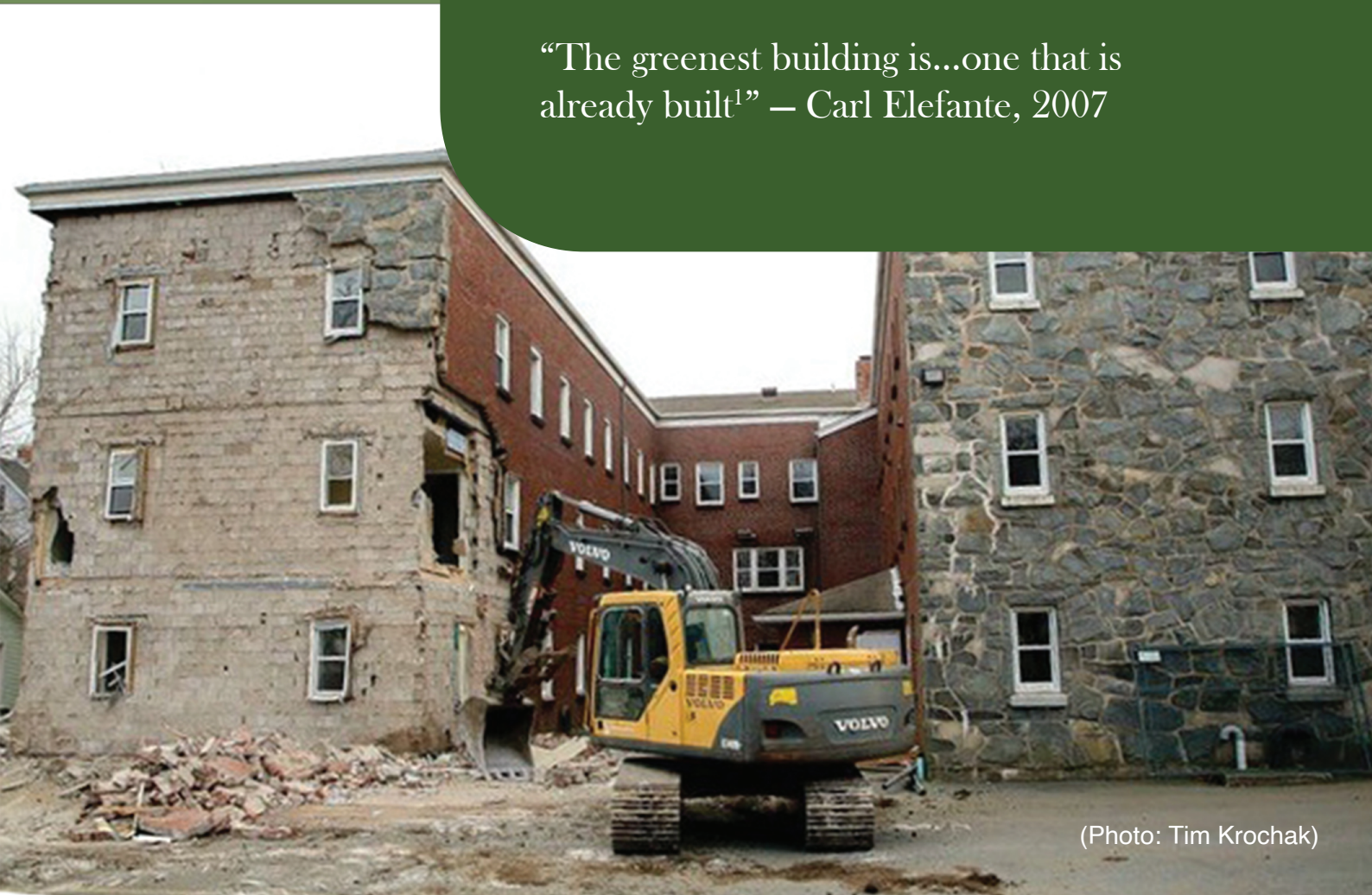


# Buildings For the Climate Crisis - A Halifax Case Study

(The Path Forward)

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“The greenest building is...one that is  
already built<sup>1</sup>” – Carl Elefante, 2007



(Photo: Tim Krochak)

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Development Options Halifax is a volunteer citizens' group working to improve government decision-making by providing better information.

Friends of Halifax Common is a volunteer citizens' group working to protect Canada's oldest and largest Common.

Mantle Developments is a Canadian interdisciplinary climate change strategy consultancy with offices in Toronto and Vancouver.

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Image 1: Five-unit Arts and Crafts style Campbell home, 825 Young Avenue, designed by Canada's then foremost architect Edmund Burke 1902, demolished in 2016. (CBC)

“We cannot believe that a situation can be so bad, so desperate that the only solution is to demolish.” — Anne Lacaton and Jean-Philippe Vassal, French architects and 2021 winners of their field's highest honour, the Pritzker Architecture Prize, in part, for never destroying a building to create a new one.

# The Path Forward, Planning for a Circular Economy

**New directions must include** a life cycle assessment to quantify both the upfront carbon emissions and the operational carbon emissions during the life stages of a building. By identifying the potential impact of various options, the best choices for reducing the carbon emissions can be made at the design stage of a development. Governments, institutions, policymakers, businesses, professionals, tradespeople, investors, manufacturers, civil society and residents must all act to reduce demolitions, and building and construction-related emissions.

**Planning for a circular economy** goes even further by replacing the linear economy model—which “progresses” from resource extraction, production and use to its “end-of-life” waste concept—with restoration and regeneration. This is achieved, with a broader aim than reducing GHG emissions, by shifting towards renewable energy, eliminating toxic chemicals and aiming for the elimination of waste through the design of materials, products and systems that are able to be maintained, repaired, reused, remanufactured, dismantled, recycled, leased or shared.

**In Nova Scotia** a circular economy is a focus area of the goals and initiatives established under the provincially legislated Sustainable Development Goals Act. It is defined as

*“an economy in which resources and products are kept in use for as long as possible, with the maximum value being extracted while they are in use and from which, at the end of their service life, other materials and products of value are recovered or regenerated.”<sup>97</sup>*

**Social, cultural, and economic opportunities are squandered** when buildings are seen as disposable and building materials as one-time products that have no function once a building is demolished. These go beyond the fact that communities are tax burdened by the 25-30% of Nova Scotia’s waste stream to landfills that flows from the demolition and construction industry. Although this report has focussed on the environmental and climate cost associated with demolition, construction and building, there is empirical evidence that neighbourhoods with a mix of older, smaller buildings of diverse ages support greater levels of positive economic and social activity than areas with large, new buildings.

**Older, smaller, mixed-use neighbourhoods**, when compared to areas with predominantly larger, newer buildings, are more walkable with a higher transit score; have greater nightlife; are home to and desired by a younger median age and with more age diversity; have greater affordability and flexible space; with a higher proportion of new businesses, women-owned businesses and minority-owned businesses; have greater concentrations of creative economy; and contain a significantly higher proportion of jobs in small businesses<sup>98</sup>. Added to these advantages in the context of a small city such as Halifax is the draw of being a unique historic area that still offers a sense of place. Unfortunately, this is all under threat as developers, condoned by decision-makers, rapidly convert the area to the uninteresting, homogenous, placeless urban typology emerging throughout the world.



Image 10: An in-fill option: 1864 single family house doubles in size to become 10 units. (Photo: P. Cameron)

**Greater population density** is also found in older commercial and mixed-use districts with more businesses per commercial square foot than in streets with large, new buildings<sup>99</sup>. When demolitions occur, higher unit costs and increased local property tax displace lower income earners. Since 2008, the commodification of real property has been the largest driver behind the global construction boom and higher costs, as the wealthy park their money in urban real estate. Such speculation inflates local land values and is detached from local incomes, such that the working class and poor can no longer afford to live in many of the world's major cities.

**Who is densification for** if housing units are unaffordable or treated as investment properties?<sup>99</sup> It's estimated that one-half of the condos in Vancouver and one-third of the condos in Toronto are empty, either investment properties or part-time second homes<sup>100</sup>. This investment driver behind construction and building comes at a social, economic, environmental and climate cost. Unchecked market forces, with private sector property developers or wealth management funds as both providers and as primary beneficiaries of housing, are a disruptor rather than a solution for meeting citizens' needs.

In Halifax, affordability and the general shortage of units for families with children is making HRM a city of commuters, since job opportunities continue to be largely on the Peninsula. Ironically, as social stratification within a city is reinforced by displacement of middle- and low-income earners, densification increasingly caters to a wealthier sector with high-impact behaviours or lifestyles.

# Transforming Demolition, Building and Construction

**In summary**, this report has identified ways in which demolition, building and construction in Canada are adversely affecting our ability to reduce our GHG emissions and retain the social, cultural, economic and environmental advantages of smaller, older, neighbourhoods. The Halifax-based case-study shows that the construction of two adjacent proposed high-rise developments will emit 31,000 tonnes of CO<sub>2</sub>e. Together the projects will require the demolition of 12 to 14 historic buildings. These contain approximately 110 residential and commercial units with a total area of 10,300m<sup>2</sup>. This is equal to destroying three four-storey buildings of 3,135 m<sup>2</sup> or a single mid-rise 12-storey building. The embodied carbon cost of replacing this area will be an unnecessary 2,214 tonnes of global warming emissions.

**A smaller-scale in-fill building** proposed by the citizens' group DOH would retain all but one of the existing buildings. In addition to the remaining 80 units, this option would add approximately 550 to 570 new units for a total of between 625 to 645. At 51,000m<sup>2</sup> the DOH proposal has a total embodied carbon impact around 18,000 tonnes of CO<sub>2</sub>e, a 40% lower embodied carbon cost. This would forego an unnecessary expenditure of embodied carbon to replace existing, useable building area.

**With careful planning and design** this mid-rise can achieve further advantages. Using low-to no-carbon construction materials and highest green building standards it could be zero-carbon and energy self-sufficient. Its distinct social, cultural, economic and environmental advantages can address the climate crisis and benefit society. Mid-rise projects have lower capital cost, faster project turnaround, reduced operational cost, better community acceptance, retain small-scale, mixed-used character and reduce displacement.

In conclusion, we have no time to waste on regulating the reduction of demolition and requiring carbon budgets for the buildings and construction industry.

# Some Recommendations:

“The most aspirational designer can be limited by a client with a narrow strategic vision, and the most aspirational client can be limited by design teams unskilled in delivering net zero carbon. Regulation and policy must be implemented quickly so that the minimum standards are set to deliver net zero carbon.<sup>101</sup>”

## Policy

Immediately-

**Policy Recommendation 1:** Recognizing the carbon cost of demolitions, the material waste and the unnecessary penalty to the climate, society and the economy, Halifax, along with all levels of government—municipal, provincial and federal—must immediately prioritize conserving and adapting buildings as a first course of action, and if demolition is an appropriate last resort, re-using materials more effectively.

**Policy Recommendation 2:** Recognizing the carbon cost of large-scale buildings, Halifax and all levels of government must change the rules of development to reduce the impact of the industry by requiring a carbon budget for each development. This must include benchmarks for what is permissible now, with targets and timelines for what will be permitted in subsequent years, so there is a 50% reduction in embodied carbon by 2030.

**Policy Recommendation 3:** Recognizing the limits of growth and the impact of climate change, waste and over-consumption on Earth along with its incumbent inequity, all levels of government must change the policies and practices that perpetuate growth in material consumption and production in order to balance social, environmental and economic measures and create a more equitable human existence. In Nova Scotia this is a focus area of the goals and initiatives established under the Sustainable Development Goals Act that must not continue to be ignored.

## Policy Guidance

- Introduce a provincial moratorium on demolitions.
- Create a conceptual path forward to regulate embodied and operational carbon emissions in the building and construction industry using a Life Cycle Assessment (LCA) methodology. Include legally-binding targets, year-by-year timelines, policies and accountability measures with audits to achieve net-zero embodied and operational carbon GHG emissions.
- Develop a framework for an environmental full-cost accounting assessment of the demolition, construction, building sector such as GPI Atlantic, to include environmental, social and economic measures.
- Maximize collaboration to ensure that all involved parties are consulted, but that decisions are independent from industry or government, and the focus and outcome remains on GHG emissions reductions, not on what is politically palatable. This is transforming a culture.
- Develop and enforce scientifically-based, consistent standards on what actually constitutes net zero.
- Adopt zoning practices, including height restrictions that encourage land use patterns that control/reduce/eliminate demolition and increase distributed density.
- Promote less carbon/resource intensive, secondary or recycled materials (reduce/avoid aluminum, cement, petrochemical-based materials and steel).
- Set building codes, planning and specification requirements, rules, regulations, taxes, etc. to create incentives for reducing carbon intensity, with sectoral targets for building and construction that include interim two-year targets enroute to final goal of 50% GHG reduction by 2030—treat carbon like we did cancer-causing cigarettes.
- Set requirements for product labelling for building and construction materials.
- Set requirements for the building and construction industry to measure, report and reduce embodied carbon emissions beginning 2022 for building permitting—this is needed to identify opportunities for reducing GHG emissions in the initial phase, develop capacity and assist future policy development and standardization.
- Set strict absolute limits on embodied carbon emissions for all developments by 2024.
- Set real, legally-binding government targets for net-zero GHG emissions reduction in building and construction sector by 2030, with annual reporting and audits on progress.
- Create material recovery standards for all building demolitions.
- Adopt policies requiring commercial and multifamily building owners to publicly report energy-consumption data.

## Building Codes and Permitting

- Make stringent life cycle assessment mandatory prior to issuing building or demolition permits with the intent to disincentivize demolitions.
- Design building codes to transform the building sector, not for minimum standards, that is to mitigate emissions, increase resiliency and durability.
- Require carbon budgets for all renovation or new construction permits at the application stage that includes embodied carbon and operational carbon accounting and targets whole life net-zero carbon.

- Set carbon caps for building archetypes that incentivize decarbonization through performance ratings.
- Require material and product resources for renovation or new construction to measure and declare carbon emissions.
- Set low-carbon compliance requirements for materials.
- Pioneer new energy code based on flexibility and measurement for existing buildings, i.e. incorporate flexibility so deep retrofit requirements can be tailored to building type.
- Evaluate building energy performance certification programmes from the perspective of carbon lock-in potential.
- Harmonize building code requirements with GHG emissions reduction objectives (reduced parkade requirements, low-carbon materials use, accommodation for renovation or adaptive re-use).

### **Trades**

- Demolitions to be conducted by licensed tradespersons so that dismantlement maximizes materials reuse.
- Best practice targets for embodied carbon stipulate that the building is made from re-used materials and can be disassembled at end of life for re-use, re-cycling or re-purposing.
- Standardize technical data (e.g. on construction materials, window retrofit vs. replacement, testing & certification, etc.)
- Standardize, support and invest in skills and educational training of industry players in netzero carbon, high performance building design and construction (e.g. architects, designers, project managers, engineers, tradespeople, construction workers, building inspectors, academic and trade school instructors) with requirements for regular training session updates.

### **Incentives**

- Set a penalty schedule for demolition based on the total area to be demolished.
- Set costs higher for carbon intensive developments (e.g. development cost surcharges, property tax) and incentivize low- or no- or carbon draw-down projects with low environmental impact (e.g. reduced development cost surcharges, Development Permit Area guidelines, expedited approvals, tax exemption bylaws, fee rebates, innovative financing, building labelling, etc.).
- Work with investment institutions, real estate agents and public to identify risks associated with carbon-intensive developments and make climate change a key priority in financial decision-making to get to a net-zero carbon economy.
- Create financial incentives for carbon neutral or carbon draw-down building retrofits and additions that prioritize those citizens with the greatest need.
- Set a target to upgrade at least 5% of the building stock to zero- or near-zero emissions structures each year.
- Develop comprehensive building-by-building performance data to support tracking and recording a building's energy performance over time, and identify opportunities for operational efficiency improvements and retrofit projects, and to inform policies, programmes, incentives and investment.

# Conclusion— Limits to Growth Turns Fifty

We're fast approaching the 50th anniversary of the 1972 publication of *Limits to Growth*<sup>102</sup> where a team of MIT scientific researchers and modelers warned of the outcome of unfettered human demand on Earth's resources. The treatise triggered discussion and criticism even though it offered hope by acknowledging that human ability to curb consumption and production is effectively a choice, and that a balance between ecological and economic stability can be achieved and result in a more satisfying human existence.

In a re-visit to *The Limits to Growth: the 30 Year Global Update*<sup>103</sup> the warning was starker and climate change and other resource uses and pollutants acknowledged as stretching past Earth's capacity. But again, it offered hope for reducing this trend by changing policies and practices that perpetuate growth in material consumption and in population; by more efficient use of materials and energy; and, by balancing sufficiency, equity, and quality of life rather than quantity of output.<sup>104</sup> It outlined choices that could be opportunities.

**Now let the creativity and metamorphosis begin.**